



Coach's Manual

Entry Level

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FOREWORD from the PRESIDENT of WORLD ARCHERY

Dear Friends,

It is a pleasure for me as President of World Archery to introduce the revised Archery Coaching Manual level 1. The first edition was used worldwide and we hope that this 2nd edition will be used even more.

This revision was made possible by the work of many coaches worldwide but especially the hard work of those who have their picture on the page dedicated to the contributors. Thank you so much to them!

This manual is an important tool for coaches and will assist coaches in welcoming the first level of athletes. It is critical for a sports organisation to provide a high quality introduction to beginners, since a good first impression goes a long way towards creating a lifelong athlete.

Our sport is growing and we need many more quality coaches. We are convinced that this manual will help to achieve this increase in level.

Yours sincerely,



Prof. Dr. Ugur ERDENER
World Archery President

FOREWORD from the CHAIRMAN of the WORLD ARCHERY COACHES COMMITTEE

This Entry Level (World Archery level 1) coaching manual is the culmination of many thoughts and documents provided by many top coaches throughout the Archery Fraternity. These coaches have dedicated many hours of their time putting down on paper their experiences and coaching knowledge that they wish to share with all coaches around the world. These documents have been collated into this one document by a small number of reviewers who again have given their time so willingly and it has been a pleasure to be a small part of the team.

There are many types of book that can give much pleasure, such as mystery books and romantic books etcetera. I hope that this book will give as much pleasure and be seen as a reference book to be read and referred to throughout each coach's career. There are many ways to teach and coach new archers. This manual shows a sound basic method which has been tried and tested over many years in many countries. When the archers have reached a certain level or the coach needs to increase their knowledge then referring to the Intermediate Level (World Archery Level 2) manual would be an option.

Technical developments are continually advancing the progress of archery. This, along with new developments in shooting techniques, will bring new and advanced horizons in our sport. With these advancements I envisage new goals being achieved which in itself will bring greater heights of excitement and satisfaction. With this greater enjoyment I can see our ancient sport growing into a major sporting activity.

Other areas in this manual will show the names of the contributors to this important Entry Level Coaching Manual but I would like to add my thanks to everyone who helped to bring this manual to fruition, Thank You.



Ken BEARMAN
Chairman – World Archery Coaches Committee

FOREWORD from the DIRECTOR of the WORLD ARCHERY DEVELOPMENT and EDUCATION DEPARTMENT

Dear Readers,

First of all, thank you for your interest in archery coaching.

Congratulations to everyone who is already a level 1 archery coach and wishes to update their knowledge and skills. Thank you for serving the World Archery Community. Best wishes to those of you who are starting or considering starting to teach our wonderful sport to novices. A fantastic experience is ahead of you.

Whatever your teaching or coaching profile is, I hope that you will enjoy this revised manual that includes many new and useful coaching tips. As for the first edition, we* tried, as much as we could, to suggest how to have a practical approach in coaching novice archers. The first edition has been translated into several languages and introduced into the National Coaching Certification Programme in many countries. This second edition should receive a similar or better response from the archery world. The most important thing is that it helps you in your endeavours to coach beginners. As good as this manual may be there are other methods, ways, processes, tips, exercises, concepts... that are effectively used with beginning archers. If you have any special techniques that you find successful we would appreciate it if you would share them with the World Archery community; simply by contacting the World Archery office.

** To know who the persons behind the "we" are, see the chapter "Thanks to the Contributors".*

It is much appreciated that the contributors have shared their experience and knowledge with us to help produce this manual. Thank you so much to each and every one!

I wish you as much pleasure in reading the contents of this revised version as we experienced while writing it down.



Pascal COLMAIRE
World Archery Director of Development and Education

THANKS to the CONTRIBUTORS

What could be nobler in the world of sports coaching than to share know-how?

The World Archery family wishes to express its sincere gratitude to the following people, in alphabetical order:



BEARMAN Ken (GBR)
Chairman of the World Archery Coaches Committee

Ken contributed to many parts of the revision tasks including illustrations, wording and spell check of the entire manual.



COLMAIRE Pascal (FRA-CAN)
World Archery Development and Education Director

Pascal is a former elite archer (European and World Champion). He was the key coordinator and driving force behind the revision process, bringing many new contents into this second edition of the WA level 1 Coaching Manual. This physical education teacher was involved in the

revision of every chapter and added several new sections, drawing upon his 41 years of archery coaching, including 35 as professional coach in three countries (two continents). His 37 years of experience in archery coaching education were very helpful during the revision process.



DILLON Bruce (AUS)
Regional Coach Archery Australia

Since commencing coaching archery in 1979 Bruce has gained experience by coaching archers from beginners to international level. The experience gained in understanding and solving problems encountered by archers has been used by Bruce in the revision of the chapter "Common Problems".



Thank you also to the French Archery Federation "Federation Française de Tir à l'Arc" for allowing the use of some pictures in the Physical Developments.



FINARDI Roberto (ITA)

Roberto contributed to the "Physical Developments" chapter. This expert in physical education and preparation is the author of many publications about the theory and methodology of training. Since 2007 Roberto has been the physical trainer of the Italian National Archery Team (Recurve Bow).



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Joy was contracted to edit this revision. She is a registered nurse and holds a Bachelor's of Science in Psychology. Joy is a former member of the Philippine Women's Archery Team and is currently a WA Level 1 Coach Trainer Candidate.



Hugh MacDonald
Canadian National Recurve Team Archer

Hugh is a currently competing recurve archer who has represented Canada at events up to and including the Outdoor World Archery Championship level. He mainly provided text-editing and formatting suggestions for the manual.



ODDO Nino (ITA)

Nino was a Member of the World Archery Coaches Committee when the revision process began. His primary contributions were to the preparation, editing and translation of the "Physical Developments" chapter



PODRZAJ Marjan (SLO)

Marjan is a co-author of the new chapter "Starting With a Traditional Bow". He has experience in various sports. In archery he had/has many positions: coach, competitor, equipment developer, officer, organizer and writer. Since 1978 he has been competing as national team member in more than 50 European and World archery championships. From which he took 3 gold, 2 silver and 4 bronze medals in Recurve, Bare-bow and Compound.



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Urte is a co-author of the new chapter "Starting With a Traditional Bow" and undertook the revision of the "Games" chapter. She is an experienced international traditional archer, national team coach and coach educator. Since 2012 she has been WA Coach Trainer.



PREISSER Josef A (RSA)

Chairman of the Coaches Committee of the Federation of African Archery

Josef contributed to the revision of chapters 7 and 10. He developed and introduced the coaching qualification programme, levels I-III, for the Federation of African Archery including clinics in both theory and practice plus final exams for FAA coach accreditation.



RHODES Sheri (USA)

Sheri contributed to the revision of the chapter "Activity Description and Archer's Skill". She has been a teacher and an elite level archery coach for more than 40 years.

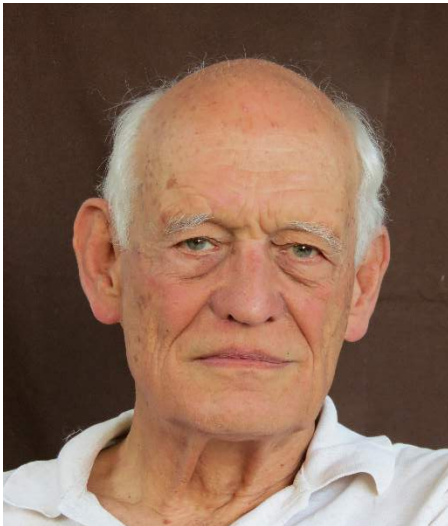


VERDE Andrés F. (ARG)

Andrés is the co-Author of the new chapter "Starting With a Traditional Bow". He is a physical therapist dedicated to traditional archery since 1993 and has been a coach since 1998.

Have also contributed to chapter 8 "Starting with a traditional bow": Dietmar VORDEREGGER (AUS), Franci ROŽMANEC (SLO), Stig NIELSEN (DEN) and Jon JAGD (DEN)

Again thank you very much to all of you!



VAN WARMELO Konrad - RSA

Konrad, a World Archery International Judge Emeritus, contributed to the chapter "Teaching Aids and Tips". He also worked on the revision and editing of the other chapters.

INTRODUCTION

This new chapter "Introduction" will give you a general picture of the coaching philosophy applied to the various teaching conditions. This philosophy will be the connecting thread between the different technical and demonstrative chapters of the manual.

Manual Objective

Some general preliminary comments are necessary to understand the main considerations in the coaching of our sport. People using this manual should consider, first of all, that this is not a technical publication intended to improve the shooting level of the readers, but a document written with the purpose of explaining the teaching process of archery and the fundamentals of coaching within the sport of archery. There is a clear difference between these two objectives which will become evident later in this manual.

In comparison to many available publications that explain how to properly handle the bow & arrows, the objective of this manual is to provide suggestions on how to teach novice archers, that means how to transfer our know-how to other persons.

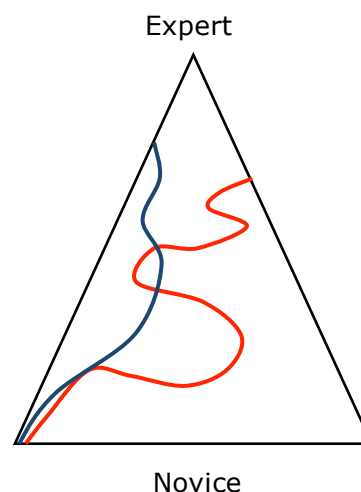
It has been found that people who understand the technical fundamentals and can demonstrate them correctly are usually good coaches. Therefore, in this manual, the priority has been on good teaching with a strong emphasis on the visualization and demonstration of the different technical steps.

The Archery Coach Candidate

Even in countries that have only recently become involved in archery, technical information has been widely disseminated through several types of media, including the WORLD ARCHERY website, the Internet, or specific archery publications. This dissemination of information could incite and help some archers to become archery coaches. It may even inspire them to participate in a level 1 coaching course. However a minimum level of expertise (practical experience, technical competencies, competition background...) is a considerable bonus in guiding the development of the novices. The archery expertise of the

coach candidates and how it can contribute to their becoming efficient coaches is discussed below.

Each former archer has reached a certain level of proficiency through a progression path. (The red line in the illustration below.)



Those who have subsequently become coaches, wish their students to both achieve a better level than they themselves did and to do so through a straighter path. (The blue line illustrated above.)

The Novice archer

A "novice" is defined as a person who has little or no background in our sport. The level 1 archery coach could possibly encounter persons that already have had some experience in archery (even if only from Summer Camps). This experience, which is usually technically incomplete, could be a bonus but sometimes is not, as possible incorrect habits and techniques would have to be replaced by correct ones.

Archery is accessible to a large range of ages, to both genders without any barrier, and also to most people who have some physical or mental impairment. The level 1 coach should be able to properly introduce any of these profiles of novice to archery.

National Coaching Education Program

The levels

Each country sets the structure and coaching levels of their national system to suit their own needs and may cover from two to five levels.

Each level should have a justified existence with a specific definition of the different interactions between the archery/training fundamentals, the coach and the level/goal of the archer.

The WORLD ARCHERY Coaching Committee considers the coach's role as helping in the archer's development over three steps; hence three coaching levels have been set.

Level 1

This coaching level has been designed according to the usual needs of novices. Since we do not know what type of bow or which discipline the novices will choose in the future, they need to learn the common basics of archery. This allows them to be able to adapt easily to, and practice, any type of archery in the future. This means – any type of bow and in any discipline. Hence the entry level archery coach has to be trained in:

- teaching
 - safety
 - equipment selection, setting and maintenance
 - common technical bases of archery
 - session preparation and management
 - entry level program preparation and management
 - connected developments
 - serving:
 - any novice: young, teenager, adult, elder, disabled
 - an individual novice as well as to a group of novices
 - in various environments: in an archery club, at school, in a community centre, in a rehabilitation centre, in a resort centre...
- This list is not exhaustive.

It is also important to remember that at the novice level, the coach can, and will, meet different kinds of potential archers, defining the two main categories of students:

- 1) People approaching archery mainly for fun or as a recreational/social pastime.
- 2) People approaching archery as a sporting discipline.

Level 2

This coaching level has been designed according to the usual needs of the archers who have completed the level one program and who have decided which bow and optionally which archery discipline they will shoot. Hence the coach's task is to improve a person's archery skills in one or two archery "specialities", which would be in a combination of Bow divisions and Disciplines. Level 2 mainly provides technical knowledge.

At this intermediate level, it is important to realise that some archers will turn to recreational archery and some to competitive shooting.

Level 3

At this level coaches are responsible for coaching/managing archers who have decided to specialize in one or two archery disciplines, who are dedicated and are striving to perform to the best of their ability, many of whom will have the ambition of representing their country at the international level. For some strong clubs and/or Provincial archery associations it could be at the provincial and/or National levels. Some of these archers will progress into professional/semi-professional training, i.e. more than one session per day, but most will be dedicated amateurs training up to 5 or 6 times a week. Whatever their status the archers at this level need some coaching assistance in several areas such as:

- Training plan
- Connected developments
- Preparation of important events
- Fine tuning of the equipment

This list is not exhaustive

This manual will only refer to Level 1

Efficiency of the program and the trained coach

The content of this manual strives to suggest how to improve the coaching skills of those in charge of novice archers. Coach efficiency can be achieved through:

- A good initial coaching education consisting mostly of a coaching course alternating between theory and practical education. It is usually conducted over several (approximately 4) week-ends or several days in a row (at least 7), with an evaluation of each candidate at the end of the course.
- Continuing education which can be proposed by an archery organization, an organization of generic sport, etc. but must also be the responsibility of every archery coach.

This second pillar of coaching education is particularly important since we are referring to a very long lasting process.

A 2007 survey showed that an average of 7 years was required to bring a novice to a world elite level (for those who were "lucky enough" to reach that level). For a high level archery coach, the development period is even longer. Hence becoming certified after a week of training does not mean that now this person is instantly a good archery coach. It just acknowledges the good disposition of the new trainer to become a good archery coach, but there is still a long road ahead.

What is a good/efficient coach?

Of course each level has its specific goals as outlined above. For the level 1 archery coach there are some priorities such as safe practice, social integration, basic archery skills, etc. Beyond that, one can generalize that a good/efficient coach helps their student(s) progress; not only with sport specific performance, but also with themselves and their personality.

Also, we should keep in mind that one of the most important objectives for an archery club is to get archers who progress to the regional archery elite. The same applies to the Provincial/State Archery Association for the national level and to the National Archery Federation for the international level.

"Being a good coach is not enough to get good results"

Experience shows that there are several "good" coaches who are not "efficient", since they do not produce top archers. While some "average" level coaches get excellent results. These two contradictory situations seem to be due to the sporting/working environment. Thus we have written down below the usual components of an efficient working environment for an archery coach.

CRITERIA FOR EFFICIENCY IN THE SPORT OF ARCHERY:

- 1) Efficient coaching assistance.
- 2) High level training services and access.
- 3) Broad network of competitions.
- 4) Good administration.
- 5) Contracts of objectives/services between the club, the archer and the coach.

We strongly invite any archery coach, including level 1 coaches (even though this matter is

more appropriate for level 2 and 3 coaches) to also contribute in improving these criteria in addition to their own coaching/technical skills. See below some details on these criteria.

Criteria 1: Efficient Coaching Assistance.

- A good initial Coaching Certification Program;
- A strong continuing Coaching Education Program;
- Available access to professional coaches;
- Coaching assistance commensurate with the needs of the archers at their various development steps;

This list is not exhaustive

Criteria 2: High level Training services and access.

Among others:

- Good archery facilities and equipment;
- Accessible archery facilities throughout the year;
- Adapted to the schedule and commitments of work/school;
- Generic sport facilities such as gymnasium, strengthening room, swimming pool, etc.;
- Support staff in generic sport development: strengthening, psychology, medical assistance, etc.;

Criteria 3: Broad Network of competitions.

- Tournaments of various competitive levels to fit the archer's current competitive level;
- Tournaments of different organizational standards to prepare the archers for any competition level;
- Access to many tournaments, to allow personalized schedule of competitions;
- Skilled Judges;
- Fair (clean) competition;

Among other things.

Criteria 4: Good Administration.

In any organization, there is no lasting efficiency without a good administrative management.

- Fair and understandable decision-making processes;
- Good communication at all levels;
- Transparency in all activities;
- Budget management skills;

This list is not exhaustive

Criteria 5: Contracts of Objectives & Services.

Contracts are generally unnecessary at the novice level. Once the athlete has committed to a path of excellence, a contract can define the goals and conditions of partnership between the Athlete, Association/Federation, Coach, etc. This document outlines what happens in the case of the achievement of failure of prepared objectives, among other things.

Your time and energy to contribute in improving the above criteria of an efficient working environment for an archery coach, will pay back.

We would like to encourage all coaches to read this manual and to use it as a main tool in their coaching activities.

Enjoy your reading!

TERMINOLOGY / GLOSSARY

Actual draw length: The personal draw length of the archer measured at full draw, from the bottom of the slot in the nock to the pivot point of the grip plus 1 3/4 inch (45mm), which is the back edge (far side of the bow) on most bows.

Actual arrow length: The personal arrow length of the archer, measured from the bottom slot of the nock to the end of the shaft (this measurement does not include the point/pile); with this end of the shaft at 1 inch (25mm) in front of the vertical passing through the deepest point of the bow grip or the arrow rest.

Actual draw weight: The energy required to draw the bow to the actual draw length (commonly measured in pounds).

Anchor point: A location on the archer's face to where the string hand comes to rest at full draw to give consistency to shooting. Also known as "reference point" or "facial marks".

Apache method: Aiming method along the arrow shaft

Arbalest: (1) A mechanically hand wound crossbow. (2) A person who shoots a crossbow.

Archer: A person who shoots a bow and arrow.

Archer's paradox: The initial stages of flight in which the arrow flexes to clear the bow handle.

Arm guard: A protective shield, usually of leather or plastic, worn on the inner side of the forearm of the bow arm. It protects the arm from being hit by the bow string. Many different designs and types of arm guard can be found

Arrow: A projectile shot from a bow.

Arrow plate: An attachment on the side of the bow to give single point contact to the arrow and provide smooth arrow passage. Not in common use today.

Arrow rest: A device on the bow to provide a contact point; also a resting point, or shelf to support the arrow.

Arrow shelf: A horizontal projection from the bow window upon which the arrow can lie in the absence of an arrow rest.

Arrow straightener: A mechanical device used to detect and eliminate bends in aluminium arrows.

Back (of bow): The side of the bow facing away from the archer, when holding up the bow.

Bare shaft: An arrow shaft without fletching.

Bare-bow: A class of shooting where no sighting marks, protruding stabilizers or other accessories are permitted.

Barrelled arrow: An arrow that has a greater cross section in the middle and tapers down at both ends.

Basic technique: The fundamental technique of shooting a bow and arrow. Usually the style taught during the introduction to archery, forming the basis for consistent shooting.

Belly (of bow): The surface of the bow facing the archer during shooting. Also known as the "face" of the bow.

Black: The fourth scoring colour on the Indoor/Outdoor target face, when counting from the centre of the target.

Blue: The third scoring colour on the Indoor/Outdoor target face, when counting from the centre of the target.

Blunt: An arrow point that is not tapered, generally used for Popinjay or shooting small game.

Bobtail arrow: An arrow that has the greatest cross section at the front of the arrow and tapers down toward the back.

Body alignment: The relationship of the archer's legs, hips, trunk, and shoulders while shooting. Body alignment has to be lined consistently towards the target.

Boss: An alternative name for "Butt".

Bouncer: An arrow that hits and bounces away from the target instead of remaining in the buttress. Also known as a "bounce-out" or "rebound".

Bow arm: The arm that supports the bow.

Bow efficiency: The ratio of kinetic energy received by the arrow to that stored by the bow.

Bow hand: The hand that supports the bow.

Bolt: A projectile shot from a crossbow.

Bow scale: A device that measures the draw weight of a bow.

Bow sight: A device, which can be of several different designs, attached to the bow and which assists the archer in aiming.

Bow sling: A strap attached to the bow through which the archer slips the bow hand, thereby preventing the bow from being dropped upon release.

Bow square: A measuring device that can be temporarily attached to the bowstring, which lies on the arrow rest, to measure various aspects of the bow/string relationship: bracing height, nocking point location, tiller, peep/kisser

location, button height, etc. Also known as string gauge, bow gauge and fistmele gauge.

Bow string: The string for a bow usually made of synthetic material with two looped ends.

Bow stringer: A device which an archer uses to assist in stringing the bow.

Bow window: The cut-out section on the arrow side of the bow to allow the arrow to pass through or near the centre line of the bow.

Bow: A long object with a string attached from one end to the other holding the object bent and under tension and which projects an arrow upon drawing and release.

Bowyer: A person who makes or repairs bows.

Braced bow: A bow that has had a string fitted into position ready for shooting.

Bracer: An alternative name for "arm guard".

Bracing height: The distance between the string and pressure point, usually the throat of the handle or the arrow rest (or the place/point indicated by the manufacturer) when the bow is strung.

Broad-head: A multi-edged sharp arrow point used in hunting live game.

Buffer lane: Strip of land beside the field of play to keep spectators at a safe distance.

Bull's-eye: The area on the target faces with the highest scoring value. A term not often used in target archery, see "gold".

Butt: A device onto which the target face is fixed and which stops the arrow. Also known as "boss"

Button: See Pressure button.

Cam: wheel-like device mounted on the limb tips of a compound bow, and operates to decrease the amount of weight held on the bow string at full draw.

Cant: To tilt the bow left or right while shooting.

Cast: The ability of the bow to propel an arrow and the degree of efficiency with which this is achieved. Denotes the speed of the limbs in discharging the arrow and is used as a term to refer to the parabola made by the arrow in flight.

Centre serving: The serving on the central area of the bow string which protects the bow string from wear.

Centre shot: A bow which is designed to allow the arrow to take a position central to, or on the mid-line, of the limbs. Centre shot is also used to refer to the correct alignment of the arrow

Chest guard: A protective device that covers the side of the archer's chest that is nearest to the bow which keeps clothes out of the path of the string during shooting.

Clicker (draw length check): A device attached to the bow which gives an audible indication when the arrow has been drawn to the desired predetermined draw length.

Closed stance: A shooting stance where the foot furthest away from the target is behind the line drawn from the centre of the target to the foot closest to the target, or the line of the shoulders is more than 180 degrees taking a line from the shooting position to the centre of the target. A clockwise turn of the feet position for a right handed archer, and anti-clockwise for a left handed archer.

Coach: A tutor or teacher of sporting activities.

Cock fletching: The fletching on the arrow that identifies a certain fletching. This fletching is sometimes a different colour from the other two fletchings.

With different types of bow and different bow set-ups the vane could face upward, downward or at right angles to the string. Also known as the cock feather or index vane.

Composite bow: A bow that consists of different laminated parts or materials.

Compound Bow: A bow where the string is attached to pulleys, wheels, or cams to increase the kinetic energy when an arrow is released and to decrease the bow weight held at full draw.

Course: The range on which archery rounds are shot.

Creep: Letting the drawing hand edge forward before releasing, thereby reducing the drawing length.

Cresting: Painted rings on the arrow just in front of the fletching for decoration or identification. Cresting is optional.

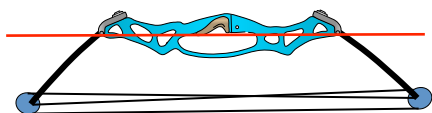
Cross hair: A sight which has two fine lines that cross at right angles; the intersection of the lines is used for lining up on the given aiming point.

Crossbow: A bow that is fitted horizontally on to a stock, and is shot in a fashion similar to a rifle.



I would like to enter the Crossbow section.

Deflexed riser: A riser with ends slightly bent towards the archer, built-in during construction, for smoother draw.



Director of shooting: The official in charge during a tournament.

Dominant eye: The eye which is dominant while aiming with both eyes open and is preferentially used by the archer. This is physiologically determined.

Draw: The act of pulling back the bow string thus storing energy in the bow.

Draw (Flemish): The use of only the index and second fingers to draw the bow, the index finger above the arrow and the other beneath the arrow.

Draw: The action of opening the bow.

Draw-force curve: The curve as charted with the increase of weight during the draw being one axis, and the measured draw length being the other axis.

Drift: Left or right movement of an arrow during flight caused by the wind.

Drop away rest: An arrow rest/launcher that drops away, clearing the path for the arrow as the bow string is released. (Mainly used on compound bows).

Dry-fire: release of the string without the normal discharge of the arrow.

Eccentric pulley or wheel: A cam like wheel mounted on the limb tips of a compound bow, used to decrease the amount of weight held on the bow string at full draw.

End: A specific number of arrows shot before the

archers go to the target to score and collect their arrows. Usually three or six arrows per end.

Facial Marks: See Anchor point.

Fadeout: The point where the non-working part of the limb connects to the riser fades out to the working part of the limb.

Field Archery: A type of archery round shot outdoors in an undulating wooded area with targets of varying sizes and at varying distances. The archers walk from target to target.

Field Captain: A person controlling the shooting along all or part of the shooting line, and who is responsible to the judge

Field point: An arrow point that is usually heavier than a target point and with the diameter of the front end smaller than the arrow shaft.

Finger tab: A piece of leather worn on the drawing hand to protect the fingers and give a smoother release to the string.

Finger sling: A piece of leather, plastic or rope looped at each end through which the archer slips the thumb and finger after taking hold of the bow, permitting a loose grip on the bow. It also prevents the bow from being dropped upon release.

Fishtailing: A horizontal left/right motion of the nock of an arrow during its flight to the target.

Fistmele: The distance between the bow grip and string when the bow is strung as measured by the closed hand with the thumb extended. The fistmele is no longer used in modern target archery and has been superseded by the more accurate bow square.

Flemish twist: A method of assembling a bow string end loops by twisting the material similarly to that of making a rope. It eliminates the need for serving the string loops.

Fletching jig: A mechanical device that is used for accurate and consistent placement of the vanes on an arrow for gluing.

Fletching: (1) The feathers or plastic vanes fitted to the arrow. (2) The process of attaching fletch to an arrow shaft.

Flight archery: Shooting for maximum distance for the type and weight of bow being used.

Flinch: To move either the bow or release arm just prior to the release, usually caused by anticipating the clicker or fear of hitting the arm. A flinch includes any twitch preceding release.

Follow through: Continuing all activities produced during the full draw (visual, physical, mental and respiratory) during and after the shot. Very often this term is only applied to the physical activity of the upper limbs.

Foot markers: Small objects placed in the

ground to mark the place where the individual places the feet to assist with consistency of stance.

Footing: A hardwood section that is spliced onto the front of a wooden arrow shaft to give extra strength and durability.

Freestyle: An old definition of a shooting class where the bow has a single string and the bow is held with one hand and the string is drawn and released with the fingers of the other hand.

Freeze: A shooting flaw where the archer aims outside of the gold (bull's eye) and cannot move the sight aperture into the centre. Also, an inability to release an arrow. A psychological shooting problem.

Full draw: The position reached when the string has been pulled back to the anchor point (facial reference point) prior to the release.

Gold: The central scoring colour of the Indoor/Outdoor target face.

Grain: A small measure of weight used for arrow components (1 gram = 15.432 358 353 grains).

Ground quiver: An arrow holder that sits on or sticks into the ground; may also hold a bow.

Group: The pattern of an archer's arrows as they appear on the target.

Handle: The centre section of a bow also called the "riser".

Hanger: An arrow that does not penetrate the target fully but hangs down the face.

Heeling (the bow): A term used when the archer puts most of the pressure on the lower part of the palm (with the heel of the bow hand) when at full draw.

Holding: Maintaining a steady bow position at full draw during aiming.

Horizontal plane: The plane parallel to level ground that travels through the middle of an archer's arrow at full draw

Hen fletching: Fletching other than the index fletch or cock feather. Sometimes called the shaft fletching.

Index fletching (Recurve): The fletching that is fixed to the arrow at right angles to the nock slot (as for archers shooting with fingers).

Index fletching (Compound): The fletching that is fixed to the arrow and is in line with the nock slot (as for archers shooting a compound bow using a release aid and arrow launcher).

Instinctive: A method of shooting in which no sight or other aiming device is used. The archer looks at the target and shoots.

Judge: The person responsible for the application of the rules of shooting during a

tournament.

Kisser button: A small disc, or similar, which is fitted to the bow string and is drawn to the lips, or other reference point before loosing (releasing).

Kyudo: The traditional Japanese form of archery.

Laminate: A bow laminated from two or more kinds of wood or other synthetic materials.

Launcher: An arrow rest where the arrow rests on top of a pronged extension just under and in line with the arrow. Can be spring loaded or drop away.

Left hand archer: An archer who holds the bow in the right hand, draws with the left hand and aims with the left eye.

Left hand bow: A bow with the window cut out on the right hand side when viewed from bow's string side.

Let down: To return the string to the rest position from draw without releasing the bowstring.

Let-off: The weight reduction from the peak weight to the holding weight on a compound bow.

Level: A bubble device or spirit level attached to the sight to help the archer maintain a vertical bow position. Very common on compound bows, but not permitted for competition on Recurve bows.

Limbs: The parts of a bow that bend when the bow is drawn and give the propelling force to the arrow.

Longbow: A traditional bow popular in England in the middle ages, usually 6 feet or more in length and made of Yew wood or similar.

Loop: The woven or served eyes at the ends of a bow string that fit into the notches at the tip of the limbs when the bow is strung.

Loose: The action of the hand at the point of release. The act of releasing a bow string to shoot the arrow.

Low wrist: A bow hand position where the hand is flat against the bow grip and the pressure during the draw is in line through the forearm bone.

Mark: The precise place the archer is aiming to hit.

Mat: A device onto which the target face is fixed and which stops the arrow.

Mass weight: The weight of any piece of equipment placed on a weighing scale; usually used in reference to the bow. Not to be confused with the "draw weight".

Minnowing: Similar to "fishtailing" but the

movements are less severe but much faster.

Monofilament: A single strand material which is one of the possible materials used for the centre serving on the string.

Nock locator: A locator on the bowstring against which the arrow nock is placed and indicates the nocking point.

Nock: This is a device fitted to the back of the arrow that has groove in it which fits onto the string. Also, it is refers to the grooves at the extreme ends of the limbs in which the loop ends of the bow string are fitted.

Nocking point: The marked position on the bowstring where the arrow nock is placed before drawing and releasing.

Open Stance: A shooting stance where the line of the shoulders is less than 180 degrees taking a line from the shooting position to the centre of the target. An anti-clockwise turn of the feet for a right handed archer & vice versa for a left handed archer.

Over bowed: An archer using a bow that is too strong for them.

Over braced: A bow that has a bracing height greater than the manufacturers' recommendation, or a bow that is fitted with a string too short for optimum and safe performance.

Over draw: A device fitted with an arrow rest that protrudes inside of the bow allowing for shorter arrows to be used. Sometimes used on compound bows.

Overdrawing: To pull the string further back than optimum at full draw and may cause limb failure.

Overdrawing: To pull the string further back than optimum causing the arrow to fall off the arrow rest.

Pass through: An arrow that hits the target but passes right through.

Peak weight: The highest weight achieved during the drawing of a compound bow.

Peeking: A shooting flaw wherein the archer moves the head, or the bow out of the way, at release to watch the flight of the arrow.

Peep-sight: A plastic or metal device attached to the string and has a small hole which the archer looks through to line up the front sight with the target. Also, required to give clarity to a magnifying front sight in compound shooting. Only permitted in the compound bow division.

Perfect end: An end in which all arrows land in the highest scoring zone.

Petticoat: An outer, non-scoring area, on some target faces where the target pins are placed to

hold the face on the target mat. Also known as the "Skirt".

Pile or Pyle. The metal tip attached to the front of the arrow shaft. Also known as the arrow point.

Pinching: Squeezing the arrow nock with the drawing fingers whilst at full draw.

Pin-hole: The exact centre of the gold ring in the target face that is used in competitive events. Also know under various terms such as Bull's-eye, Spider...

Plucking: A shooting flaw in which the string hand is pulled out and away from the face or facial mark (anchor point) at the moment of release.

Point: The metal tip attached to the front of the arrow shaft. Also known as the "Pile".

Point of aim: This is the place or the object at which the archer aims when using the tip of the arrow to aim. This may be above, below or on the target or on the ground, depending on the distance of the target and the cast of the bow.

Popinjay: A type of archery where the targets (representing birds) are placed on a mast. The archers stand under the mast and shoot upwards to knock the "birds" off the perch.

Porpoising: The up and down movement of an arrow in flight, usually caused by a wrongly positioned nocking point.

Powder pouch: A container for talcum or similar powder often used to dry an archer's hands or applied to the finger tab for a smoother release.

Practice bow: A simple bow with a light draw weight, usually used when teaching beginners.

Pressure button: A device that fits to the bow and protrudes just above the arrow rest which can be adjusted to assist in obtaining true arrow flight. Also known as Plunger button, Berger button or Button.

Pressure point: The place on the bow grip where the hand pressure is located when at full draw.

Pull: To remove arrows from the target.

Quiver: A holder for arrows that may be worn by the archer or placed on the ground. This may also be mounted on a hunting bow.

Range: (1) The distance to be shot. (2) The place where shooting takes place.

Rebound: See Bouncer.

Recurve bow: A bow with limb tips that are curved forward, away from the archer.

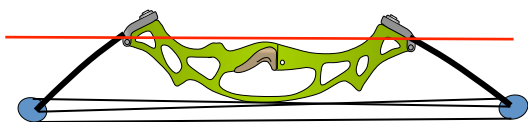


Do you have a Recurve Unlimited Division?

Red: The second scoring colour on the Indoor/Outdoor target face, starting at the centre of the target.

Reference point: see Anchor point

Reflexed: A riser or bow limbs that curve away from the archer (convex).



Release: The act of freeing the bow string from full draw to launch an arrow.

Release aid: A mechanical hand-held device mainly used with compound bows, which attaches to the bowstring and is used to draw and release the string, minimizing the string deflection on release.

Right hand archer: An archer who holds the bow in the left hand, draws with the right hand and aims with the right eye.

Right hand bow: A bow with the window cut out on the left hand side when viewed from the bow's string side.

Riser: The centre section of a bow to which the limbs are attached.

Round: A complete set of ends shot at designated distances and sizes of targets to obtain a standard score.

Self-Arrow: an arrow made from a single piece of wood.

Self-Bow: A bow made from a single piece of wood.

Self-Nock: A groove made in the back of a wooden arrow and reinforced with twine and glue for the purpose of nocking the arrow to the string

Serving tool: A mechanical device to assist in winding serving material onto the bow string.

Serving: Thread wrapped around the bowstring at its centre and on the loops to protect the string and reduce wear.

Shaft fletching: Fletching other than the index fletch. Sometimes called the hen fletching.

Shaft size: An identification code given to a particular arrow size and properties to allow matching a particular arrow with the bow weight in use.

Shaft: The main body of the arrow; an unfletched arrow tube or solid wood dowel.

Shake: A crack running with the grain in a bow stave.

Shooting glove: A partial glove with three fingers to protect the drawing hand fingers and to ensure a smooth release of the bow string. Used mainly by hunters and uncommon in target archery.

Shooting line: A single line marked parallel to the targets from which all archers shoot.

Shooting plane: The plane, perpendicular to the ground, in which a shot arrow flies.

Sight bar: The vertical part of the bow sight to which the aperture assembly is attached.

Sight block: The moveable portion of the bow sight which holds the sight pin.

Sight extension: A bar that allows the bow sight to be extended away from the bow towards the target.

Sight pin: The part of the bow sight that is superimposed on the centre of the target during the act of aiming.

Sight window: The recessed area of the riser just above the grip.

Sight: Any device mounted on the bow that allows the archer to aim directly at the target or mark.

Sighters: Practice arrows shot prior to the commencement of a tournament.

Sipur: An extension which is fitted to a bow to enable a short arrow to be used (usually used in flight shooting and not in target archery).

Skirt: An outer, non-scoring area, on some target faces where the target pins are placed to hold the face on the target mat. Also known as the "Petticoat".

Sling: A strap used by an archer to prevent the bow from being dropped upon release. See also Bow Sling, Finger Sling or Wrist Sling

Snap shooting: Shooting without pausing to aim carefully or shooting before reaching the facial marks or anchor point.

Spectator line: A clearly marked line over which spectators must not pass.

Spine: A measure of the stiffness of arrows. Some manufacturers use different measurements

across the supporting points and different weights to calculate the spine of their own manufactured shafts. Most commonly, however, it is the measured deflection of an arrow shaft established by hanging a specified weight (880 grams) from its centre whilst being supported at both ends across 28".

Springy rest: A small spring with an arrow rest extension and substitutes for a Pressure button.

Stabilizer: A rod and weight assembly mounted on either the face or back of the riser to help eliminate torque of the bow around its axis upon release.

Stacking: A rapid disproportionate increase in draw weight when drawing some (usually older) Recurve bows.

Stance: The physical alignment of the body in relation to the target in preparation for shooting.

Stave: A wood blank that a bow is fashioned from.

Stock: The main part of a crossbow which houses the trigger mechanism and to which the bow prod is fixed.

String alignment: The visual relationship between the bowstring and the bow limbs or sight.

String fingers: The fingers that hold the bowstring when shooting a bow.

String gauge – see bow square/fistmele gauge.

String grip (Mediterranean): The use of the first three fingers to draw the bow, the index finger above the arrow with the other two below the arrow.

String grip (Apache): The use of the first three fingers to draw the bow, with all three fingers below the arrow. Commonly used by beginners to allow aiming along the shaft.

String grip (Mongol): The use of the thumb around the string just below the arrow. The thumb is locked in position by closing the index finger round the end of the thumb. The arrow would be on the same side of the bow as the hand that is drawing the string. This form of the draw is uncommon in modern target archery but is found in several traditional archery disciplines.

String height: See bracing height

String jig: A device on which bow strings are made.

String loop: The part of the string that fits over the nocks at the end of the bow limbs.

String walking: A style of shooting where the archer moves the position of the string fingers on the string to adjust the vertical displacement of the arrow. No bow sight is permitted when this method of shooting is being used.

String: The cord on a bow to which the arrow is nocked, usually made of synthetic material.

Tab: See Finger tab.

Tackle: Archer's equipment.

Take down bow: A bow consisting of a riser and separate limbs that can be assembled for use and disassembled for storage or transport.

Target archery: A competitive round shot at fixed distances in an open field.

Target face: The cloth or paper or cardboard scoring area mounted on the target butt.

Target lane: Accommodation for, at most, three archers to shoot simultaneously from the shooting line at one target butt.

Target panic: The inability to hold the sight on the gold long enough to steady the bow sight and aim before release. Also known as "Gold Shy

Target Stand: A structure which holds the target butt in the designated correct position.

TFC: Torque Flight Compensator; an old adjustable flexible coupling fitted between stabilizer rods and the riser to damp down vibrations.

Thumb ring: A ring that fits onto the thumb with a small raised section that holds the string during the draw. Mainly used in the Eastern and Asian countries in traditional archery.

Tiller (static): The difference in measurements between a given point on the top and bottom bow limbs and the bow string. Most bows now have adjustable limb bolts that assist in adjusting the tiller measurements. Usually 4-9mm more at the top limb measurement is preferred.

Timber hitch: Traditionally the knot which is used to form the second loop on a string which has been manufactured with one loop, such as a longbow string.

Tip: The extreme end of the narrow part of the limbs.

Torque: A rotation of the bow about its axis upon release of the bow string.

Toxophilite: One who enjoys the sport of archery.

Toxophilus: The title of the first book to teach the art of archery, written in 1544 by Roger Ascham who was the archery coach to Queen Elizabeth 1st of England.

Toxophily: The love of the sport of archery

Trajectory: The curved path an arrow follows during its flight to the target.

Tuning: Adjustments made to the bow and arrow set-up, to achieve the truest arrow flight possible.

Under-bowed: An archer shooting a bow that is too weak for the task being undertaken.

Under-draw: An archer who does not draw the bow to its full potential.

Under-strung: A bow with a string too long resulting in a low bracing height and reduced efficiency.

Unit aiming: Maintaining the relationship of the body's shooting line while adjusting the elevation needed from the waist or hips.

Upshot: The final shot in an archery tournament.

Valley: The point of the lowest holding weight reached while drawing a compound bow.

Vane: A feather or plastic fletching fitted to the arrow.

Vertical plane: The plane parallel to the shooting line and perpendicular to the ground that includes the archer's spine.

Waiting line: A line parallel to the shooting line which the archers about to go to the shooting line must not cross until given the signal to do so.

Wall (Back): Limit of drawing of a compound bow beyond which the string cannot easily be pulled.

Wand: A piece of wood, 6 feet long, and 2 inches wide, that is driven vertically into the ground serving as a shooting mark. Used in the traditional ancient event of "splitting the wand", at 100 yards.

Wax (string): Material, traditionally bee's wax used to seal the bow-string preventing excessive moisture being absorbed. It also binds the string fibres together and lubricates the loop ends.

Weight: The force required to draw the bow, measured in pounds to the specified draw length. Not to be confused with the mass of the bow

White: The fifth or outermost scoring colour on the Indoor/Outdoor target face.

Windage: Horizontal correction of the bow-sight adjustment to compensate for wind drift.

Wobble: An erratic motion of an arrow in flight.

WORLD ARCHERY standard arrow: An arrow not exceeding the diameter of 25/64 of an inch (9.4mm) with a specification of the XX75 alloy or its equivalent.

WORLD ARCHERY standard bow: A basic one piece or take down bow with wood and/or glass fibre limbs. It can have a simple sight and a non-adjustable arrow rest. The tab or finger protection must exclude any form of stiffening or

locating platform. The un-braced bow complete with its accessories must be capable of passing through a hole of 12.2cm in diameter.

WORLD ARCHERY: Previously known as Fédération Internationale de Tir à l'Arc. The international governing body of archery.

Wrist sling: A strap, cord or lace that wraps around the archer's wrist and the bow, thereby preventing the bow falling to the ground during release.

Yaw: An arrow's erratic motion during flight.

Yellow: The central scoring colour on the Indoor/Outdoor target face.

CHAPTER 1: ACTIVITY DESCRIPTION and ARCHER'S SKILLS

1.1. The archer's task

1.1.1. Physical task

Archery consists of *shooting arrows with accuracy and consistency to the centre of a target*. To give a simplified physical view, the archer's task is to:

- Repeat an action that will consistently place the arrow in the same spatial position.
- Provide an equal "push" to the arrow shot after shot.



In other words, arrow after arrow, the novice has to:

- Recreate an identical body posture; hence to repeat:
 - All the actions that are required to reach the stage of releasing the string
 - The positioning of all the parts of the body in relation to the target
- Release the string in an identical way.

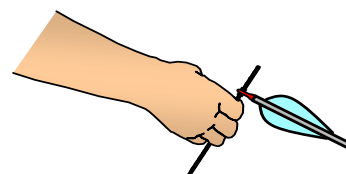
To achieve this twofold process, the novice has to repeat multiple tasks and do them correctly, which will help to make it easier to reproduce them accurately.

To establish correct shooting technique the novice has to consider not only the bow (as the source of the energy that propels the arrow) but also the consistent body alignment and repetition of all the other required actions. Only strict attention to these points will result in consistent arrow flight, and thus accuracy.

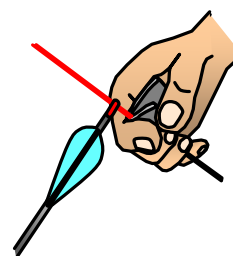
Coaches often begin by helping the novice to develop and repeat a shooting sequence. For this purpose this manual describes the most popular techniques used today, which coaches can use to build an efficient shooting sequence.

In this manual we have mainly used the "shaft aiming" or "straight line aiming" technique. In this method the bow does not have a sight and the archer hooks the string underneath the arrow using the first three fingers of their string hand. But the archer's task and skills are similar whatever the selected aiming technique, including the use of a sight.

Technically the most important aspects to be considered are roughly outlined in the illustrations below:



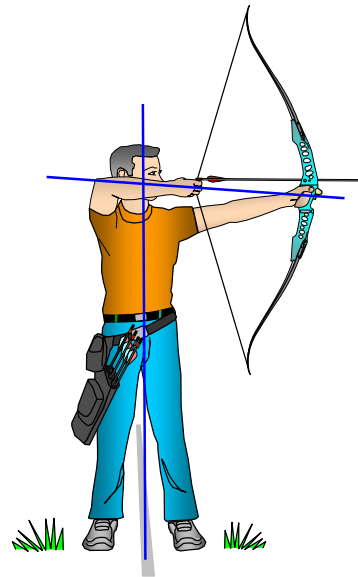
Place the three fingers on the string; also called "hooking". The string fingers should remain stable on the string during the shooting process.



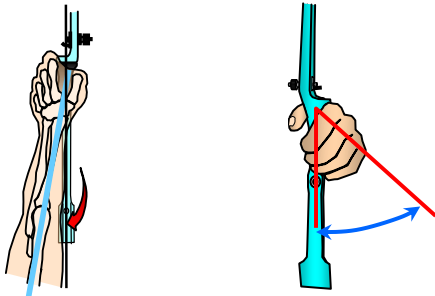
A deep hook, allowing at full draw the string to settle deeply into the joint furthest from the hand, promotes string hand consistency. The palm should be quite relaxed, allowing the back of the hand to be flat (no bent knuckles), the thumb and little finger are to be kept relaxed.



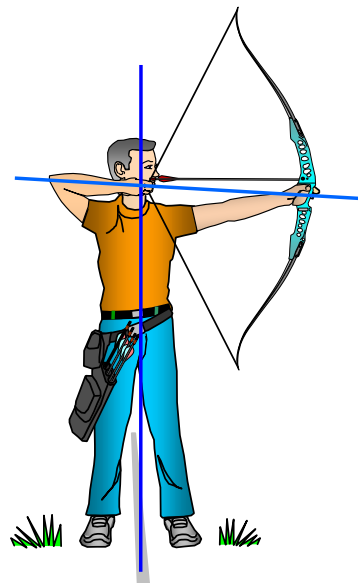
Stand tall with a stable and powerful central body. The body weight should be distributed evenly over the two legs, with the feet approximately shoulder width apart – in a square stance – and with less weight on the heels than on the toes.



The draw is achieved through a balanced action from the bow and string sides, without any change in the head and body position. Only a slight improvement of the alignment of the shoulders with the bow arm takes place.



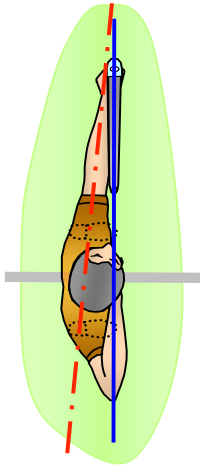
Put the bow hand on the bow grip making sure the knuckles make an approximately 30 to 45 degree angle with the riser and the elbow is rotated away from the string. The bow hand should remain stable on the bow grip during the shooting process. The bow should press along the long bones of the forearm (the forearm axis).



On the pre-draw have the centre line of the body upright, with:

- The shoulders aligned with the bow arm.
- A straight line from the pressure point on the bow grip through the drawing fingers to the tip of the string elbow.

At full-draw the novice should maintain the upright body, with a straight line from the pressure point on the bow grip through the drawing fingers to the tip of the string elbow. The next two illustrations further demonstrate the proper posture.



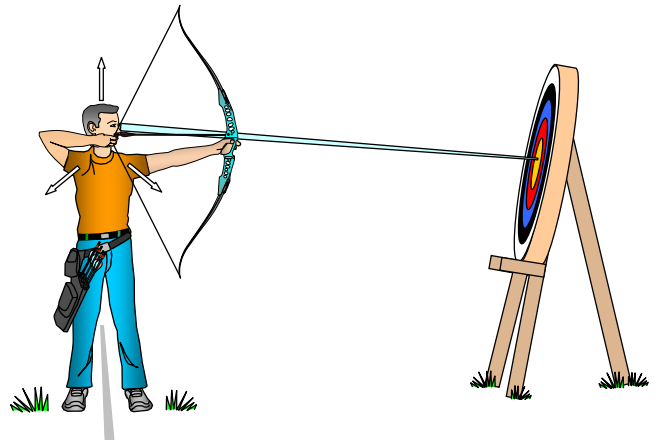
Looking down from above there should be two straight lines from the pressure point on the bow grip through:

- The bow arm and the two shoulders, and
- The bow hand/arrow to the tip of the string elbow.



Looking from behind; the bow should be vertical, with the shoulders and hips in line with the target (square stance). The string elbow is aligned with the string and the centre of the bow.

Note: the lower back is flat.



While aiming the novice must:

- Either resist the spring effect of the bow (without clicker)
- or, increase draw length a little (with clicker)

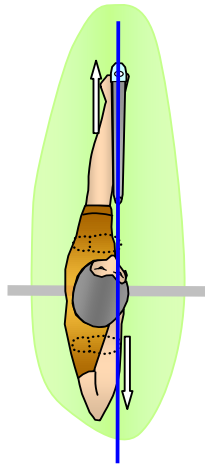
Hence he/she has to provide an extension effort either isometrically (without any move like without a clicker) or concentrically (with move, like with clicker).



During the release the only movements should be:

- The bow arm extending a little toward the target. This extension should be from the follow-through activity of muscles and not be a deliberate push of the arm towards the target
- The string hand moving away from the target, along the arrow axis; hence sliding along the jaw or neck (depending on the sighting technique).

The next illustration further demonstrates proper follow through.



The backward movement of the string arm is the continuation of the muscular activity from the back and posterior part of the string shoulder despite the fact that the string fingers have released the string.

To achieve the above suggested technique the bio-mechanical abilities of the novice must be taken into account. The novice must be coached to the bio-mechanical attributes of their body and not to a technique they cannot physically achieve.

A simplified description, such as the one above, cannot be complete.

The actions repeated by the novice to draw or open their bow, not only during the draw but also during the aiming sequence must be taken into consideration. Therefore, to be more accurate, the novice should repeat the entire shooting process – which encompasses all of the shooting sequence, including all positions and actions executed by the novice when preparing for and accomplishing the shooting routine – in a regular and consistent manner. This routine will be covered in more depth later in this manual.

When we consider what a novice has to do according to a simplified analysis, we can understand that a simple, easily reproducible shooting technique is most effective in giving similar results with each arrow shot. Nevertheless there are several positions and ways to open (draw) the bow and release - in other words "shooting

techniques" - that can be used efficiently in archery. What is important is the quality of the repetition, not necessarily the technical attributes of the novice, providing that the fundamental actions are realized correctly by the archer.

1.1.2. The Coordination of the archer

Accurate aiming does not guarantee a good shot!

A misconception of most novices is "*I have to aim accurately at the centre of the target to get my arrow there*". Any experienced archer, know well that precise aiming cannot guarantee a good score.

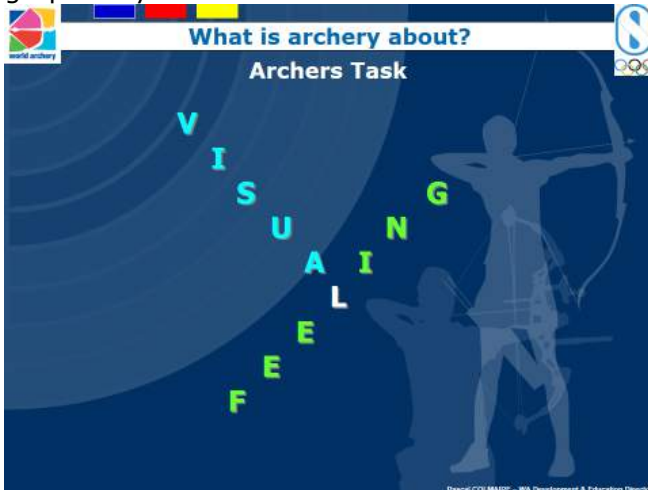
A good shooting action and an efficient shooting sequence involve the interaction of input and impressions from different senses. These sensations and reactions include the visual picture of the sight, the *feel* of the body, the mental state and an awareness of the environment. The novice has to consider all of these factors and should release the arrow only when satisfied that each one has reached an optimal stage. The way a shot feels is important as the novice cannot see himself and has to rely on the feedback from muscles to evaluate each shot.

Each of the above can be considered as:

- Visual picture or references: what the novice can see, such as the sight floating in an acceptable zone over the centre of the target face, the string alignment and the bow held in a vertical position
- Feel / FEELING references: what the novice can feel during the whole shooting sequence (from the start of the draw until after the release), from two sources:
 - Physical: the *sensations related* to movements, body position and stability such as balance, body alignment, head position, positioning on facial marks/anchor point, draw effort with tension and relaxation. This is an important component of good shooting
 - Mental state: confidence, concentration and focus, freedom from distractions, stress level

- Awareness – of the environment, safety, competition timing

The interaction of all of these physical, mental and awareness senses are illustrated graphically below.

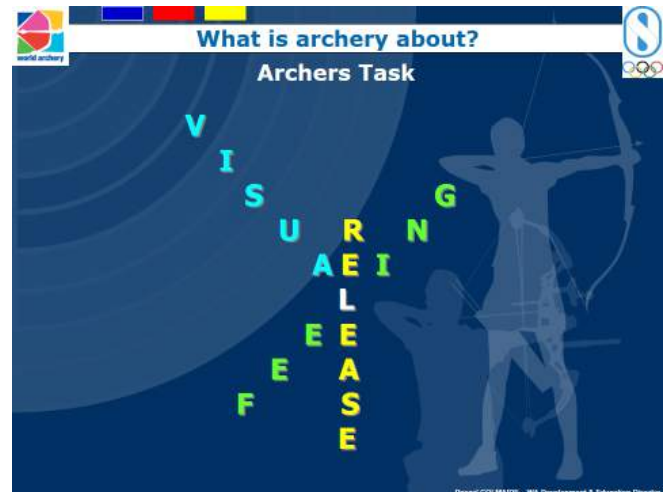


The coach will help the novice to identify, develop and organize all the necessary feelings and all types of sensations: *joints and body position, relaxation level, body balance, stress level and confidence level, etcetera.*

The visual picture and visual awareness of the environment will interact with the physical and mental feel of the archer's body.

It is important to start coaching the novice toward the development and enhancement of the body and joint positions, body balance, and the archers' strength, keeping in mind the biomechanical structure of the archer.

Once the novice is aware of what these factors are, what their impacts can be and is able to then combine them into a consistently repeated shooting sequence, they will have to learn to release the string *during* the time that all of them are close to ideal

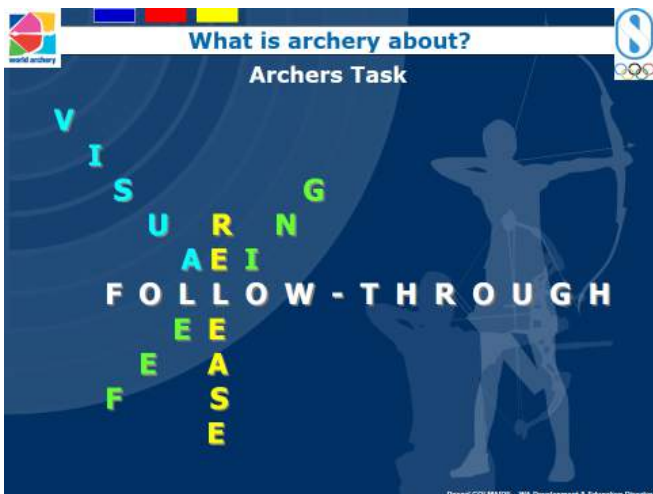


When the optimal interactive position has been reached, the arrow is released. To release the arrow before the optimal position has been established will not result in a good shot and is likely to lead to the development of faults in style.

The more stable novices are in their stance and the stronger they are at full draw, the visual-motor (or vision-feeling) coordination whilst aiming occurs more often and lasts longer when it does occur. The result is that the novices can release with more confidence and control. Confidence and control are two important criteria of success in many activities.

If the novice is weak and unstable they may not be able to produce or maintain this feeling of the coordination of factors. A release executed only on the visual references (aiming) will rapidly lead the novice into "Target Panic"; a serious problem that will be covered later in this manual.

During and after the release, the archer must follow-through, maintaining the body position and other visual and physical sensations. The follow-through is an important part of the shot and the arrow is only considered shot well when the follow-through has been accomplished correctly.



The Release must be done WHILE MAINTAINING the quality of the motor-visual coordination.

The release should only occur during the archer's visual and feeling coordination range.

During the release process the quality of the vision-feeling combination of the novice should be perfectly maintained, even during the acceleration and propulsion of the arrow by the string. The shot must be controlled and orientated toward the centre of the target. Hence the novice must strive to maintain the harmony of vision and feeling. In other words: a perfect continuity of all the archer's skills (mental, physical, visual and respiratory) must be ensured during the release of the arrow until it has completely left the bow.

A subconscious or automated release contributes to maintaining the quality of the vision-feeling combination of the novice during the release of the arrow and through its initial stages of flight.

Whatever the natural skill of a person, experience has shown that almost anyone can become a good archer provided much well-structured practice is done. Thus the novice must be attentive in their practice and perform the above tasks consistently in order to improve as an archer.

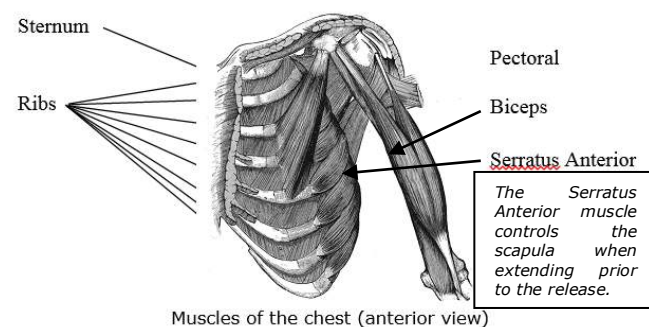
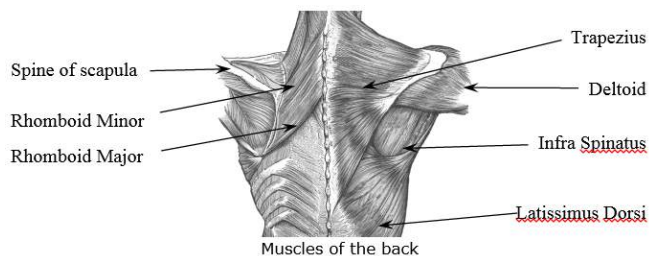
1.1.3. Another task of the archer: force production

As in many sports there are some exertions to be made in archery. Any change in the production of these efforts (e.g. intensity,

direction...) will generate a different shot and thus a different impact on the target. Here are some key points in the correct production of the requisite forces.

a) Repetition of the forces on the bow and the string.

- Should allow the correct feel for the novice to be established
- Some force is required to use a bow but there should be minimal body tension.
- Like in any activity with an apparatus, the coach will teach the beginner to be relaxed on this device
- Usage of the arm muscles should be kept to a minimum
- Shoulder and back muscles should be used for drawing the bow and extending prior to the release
- While at "full draw" the extension should come from scapular motion (not the arms or hands)



Muscles of the chest (anterior view)
Side of the bow arm for right handed archer

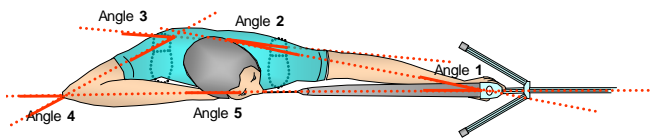
b) Force alignment

- The novice must align the body and shoulder girdle correctly to produce a consistent draw length.
- Correct body alignment helps reduce the onset of fatigue.

c) The angles to be considered for correct body alignment

Because the riser and the string apply opposed forces in the "shooting plane", the novice must also provide efforts on

the riser and the string. Doing so as close to the plane of bow's forces as possible is called being "aligned".



- Angle 1, the angle between the bow arm and the power line should be kept to a minimum, bearing in mind good string clearance.
- Angle 2, the angle between the bow arm and the shoulders should be as close to 180 degrees as possible to get maximum power in the bow shoulder.
- Angle 3, will depend on the length of the archer's string side upper arm and forearm. It is not so important but if possible it should be kept to a minimum that the body will allow.
- Angle 4, this should be kept as small as possible. It is important to maintain the power line from the pressure point on the bow grip through the drawing fingers to the tip of the drawing elbow to ensure an efficient release and follow-through.
- Angle 5, this should be as close to 180 as possible, the back of the hand should be straight and in line with the power line. This will ensure there is no torque applied to the string during the expansion phase.

This body/bone alignment allows for less muscular activity to handle the bow weight. Muscles are therefore more available for control and stability purposes (see the next section "Stable efforts"). This alignment also contributes to a proper direction of the string, particularly upon release. Nevertheless this body alignment could be an issue for the string clearance. The coach should assist the novice to encounter the best compromise in this matter (techniques to handle this compromise are given in this manual).

d) Stable efforts

Since archery is based on accuracy and stability, the coach has to assist novices to generate stable efforts. This can be achieved through a combination of technical developments and strength development. A novice using a low percentage of his/her strength is usually

much more stable than a novice using a high percentage of his/her strength. Hence a high strength potential has to be developed.

The above points make up the *technique*, which is mastered by repetition. Some people say "as long as you do the same thing time after time almost anything can work". However, the wrong use of the body can introduce errors even if repeated consistently. In fact, to repeat a wrong action does not necessarily mean to obtain good results. Novices must perform each action correctly and only a very intense repetition training routine can reduce the number of conscious controls: this is known as "automation induced by muscle memory".

1.2. The archer's skills

The skill of the novice is not in shooting one arrow correctly, but to repeat it time after time. The only way this can be achieved is to train the body and mind of the novice to accurately repeat a shooting routine, even under fatigue and/or stress. The areas to be considered when training to do this multi-functional task are:

- **Strength:** to operate the bow without any stress or strain.
- **Static Stability:** to be able to keep a stable stance while shooting.
- **Dynamic Stability:** to be steady while aiming (no tremor in the upper body at full draw).
- **Visual Focus:** to be able to stay visually focused no matter what distractions may occur.
- **Mental Focus:** to be able to stay mentally focused on the task at hand under all conditions.
- **Inner Body Feeling:** to be aware of the total and correct feel of shooting the bow and, therefore, of any position, movement and effort generated in the body during the shooting process.

In addition to the above requirements the following points need consideration if the novice is to have a complete training routine.

- **Psychology:** to keep the mind focused on the task at hand.
- **Relaxation:** to be able to keep calm in stressful situations.
- **Concentration:** to be able to ward off irrelevant distractions when performing.
- **Positivism:** being confident that he/she will perform well no matter what situation may occur.

Also, short term and long term goals are essential for planning progress. These goals help in the development of all archers whatever their level of expertise. Whatever goals are set they must be:

Specific
Measurable
Achievable
Realistic
Timed
Exciting
Recorded

In conclusion a coach is responsible to develop several habits in each athlete they work with. The level 1 coach assists the beginner in the consistent repetition of a shooting sequence built on biomechanical principles. A strong foundation is designed to achieve this consistency under the load of bow weight. Strength, stability, inner body feeling, mental focus and concentration, and relaxation are other components that are developed as a part of the program. A coach works with both body and mind to develop a better person as well as an efficient athlete.

CHAPTER 2: SAFETY

The use of archery equipment could be dangerous, and therefore must be treated with great care. It is very important that everyone teaching people to shoot thinks about safety. This section of the manual will help you to keep everyone safe while teaching them to shoot.

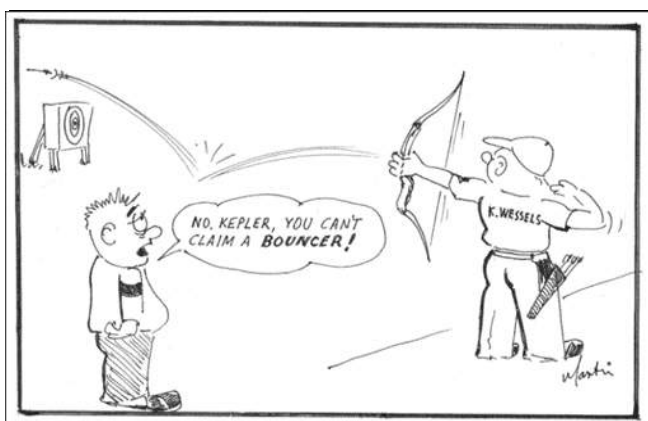
2.1. Planning

2.1.1. Facilities

Before starting each teaching session you should check the area to be used to make sure it is safe for you, for the people you are teaching and any other people who happen to be near you.

If shooting outdoors:

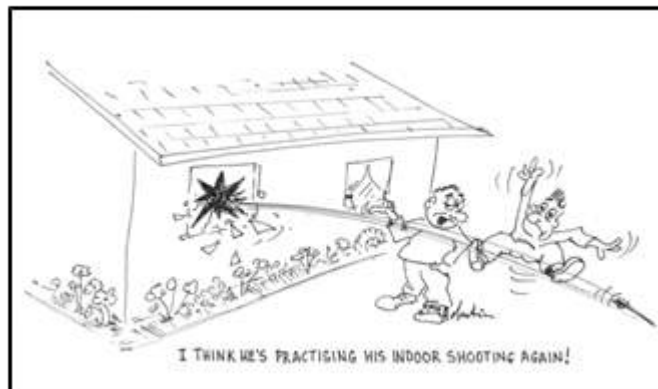
- Check the area to see that no one could walk into the shooting range area, put up "warning" or "keep out" signs, or flags, and if possible, fence off the area;
- Make certain there is plenty of space (at least 30m, ideally 50m) behind the butts for any arrows that miss the target. If this space is not possible, use a high bank behind the butts or put up straw bales or something similar to prevent arrows from flying too far;
- If the ground is very hard put straw, leaves or something similar to protect the arrows and stop them from bouncing too far;



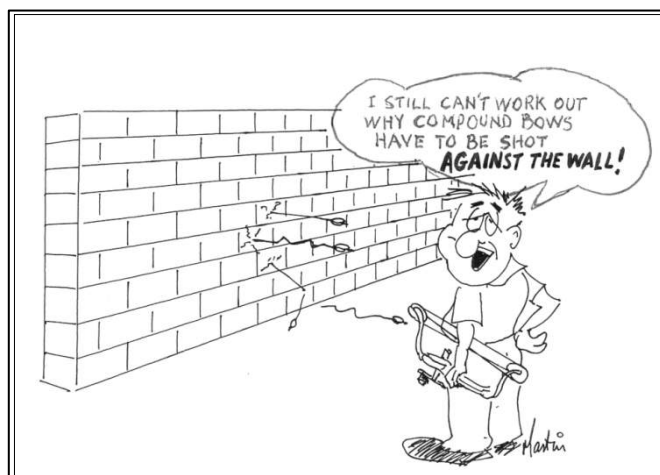
- Make sure the ground has no holes or other hazards that people may fall over and injure themselves;
- Have the target butts firmly fixed into the ground so they do not fall over when the arrows are pulled out;

- Keep all spectators 10 meters behind the shooting line and make sure all young children are supervised by their parents.

If shooting indoors:



- Make certain the doors that people could come through at a level with or in front of the shooting line are closed and have "keep out" signs on the outside. Some of these doors may be emergency exits so keep these clear in case use is required;
- Make sure the butts are firmly fixed to the wall or weighted to the floor so they do not fall over when the arrows are pulled out;
- To prevent damage to the arrows, bouncing back off the wall or damaging the walls, make sure the area above, below and to the sides of the butts are covered;



- If netting is being used to stop arrows, make sure it is properly installed (see chapter 9 Facilities-Equipment)
- Keep all spectators 10 meters behind the shooting line and make sure all young children are supervised.

2.1.2. Emergency action plan:

Although serious injuries or accidents are very rare, you must be ready to deal with them if any such accidents do occur.

If at all possible, have someone at the range that has formal training in first aid and CPR.

Develop an Emergency Action Plan and write it down so everyone knows what they have to do in case of an emergency. Include how to get medical help, any telephone numbers to call, where to find a telephone and the names of the people who are able to carry out first aid while waiting for medical help. Put this important document where it can always be seen, and keep a copy in the First Aid Kit.

2.1.3. First aid:

The basic rule of first aid for a sports injury is **RICE**.

R – Rest.

I - Ice or cold water is used for cooling the injured area and to prevent inflammation.

C - Compression/pressure to reduce the blood flow to the injured area.

E - Elevation/raise the injured part to help prevent swelling.

Every range should have a first aid kit. Talk to your nearest medical centre or nurse to help you put together a proper kit. A simple first aid kit might contain the following:

- Blunt ended or bandage scissors;
- Safety pins in various sizes;
- Bandages - crepe and tubular in various sizes (ask your pharmacy or medical centre);
- Zinc oxide strapping for securing bandages, and strapping joints;
- Gauze swabs, Cotton swabs/Cotton balls;
- Cleansing tissues;
- Self-adhesive strip dressings, Athletic tape/adhesive tape;
- Antiseptic ointment;
- Orthopaedic felt or foam pads (can be cut to shape) - for sore feet;
- Instant cold packs or cold spray (ask your chemist or medical centre);
- Petroleum Jelly;
- Eye patches;
- Insect repellent;
- Towel;
- Latex gloves;
- Plastic bags;
- Access to a communication system for contacting specialized assistance;
- First aid manual

Make sure there is always someone around who can do first aid. Don't have anything in your

first aid kit that the first aider does not know how to use. Remember that first aid is exactly what its name says: FIRST AID - seek medical advice if the injury is anything more than minor.

Make sure EVERYONE knows where the first aid kit is kept.

Do not allow the contents of the first aid kit to be used for anything except first aid.

When you use the kit make sure you replace what is used. Regularly check the items in your kit and remember to restock them before they are used up or when they are out of date.

When using an ice pack, make sure it is not put directly onto the skin or you may cause a cold burn; wrap it in a small towel or cloth before applying it to the affected area. If no ice is available a cloth soaked in cold water could be used.

2.1.4. Archery site

Draw a detailed plan of the site where the archery classes will be held. Indicate emergency phone numbers, where the first aid kit is kept, the route that the medical staff should follow in case of an emergency and all other details that you consider useful such as relevant mobile phone numbers and the names of the people in charge of the archery lessons, location of the nearest hospital.

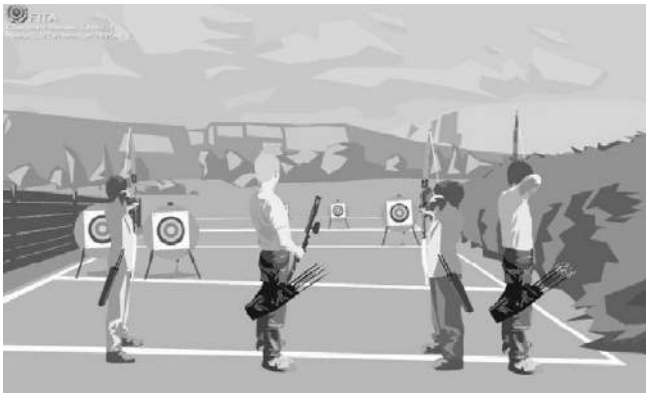
2.2. Group safety

2.2.1. Planning

All shooting must be under the direct supervision of one coach or other identified person whose duty is to control the shooting of the group. He/she signals the start of shooting, the end of shooting and when archers are allowed to go to the target to collect their arrows.

Make sure you have adequate supervision. If at all possible a 1:6 coach to archer ratio is ideal, up to a maximum of 1:12.

The shooting line should be straight, not staggered. If you have archers shooting at different distances, put the targets at the distances being shot and have everyone shoot from the same straight line.



A single shooting line helps make the shooting range safe.

Have a whistle to control the shooting and make sure that everyone can hear it. Make sure you use the same signal each time you want the archers to carry out a particular task, for example 1 whistle to start shooting; 3 whistles to collect the arrows.



Keep archers as well spaced as possible, no more than 2 people per target is good but definitely do not have more than 3 persons per target shooting at the same time. Keep all of the equipment in good condition, it must be inspected often and repaired as necessary.

2.2.2. The lesson

The first things to tell your beginner group are the safety rules:

- Do not touch equipment until told to so by the instructor;
- Do not put an arrow in the bow until standing on the shooting line and facing the target;
- Do not raise the bow or shoot an arrow until told to (voice command or 1 whistle);
- Never shoot if there is anyone in front of the shooting line (including behind the target);
- Do not raise the bow hand higher than the hand drawing the string;



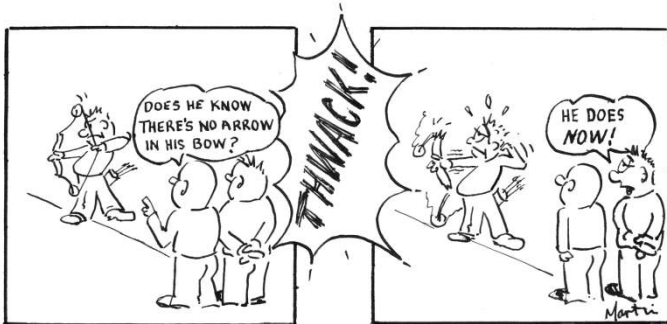
- If an arrow drops in front of the archer it must be left there until after the 3 whistles to collect arrows has been given, never move forward of the shooting line while shooting is still taking place;
- When pulling arrows out of the target be careful that no-one is standing directly in line and could be hit with the nock end of the arrow as it is withdrawn from the target;
- If there are more than 3 blasts of the whistle this means there is some danger, STOP SHOOTING IMMEDIATELY. Take any arrows out of the bow and return them to the quiver until there is a signal to recommence shooting.
- All archers must have one foot on either side of the shooting line or have both feet on the line.
- If people are shooting from a wheelchair there should usually be one large wheel and one small wheel on each side of the line. Make sure the wheelchair brake is on.
- Archers should stand in a direct line with the target they will be shooting on, do not shoot diagonally across the path of arrows of someone shooting next to you.
- Keep the bow vertical when loading the arrow and after shooting the arrow. Do not swing the bow sideways at any time.
- Always take care on the line so you do not disturb other people still shooting.
- When archers have finished shooting all their arrows, they should put their bow against the bow stand and step back behind the waiting line.
- If people are behind the target looking for arrows that have missed, have one member of the group stay in front of the target so that everyone knows shooting cannot start.

2.3. Personal safety

Many archers do not concern themselves enough with their own safety while handling archery equipment.

Let's look at some things that can prevent injury:

- A proper warm up should be the start of each shooting session to prevent muscle damage.
- Flat-soled shoes should be worn on the range to provide a firm foot position that is repeated every time. For competitions, shoes that cover the whole foot must be worn
- Stringing a bow, if done incorrectly, can cause serious injury. Bows should be strung before the first few teaching sessions begin and then the correct way to string a bow should be carefully taught;
- Strings that are too long or too short for the bow are dangerous and must be replaced as well as strings that are fraying; especially if the fraying is around the top or bottom tips of the bow;
- Armguards and finger tabs must fit the user to prevent injury;
- Releasing the string without an arrow can damage the bow and cause injury; a bow should never be dry-fired.



- Damaged equipment such as twisted limbs, cracked bows or arrows, loose or cracked nocks or loose points, must not be used until they have been repaired or replaced;
- Arrow length is very important. To start with, they should be long. If they are too short they can be overdrawn just before release and can hit the bow and break, or go through the archer's bow hand;
- The feet, body, and head positions must be suitable for each archer to have a clear string release so that there is no damage to the bow arm, face or chest, particularly women's chests;
- Strings can catch on clothing and cause damage and/or the arrow to miss the target. Sleeves should be tight or fastened at the back of the arm, chest pockets should be emptied, and if possible covered, caps turned to the back and any badges, jewellery, and

etc. that may catch the string must be removed. It may be necessary to tie back long hair;

- If possible, belt quivers to hold the arrows should be used but if they are not available, arrows must always be carried points down to the ground. Ground quivers can also be used to hold arrows. Never allow people to run with arrows in their hands;
- Wherever you are shooting, a cardboard cylinder fixed to a bow-stand, or something similar will keep the arrows safely pointing downwards. Also, the bows can be rested against them when not in use, so the equipment is safe and people will not get hurt by falling over it.
- When walking to the target, keep a look out for arrows that did not reach the target. Collect and take them to the target or return them to their owner when possible;
- Make certain you find all arrows before leaving the ground so later users are not hurt by them.



- It is important that people who have been injured or ill are fully fit before returning to shooting and they should begin slowly, shooting only a few arrows and building up to shooting the full number over a period of time.

2.4. Equipment safety

In the above list of prevention of human wounds, there are also some elements concerning the equipment, such as stringing the bow, releasing the string without an arrow... Sometimes arrows do not stick into the target properly and hang down across the target.

If shooting continues, other arrows could hit the hanging arrow, damage both arrows and/or bounce off and not score any points. As soon as you see an arrow hanging on your target,

everyone on the target should stop shooting and inform the person controlling the shooting. The controller should wait till everyone else has finished shooting on the other targets then go down to the target with the hanging arrow with just those archers, score all the arrows in the target (if any scoring is taking place), remove the hanging arrow, and place it at the back of the target. The archers on the target with hanging arrow can then return to the shooting line, finish shooting their arrows and then everyone goes to collect their arrows.

To recuperate an arrow from the grass: 1) Clear the fletching area. 2) Pull backward the arrow in its horizontal axis (level with the ground). 3) Only when the whole shaft is cleared and visible, to lift it up.

2.5. Range etiquette

When shooting is taking place it is important that other archers are not disturbed. Train the archers to be considerate to others on the line. This includes:

- Not talking or laughing loudly.
- Not giving advice to others on the line.
- Not criticizing out loud their own shooting performance or that of others.
- If an archer has a problem, have him move back off the line and seek help rather than asking the archer nearest to him for advice.
- When the archer has finished shooting, let him leave the line while the other archers finish theirs.
- Not touching other people's equipment without getting their permission.
- Not removing other archers' arrows from the target unless the owner has given permission to do so.
- Being careful of the other arrows in the target when they remove their own.
- Being totally honest when calling the arrow values, whether they are theirs or other archers' arrows on the target. If they are not certain of the arrow value, have them ask the others on the target for confirmation.



- Being careful and totally honest when writing and adding the arrow totals.
- Being pleasant to other people, being a good sport.



- Many jobs have to be done to ensure archers are able to shoot their arrows in practice and in tournaments. Always be prepared to help the officials before and after the shooting.
- Remember alcohol and archery don't go together. Never permit alcoholic beverages on the range or before a shoot. Anyone who has been drinking alcohol must not be allowed to shoot.
- Smoking is not permitted in or around the athletes' area. Many places do not permit smoking at all; so make sure you know the rules where you are going to shoot.

In conclusion:

Safety is a key concern when participating in any sport. Being mindful of the potential hazards involved helps keep any risk to a minimum. Whether it be personal safety, equipment care, awareness of first aid procedures or general shooting etiquette, all archers should take the proper measures at the range. In so doing they will ensure a safe and enjoyable sporting experience for all.

CHAPTER 3: COACH'S ROLE and WHAT IS COACHING?

“BEING A GOOD COACH IS NOT ENOUGH”

The above statement means that some coaches who are recognized good by their students and even other colleagues do not necessarily get good results; simply because they do not operate in an efficient environment. An efficient organization requires good administration and management including:

- A comprehensive and fair decision process
- Good communication at all levels
- Transparency of all activities
- Good budget management
- This list is not exhaustive

Hence a level 1 archery coach must collaborate with the elected and/or key persons from their archery organization, to contribute to the good of the overall administration structure.

As a coach, you play a critical role in helping novices enjoy their involvement in sport. To make sport fun for everyone, you need to understand how novices grow and develop, how they communicate with one another, and what motivates them to come back for more. This manual gives you a summary of the skills and knowledge you need to be an effective coach.

Archery is widely recognized as a good physical and mental exercise which is ever increasing in popularity as a sport for all ages. People participate in archery for various reasons. They enjoy learning new skills, and testing these skills against others. They like the challenge and excitement inherent in the sport. Winning is important, but archery allows the simple pleasures people get from being active, being with friends and just being part of archery! The approach you take to coaching should reflect these desires. You're on the right track if you concentrate on fun and teaching the fundamentals.

- Fun: Make it a great experience for all beginners (see the chapter on "Games").
- Teaching fundamentals: Focus on the basics. As novices learn and develop their skills, their enjoyment of the sport will grow.

A well prepared training session can make archery coaching a positive and enjoyable experience. An archery coach should encourage more people to make sport and recreation an integral part of their daily lives, and look upon archery as a lifetime sport.



Here is a brief summary of some of the major coaching principles covered in this manual. You could call it the "Coach's Creed:"

- Safety first
- Be ready, willing, and able to help your novices develop to their full potential while recognizing their differences. They come from different backgrounds, are born with different talents, and grow and develop at different rates.
- Discuss with novices and developing archers what their ambitions are, help them set realistic goals based on each person's stage of growth and development.
- Lead by example. Teach and demonstrate self-discipline, co-operation, fairness, and respect for officials and opponents.
- Emphasize challenge and fun. Learning new skills and techniques can be fun when introduced through active drills and competitions.
- Be flexible and willing to learn as you develop your skills as a coach. Don't be afraid to make mistakes or to ask for help when you need it.
- Keep things in perspective. Make sure the time commitment required of your novices is reasonable. They are individuals first and archers second.
- Fair Play: do not show favouritism, always be honest and treat your archers with the same respect that you yourself would expect.

3.1. Your role as an archery coach

The level 1 archery coach should help the archers in their own development, particularly in three areas:

- Environment: safety, social (club integration), fun, fair-play, and so on.
- Development: physical, technical and psychological.
- Equipment: selection, set-up and maintenance.

Coaching is for anyone who enjoys archery, cares about people and wishes to share this passion. It is for high school athletes, women and men, parents and grandparents. What does it take to coach? It takes people who are sensitive and caring, who are organized, who want to work with others, and who will teach from the heart. Coaches are people who love archery and want to pass on their knowledge.



When working with your novices, you should remember that you are a teacher, a leader, and a counsellor.

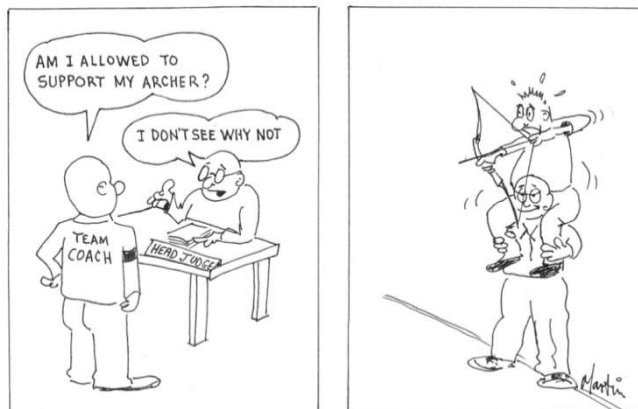
As a teacher, you:

- Provide simple essential teaching points to help your novices learn;
- Encourage skill development through different teaching and effective learning situations;
- Provide lots of activity contributing to an active lifestyle of the beginners.

As a leader, you:

- Make archery a positive and enjoyable activity to do;
- Set goals that are challenging but realistic;
- Offer encouragement and support to help your novices be the best they can be;
- Instil the importance of being a good sport and playing fair;

- Respect each individual's rights and wishes, never humiliate a novice or chastise them in front of others;
- Facilitate the integration of all novices' into the class, club, etc. (Facilities, people, internal regulations and so on) until they feel part of the social group.



As a counsellor, you:

- Listen to your novices' concerns and deal with them as best you can by being supportive;
- Respect the needs and confidentiality of each individual.

As a technical resource, you:

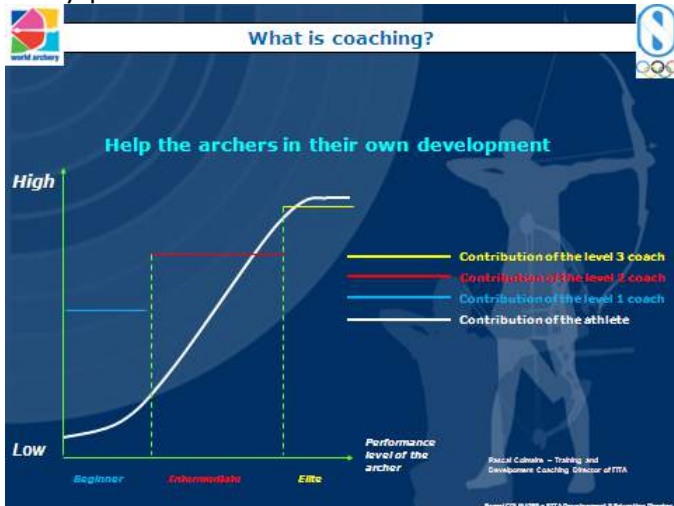
- Should have a good understanding and experience of the discipline before starting to coach;
- Should not be satisfied with knowing just what you intend to teach novices;
- Make a study of archery's history;
- Should keep current with new advances in the field.

This manual will be of assistance to all those who teach and are taught the art of shooting the bow. Nevertheless prior education in archery is required to be able to coach effectively.

When you coach, the results are real and could be immediate. You share the small victories as novices develop skills. You feel it in their energy and enthusiasm. You see it in their smiles. But the results of coaching are also subtle and could have long term effects, too. Through archery, you will help your novices to grow and develop as individuals. The archery skills they learn from you may only be used for a few years. But the aptitudes and the attitudes they develop toward themselves and others will last a lifetime. These benefits do not come easily. There is a significant time commitment involved in being a coach – for planning, practices, and competitions - and there is a real responsibility as you enter the lives of young people. But the effort is worth it. Ask long-time coaches about

their involvement in archery, and they will tell you they have gained more from it than they have given up for it.

One of your first tasks is to point out the advantages of learning. You must show your students that they have "a need to know" and will benefit in direct proportion to the effort they put into it.



Coach/Athlete Responsible Model

The graphic above depicts the relationship between you - the coach (*) and the archer over time. When the individual begins archery, you are responsible to provide considerable guidance and direction as the novice acquires sport skills and learns the rules and conduct for competition. As time passes the archer will gain experience and their responsibilities and involvement will change as their development progresses.

The WA Coaches Committee considers that the archery coach must help the archers in their personal development; hence the coach must give some responsibilities and leadership to the archer in the athlete-coach partnership. For that purpose the coach must mainly:

- Analyse: the archer's skills, behaviour, fitness, mind-set, etc.
- Provide feedback
- Propose individualized techniques, training plans, exercises, approaches, etc.

The share of responsibilities and leadership of the athlete will grow over time.

(*) The above graph also shows the importance of a good harmony in coaching ways, style, etc. among all coaches, allowing a successful transition for the developing archer from one step/coach to another. Any drastic conceptual coaching changes during these transitions could:

- confuse the archer;
- require a long adaptation time for the archer to recover some efficiency (if any) within the new coaching way;

- generate some comparison and tension among the coaches.

In these ways, disparate coaching styles could be damaging for the archer's development and for the training environment.

3.2. Coaching qualities

The qualities necessary to make a success of any instructional program are many and varied. Each of us possesses some or all of these qualities to different degrees, so it is up to you to evaluate your knowledge or ability and add to it where necessary.

3.2.1. Technical knowledge

Know the material you are about to use, otherwise it will be impossible to teach it to others.

- Keep up with current archery developments in technology;
- Ensure your knowledge of current rules is up-to-date;
- Don't rely on reputation or past performance.

3.2.2. Personality

Where people must work together, compatible personalities are essential for success. There are many things about an individual's personality to which others respond favourably or unfavourably.

Concentrating on and improving one's own specific qualities should develop a likeable disposition.

By observing other coaches and weighing up their characteristics, we can adopt those that contribute to successful teaching, while avoiding those that do not. However, be yourself. Do not be artificial. Sincerity is of prime importance. Be alert to personal appearance.

3.2.2.1. Sincerity

After the knowledge of the topic, the most important factor is sincerity. At all times be natural, be sincere and enjoy your experiences while presenting your material. If you are sincere, you will express the concepts fluently and clearly and you will find that you will be accepted more readily. Avoid "putting on a show." Your audience is more concerned with the material than your presentation.

3.2.2.2. Sincerity of purpose

Sincerity of purpose, punctuality and neatness are high on the scale of the coach's requirements. These aspects contribute considerably to the novice's evaluation of you and reflect in the attention shown during the presentations. You must be natural; sincerity is fundamental.

3.2.2.3. Attitude toward the group

You must strive for additional knowledge and improved teaching abilities. A coach should have an interest in class members and their problems. Be fair in all decisions. Your attitude influences the class morale since the class adopts both the attitudes and the point-of-view projected by the coach. Listen to your student's point of view, their views may be different to yours and things might be learnt that have not been previously considered.

3.2.2.4. Appreciation

This principle emphasizes that your real task is to train people, not just to teach subject matter. You must be aware that novices learn many things other than the material presented. Novices, as a rule, react directly to your attitude. You must, therefore, employ a positive attitude. Refrain from making remarks or giving personal opinions that may contribute to undesirable novice attitudes. Learning is not complete until the novice has acquired the correct attitudes and habits of conduct and applies them correctly.

The following check list summarizes the material discussed:

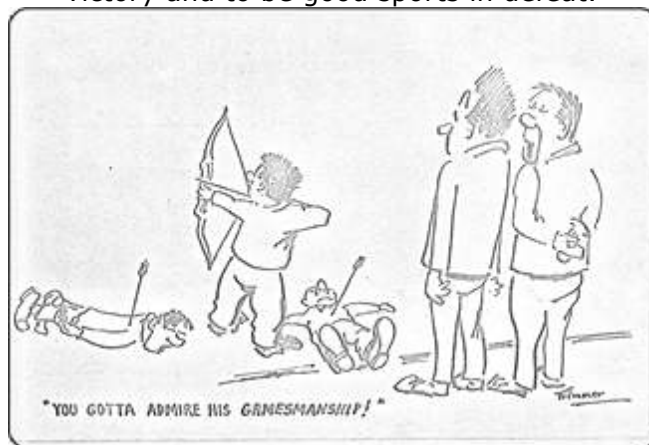
- Treat learners as equals;
- Discuss, do not argue;
- Expect good results and give credit where due;
- Keep the class alert and on its toes;
- Be fair. Favouritism is divisive;
- Be courteous, patient and tactful and when the need arises be humble;
- Maintain poise, avoid nervous habits;
- Lead, do not be forceful;
- Consider first impressions;
- Remember, communication is two-way;
- Always have empathy with each situation;
- Discipline through respect;
- Know the answers - don't bluff;
- Admit mistakes;

You must also employ other qualities, such as being a good communicator, organizer, teacher, etc. The theory component of coaching education discusses these concepts in greater detail.

3.2.3. Fair play

Sport gives your novices a chance to experience fair play in action. Make sure that you talk to your novices about what fair play means to them. Here are some things you can do to encourage it:

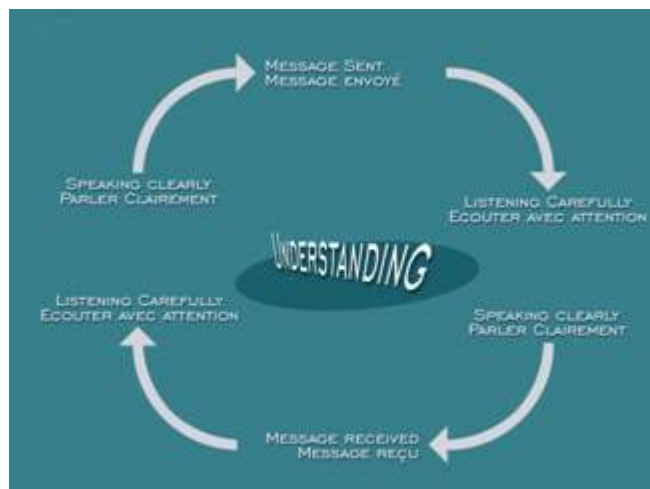
- Recognise and respect individual differences;
- Provide equal opportunity for all to participate;
- Learn and follow the rules of the game;
- Encourage your novices to always do their best;
- Instil a positive attitude toward competition;
- Encourage your novices to be modest in victory and to be good sports in defeat.



3.2.4. Communicating

Communication is a two-way process. Good communication leads to good understanding. In order to help your instructions to be both productive and relatively easy to carry out you should be aware of some parts of the instructional process illustrated below.

3.2.4.1. Communicating with your novices



Communication is a two-way process

Here are a few simple tips to help you communicate effectively with your novices during practice and competitions:

- Give them an opportunity to speak and ask questions;
- Listen carefully to what they say and how they say it;
- Speak to every novice at every session;
- Speak to them using words they understand. Always keep it simple.



3.2.4.2. Speaking ability and control

The coach's ability to control the group or individual starts with speaking ability. Audibility and clarity and diction are key elements to success. Firm control is very different from forceful and dogmatic insistence, which can only cause hard feelings and lack of cooperation. Be alert to your diction and voice. You can find more in the following sections."

3.2.4.3. Audibility

You must speak loudly enough to be heard by all the novices. Speak directly toward your group in a voice loud enough for those in the back to hear clearly. Always be aware of those in the farthest corner, noting whether they are able to understand you, nevertheless your volume should not irritate those in the first row.

3.2.4.4. Clarity

Articulate distinctly and take care not to slur your words. If you have an accent, try to keep your phraseology within the scope of those listening to you. Use words that they will understand. The terms used should be the same as those used in this manual, which the novices will use later to refresh their memories, and for reference. Care must be taken to ensure that you give only the details relevant to the subject under discussion. Do not confuse the issue with facts beyond what is required at that stage of learning. Remember, "Brevity is the soul of wit."

3.2.4.5. Speed

For the first lessons, you should be careful to keep a slow speech rate. 140 words per minute as recognized as the upper retention limit when speaking to a group. Your speech rate may be increased in later levels when your novices are more conversant with the subject matter. Make sure you give your novices the time they need to assimilate the facts you are giving them.

3.2.4.6. Gestures

If gestures come naturally to you by all means use them but try to avoid overdoing it. The overuse of any mannerism will cause irritation and diminish the effectiveness of the movement. Vary your actions, act natural and project yourself to your group.

3.2.4.7. Enthusiastic versus monotony

If you are enthusiastic about your topic, your audience will be enthusiastic too, and it will excuse any weaknesses in your delivery. When speaking to any group you must be careful to keep your tone of voice flexible, avoiding the mechanical sound of the one-note level of speech. At no time should you read a prepared speech. Small cards with brief notes and headings of each of the topics you plan to deal with, will enable you to maintain a well-developed order for your presentation and prevent you from forgetting one or more sections of your subject. You should try to open your presentation with a few concise remarks outlining the material you intend to present. At the conclusion, you should briefly summarize your presentation, noting the key points, which you hope will be retained by the novices.

3.2.4.8. Repetitious phrases

Most speakers tend to overuse some pet phrase. Try to avoid excessive use of such things as "fair enough", "by and large", "you know", and many others. Similarly, the speech fillers such as "hum's", "ah's", and "er's" can be quite distracting and unproductive. These useless additions only tend to irritate and distract the novice's attention from the real material being discussed.

3.2.4.9. Humour

Every good speaker knows the value of humour in relaxing his or her audience. All speeches are improved by the skilful use of suitable and tasteful anecdotes relevant to the subject material being discussed. These jokes must be used in a natural easy manner as a tense joke invariably falls flat. Always be ready to laugh at yourself if you make an amusing slip; you are not expected to be perfect.

3.2.4.10. Timing

When you plan to give a talk on a topic make sure that you cover all the relevant material and leave enough time for questions. Sometimes you can get so absorbed in your talk that you forget the time or you might get side-tracked and depart from your planned material. Both can cause time problems, which may be difficult to correct when you finally realize what is happening.

3.2.5. Time management

To become a good athlete, several criteria are needed, but two are fundamental: time and money. Hence the coach should assist the archer with these two matters. First let us consider the time criteria.

According to some statistics made at the 2007 World Championship, it generally takes seven years to bring a novice to the world level (there are exceptions in both directions: faster and slower). A poorly organised training program would certainly make this period longer, while a well-planned training program could reduce this period.

The training volume has grown a lot. Nowadays many top level archers practice 2 or 3 times per day, five or six days per week. Shooting several hundred arrows per day is very common.

For the same reasons, the coach should also be an efficient time manager. The level 1 coach will strive to make the best use of the time allocated to a practice session. A novice shooting only 40 arrows during a session will certainly not benefit the same amount as another novice shooting 80 arrows in the same time. Hence a coach should always strive to provide the maximum practice time possible during each class.

It is poor planning to finish a training session either early or late. Ending early can be interpreted as a lack of interest from the coach, while finishing late could give the appearance of

not being fully prepared for the session. Any good session must have a well-prepared outline to ensure suitable distribution of time over all the steps of your class. Novices should know what time the lesson is to end or when a break is due. Since coaching is assisting an athlete to develop various skills in a period of time, the coach should make the best use of the total available time of the archer. Hence time management, programming and planning are important coaching skills.

3.2.6. Managing the financial resources

Let us now consider the second fundamental criterion to becoming a good athlete: money. There is no efficient organization without good administration. This is valid for a sport club as well. Good administration includes good budget management.

Archery, like all sports, comes with a specific cost: the price of equipment; not only the shooting gear, but also the target requirements and the club uniform (if any). Transportation to practice and tournaments as well as registration fees also contribute to the budget. Additionally, to properly instruct, a coach needs teaching tools, elastics, mirrors, video, etc. Thus the management of the (usually low) budget of an archery organization must be very effective. It would be a shame to spend a significant part of a club budget on a banquet while ignoring the crucial needs above. Hence the level 1 archery club coach must assist the decision makers to make the best use of the available financial resources, and if possible help to increase them.

3.2.7. Selecting a teaching method

It is important that the coach develops a coaching technique on the same level with the novices being coached. If the level is too high or too low the novice will soon lose interest and the coaching session will not be very productive.

Learning the basic shooting form is quicker through the on-going correction system. When bad form is allowed to be repeated it becomes the accepted form and it is very difficult to change later. Because of this, it is generally accepted that each stage of the program should be firmly acquired by the novice before proceeding on the next stage. The World Archery Beginner Awards Program not only provides suggestions for teaching archery skills in a proper progression, but also through evaluations as it ensures each stage is firmly acquired. A final brushing up of the form can be done later as long as the basics are clear to the novice.

An efficient teaching method for most of the technical skills in archery, includes the visual (to see it, even to visualize it), and the feeling (identification of the perceptions).

Trial and error should always be conducted under close supervision until the correct sequence of responses has been learned. Once the novice has learned the correct sequence, it can be entrenched by repetition. Repetition is the most effective way of preventing the archer from forgetting, but its use must be tempered by judgment. Prolonged repetition will produce boredom and apathy. It is better to practice one hour a day for six days, than to practice six hours in one day. This principle should be remembered when training is being conducted. It is important to maintain a high level of focus during practice. If the focus while practicing a particular form aspect deteriorates to a level where the target skill is no longer being trained effectively, the session should be stopped or a different exercise undertaken in order to maintain the novices' interest and enthusiasm.

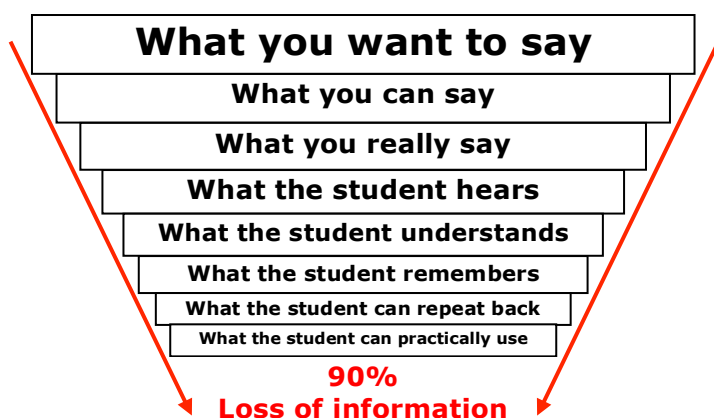
A physical involvement of the novice in his/her apprenticeship is always recommended against a passive learning:

TELL ME.....I FORGET

SHOW ME.....I REMEMBER

INVOLVE MEI UNDERSTAND

Coaching heavily based on oral instruction is risky as shown on the illustration below:



To develop a coaching technique, the coach has to make several choices and they have to be done before starting to deliver the level 1 program. They mainly concern the following:

- Safety: Most important of all. How will you ensure the safety at any time?
- Skills: You have to select the skills to be developed during the level 1 program and

set how far you want to develop them. You can refer to the World Archery Beginner Awards Program.

- Demonstrations and Instructions: You must figure out how you will balance these two components of skill introduction in each session.
- Teaching Method and Supports: How will you teach each skill in the program and with what (e.g. which teaching aids)?
- Set-up: You have to decide the shooting distance, type and size of targets, number of arrows, duration of each step of your teaching process and of the entire session, among other choices
- Observation and Feedback: You must anticipate what you wish to observe, from where, how, etc., and how you will provide feedback to your students
- Implementation Assistance: Ask experienced archery coaches what the most common difficulties novices face in properly implementing the skill at hand; this will help you to learn how to best assist the novices.
- Individualization: Since everyone is different, and since there are several successful archery forms and techniques, you will have to work with each novice to determine the shooting technique that should be the most efficient for him/her.

3.2.8. Managing the human resources

3.2.8.1. Managing the coach/parent/athlete relationship

As a coach, you are ultimately responsible for most of the novice's training activities. This role will be easier and more enjoyable if you recruit others to help. Experienced archers or those who are contemplating becoming a coach can be called upon to serve as an assistant coach or manager. Here are some suggested roles and responsibilities for these positions:

Assistant Coach (archer contemplating becoming a coach)

- Review the practice plans with the coach before each session.
- Assist the coach in practices and competitions.
- Run a safety check of the play area.
- Assist in the maintenance of the novices' equipment.
- Maintain the first aid kit.

Manager (an experienced archer)

- Look after the club equipment that the novices are using.
- Provide information regarding practice sessions, tournaments, registration and transport.

- Make any necessary telephone calls to novices or parents.
- Manage budget and funds.

Tips for finding volunteers

- Ask your league scheduler or club president for names of people who could assist when you are getting other information from them prior to your season.
- Do not allow your lessons to be a babysitting service, do not allow "drop off", and solicit the involvement of the parents.
- Ask neighbours and friends to help out. If not, ask them to suggest others who enjoy people and have a background in archery.
- It is important as a coach to monitor the coach/parent/athlete relationship during practice. Often a parent can dominate the relationship and negate some of the progress you've made with the novice. Getting the parent involved with another novice can help, for example "I noticed you're good at teaching _____ and little Johnny needs help with that. Could you help him," thereby directing him away from his own child.

Tips for keeping volunteers

Once you've found volunteers, it's important to keep them motivated and involved. Here are some ways you can do it:

- Involve them in planning wherever possible;
- Have them do things they find enjoyable;
- Acknowledge and thank them for their contributions;
- Keep an open dialogue with parents;
- As they gain experience allow them to take over some coaching duties from you;
- Encourage them to take a formal coaching course;
- If they don't already shoot, encourage them to learn.

Meeting with novices & parents

Regular meetings encourage communication and help build a positive relationship. Many coaches like to hold three meetings each season: one at the beginning, one at mid-season and one at the end. Some coaches have meetings with novices and parents together; others like to hold a separate meeting for each group. Sometimes it may be preferable to speak to novices or parents individually.

The age range of your novices and the approach you like to take will determine how you handle meetings and how many you hold. Remember, much can be accomplished in brief sessions before and after practices and competitions.

Parents meeting

A meeting specifically with parents at the beginning of the season can be helpful in covering the items in the list above. Since parents are likely to have a broader scope of interest, it is a chance to go beyond and cover related topics as well. As an added bonus, it is an ideal time to recruit volunteers. For the parents this meeting provides an opportunity to interact with each other and you as the coach to see that they are entering their child into a program that they can support.

Here are some additional items to cover in the parents/adults meeting:

- Welcome and introductions;
- Goals of the program
- Roles of the various persons running the program
- Novices' hopes, expectations and long term objectives;
- Listen to parents' expectations;
- Your coaching philosophy;
- Ways parents can assist and be involved;
- Schedule for practices, and competitions;
- Arrangements for car-pooling or travel;
- Equipment and other costs, fundraising activities;
- Questions and answers;
- Explanation of rules, safety, etc.;
- Use of the club/school Website, Facebook and E-newsletters as source of communication;
- How and when you can be contacted for follow-up.
- Distribute the schedule of club events i.e. social and tournaments etcetera.

Use this meeting to hand out schedules and circulate a novice's directory. Also, this is the perfect opportunity to get a novice's Medical Information Card for each student in the session.

It is important to listen to parents whenever they want to talk to you about their child. It is your role to guide parents in their involvement in archery. You can do this in a number of ways:

- Encourage them to acquire an understanding and appreciation of the archery through knowledge of basic rules, skills, and strategies;
- Expect the same respect for fair play from them as you do from your novices;
- Discourage and inform those who want to coach from the side-lines. Getting messages from others will only confuse your novices. Explain to them how they can participate in your development plan.

Parents should guide their children's involvement in sports, but they should be encouraged to let them make their own final decisions. A child who really doesn't want to participate in archery just now should not be forced into doing so. This will only lessen the chance of the child taking it up later and can even lead to negative feelings about sport in general. From time to time, some parents may have to be reminded that it's just a game.

3.2.9. Ethics

Archery challenges everyone involved - novices, coaches, officials, and parents - to do their best honestly and fairly. Your conduct as a coach will serve as an example to others. Please refer to the World Archery Code of Ethics in the appendix as a guide for your actions as a coach.

Sport gives all archers a chance to experience fair play in action. Here are some things you can do to encourage it:

- Recognise and respect individual differences;
- Provide equal opportunity for all to participate;
- Give value to Drug Free Sport;
- Learn and follow the rules of the game;
- Encourage your novices to always do their best;
- Instil a positive attitude toward competition;
- Encourage your novices to be modest in victory and to be "good sports" in defeat;

3.2.10. Experience

Naturally the more experienced you are, the better you will perform in front of the group. In each teaching situation you will find you are learning new phrases and methods while becoming more skilled in the use of the time at your disposal. Be aware of becoming too glib as this tends to make the whole process too automatic.

*It takes a long time to become a good archer;
as a consequence it takes longer to become a
good archery coach!*

3.2.11. Self-evaluation

*To get progressing athletes, we need
progressing coaches!*

To progress a coach needs to get experience, continuing education, exchanges of experience and self-evaluation.

You should evaluate yourself from time to time to see how you're doing as a coach. Complete the following checklist early in your season. Do it again midway through and once more at the end of the season.

Some questions to ask oneself regularly.
(See the Self-evaluation questionnaire below)

One of the best indications of your success as a coach is the frequency of new-members or dropouts. Ask yourself why novices are dropping out: are practices boring? Are they too competitive? Is there a lack of equipment? Are your facilities unsafe?

If you're a good coach you may suddenly find yourself inundated with new members as happy novices bring their friends and relatives in. Keep monitoring yourself and if you're not at the level you want to be, plan to make some changes. To help you do this, complete the following questionnaire to find the areas where change will help your development as a coach.

Self-evaluation questionnaire

QUESTIONS	YES	NO	If no, how can I progress in this matter?
Do I make sure novices feel at ease when I am talking to them?			
Do I update my knowledge through clinics and magazines?			
Am I prepared for our sessions?			
Do I make sure practice involves lots of activity for each child?			
Do I encourage cooperation?			
Do I do a safety check of the field and equipment before sessions?			
Do I involve novices in making decisions?			
Do I actively assist novices who are having difficulties?			
Do I promote respect for the officials and the rules?			
Am I an enthusiastic coach?			
Do I try to make sure everyone is enjoying the session?			
Do my archers shoot enough?			
Do I increase my inventory of games?			
Do I increase my inventory of teaching exercises?			
Do I increase my inventory of self-development exercises?			

3.3. Code of Ethics

Note: This section repeats several topics covered elsewhere in this manual due to their overwhelming importance in coaching and the sport of archery in general.

Contents:

Preamble:	1.
Role of the Coach:	2.
Dignity:	3.
Integrity in Relationships:	4.
Professional Competence:	5.
Personal Standards:	6.
Confidentiality:	7.
Coach Responsibility:	8.

1. Preamble:

Coaching within the sport of archery can contribute with the development of individuals in their chosen sport. It is a process for developing many awareness skills which, when used, will enhance the archer's ability, consistency and enjoyment of shooting the bow.

Every coach should respect and protect each person's human and civil rights, and should not participate in any unfair or discriminatory practices or condone such activities.

It is essential to establish and maintain a standard of ethical behaviour whatever level of coaching is being undertaken. The coach should work within an ethical framework that is acceptable to them, the person they are coaching and the national guidelines of the country in which they are coaching. The principles of responsibility detailed in this document provide the core values for good progressive coaching.

This code of ethics for coaching is a framework within which to work and lists a series of guidelines rather than a framework of rules.

It is expected that archery coaches will encounter ethical dilemmas/difficulties in many areas; they must respect the integrity and confidentiality of the athlete at all times and reject any forms of abuse whatever level or guise they may take.

Coaches who adopt this code of conduct also accept the responsibility of the task they are undertaking. This includes the

responsibility toward the parents, family, and colleagues of the athlete, their employer and the organisation under whose umbrella they are operating, i.e. club, county, country and World Archery.

2. Role of the Coach:

To gain respect you have to give respect, and when you give it make sure that it is genuine and sincere.

Coaches play a vital role in the progressive development of their archers. How coaches communicate with the archer and the atmosphere they create often determines whether the interactive experience is beneficial or detrimental. Based on this, coaches should adopt a positive approach to coaching. This should be based on good common sense and incorporate several basic principles.

- 2.1** Give plenty of praise and encouragement. When people are learning and refining newly adopted skills, coaches should provide plenty of genuine praise and encouraging statements that are related to the skills and performance of the archer.
- 2.2** Give praise sincerely. If coaches are not sincere with their praise and encouragement, they will lose their credibility with the archers they are coaching.
- 2.3** Develop and produce realistic expectations. It is imperative that coaches and their archers have realistic expectations that are based on each individual's abilities.
- 2.4** Give praise for effort as much as outcome. For some archers, winning events may be an unlikely achievement, but trying to succeed by giving maximum effort is attainable by all those involved.
- 2.5** Give praise for correct techniques and performance, not just outcome. Coaches should remember to encourage archers to improve their skills. They should also provide encouraging feedback to the archer when they have produced a good technique but are less than successful with the result. Winning at the expense of skill development

will lead to failure at the more advanced levels of archery participation.

- 2.6** Employ a 'happy sandwich' approach to correcting mistakes. This technique focuses on providing a corrective instruction sandwiched between two positive and encouraging statements.
- 2.8** Help archers set realistic but challenging and attainable goals. Help archers to define success by achieving personal goals that have been set by mutual discussion and agreement. These goals should be recorded so that they can be referred to through the progression of improvement and time.
- 2.9** Ensure that training and practice are enjoyable and always end on a positive note.
- 2.10** Expect children or juniors to perform within the limits of their age, physical attributes and ability rather than as miniature adults.

3. Dignity:

Safeguarding the dignity of the individual is a fundamental requirement of being a coach.

- 3.1** There shall be no discrimination between participants on the basis of race, sex, ethnic origin, religion, philosophical or political opinion, marital status or any areas that would be offensive or cause aggravation to any person the coach is likely to come in contact with.
- 3.2** No practice constituting any form of physical or mental injury to the participants will be tolerated. All doping practices at all levels are strictly prohibited. Any form of inducement to indulge in, or partake in, any drug abuse is contradictory to the Code of Conduct for Coaches.
- 3.3** All forms of harassment or abuse against participants or spectators; be it physical, mental, professional or sexual, are prohibited.

4. Integrity in Relationships:

Coaches must not encourage archers to violate the rules laid down by the official organisation/federation governing that activity. They should actively condemn any such action and encourage archers to adhere to, and abide by the spirit of the rules.

- 4.1** Coaches should not compromise their archer's integrity by condoning any activity that would present an unfair advantage. The coach must encourage and actively pursue measures that progressively develop performance improvement in a safe and considerate manner that will not jeopardise the archers' well-being for future performances.
- 4.2** It is the coaches' responsibility to ensure training and programmes they follow are directly relevant to the archer and that they are in accordance with the age, ability and experience of the archer and will not cause any incapacitation.
- 4.3** The coach should be responsible for the conduct of their archers and must discourage any behaviour that would bring them, the archer or sport into disrepute, whether this is in training, travel or competition.
- 4.4** Coaches must treat all opponents with respect whether it is in victory or defeat, and should encourage their archers to act similarly. It is the coach's duty to prepare their archer to respond to success and defeat in a cordial and dignified manner.
- 4.5** Coaches must be able to present any evidence of documented qualifications on request and must not refer to or display any item that falsely implies any sponsorship or accreditation qualifications.

5. Professional Competence:

The coach should take the limits of their knowledge and capacity into account; and should not assume responsibility if they are not sufficiently prepared for the task at hand.

- 5.1** The coach should recognise and accept when it is necessary or appropriate to refer their archer to other coaches or sport specific specialists for further development. It is also their responsibility, where appropriate, to verify the competence of the person or organisation to which they are referring their archer.
- 5.2** It is important for the coach to obtain documented evidence of their qualifications either through coach training or documented coaching performance.
- 5.3** The coach must refrain from working in an environment that is unsafe or jeopardises the safety, or well-being, of their archers or other participants.
- 5.4** Coaches should actively seek ways of improving their personal and/or professional development; they have a responsibility to themselves and their archers to improve their own ability and effectiveness.

6. Personal Standards:

Personal appearance is a matter of individual preference and culture but a coach should project an image of cleanliness and efficiency; and not project an image that would offend either onlookers or the archers being coached.

- 6.1** Coaches must be aware of, and project an image of high standards of coaching to their archer, their archers parents and families, other coaches, spectators, officials and all other persons that may be in the vicinity or able to observe any activity being undertaken.
- 6.2** Coaches should never smoke when they are conducting a coaching or training session.
- 6.3** Coaches should not drink any alcohol before conducting a coaching session. It may affect their decisions or competence to coach and may compromise the safety of the archers or spectators of the session. It may also be offensive to archers to smell alcohol on the breath of the

person they are being coached by, and breathing out alcoholic fumes does not portray a very good image of a coach in charge of an important training session.

7. Confidentiality:

When a coach has a good working relationship with an archer it is inevitable that a great deal of confidential information is shared and sometimes recorded. It is imperative that the coach and archer agree on which of this data is regarded as confidential, this confidential information must not be divulged to any person or persons without the express approval of the archer or their parent or guardian.

Coaches must not disclose information entrusted to them in confidence. Any disclosure of information must not be for personal gain or benefit, nor be undertaken maliciously to damage the reputation of any person or organisation.

Some person, persons or organisations may have a need or right to have knowledge of some of this confidential information. It may fall on the coach to decide whether the disclosure of such information is in the best interest of the archer or sporting organisation. Some examples of this are:

- Performance information for team or competition selection.
- Disclosure of information to doctors, athlete's parents or family where the health or safety of the athlete may be in jeopardy.
- Disclosure of information to protect children or vulnerable adults from abuse.
- Disclosure of information for legal or disciplinary requirements.

8. Coach Responsibility:

Responsible coaching carries the expectation that activities carried out by coaches will be beneficial to the archers they are coaching and to the sport in which they partake. The purpose of coaching is to improve the archer's performance and at the same time minimise the risk of injury by employing up-to-date techniques and ensuring that all their training programmes are well prepared.

- 8.1** The coach should recognise and acknowledge their limitations and work within these limitations. They should accept the responsibility to refer their archer to other coaches or sports specific experts who have more advanced knowledge than themselves, and work with these people to enhance their archer's well-being and/or performance.
- 8.2** The coach should strive to enhance their knowledge and coaching skills through research and personal learning projects, and to ensure their training programmes enhance their archer's well-being and/or performance and does not harm or hinder them in any way.
- 8.3** The coach must be responsible for their archer or team and themselves in the pursuit of professional competence both in training and competition through well balanced and appropriate training programmes.
- 8.4** The coach must ensure that all training exercises and training programmes are appropriate for the person they have been designed for, and take into consideration, age, health, ability and experience of that person.
- 8.5** The coach must take into consideration the individuality and ability of each team member when constructing training exercises or training programmes.
- 8.6** The coach must constantly monitor their archer's physical and mental condition, take the necessary or appropriate immediate action, and take this into consideration when overseeing training exercises or constructing training programmes.
- 8.7** The coach must be aware of every day pressures the archer may have, such as educational, occupational, family or financial, and adapt their actions, instructions and training programmes accordingly.
- 8.8** The coach must consider the archer's well-being and future development when making decisions

on whether the archer can continue competing if suffering from a minor injury, fatigue or minor ailment. It is imperative that the well-being and future development of the archer are put before current performance.

In conclusion, we hope that this chapter will help to clarify the role and responsibilities expected of an archery coach. Also, the related qualities and values that to be developed along with the expected behaviour and social interaction; in other words, all that is needed to be considered to be good archery coach.

CHAPTER 4:

ENTRY LEVEL PROGRAMME & ARCHERY CLASSES

4.1. Preparation of a Level 1 Archery Training Program

4.1.1. Programme planning and preparation

An entry-level programme is based on the teaching the steps required to shoot an arrow towards a target in the proper sequence. "Practice session sequencing" provides an example of a sequence of such steps.

You can use these steps for your sessions with novices. With no further knowledge on their part you can practice archery on a recreational level with your students, always keeping safety in mind.

If you want to educate your novices to perform to their highest level, you have to organise your archery programme in a structured way, to proceed step by step to the eventual best performance of your archers. As a result, your practice sessions with your novices will give both you and your students satisfaction and enjoyment.

You need to set the following:

- The length of the programme:
 - A complete beginner archery programme consists of at least 15 practice sessions.
- The number of practice sessions scheduled:
 - A novice should practice at least once a week, more is better.
- Location(s), dates and starting time:
 - A booking process may be required.
- Length of the practice sessions:
 - Usually an entry level archery class lasts one to two hours.
- The archery equipment available:
 - Usually from your archery organisation or local club.
- The human resources available:
 - Will you be alone or assisted? An experienced coach can operate with one or several assistant-coaches.
- The number of novices in the course:
 - The size of the class depends on the ability of the coach. Ideally there is a ratio of 1 coach to 6 novice archers.
 - Pending the profile of the novices, the available equipment and your experience in archery coaching, 6 to 12 may be acceptable.

- The age range of the archers:
 - All ages from eight and up are acceptable. However, younger archers may require more coaches
- Finance/budget:
 - Including the financial participation of the novices.
- Anything else that might pertain to your particular situation.

Knowing the above elements, you can now prepare the various classes of your programme and your promotional campaign.

4.1.2. Practice session sequencing

An archery programme should be structured in a methodical way. To get results, the novice first has to learn to shoot correctly. The learning process follows a natural and logical progression. In the beginning a novice often finds it difficult to find or control the muscles necessary for good posture and shot control. With training the required muscular movements will become controlled and refined. Depending on the body awareness of the novice, it may take several training sessions for the shooting sequence to become automatic.

During an entry-level archery course the coach follows a systematically organized programme to teach the basic shooting skills. These skills may be taught in the following order, in the case where the program starts with the shaft aiming method (see 6.9. FACIAL MARKS OR REFERENCES):

1. Stance and Body-pre-setting
 2. Hand positions
 3. Bow raising
 4. Pre-draw
 5. Draw (Bow opening)
 6. Full draw activity
 7. String clearance
 8. Bow hand (introduction of the sling)
 9. Release
 10. Follow-through
- With any aiming method other than using the shaft (straight line), the three following skills may be taught earlier
11. Facial marks (face/draw-hand position), also called Anchor Point
 12. String alignment
 13. Sight setting (use of the quadrilateral method)

For all methods and techniques, finish with:

14. Final overview of the novice

Note 1: Some of these basic skills may require many sessions and many different exercises. Build your own plan of teaching themes. In chapter #6, this manual will provide suggestions for teaching each of these basic themes.

Note 2: In this manual we have mainly used the shaft or straight line aiming technique. But many of these basic skills are also taught when using any other aiming method from the beginning, including the use of a sight.

4.1.3. BAP, a world Archery tool to build your entry level programme from

The World Archery Beginner Award Programme (BAP) described in chapter 13, is a great assistance to track an archer's development. If the BAP system is not used, a bespoke file for the development for each novice can be made. Learning to shoot with a bow effectively takes time. It requires the learning and mastery of many different details and actions. Therefore, divide the total process into logical principles or steps. The progress of the novice's development and any flaws the novice is working on can be recorded and archived.

The main principles for building an entry-level programme include:

- Always focussing on doing things right rather than avoiding mistakes
- Assuming a proper stance and posture without a bow
- Assuming the correct posture with the bow
- Maintaining correct posture whilst shooting and follow through (including back tension), resulting in a passive release
- Making effective use of skeletal structures (bones) instead of using muscle power
- "Paying attention to what you are doing in the here and now; thinking about this step only and how to do it correctly."
- Proper evaluation considering the quality of the shot first instead of looking at the target for the results

After some time the coach will find out that each novice has his/her strong and weak points. At this time the advice of the coach will become tailored to each archer's needs.

If a novice moves or gets a new coach he/she can take this chart with them and the new coach will know at what point to continue teaching.

4.1.4. Promoting your programme

Before you start an archery class or course you need to interest people in the sport of archery. A promotional campaign can be useful, and should include the programme duration, location of the facility, schedule, cost, etc. Examples of successful marketing techniques include:

A promotional article in a local newspaper is often enough to garner public interest. A promotional article in a local paper.

- A poster in the window or on a publication board of large stores or other public facilities. (Ask permission first.)
- A small advertisement on the inside of the window of your car.
- E-advertisement: Website, Social media...
- A Come-and-Try event

Usually people enter their name on a list if they want to attend an archery course. As them for their address or telephone number as well, in case you have to contact them, e.g. for the exact start date of the new course. You may have to make a waiting list.

4.1.5. Registration and Data Banking

You, as a coach, have to keep track of all kinds of information which you can subsequently retrieve, and which may be used or needed for membership and/or during a training session. Some of this information will require regular updating as it will possibly be used for future training sessions. We call this administration activity "Data Banking." Your database will usually be in a notebook form, or recorded electronically. Remember that information can be confidential; in some countries it is even forbidden by law to publish personal data without permission.

In a later stage you might need the following information as well:

- Equipment required by the archers
- Equipment needed by you as the coach

As a coach, ensure that you are up-to-date about insurance and liability considerations.

Upon registration, inform the novices of clothing recommendations for the shooting sessions.

4.1.5.1. File of participants

Preparing simple forms like a File of Participants or Participants Chart is useful for administration. Ask the novices and parents to provide the necessary information. When the directory is complete, remove any confidential or non-public information and make photocopies to give to each archer or family group. Parents often appreciate having a copy

so they can get to know the names of the archers their child is shooting with.

The coach should know all his archers. A list of names is useful to get to know all novices by name as quickly as possible. Use a File of Participants with, among others, the following attributes:

- Given name and family name
- The name the novice wishes to be known as
- Sex
- Date of birth
- Address. Useful for arranging carpools, for example
- Phone number
- Email address. Have a question on the intake form asking whether they mind sharing their email address with the group
- Shooting side
- A picture of the novice would be useful for future memory

4.1.5.2. File of equipment

An inventory can be made so that the coach will know what equipment is available and what is still needed and should be purchased before the programme starts.

It is recommended to start with no target face, but if you use any, give preference to large target faces, 80cm minimum. Don't forget to ensure the tackle box is well filled with repair materials such as arrow rests and spare nocks, strings and dental floss or thread to make proper nocking points.

Repair the equipment where necessary. And last but not least: don't make a dustbin of your tackle box!

In an Equipment File or Equipment Inventory Chart we store the information about the stock of bows, such as

- Identification of bow
- Left or right-hand
- Bow weight
- Bow length

Mark the identification of the bow on the riser. You can have a similar file for the stock of arrows and other equipment such as arm guards and finger tabs as well.

4.1.5.3. Equipment assignment file

An Equipment Assignment File or Equipment Assignment Chart is recommended. It indicates the equipment that novices use and it will include:

- Name of the archer
- Arrow length and size
- Identification of the club equipment used

4.1.5.4. Medical information card

Having a Medical Information Card for each novice is important for safety. A blank novice Medical Information Card is provided at the end of this chapter. Copy the required number, and then ask parents to complete one for their child at the beginning of the programme.

Review all the cards when parents return them, and ask for any additional information needed. Knowing these details helps to prevent problems and allows you to deal with injuries or accidents more effectively if they occur. Assure parents the information will be kept confidential.

4.2. Preparation of an archery class

4.2.1. Come-and-Try event versus the first class of an entry level program

Below we have made suggestions for the first class of an entry level programme. For a Come-and-Try event our recommendations would be different since we have to get the participants shoot arrows within a short time. Safety is the main concern, while proper shooting form is not so important. The idea is that people shoot arrows for as long as possible and hit what they are aiming at.

The shaft aiming method is particularly appropriate to a Come-and-Try event, because it is easy to hit the target at a short shooting distance with minimal technical acquisition and equipment adjustment.

The first class of an entry-level programme is quite different from a Come-and-Try event. In a class, it is important to take the time to help the novice get a firm grasp of proper basic archery form. This will allow them to build efficient shooting form for however long they participate in archery.

4.2.2. Educational concept

Like any training, there is in archery coaching a lasting debate on global and analytic instruction of the novice. Let us look a little at these two concepts, that have the same final goal: to teach to teach a single person a shooting sequence.

4.2.2.1. Global learning

A pre-determined sequence is taught to the novices. Very often it is "a movement or a path" starting from the bow elevation to the release. Its main advantages and disadvantages are:

Advantages:

- For the novice:
 - Allows an early fluid execution
- For the coaches:
 - Only one form to be instructed; hence an easier coaching education also an easier task
 - Facilitate harmony among coaches

Disadvantages:

- This pre-determined sequence cannot fit some novices; hence some later changes may be required for customization
- Some details can escape the novices

4.2.2.2. Analytic learning

The shooting sequence is built and instructed by steps. The advantages and disadvantages are the opposite ones of the Global Learning, i.e.:

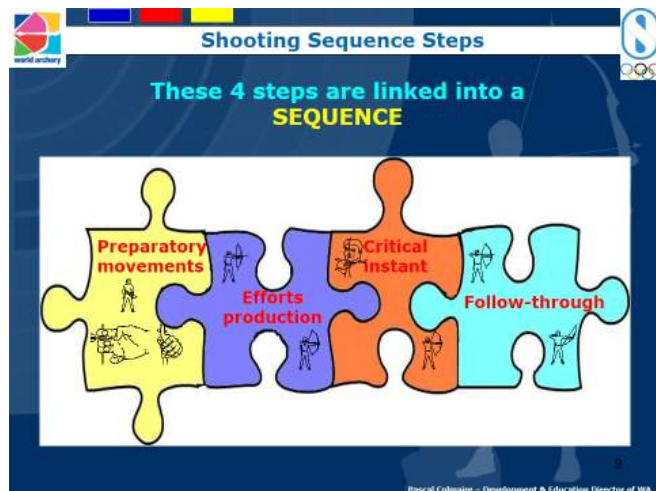
Advantages:

- Allows the coach to individualise/customise each component of the shooting sequence; hence the complete shooting sequence of each person
- Allows the novice to understand what is important in each step

Disadvantages:

- Possible lack of fluidity; hence post-work on linking the steps is often required
- The coach needs a strong coaching education to be able to individualise/customise while still respecting the fundamental bases

In this manual we are using the analytical approach to allow the apprentice coaches to individualise and customise the shooting sequence for a potentially diverse group of beginners. Furthermore this study will augment the development of a global process of teaching archery to novices.



Individual steps learned analytically are joined to form a complete shooting sequence.

In fact even each piece of the above sequence/puzzle is made of various pieces of puzzle. These pieces and "sub-pieces" are detailed in chapter 6 of this manual.

Similar to the common technique of assembling a puzzle by starting with the edge pieces, the various archery classes provide a structure to organizing the instruction and development of novices. Nevertheless, in the same way we sometimes find a piece of the puzzle that fits inside the puzzle frame, one can have a novice implementing some skills correctly that we have scheduled to teach later (for instance a still top body, a correct string grip or bow hand, a correct release...)

Since we are all different customization should also be part of our teaching delivery.

4.2.3. Introduction / Pre-practice tasks

In this section we consider the tasks and activities of the coach who will be conducting a level 1 archery session. We describe the tasks of the coach, which will be helpful to prepare such a session. To be a successful coach, you will have to simultaneously prepare the course as a whole and the unique content of each individual session while keeping the goals you want to achieve in mind. Preparation of a session includes, among other things, writing (briefly) the intended content of the session and preparing the equipment and teaching aids you plan to use in that session.

There are several things to do before each practice session. The following is a suggested list of things to do:

- Secure the shooting range by posting signs, locking doors and inspecting permanent signs as necessary
- Prepare target faces

- Have any scorecards necessary ready with clipboards and pencils
- Have any special equipment needed for the session ready, such as teaching aids: elastic bands, video cameras, etc.
- Open the equipment cabinet or storage area
- Have the tackle box and first aid kit ready

A beginner archery session is a 45-minute to two hour gathering of archers, conducted by a coach, with the following objectives:

- To discover the sport of archery
- To learn the basics of archery
- To have a good time with a bow and arrows

Afterwards we will suggest you how to plan an archery programme at entry level. In chapter 3, "Coach's role and what is coaching", we went into more detail about to the role of the coach.

4.2.4. Typical tasks for the first session

Actions such as choosing the shooting side and determination of arrow length are typical for the first session only.

4.2.4.1. Shooting side choice

Before giving out equipment determine whether the novice is right- or left-handed. There are two possible criteria to consider when choosing the shooting side, and there have been long-standing differences of opinion as to which criterion is more appropriate: the hand or the eye? Good results have been achieved using either criterion.

The shooting side or drawing hand could be chosen on the basis of the most agile hand. Since this hand is generally the strongest, the novice would be able to control the bow weight better, facilitating the learning of the shooting process.

Manual ease and dexterity should not be neglected when choosing the shooting side. You probably remember how awkward you felt the first time you handled a bow; particularly when loading the arrow on the bow. This awkwardness increases when a right-hander is asked to shoot left-handed, or the other way round. But because of the fact that the act of shooting is new for the novice it is hardly an overriding influence in the process of learning this new skill at all.

Consequently, some novices slow down the entire group, giving them an uncomfortable feeling of being clumsy. It is a task for the

coach to be inventive with such minor problems.

If the novice is physically weak on one side, especially in the arm or shoulder, give priority to the side with greater dexterity, because performing some actions, such as nocking the arrow, are easier and generally the balance will be more solid.

If you choose the dominant hand for determining the archer's shooting side, be sure the novice uses the proper eye. Right eye for those who draw the string with the right hand, and the opposite for the left eye. By using the "shaft or straight line" aiming method (see Chapter 6) this control is easy to ensure. Otherwise you may have to block the vision for the eye that is not used for aiming.

If you decide to choose the shooting side based on eye dominance, you may use one of the following methods, or another you know of, to determine the master eye.

Method #1:

Have the novice overlap their hands and hold them out in front of their face as illustrated below.



Have the novice look, with both of their eyes open, through a small hole in their crossed hands directly at the tutor, as shown in "figure 1". Then get them to gradually bring their hands back to their face, keeping both of their eyes open and you will see the hands will come back to the eye that is their "master eye", as shown in "figure 2". There are many methods of determining the master eye but this is a simple and quick method.

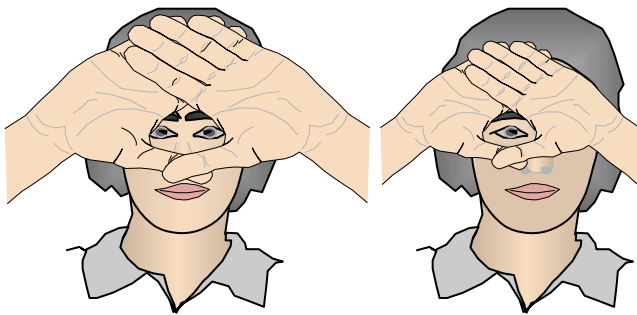


Figure 1

Figure 2

Method #2:

It is a similar method as #1 above, but it can be done by the novice alone; without the assistance of the coach.

The novices hold their arms out at arms' length and look through a small hole in their crossed hands at an object in the distance. Keeping the hands steady, close the left eye. If the object is still visible through the hole, then the right eye is the dominant eye. To confirm this, with both eyes open the novice slowly brings hands back towards the face; the hole will be in front of the dominant eye.

This method also works having the novice look through the hole in the middle of a CD or DVD instead of using the novice's crossed hands. If a disc is not available, a piece of cardboard approximately 15cm square with a 1.5-2cm hole in the middle can be substituted.



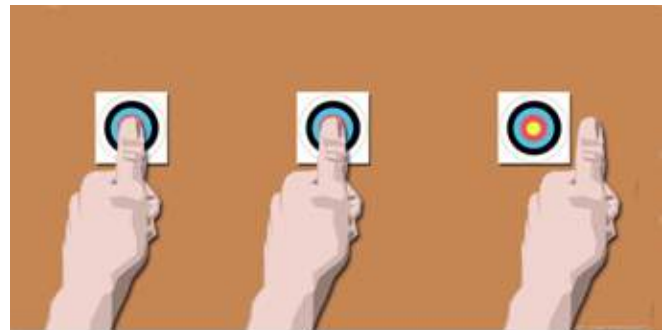
Method #3:

Using a set-up similar to method #1, have the novice look at you through the hole.

An alternative is to have the novice at about 2-4 m from the coach. Ask the novice to point, with the extended arm, with the index finger (or with the thumb) to your own dominant eye without moving his head and keeping both eyes open. The coach can now see under which eye the novice has his index finger placed. That eye is the dominant eye. You may check that with his other arm. Take care the novice doesn't move his head while he repeats the procedure.

Method #4:

Extend one arm and with both eyes open, point a finger, or thumb, at an object (left illustration).



Close the left eye. If your finger stays in line with the object, the right eye is dominant (Central illustration). Reverse the procedure and close the right eye to prove the left eye is not dominant (right illustration). For a left-eye the obvious adjustments to the above result are true.

To summarize, when the right eye is used for aiming, the string is drawn with the right hand, the bow held in the left hand. The reverse is true when the left eye is used for aiming.

Those who do not have a "dominant" eye for shooting may close one eye while aiming.

Some novices cannot close the "non-dominant" eye, but though it is open during shooting, aiming can be done in the correct manner because of the extra strength and visual control the dominant eye has over the other eye. Alternately, the archer in this case could go with his/her dominant eye rather than hand. If this is not possible and the novice cannot close an eye, an eye patch may be used. If a novice has a very weak eye, the shooting side can be the side of the more able eye.

In cases where the beginner novices are really unsure, let them try both Right-handed and Left-handed bows and let them decide which feels better.

4.2.4.2. Determining draw and arrow length

Use an elastic string over the string bracing the bow, and a very long arrow that can be graduated. The use of the elastic string, or a very light bow, is recommended to avoid any top body deformation under the weight of a regular bow. The novice pulls the elastic string to full draw, in front of a target, keeping the bow shoulder down and the head straight.

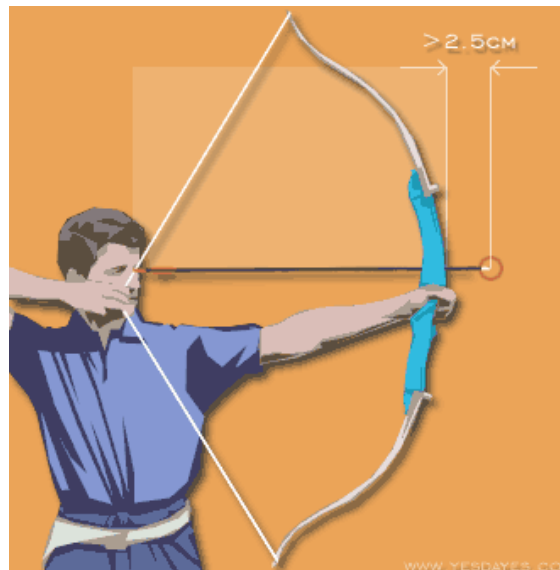


While the novice holds the draw, the coach or an assistant marks the arrow shaft at the back of the bow handle (ideally 1 inch in front of the shaft contact with the arrow-rest). The archer's draw length is the distance from the mark put on the arrow shaft to the bottom of the nock groove.

Draw length depends on the body size and the form of the archer. Usually the measured draw length increases with the experience of the archer, so keep that in mind when determining the arrow length.

Determining arrow length

To determine the arrow length for a novice archer, simply add at least 2.5 cm (1") to the draw length (illustration below). Bow length and weight can then be selected.



4.2.4.3. Choice of equipment

Please refer to chapter 9 for further advice on equipment.

For a level 1 course most bows will be fine as long as the bow is in good condition and is low poundage. The bows to be used in level 1 sessions must not be stronger than 22 Lbs.

Having determined the draw length in inches, you simply add 40 to get the desired bow length. For instance a novice with a draw length of 28" needs a $(28+40=)$ 68" bow.

Unfortunately there is not always a big choice of bows available for the level 1 classes, so you should be aware of not taking too many novices into one class. You could give several sessions one after the other. Some equipment can also be made, including bows from PVC tubes. For further details about equipment, see Chapter 9 - Equipment and Facilities.

4.3. Archery class

4.3.1. First practice session

The first practice session is in many cases a novice's first impression of participating in archery. Thus it is important to ensure that the experience is positive, engaging and fun while providing the necessary instruction for success. Here are some items to include to help your first session to be a smooth one:

1. Introduce the coaches and archers. To keep overall supervision during the first couple of sessions a 1:6 coach:archer ratio is ideal. Check that all the forms are completed. If not done yet, do it now.

2. Introduce the facilities and the equipment to be used. Also remind the novices about the recommendations regarding clothing.
 3. Introduce warming-up.
 4. Demonstrate how to shoot, having positioned the novices so they may properly and safely observe. Provide safety rules throughout the demonstration. Tell the novices the meaning of "Let Down!" Explain the differences in shooting for left-handed individuals.
If you have distributed the equipment beforehand (not recommended, see step 7), ask the novices to put their bows down, then perform the demonstration, first from one shooting side, then with the opposite side in case there are both right- and left-handed novices in your class.
 5. For each novice determine the shooting side.
 6. If necessary, divide the novices into workable pairings/groups bearing in mind space, equipment and coaches available.
 7. Through mimicking and simulations, in front of a mirror if one is available, either hands free or using an elastic resistance band, have the beginners implement a proper shooting sequence. That is, ensure that each novice is using technically good shooting form and technique before they shoot any arrows. This is imperative as it is usually much more difficult to rectify form errors once the archer has progressed to using a set of archery equipment. Only after the novices' form is adequate may they progress to the next step.
 8. For each participant:
 - Measure the arrow length required
 - Issue a quiver and show the novice how to affix/adjust it.
 - Issue six arrows of the length to suit the bow weight and draw length of the archer, preferably fletched (or crested) in the same pattern. Remind the class that the arrow must be loaded on the string only when on the shooting line.
 - Estimate the bow weight and length
 - Distribute a strung bow that fits their physical requirements. Immediately emphasize and explain why *dry firing* is forbidden. Bows should have an identification number so that the novice can readily identify the bow for the next session. At this stage a bow is rarely too light, on the contrary it is often too heavy, therefore encourage the use of lightweight bows
 - Distribute an armguard and show the novice how to affix/adjust it.
 - Determine if a chest guard is required and show the novice how to affix/adjust it.
 - Check if clothing is suitable, if not fix the clothing and provide recommendations for the next session.
- Note: two items are not mandatory for the first session:
- A finger tab since few arrows will be shot during this first session and since the bows are very light. If/when you issue one, explain:
 - Why a tab is required. Shooting without a tab will soon result in sore fingers which will cause release mistakes.
 - How to grip the string with this item
 - A bow sling because during the first session the focus of the novices should be kept on the setting of the body. Any extra item to handle can divert their attention from the setting of the body. Furthermore during the first session the novices are generally so tense while pulling the string back that they are not able to have a relaxed bow hand.
9. Choose a shooting distance between 4 and 10 m (*), depending on the physical size of the archers.
(*) *Be aware, when using a very close target, that arrows that do not stick into the target may rebound back toward the archer.*
 10. Assign two to four novices per target.
 11. Initially do not use a target face on the target butt; if you want to use one, an 80-cm target face will do.
 12. The novices must each take their turn in shooting under supervision.
 13. Watch the overall posture.
 - Pay attention to:
 - Draw/arrow length
 - String clearance in relation to the positions of the bow hand, elbow and bow shoulder
 - Assist the novices with shooting their first arrow.
 - Change equipment if necessary
 - Ask the beginners to advise you immediately if they feel any pain from

the string striking either the forearm or chest, or discomfort in the string fingers.

- At your discretion, give them permission to shoot without supervision when they demonstrate a safe shooting style and an adequate grasp of the basics.

14. The physical actions of the shooting sequence are not always easy to learn and you as the coach may have to:

- Emphasize the necessity to maintain the body in an upright position, keeping the shoulders low and draw the bow in the way you have explained otherwise safety is at risk.
- Physically assist beginners to achieve the desired positions and actions. Alternating shooting with mimetics (the act of mimicking the body position and shot without using the bow) or using a rubber band is recommended at the start.

15. When the first end is over, explain:

- How to leave the shooting line
- Where to put the bow
- Where to wait for the signal to retrieve arrows

16. To retrieve arrows:

- Blow a whistle as a signal.
- Take the class to a target, cautioning them to watch for arrows in the ground or on the floor.
- Demonstrate the correct method of pulling arrows, and where to stand while retrieving them.
- Caution that, at the target, *nobody should stand in front of the arrows at any time*. Arrows sometimes require some force to remove them from the target and consequently they may come out of the target with a backwards jerk. Someone standing in line with such an arrow, could be seriously injured.
- When you are using a scoring board (not recommended for the first lesson, a game should have preference), and leaving it at the target, you need to put it behind the target stand or at least 2 meters in front of the target. Novices may hurt themselves, for instance getting poked in the eye, when bending over to pick it up off the ground or floor.

17. After the first end when the novices are back on the shooting line, review one technical point briefly using a short demonstration. The technical point you choose could be an aspect you wish to

highlight / reinforce, or be a fault you have observed in the class.

18. During the next end, assist those who have special difficulties (if any exist), and provide individual assistance to no more than two novices at a time.

19. Depending on the time available a game could be organised, if so we suggest "Elimination by colour zones" in chapter #12. This game does not necessitate point counting and helps beginners memorise the different colour zones. Elimination games allow a rest for those who are dropped out as well as a chance to observe the "best".



20. After each end of the game, when the novices are back on the shooting line, recall the next step of the game. With each eliminated archer, make participation possible by letting them observe, or score, or take down and store the equipment.

21. At the conclusion evaluate the session briefly with the participants. Discuss the "feel" of the session and invite suggestions from the participants. Ask if there are parts of the session that can be improved. You as a coach are also learning continuously, if you want to refine your coaching skills.

22. The session length is between 45 minutes to two hours, depending on the average maturity of the group.

4.3.2. Second practice session

After the warming-up, review the finer points of form especially the upper body: head straight, flat chest and back, shoulders low, relaxed arms and hands. The novices should start to observe their own form; a mirror is a good tool to for this purpose. Intensive controlled practice is needed to reinforce the correct form details.

For the shooting part of this session the targets are set up at 10 m from the shooting line for teenagers and adults, or closer (around 6 m) for younger novices.

From this second session on, the following class plan is suggested:

Instruction
Plan of a Class

- 1 coach for 6 to 12 beginners
- The sections in a typical session in Archery are:
 - Preparation
 - Welcome
 - Warming Up
 - Review of the previous session
 - Teaching of an ability.
 - Introduction: *Demonstration and simulation.*
 - Assimilation of the ability by the increment of the difficulties: *Auto-observation, sensation of discovery, shooting without a target, shooting at empty targets.*
 - Evaluation of resistance (of ability):
 - *Shooting with a target, a duel, counting points or a game.*
- Return to more "regular" and controlled shots;
- Evaluation of the session – equipment storage.

Patric Cabral – Training and Development Coaching Director of WA

4.3.3. Following practice sessions

In the sessions to come, the novices also learn the correct procedures of assembling, stringing and unstringing the bow.

As mentioned in section 4.1.2 above, the shooting part of each session will concentrate on one skill from the list below:

1. Stance and Body pre-setting
2. Hand positions
3. Bow raising
4. Pre-draw
5. Draw (Bow opening)
6. Full draw activity
7. String clearance
8. Bow hand (introduction of the sling)
9. Release
10. Follow-through
11. Facial reference position (face/draw-hand position)
12. String alignment
13. Sight setting (use of the quadrilateral method)
14. Final overview of the novice

You have to accept that the novices will make many mistakes in their performance of the shooting sequence and that perfection is not the goal of a level 1 course.

This means that you as a coach have to help the novice to focus on doing the steps in the shooting sequence properly instead of thinking of scoring or hitting the centre of the target.

Once they start active shooting, novices may need to be given feedback about their mistakes if their scores are not in accordance with their expectations. Refocus these novices on their shooting skills. If they are result-orientated then looking for grouping is much more important than scoring. Remind the novices that they have to use the proper technique to get small groups. If they can shoot small groups they will be able to hit the centre.

In conclusion of this chapter, one can say that following a structured plan of classes will help your programme to flourish and your novices to have the best success possible.

The following is a suggested format for a "Medical Information Document".

Archer's Medical Information		
Year		
Family Name:	First Name:	Date of birth: D.....M.....Y.....
Age Category:	Equipment Division:	
Person to be contacted in case of emergency:	Last name:	First name:
	Phone day:	Phone evening:
Alternative contact:	Last name:	First name:
	Phone day:	Phone evening:
Family Doctor:	Phone day:	Phone evening:
Health Insurance Number:	Contact Lenses: Y N	
Relevant Medical History:		
Medications:		
Allergies:		
Previous injuries:		
Does the novice carry and know how to administer their own medications? Y N		
Other conditions:		
* Medical information is confidential. Only authorised individuals should have access to this card.		

CHAPTER 5: TEACHING AIDS and TIPS

Teaching is a many faceted practice, as different students learn things in their own way. People can learn through observation, examples and knowledge transfer, advice reinforced by mimicking, trial and error and repetition. Using a variety of different techniques will help your novices learn efficiently and correctly. Observation is an effective method of learning, and is the one used first. Demonstration allows the archer to observe. However, when demonstrating exactly what to do, use similar equipment to that which the archers will be using, i.e. elastic band, and respect the archery safety regulations. Observation implies both seeing and hearing. For it to be effective, the archers must be able to see what is being demonstrated and hear what is being said.

5.1. Prior knowledge

Ask the archers what they know about the skill being emphasized during the practice session. Allow questions before a demonstration. Do not be surprised at the knowledge the beginners have. Beginner archers have perceptions of the sport or even prior experience. Giving the archer the opportunity to express their perceptions has advantages:

- if incorrect, the opportunity to correct them, to better express your ideas, and teach with greater efficiency;
- if incomplete, fill in the missing blanks;
- encouraging their participation giving them motivation and avoiding the monotony of a single speaker;
- you may hear certain comments that present the exercise more efficiently;
- if they are correct, the advantages are the same as above and the work has already been done by others.

No method is perfect. This one is no exception. Some archers may monopolize the conversation too often and/or talk too long. Limit comments to the subjects discussed. Use this educational tool because the dynamics of analysis and exchange outweigh the difficulties.

5.2. Teaching aids

Below are introduced tools and situations to be used for demonstrations and practice. Chapter 6 covers the uses of these teaching aids and tips in greater detail.

5.2.1 For demonstration

The attention of beginner archers is often distracted by the release of the demonstrator's arrow. Furthermore, some archers judge credibility based on where the arrow hits the target.

When first demonstrating a skill, it is often better to use a dry-shot mechanism to keep the novice focused on the form element being taught. Examples include:

- an elastic band



- an elastic string



- an elastic or non-elastic bow string retainer



Secondly, shooting without a target face into a bare butt, or directly into a net will also help the novice to focus on form rather than arrow location



If a target is important to the demonstration, ensure you have verified your aiming point so that your first arrow hits the centre of the target. Confirm the novices are concentrating on what you want them to observe;

- by looking at the novices during the demonstration to see if they are observing the essential points
- by forcing the focus of the novices onto a specific body part or action of the demonstrator.



An aid to force the students focus

5.2.2. For practice

The dry-shot devices and shooting without a target face also assist the novice to properly implement the technique being taught.

Since teaching aids help archers better understand and feel future performance, it is important that they be similar as possible to the equipment used during regular practice. Moreover, these aids cannot differ too greatly from the actual shooting context so that too much time is not wasted on progressively reconstructing it. Consistent with this idea, let's take the exercise of "push effort" as an example. To understand the string leg's participation we could create the following situations by using three different teaching aids. Even if they are similar they can be perceived differently by the archer:

- An assistant pushes directly on the archer's bow hand, forcing the archer to counter with their string leg. This demonstrates how the string leg is involved in the shot.



Human assistance only "I have to resist when I am being pushed".

- An assistant pushes on the archer's bow forcing the archer to resist with their string leg. This demonstrates that the string leg would act in a similar fashion if the bow was being drawn by the archer.



Human and riser assistance "I have to resist when my bow pushes me".

When the archer's bow is drawn, the bow pushes against the archer, forcing the archer to counter with their string leg. This demonstrates how the string leg is engaged during the shot.



Human and bow assistance.
"When my bow is drawn, I have to resist".

Notice how the different teaching aids that are above can help perceive situations differently.

Some other aids will certainly be useful to your teaching:



Shooting simulation with an elastic band allows an easier task implementation than with a bow for the novice and a good observation from the coach.



The use of a thin elastic allows a decent string grip



Standing on an elastic band allows the archer to practice their string hook



A short string loop can be added to the elastic band for a better string grip.



Using a bent plastic tube for electric cables, helps the bow hand find the correct position more easily.

A light elastic band can be used for many learning purposes:



Wrapping the elastic band around a real bow riser the novice learns to draw the bow back with the muscles of the back of the posterior part of the string shoulder



Extending an elastic band from the bow hand to under the bow foot makes the mass weight of the bow feel heavier



Full effort simulation



Using an elastic band while drawing the bow string makes the bow tension heavier



A different variation on making the bow tension heavier



Pulled the band in a lateral direction, the coach simulates windy conditions.



Making the bow tension heavier



An elastic dry-shot device



Visual feedback of the maintained orientation of the body during the expanding step (full draw).



Controlling loose clothing

And many other uses ...

Archers often benefit greatly from seeing what their form looks like. There are many ways to provide visual feedback to your novices during training, such as:



Teaching the expanding push action



Using an elastic band to teach the expanding pull action.



Use mirrors to provide an instant (and cheap) visual feedback to your students

A camera or smart phone is very useful and there are some very good coaching applications available at reasonable prices, some are even free!



Video cameras are very useful for showing the archer how they performed a certain skill.



For learning the proper bow hand position



For learning proper string hand hooking



For checking the alignment of the bow arm and shoulders



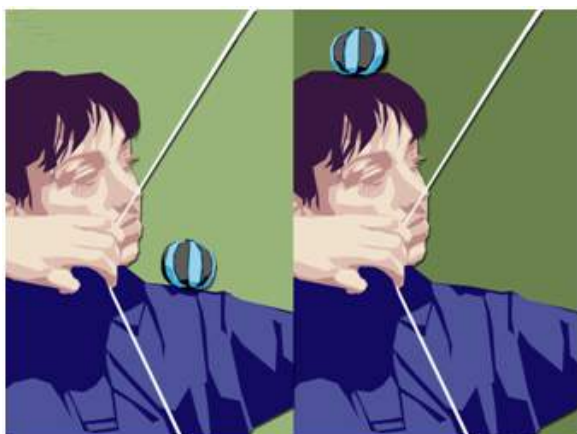
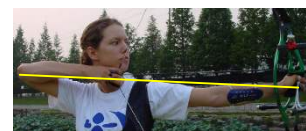
For checking the alignment of the string forearm in the shooting plane



Cut out target faces, for a progressive adaptation to the regular aiming task



For checking the alignment of the string forearm with the draw force line



Balance a soft juggling ball to check the good maintaining of some body parts.



A suspended bow to train the archer to keep their bow hand relaxed during the shot and as an introduction to using a bow sling

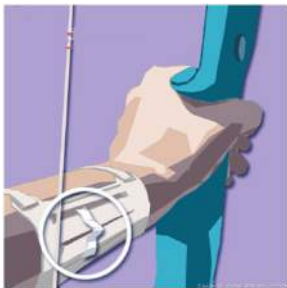
And many other uses.

Instead of a light elastic band, a piece of rope can often be used for many learning purposes:

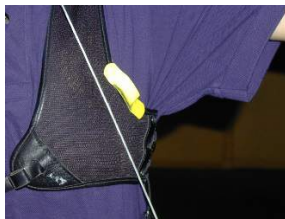


An elbow harness is a valued aid for the archer to feel the use of the back muscles during the draw and expanding actions and also to allow a "dry-fire"

Like for the light elastic band and the string/rope, self-adhesive tape, hypodermic tape, bandages, etc. can be used for many learning purposes:



For checking the string clearance at the bow forearm level



For checking the string clearance at hem level around the armhole of the chest-guard



To help identify where the string should be on the face



To represent some specific targets; here for lateral consistency

A long stick is also useful



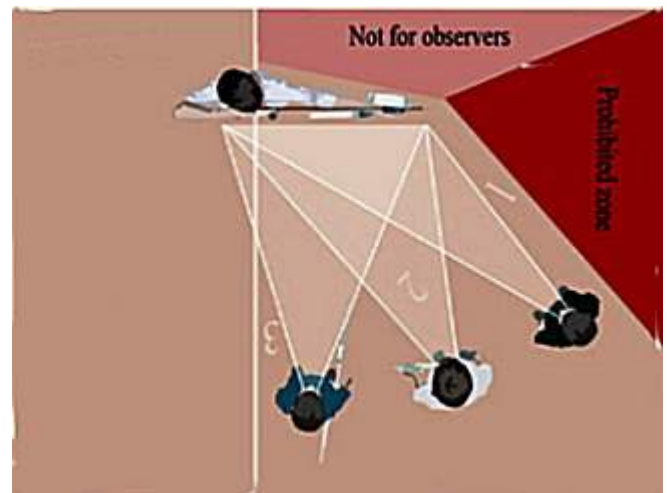
For checking the efforts in the body (low centre of gravity)



For checking the maintenance of the body orientation during the expanding action

5.3. Effective archer viewing arrangement

For safety reasons, prohibit archers from walking in front of the shooting line when someone is in the process of shooting. However, we relax this rule during demonstrations because the "3/4 front" view (or 2 o'clock - see illustration below) is the best observation angle. Furthermore the arrow resting on the side of the bow opposite to the observers; hence there is no risk.



The observers are standing on the opposite side of the bow from the arrow.

When demonstrations are done at short distances from the target, 3m to 10m, we allow the archers to be in the 3/4 front view and give the instructor the opportunity to shoot while watching if students are paying attention to the essential point of the exercise.

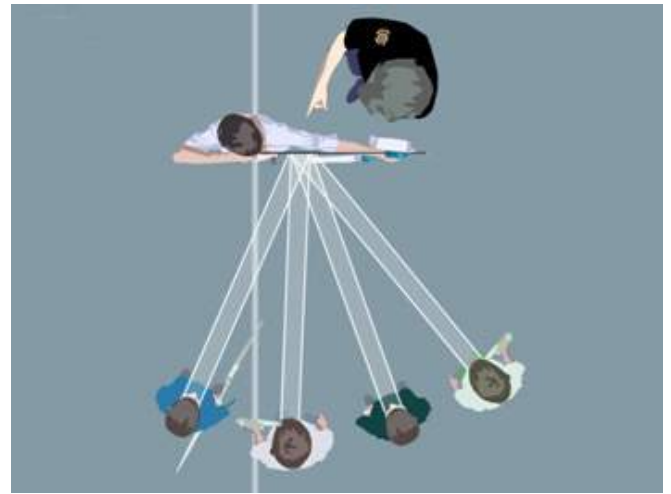
NOTE

Observation from 10 or 11 o'clock is not safe since students are on the arrow side of the bow and they cannot see very well.

If the demonstration is performed by someone else, be in one of the following illustrated positions to point out main areas of interest, or those deserving special attention, without blocking the archers' view:



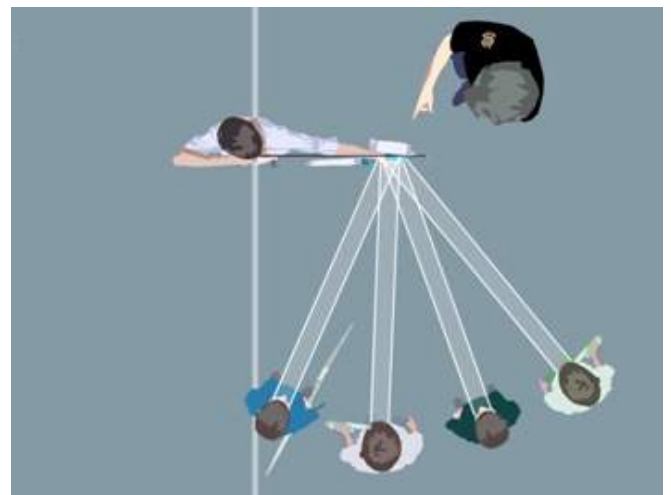
Demonstrating the archer's back.



Demonstrating the bow shoulder.



Demonstrating body alignment / draw force line.



Demonstrating the bow hand.



Demonstrating the string hand or face.



Demonstrating the bow hand.

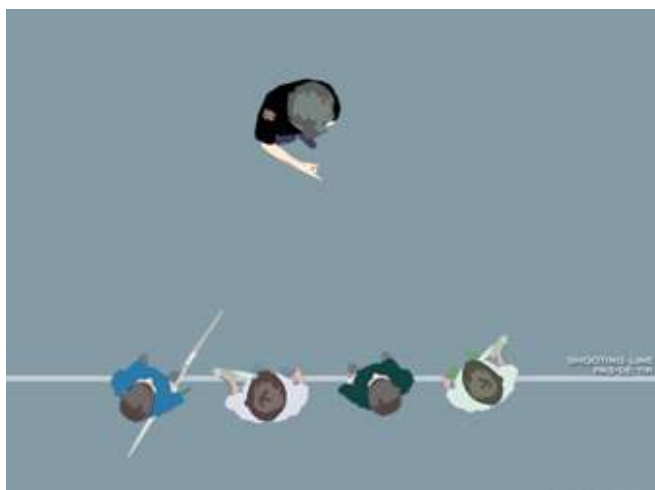
5.4. Instructions

5.4.1. During a demonstration

Instructions are essential to the learning process and group activities. If you perform the demonstration, give instructions before, during, and after the demonstration.

5.4.2. During the practice time of the beginners

- Instructions should be given just before shooting begins. If they are given earlier, they could be forgotten while shooting.



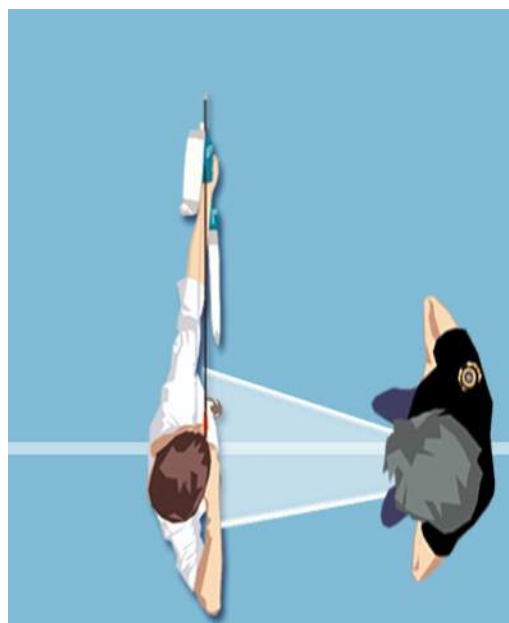
- Speak loudly enough to be heard by everyone, and use understandable language;
- Use positive language, explaining what the archer should do and feel rather than what to avoid.
- Use wording consistent with the archer's manual so the archers can consult it later to become familiar with the terminology;
- Only provide relevant instructions, avoid those not related to the archer's needs;
- The most productive instructions go with an expressive gesture. When the archer can feel the action, and note the results, they are more motivated to do it correctly;
- Use the archer's name while instructing for a more positive reception of the advice.

5.5. Observation

The commonly recommended sequence of observing is:

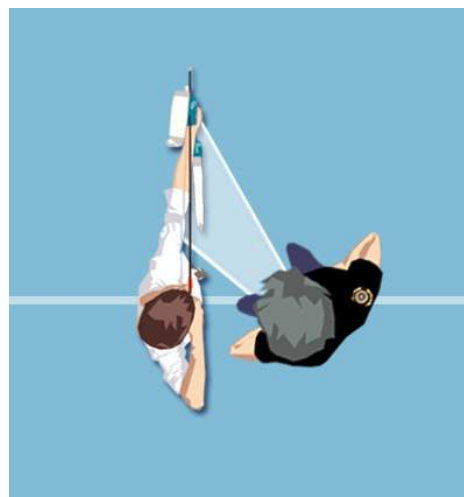
1. Stance
2. Body
3. Shoulders and head
4. Arms
5. Hands

Below we present some positions where the coach can stand to observe particular components of the shooting technique.



From this position the coach can observe:

- Body verticality
- "T" shape
- Shoulder height
- Head position and movement upon release
- Facial reference point (anchor)
- String hand
- Release



From this position the coach can observe:

- Bow hand position and relaxation
- Bow arm movement upon release



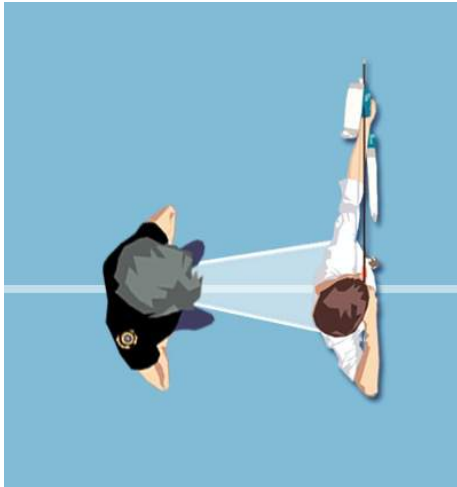
From this position the coach can observe:

- Feet alignment
- Body verticality
- Body alignment
- chest height
- Shape of the back
- Stance alignment
- Head position
- Bow verticality
- Draw force line
- String arm movement



From this position the coach can observe:

- Feet alignment
- Body verticality
- Body alignment
- Chest height
- Shape of the back
- Stance alignment
- Head position
- Eye orientation with the target
- Facial reference point (anchor)
- Draw force line
- Keep face impassive during the release
- Bow arm movement



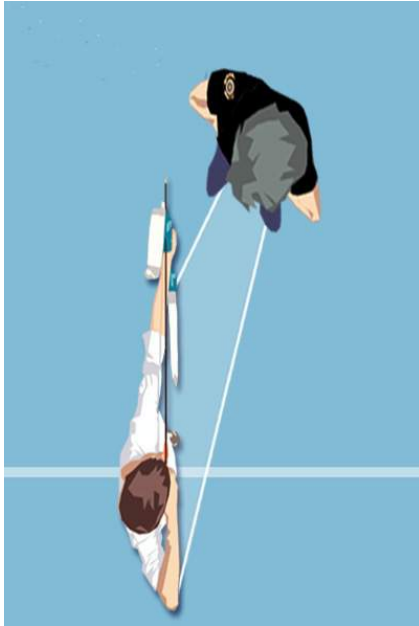
From this position the coach can observe:

- Body verticality
- "T" shape
- shoulder height
- Head position
- Scapular movement



From this position the coach can observe:

- Head position and movement upon release
- String hand
- Release



From this position the coach can observe:

- Chest height
- Head position
- Eye orientation with the target
- Facial reference point (anchor)
- Keep face impassive during the release
- Bow arm movement
- String hand and release

Conclusion:

The ideas provided in this chapter are a starting point, but with a little creativity you will discover many more ways of helping novices learn. Learning from other coaches and from your athletes will keep your techniques fresh and engaging. By using a variety of teaching aids combined with observation and active participation from your novices, you will find they progress quickly towards good form and good results.

CHAPTER 6: TEACHING SUGGESTIONS FOR PRACTICAL COACHING

Introduction:

People learn by observation, example, transfer, guidance, trial and error, and repetition.

The learning of new skills involves teaching proper basic form, not correcting minor initial faults. Correction of faults is done after the basics have been learned.

The primary tasks at the entry level are:

- Simplify the novice's initiation to archery;
- Make the novice understand what to do;
- Highlight what needs to be focused on;
- Give feedback on the current execution quality.

The feedback gives the novice the necessary information regarding what should be done and how it differs from what is being done. This ability to compare current form versus the ideal leads to learning to execute the skills properly.

Putting this into practice as a coach requires being aware of the archery skills and their key elements as presented in this chapter. Also the coach needs to know how to:

- Demonstrate the skills;
- Create learning situations;
- Provide effective feedback and encourage communication.

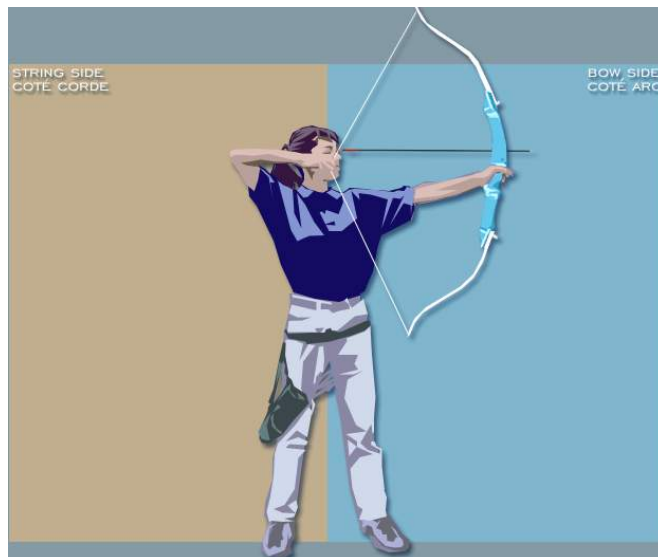
Coaching theory courses teach four phases of technical skill teaching. Applied to archery, they are:

- Skills and their key elements;
- Demonstration – its organisation and presentation;
- Practice and planning;
- Feedback and observation.

These phases and their implementation will be described in detail in this chapter.

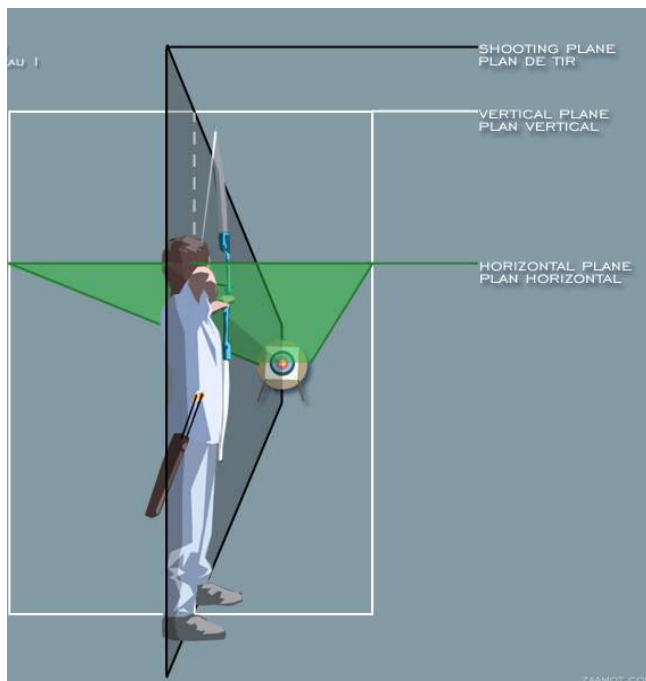
Some terminology:

For right-handers and left-handers the action of archery is reversed with respect to the side of the body that is involved. For example, the right side of a right-handed archer and the left side of a left-handed archer are called the string side. Thus terms such as "bow arm" or "string ear" shall be used to describe body sides unambiguously.



For similar reasons, we refer to the following three planes:

- Shooting or flight plane: the vertical plane in which the arrow flies;
- Horizontal plane: the plane parallel to the ground, including the nock;
- Vertical or sagittal plane: the plane perpendicular to the ground along the shooting line, relating to an imaginary plane that divides a human body into right and left halves.



The reference planes.

- Some mimics (hands only) and simulations with elastic band or elastic string on the bow
- Shooting under self-observation, using mirrors, photos, video, etc.;
- Discovering the feeling of the skill at hand through shooting with closed eyes;
- Shooting without any aiming task, i.e. without a target face;
- Assimilation of the skill by increasing the difficulty level, i.e. shooting at targets that are progressively more and more challenging. For instance shooting at successively smaller spots. Another example is the use of cut-out targets: starting with a target face largely cut-out (i.e. only with the white rings), then shooting at a target less cut-out (only the white & black rings) and so on until shooting at a full target face;
- Evaluation of skill endurance: Shooting with a target, with double scoring or a game.
- Ending the session with shots at a blank butt and/or with closed eyes is a good way to link the proper feeling to a well implemented skill.

Structure of this chapter

The steps of the shooting sequence, also called the "technical elements," and their key points are explained in this chapter.

It is important for the coach to make sure the novice executes these elements accurately. Individualizing key elements occurs when the novice has mastered the basics. The responsibility for this lies with a level II coach. Each technical skill and/or step of the shooting sequence is presented here with a two-step approach its instruction.

- First, the relevant complementary knowledge for each technical skill and/or step of the shooting sequence is highlighted in the order in which they are normally performed. Although it is not a technical skill, and introduction to the breathing sequence has been included in this manual. The shooting process starts from the stance, and is completed with the follow-through.

- Then exercises that may be used in order to teach that step of the shooting and/or breathing sequence are presented.

Note: For several exercises the coach may need to manipulate the novice in ways as described below. It is important to always get permission before touching the archer.

The use of the "Standard Teaching Process" (STP) is highly recommended in these exercises. After some explanation and a demonstration from the coach, the STP includes having the novice do the following:

The STP is illustrated in the exercise "Motionless and Stable Head – Exercise 2"

The formats of the exercises below vary, in order to keep training fresh and effective. These exercise come from various authors and/or from the same author but written at different times; since many coaches always strive to improve their services, they change their exercises' formats once in a while.

As not all novices respond to the same training methods, it is suggested that each exercise be selected to suit each individual novice and training session being conducted.

The following list is not exhaustive, but it is a basis upon which a training program can be developed.

World Archery is always looking for new and interesting exercises that enhance the teaching of archery to beginners. Submissions from novices and coaches are most welcome

6.1. STANCE

6.1.1. Complementary Knowledge

Type:

Preliminary action.

Goals:

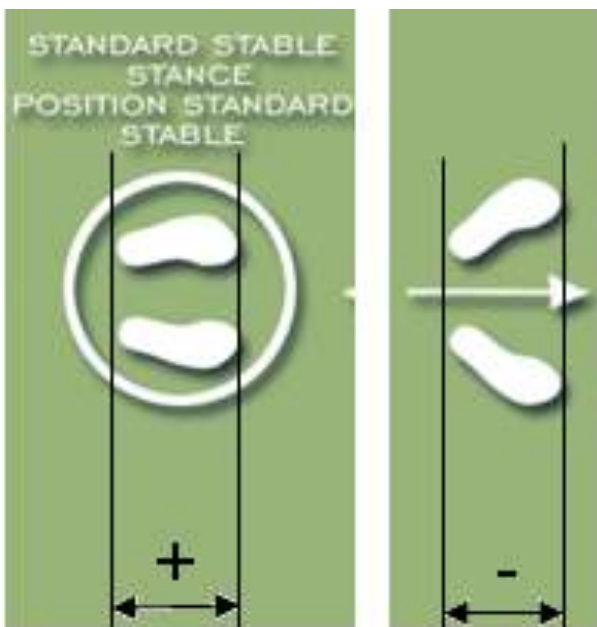
Consistent spatial relationship to the target and achieving optimal stability.

Form:

Feet parallel to the shooting line/axis, positioned at approximately shoulder width apart, with a little more weight on the front part of the feet.

Rationale:

Such a stance gives novices the opportunity to repeat actions easily and accurately. It provides sound support for pull and push efforts in the shooting plane, gives consistent direction to the body in the flight plane, and makes the coach's observation easier. Additionally, it reduces potential back problems and provides the optimum body stability in the toes-heel direction, by using the full length of the feet.



The stance creates the foundation for a good shot. It is such an important issue in an archer's form that it should be repeatedly practiced without bow and arrow so that they will be able to find the same position each and every time with ease and with minimal or no variation.

6.1.2. Exercises

Stance and Body Stability – Exercise 1

Objective:

Show to the novices that, with parallel feet, they use the full length of their feet for stabilizing the body on the heels-toes direction, which is the most critically unstable direction.

Situation:

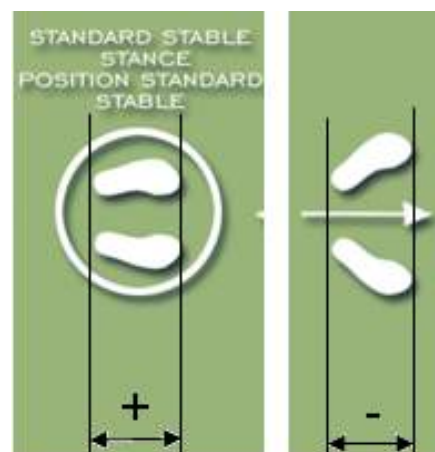
Full draw or in a regular standing position, eyes closed and without a bow, feet at more or less shoulder width apart

Instructions:

- First situation: toes spread out/heels in. This is comfortable, but the body may tilt towards the front;
- Second situation: toes close together/heels spread out. This is uncomfortable and the body may tilt backwards;
- Third situation: feet virtually parallel. This is often the most stable of the three positions.

Conclusion:

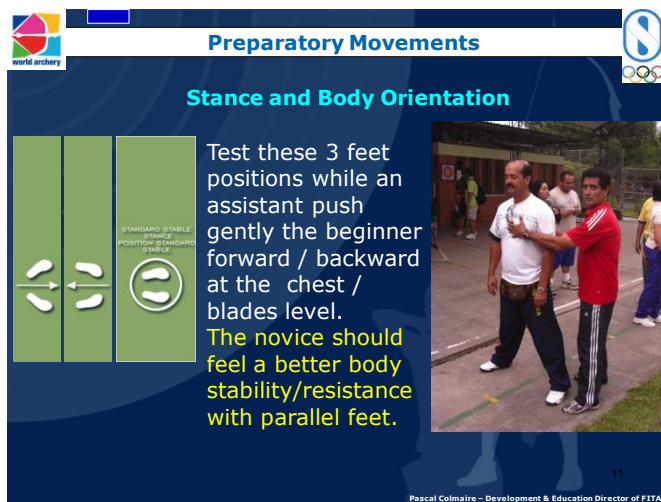
Parallel feet position offers the greatest stability. Any other feet orientations use a shorter feet length than with parallel feet for stabilizing the body in the heels-toes direction (the most unstable one).



Alternately the coach gently pushes the novice on the chest (heels direction) and then back (toes direction). Repeat this exercise with the novice using different stances. This is another way to confirm that parallel feet position offers the most stability from heels to toes.

Instructions:

1. The assistant applies some pressure on the novice's body, particularly in the heels/toes or toes/heels direction.
2. The novice adopts various feet positions (Parallel, opened, closed).



Objective:

To show the novices that parallel feet provide better resistance to backwards/forwards influences than feet with opened or closed toes.

Stance and Body Stability – Exercise 2

Objective:

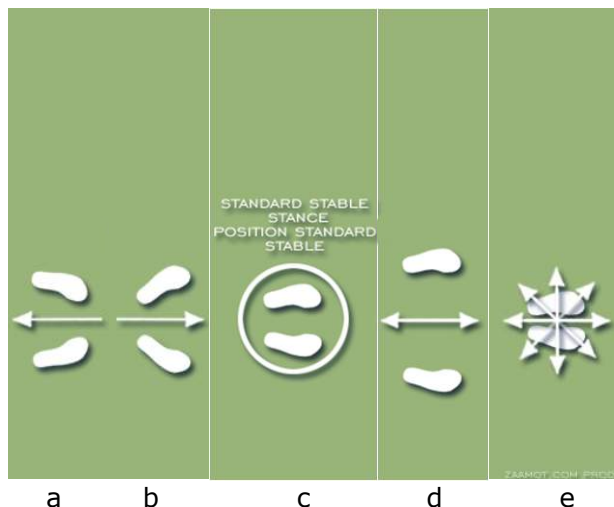
To find the distance between the feet that provides the best balance in both planes - shooting and vertical.

Situation:

Full draw or just in a regular standing position, eyes closed and without a bow.

With feet parallel to each other:

- First situation: large distance separating the feet. Good stability in the shooting plane, but unstable in the vertical plane;
- Second situation: feet close together. unstable in all directions, perhaps even more so in the shooting plane;
- Third situation: feet spread at shoulder width apart.



The various stance are identified "a" to "e" from left to right.

- **a & b** -The body moves toward the open side.
- **c** - A standard stable stance.
- **d** - A wide stance makes body move forward **and** back.
- **e** - Feet close together is the most unstable stance.

Equipment:

Optionally, this exercise can be implemented with a bow braced with an additional elastic string.

Instructions:

The novice gets a feeling for possible unstable stances and chooses the most stable one. If stability is not satisfactory, try the following:

- Make sure the archer's feet are parallel;
- Spread the feet if the body is moving to the left or right in the shooting plane;
- Bring the feet closer together (but not less than shoulder width) if the body is moving forward or backward in the vertical plane.
- Reduce the weight on the heels. The weight of the body should be taken on the full foot. With the balance on the forward portion of

the foot the body is able to compensate for wind and other influences. String clearance is also improved at the chest level.

- As a last resort, spread the toes apart or bring the toes closer together, up to a maximum of ten degrees and according to the direction of the instability. For instance turn the toes in towards each other if the body tends to lean or fall forwards.

Stance and Body Stability – Exercise 3

Put little marks at right-angles and on both sides of the shooting line where the archer's feet should be located.

Or

Draw footmarks on the ground where the archer's feet should be located (i.e. trace the archer's feet when properly placed).

Have the novice close their eyes then lead them to their standing position and get them to take up their proper stance position. The coach can then check this stance position with the aid of these marks.

6.2. NOCKING THE ARROW

6.2.1. Complementary Knowledge

Type:

Preliminary action

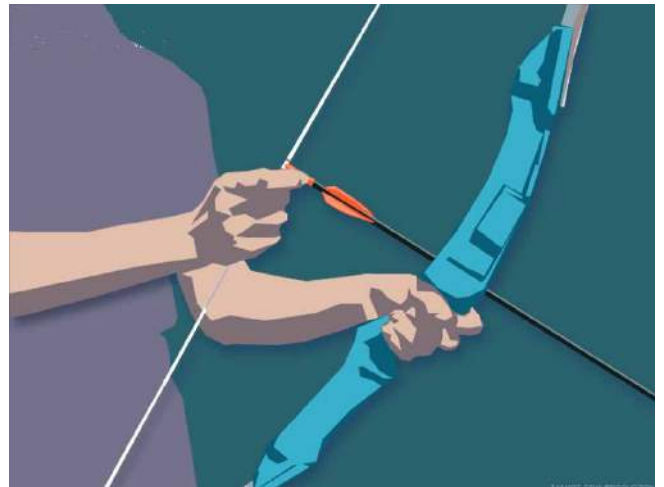
Objective:

Identical placement of the arrow with respect to the nocking point of the string.

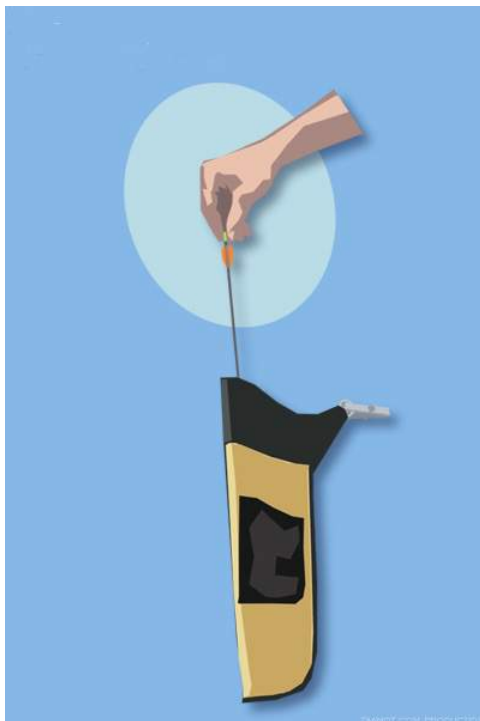
The action must be performed in a safe manner to protect the archer, other archers, and equipment.

Form:

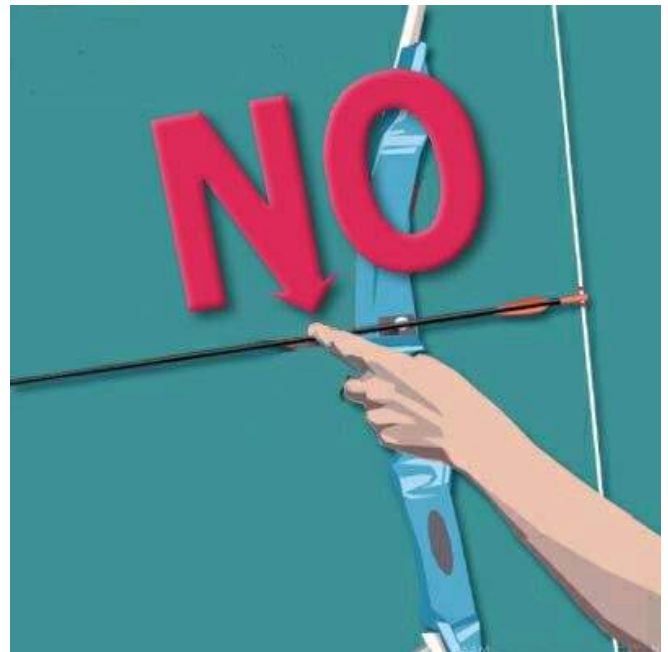
Take hold of the arrow by the nock, place the arrow on the rest, correctly turn the arrow to line up the nock, and nock it onto the string.



Nocking the arrow.



How to draw an arrow out of the quiver.



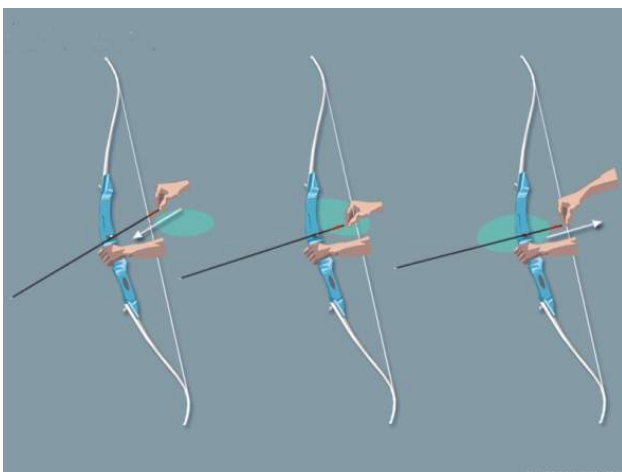
Finger pressure will damage the arrow rest.

Rationale:

Taking hold of the arrow in front of the vanes makes it more difficult to nock, and the fletching could be damaged if the hand slips. Strong vertical pressure can damage the arrow rest so care must be taken while nocking an arrow.

6.2.2. Exercises

No exercises are suggested for teaching how to nock an arrow.



Loading an arrow onto the bow.

6.3. STRING HAND AND GRIP

6.3.1. Complementary Knowledge

For the string hand two stages are to be considered during the shooting sequence:

- preliminary positioning before raising the bow;
- during the force production period and the release.

The following will mainly cover the first stage. See chapters on "Pre-Draw", "Draw" and "Draw Extension" for further information.

Type:

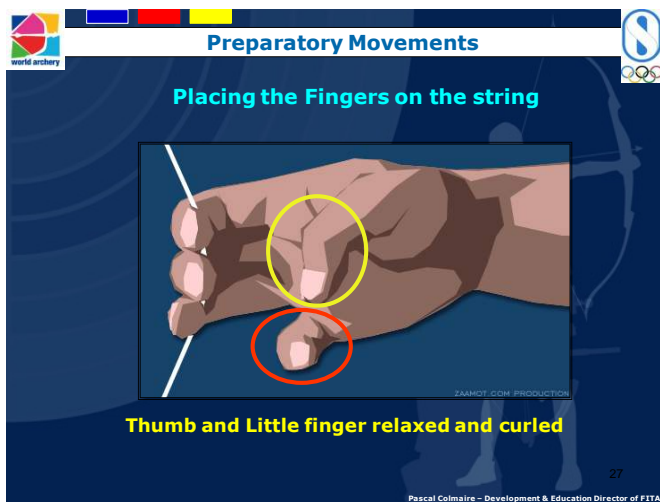
Preliminary action.

Objectives:

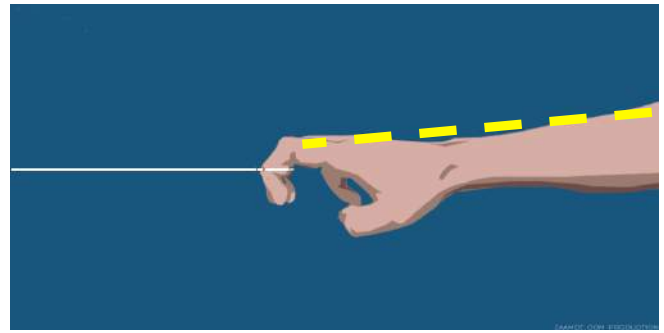
Consistent finger positioning on the string in order to produce the same distribution of effort on the string, hence on each bow limb, shot after shot.

Form:

The fingers – usually the forefinger, the middle finger and the ring finger – hook the string in the middle segment of the finger or in the knuckle furthest from the hand. The fingers that are not used – usually the thumb and the little finger – are relaxed.



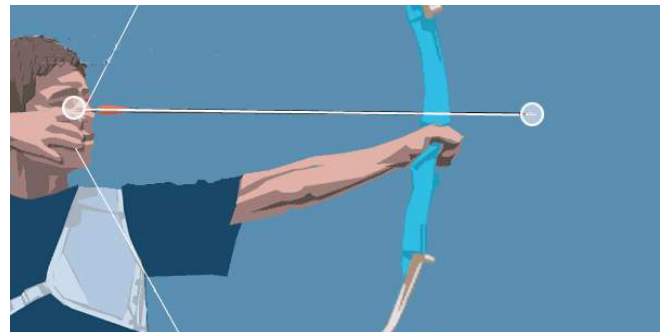
The palm and wrist of the hand are relaxed. The back of the hand is flat and aligned with the back of the forearm.



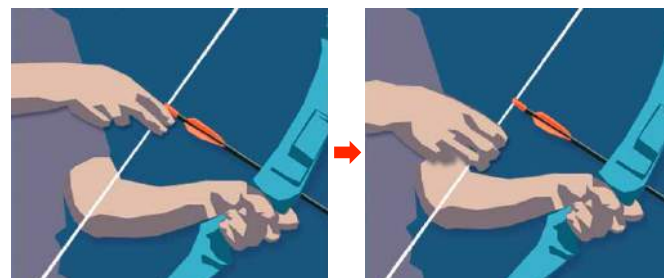
The three fingers divide the workload, each taking its share of the string pressure. At full draw, the back of the hand remains as vertical as possible, not curled-up, with the wrist as straight as possible. The interior of the forearm remains relatively relaxed. In effect, the hand is in the same axis, or shooting plane, as the forearm and arrow.

The location of the string fingers on the string depends on the aiming method used by the novice (and the shooting distance, if relevant).

Using the Shaft Aiming/Straight Line method for adults and teenagers with a bare Recurve bow:



Three fingers beneath the arrow. The space between the nock and the top of the forefinger is about two fingers, depending on facial bone structure and size of string fingers.



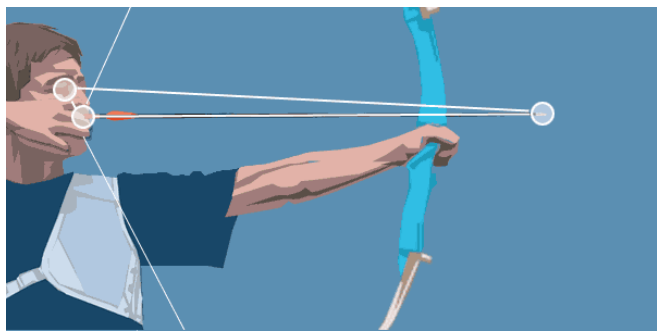
String grip for first sessions: straight line or shaft aiming method.

In contrast to the triangular and/or quadrilateral method (see below) this kind of basic grip eliminates the:

- Need to repeat facial marks at full draw;
- Need to align the string at full draw;
- Worry about producing vertical finger pressure on the arrow.

It also simplifies aiming and provides a natural easy alignment of the string forearm with the arrow.

Using the Point Aiming/Triangle method, for kids with a bare bow:



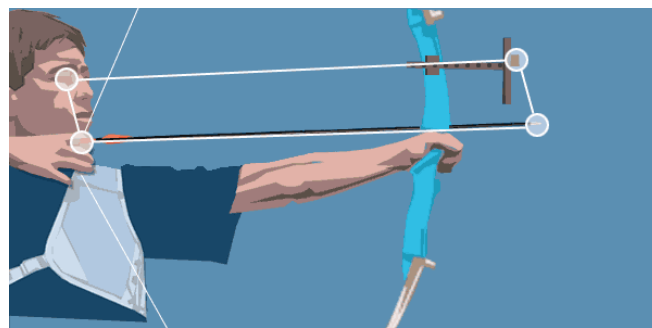
Triangle method.

Three fingers beneath the arrow, with the top of the forefinger just below the nock. Sometimes a little space (less than 2 fingers) is needed.



Triangle method.

Using a Sight/Quadrilateral method:

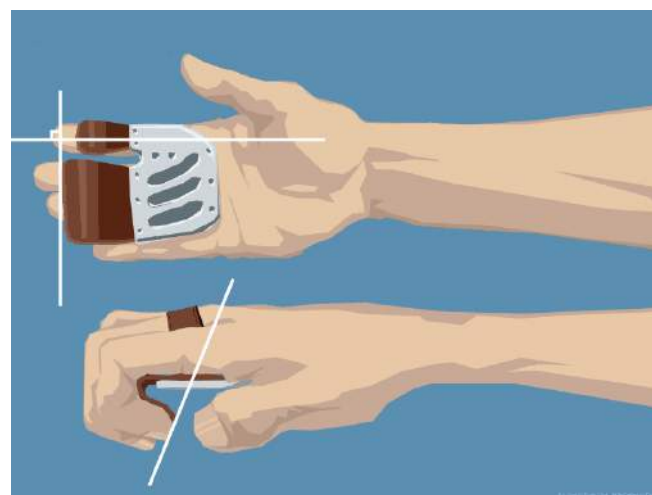


Quadrilateral method.

The forefinger is just above the nock, the two other fingers are 2 or 3 mm below the nock.



Quadrilateral method.



With a proper string grip the back of the wrist is flat.

Rationale:

The more relaxed the novice is, the better they can learn, and the less likely they are to twist the string. The "depth" of this string grip allows the muscles of the string hand, arm and forearm to be relatively relaxed, leading to the string releasing cleanly from the fingers.

6.3.2. Exercises

String Hand and Wrist Pre-setting or Predisposition - Exercise

Objective:

Correctly grip the string.

Situation:

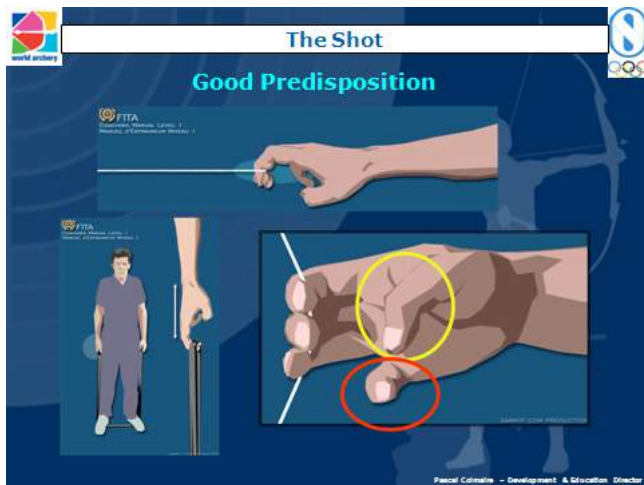
Ideally standing in front of and looking into a large mirror.

Equipment:

- Large mirror;
- Elastic band;
- A small loop of cord to be attached to the elastic band.

Instructions:

The novice places one end of an elastic band under the string foot, and grips the other end in the string fingers.



The novice observes in the mirror (or by looking directly at the hand) that:

- The joints between the fingers and back hand are flat (no knuckles pointed up);
- The back of the string hand is aligned with the forearm;
- The string is in the end joint of the fingers or "deeper" (not more towards the tips);
- The unused fingers (usually thumb and the little one) are relaxed.



String Hand Pre-setting with Relaxed Wrist and Flat Knuckles - Exercise

Objective:

Correct grip of the string.

Situation:

In pairs.

Equipment:

Usual archery equipment.

Instructions:

The novice holds the bow by the string like they would hold a bucket by the handle.



Then he/she observes by looking directly at the string hand that:

- The joints between the fingers and back of hand are flat (no knuckles pointed up);
- The back of the string hand is aligned with the forearm;
- The string is in the end joint of the fingers or "deeper" (not more towards the tips);
- The unused fingers (usually thumb and the little one) are relaxed.



1. The assistant holds the novice's forearm with one hand just above the string.



3. The assistant moves the bow and novice's forearm upward, almost to the level of the horizontal plane. The novice strives to keep the form of the grip hand and wrist while observing them.



2. The assistant's other hand gently pushes the bow a few centimetres down and away.



- From that position, the assistant alternately:
- pushes the bow a short distance away from the archer, then relaxes;
 - pulls the string forearm back a little, with some physical participation by the archer.

The shape of the archer's string hand/wrist should always remain the same.

6.4. BOW HAND AND ELBOW

6.4.1 Complementary Knowledge:

Similar to the string hand, two stages are to be considered during the shooting sequence with respect to the bow hand and elbow:

- preliminary positioning before raising the bow;
- during the force production period and the release.

The following will mainly cover the first stage. See chapters on "Pre-Draw", "Draw" and "Draw Extension" for further information.

Type:

Preliminary action.

Objectives:

- Consistent and stable bow hand contact with the bow grip;
- Same bow hand pressure on the entire bow:
 - Directly on the riser;
 - Indirectly on the limbs;
- Sufficient string clearance during the shot.

Form:

Fingers are relaxed and naturally curled; they do not hold or squeeze the bow.



Relaxed fingers.

The wrist is relaxed and therefore bends to match the angle of the bow grip. The "V" between forefinger and thumb is centred on the forearm axis.

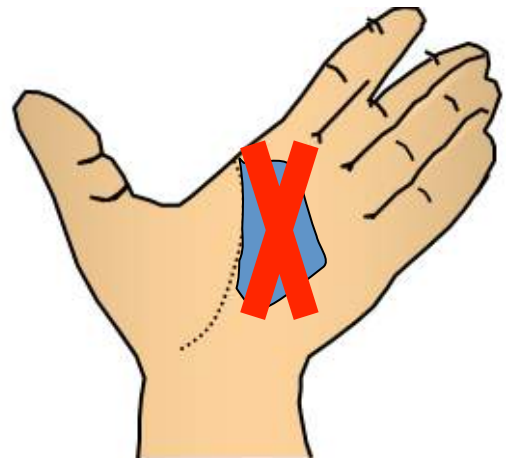


A well aligned bow hand.

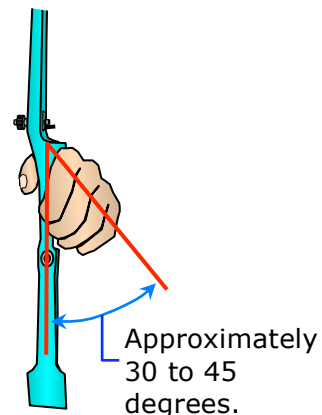
The bow pushes on the centre of this "V" and the life line axis. The main pressure zone is about 1 cm to 2.5 cm lower than the "V" point formed by the thumb and the forefinger.



The part of the palm past the life line should not press on the centre of the grip, to ensure good string clearance at the bow forearm.

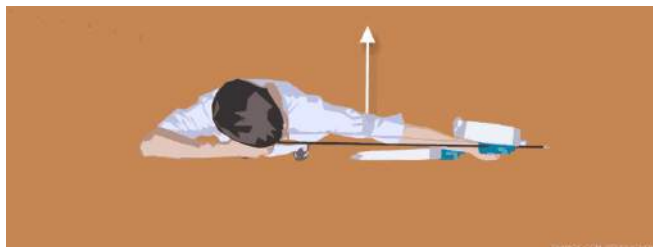


Since this part of the hand is away from the grip, the row of knuckles on the back of the bow hand is canted from 30 up to 45 degrees with the vertical.



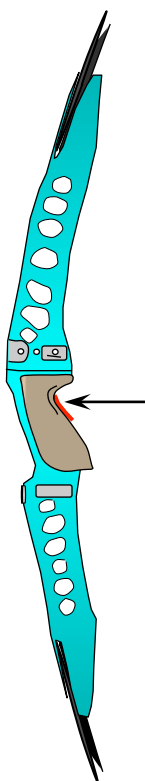
The bow arm is straight with the elbow fixed, not bent or locked. The hollow of the elbow

should be kept as close as possible to the vertical and face the arrow to get proper string clearance.



Bow elbow pointed out = good string clearance.

The main pressure zone on the bow grip should be close to the area shown on the following illustration:



Rationale:

This grip position allows the bow hand to be completely relaxed while still providing a stable and consistent placement in the bow. The use of a sling is recommended during the early sessions. Generally speaking, the more relaxed the novice is, the better their overall perception of sensory input. In the case of the bow hand, it is important to be aware of and eliminate any pressure on the bow that could generate torque on the riser. Also, getting the beginner used to a sling and letting the bow simply "jump" into the sling early on, while it is one more point to concentrate on, is one action less to change or learn in the future.

6.4.2. Exercises

Bow Hand – Exercise 1

Objective:

To discover a bow hand position that is easy to replicate; solid, but not tiring, relaxed, and allowing an efficient pursuit of the shooting process, including good string clearance.

Situation:

Shooting situation.

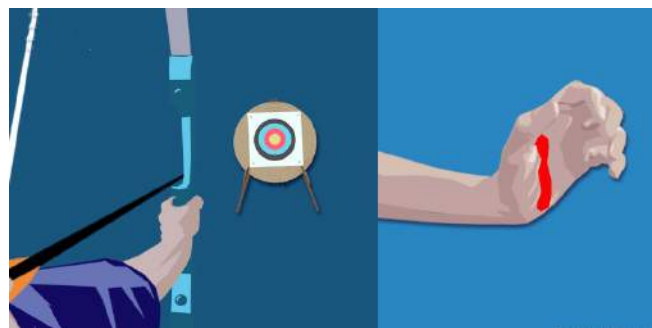
Equipment:

Bow.

Instructions:

Have the novice try different bow hand positions, and notice:

- The obstructed string displacement when the palm of the bow hand past the life line presses against the bow grip;



String clearance is poor when the palm on the little finger side presses against the bow grip.

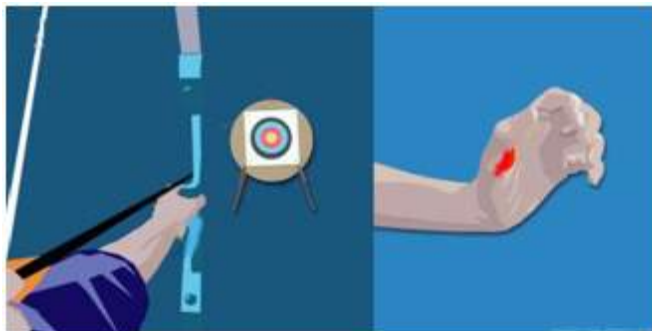
- Any discomfort and the tiring nature of the position when the string is pulled slightly with the bow grip pressing against the base of the thumb.



An unstable and tiring grip occurs when pressing the thumb against the bow grip.

Several beginners adopt the unavailing bow hand position shown in the previous illustration

to avoid their forearm getting hit by the string. Since the pressure point on the grip is moved to the left (for a right-handed archer), it generates a bow torque during the propelling process that deviates the bow string toward the bow forearm; hence no gain, but still pain! A recommended position is shown in the illustrations entitled "A good bow hand position"; this provides a support zone between the lifeline and the base of the thumb.



A good bow hand position.



A good bow hand position.

String clearance is better when the palm on the little finger side is not in contact with the side of the bow grip.



A good bow hand position.

Bow Hand – Exercise 2

Objective:

To discover a stable bow hand position and allowing an efficient pursuit of the shooting process, this includes good string clearance.

Situation:

Simulation.

Equipment:

A piece of string or a bow.

Instructions:

To discover the contact zone on the grip hand, ask the novices to pull a rope or rubber tube as shown in the next illustration:

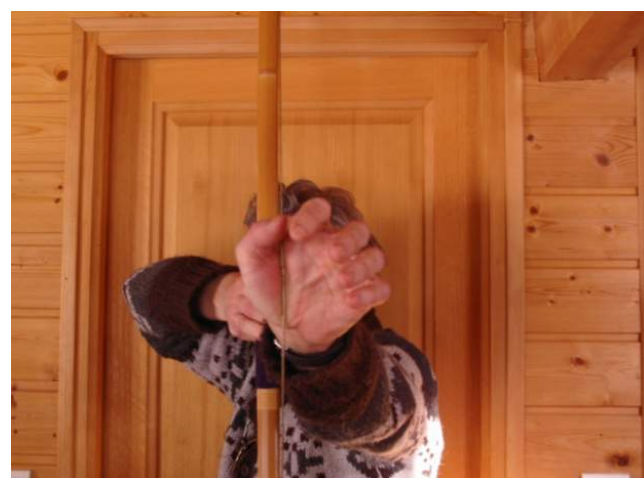


The coach should check if the rope is pressing on the proper place on the bow hand. If necessary, correct the location of the rope or rubber tube.

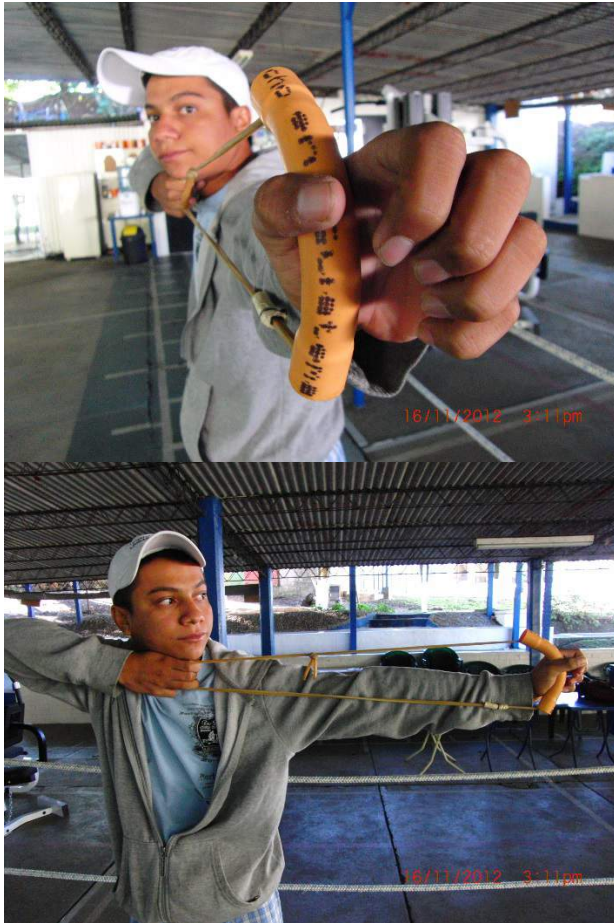
The novice should feel:

- The stable alignment of the bow hand;
- Where the pressure zone is located in the hand.

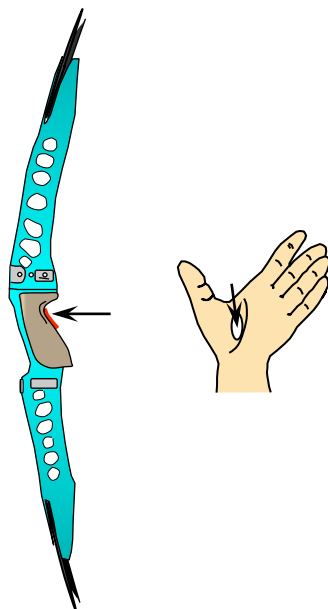
Then ask the novice to use a bow back to front, with the bow hand holding the string and the string hand holding the bow.



If the string is properly placed, the novice can keep the bow hand relaxed and the bowstring does not roll out from the bow hand. Another simple and efficient teaching aid is shown below:



At this point, ask the novices to demonstrate a proper bow hand position with their bow. Have them shoot with their eyes closed to feel the correct bow hand position.



6.5. BODY PRE-SETTING

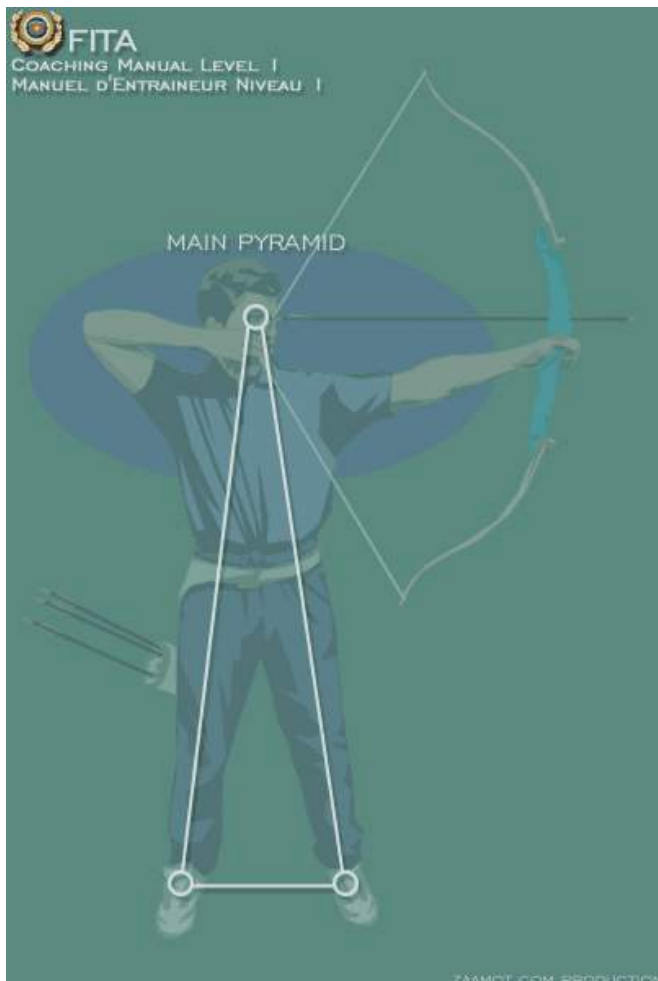
6.5.1. Complementary Knowledge

Type:

Preliminary action.

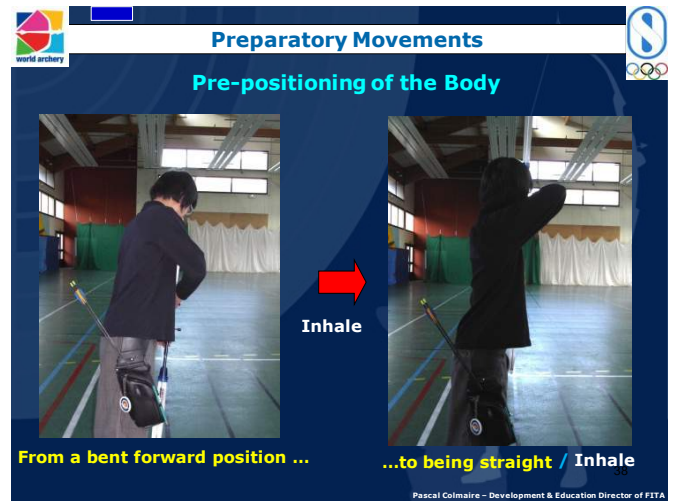
Objective:

Provide an identical, stable foundation permitting consistent repetition of upper body actions, as well as optimum general balance. It should also allow the re-positioning of the aiming eye at the same stable spot in space. We can imagine the aiming eye at the top of a pyramid (let us call it "Big pyramid" to avoid confusion with the "Top pyramid" that will be introduced later).



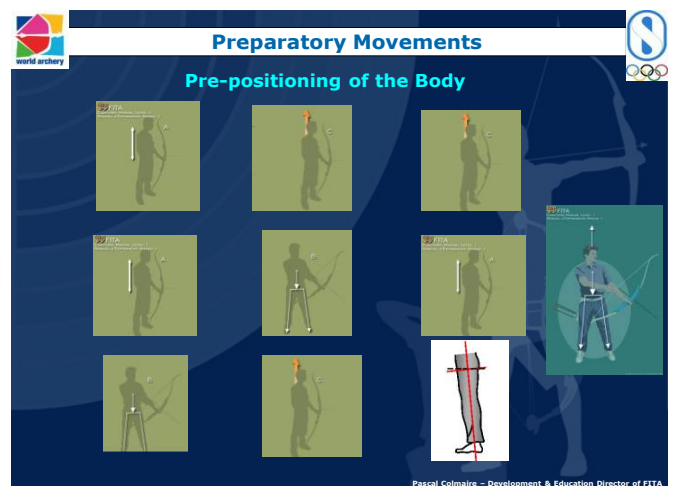
Form:

Most novices are slightly bent over while setting up the string and bow hands (see the 2 previous steps). Moving from a bent over position to an upright one creates a good base at the beginning of the execution of the shot process.



The following illustrations also present alternative ways to pre-set the body. From Left to Right and Top to bottom:

- Stay upright with flat and straight back;
- Head stretched upwards;
- Flat chest - *Do not move the chest up when stretching the head up;*
- At the same time, keep the shoulders low and down;
- Feel a strong lower body, and feel the body weight spread on both feet;
- Feel a strong belly and a low centre of gravity;



- Keep the entire body in the shooting plane with shoulders above hips and feet;
- Turn the head toward the target;
- A little less weight on heels than on the front part of the feet;
- The illustration on the right hand side summarizes the vertical firmness well.

a) Legs

Objective:

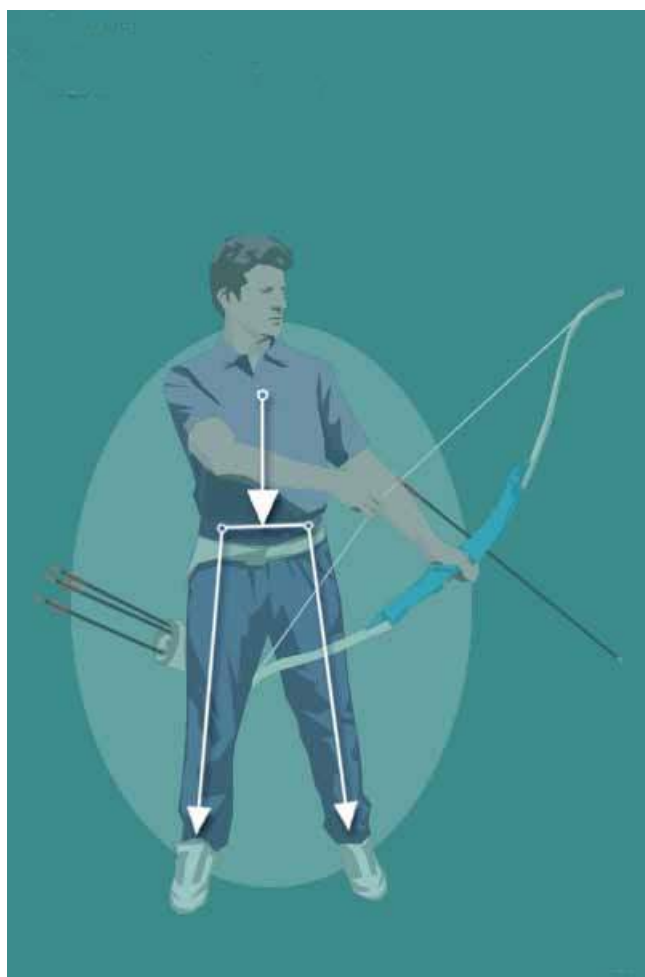
Provide an identical, stable foundation:

- permitting an optimum general balance
- on which will be set the upper body
- on which will be applied forces

Form:

- The legs form an upside-down "V" that is symmetrical around the vertical axis going through the head.

Weight is placed as equally on both feet as possible. The novice does have a weight in the out-stretched bow arm, so there will always be a bit more weight on the bow leg.

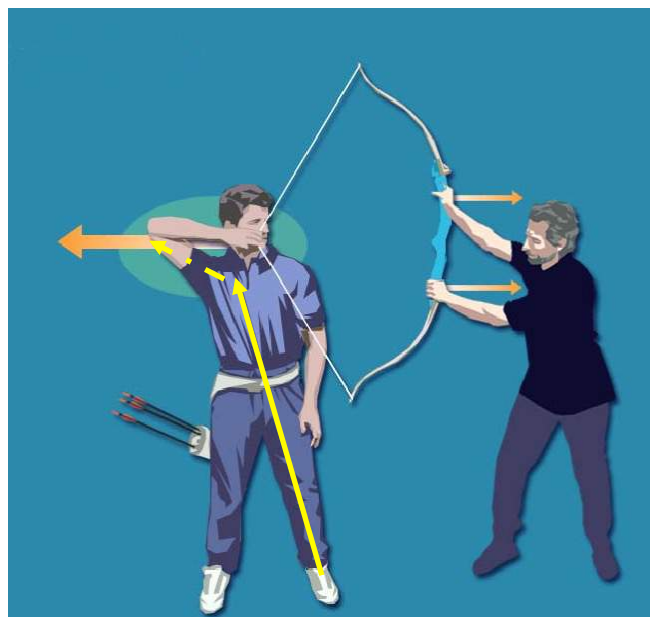


Body and legs positioning.

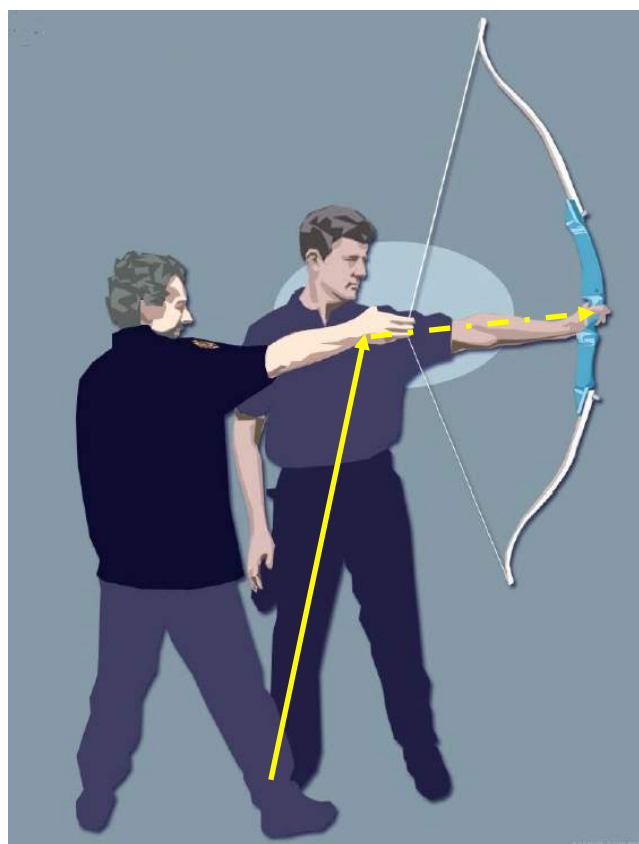
Rationale:

The body weight is distributed approximately equally on both legs. Swaying in the vertical plane is reduced because the body weight is slightly forward (toward the toes). The front of the foot is responsible for balancing so it is very important to get the stance correct during the early stages of teaching beginner archery.

The following illustrations show the contributions of each leg to the shot process:



The string leg participates in the production of the push.



The bow leg contributes to the pull.

In reality, the two efforts cancel each other out at the waist leaving only a slight downward pressure, providing a solid foundation for upper body work and good stability (see the earlier picture entitled "Body and legs positioning").

b) The Upper Body

Objective:

To pre-set the torso, shoulder, and head close to their final position.



On the left a woman with a very curved back. This form is not recommended;

On the right a man with a flat lower back: This is the recommended form.

Form:

Ensure that the novice has a flat lower back; the spine is stretched up with shoulders in the same plane as the hips. The shoulders are lowered and chest is flattened, a slight stretching in the trapezius is often felt at this point. Turn the head toward the target to its maximum rotation whilst maintaining the "stretching-up" action in the spine.

Rationale:

Stretching the head and spine up assures an erect vertical stance. The flattening of the chest and the lowering of the shoulders lowers the centre of gravity, making the body more stable and contributes to better string clearance. Furthermore, the shoulders and the head are close to their final position, thus minimizing movement during the draw phase.

6.5.2. Exercises

Pre-Setting the Body – Exercise 1

1. Have the novices close their eyes as soon as they grip the string, while they are slightly bent forward. Have them continue the sequence with eyes closed until they are upright and have come to full draw and then get them to open their eye(s) and complete the shot. Have them do this several times until they identify an internal strategy for re-setting their body in the same position.

While they have their eyes closed, have them concentrate on:

a) When and how they pre-set their body (Big Pyramid = the geometrical form between the aiming eye and both feet). This could be before raising the bow in the direction of the target or during the pre-draw, but seldom during the draw.

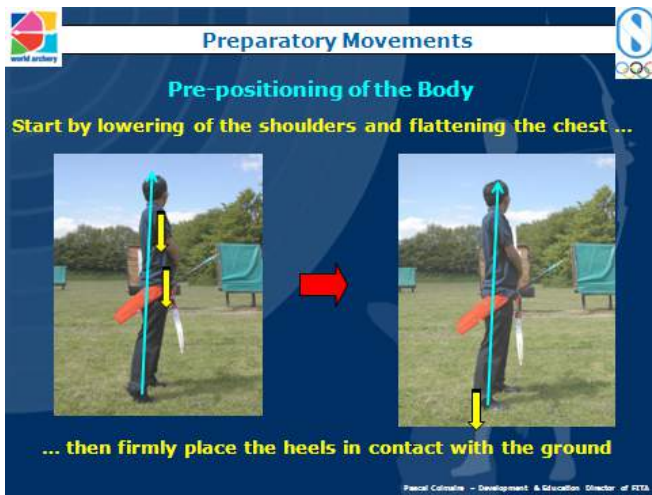
b) The following points and feelings.

- Upright body: vertical spine with body weight equally distributed over both feet;
- Low centre of gravity: heavy and powerful belly, low shoulders and shoulder blades, flat chest, and stretching feeling in the trapezius muscle;
- Solid support of the upper body on the hips: especially in the lower back;
- Erect spine with upright head: quite flat nape with a "vertical firmness" keeping the energy and body weight down;
- Body orientation: entire body in the shooting plane (shoulders above the hips and feet);
- Body weight distribution: See "Upright Body" and less weight on heels than on the front part of the feet;
- Head orientation facing the target: chin and nose pointed towards the target.

Note: The body pre-setting is often refined during the pre-draw, particularly the body orientation and positioning of the shoulders. Even during the draw there may be some minor adjustments of the body orientation.

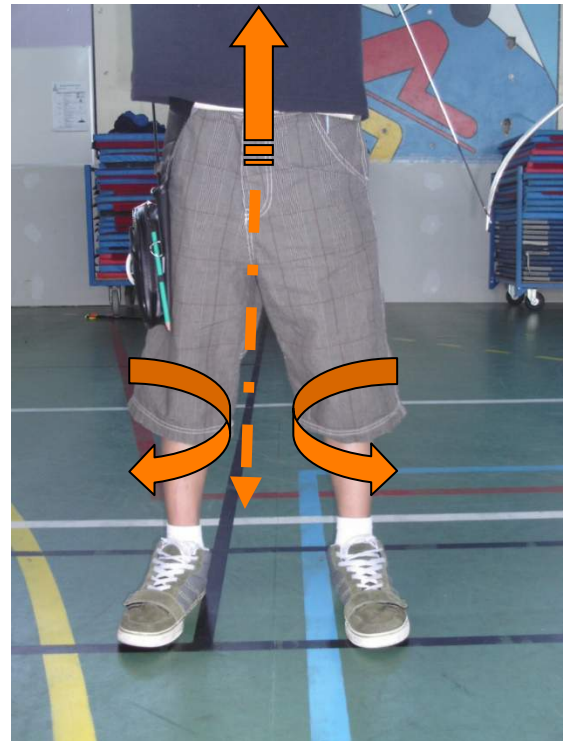
Pre-Setting the Body – Exercise 2

Lift the heels, then while keeping the body stretched up, lower the shoulders, then the chest, then the heels until they just touch the floor with a little body weight on them. This should give the students a firm and correct overall body position.

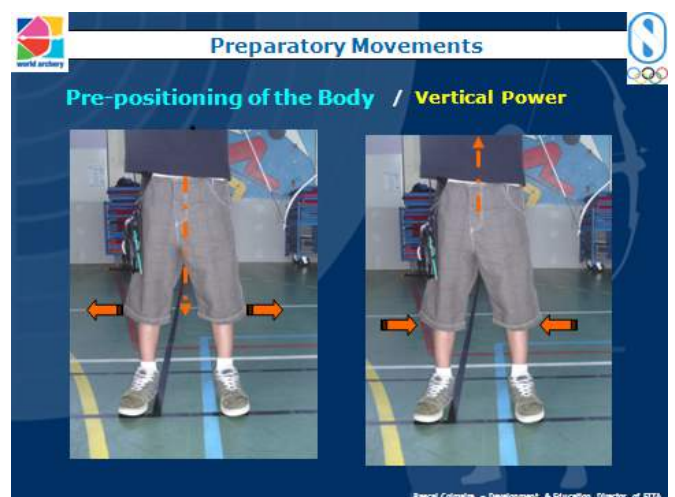


Pre-Setting the Body – Exercise 3

The legs contribute to the setting of the vertical firmness; hence the coach should help the novices to properly use their legs. Various uses of the legs are possible. The most common is probably the following one:



The knees are slightly turned outward, while the buttock is slightly tensed. This combination easily establishes the vertical firmness. The next illustration shows two other uses of the legs to establish some vertical firmness.



Both are associated with a slight contraction of the buttock.

Pre-Setting the Body – Exercise 4

To promote a low centre of gravity, place a long stick between the ground and the novice's belly. Ask the novice to keep a "heavy" belly in order to apply some pressure on the stick.



The belly pressure on the stick will have to be kept for the duration of the shooting sequence.

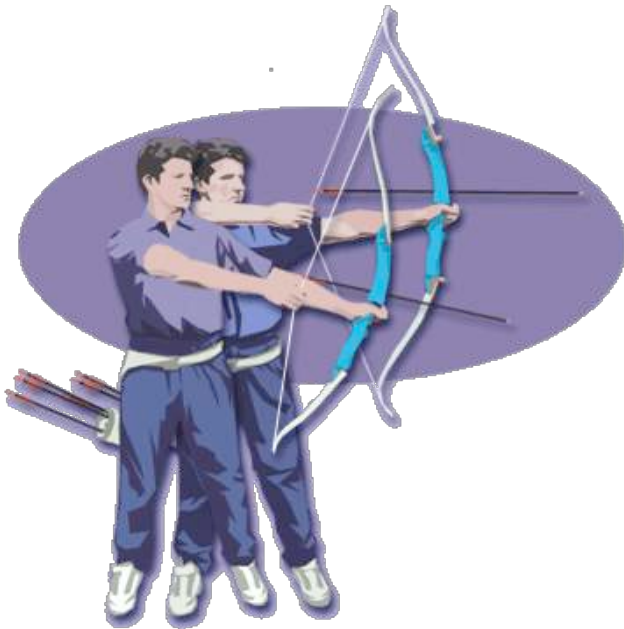
The goal is to keep the energy and centre of gravity down for body stability. It also contributes to a flat chest and low shoulders.

6.6. RAISING THE BOW

6.6.1. Complementary Knowledge

Type:

Preliminary action.



Raising the bow.

Objective:

To perform the preliminary movements with as little unnecessary motion and disruption to initial positioning as possible; this initial positioning must allow for an effective draw.

Form:

The synchronized raising of the two hands towards the target until the bow arm is outstretched and pointing toward the target.

Throughout the whole process:

- The bow shoulder must stay as low as possible;
- Both shoulders should remain approximately at the same level during this process;
- The upper body (shoulders, chest and centre of gravity) should be maintained at a lower position;
- The loaded arrow must be kept in the shooting plane. (For example, the body often deviates to the left when the bow is raised right to left);
- The head and spine stay extended as if someone is pulling them towards the sky;
- The lower back remains flat;
- As little tension (draw) as possible must be maintained on the string.



Toward the end of the raised bow position:

- Both hands are moved up to the same level;
- The arrow is parallel to the ground due to the short shooting distance for the novices.

At the end of the raised bow position:

- The arrow is at the nose/eyes level
- The string shoulder is lower than the arrow shaft;
- The string wrist is in line with the string forearm;
- A slight backward inclination of the torso toward the string foot is acceptable, but a straight body is recommended;
- The string is between the archer's aiming eye and the aiming point.

The main "raising the bow" forms are:

Up to the level at which the arrow will be while at full draw.

- This form will allow keeping the sight close to the centre of the target during the following step (bow opening or draw).



Higher than the level at which the arrow will be while at full draw, up to eye level.

A popular height is around the nose level. Drawing a bow down from an elevated position appears easier than from other positions, but special care is required to keep the hands synchronized during the draw step.



Rationale:

The simplicity of this movement is easiest to repeat and it is a safe process, even if an arrow is released accidentally. The elements already in place are minimally disturbed, and are finalized following the action. The forces exerted on the upper limbs facilitate the low positioning of the shoulders. The body's inclination toward the string foot counterbalances the weight of the bow and moves the archer's centre of gravity towards the target (the use of bows with light mass weight will reduce this inclination).

6.6.2. Exercises

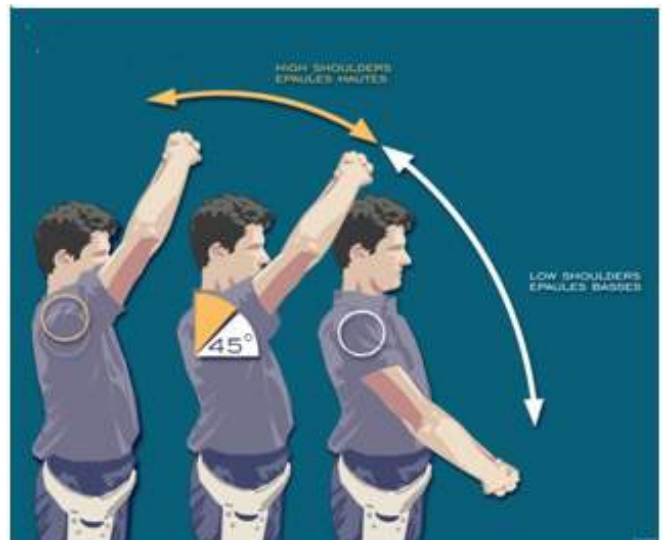
Raising the Arms, Hands and Bow – Exercise 1

1. Simulations

1.1. Have the hands together with fingers interlaced and palms in, arms against the front of the thighs and slightly bent at the elbows. Lower the shoulders by using the pectoral muscles, feel the trapezius stretching. Raise the arms up in front as high as possible, while maintaining:

- The shoulders in the lowered position;
- A flat back.

The exercise should result in the upper arms (not the forearms) being raised to an angle of about 45 degrees above the horizon, and the elbows stopping at about eye level.

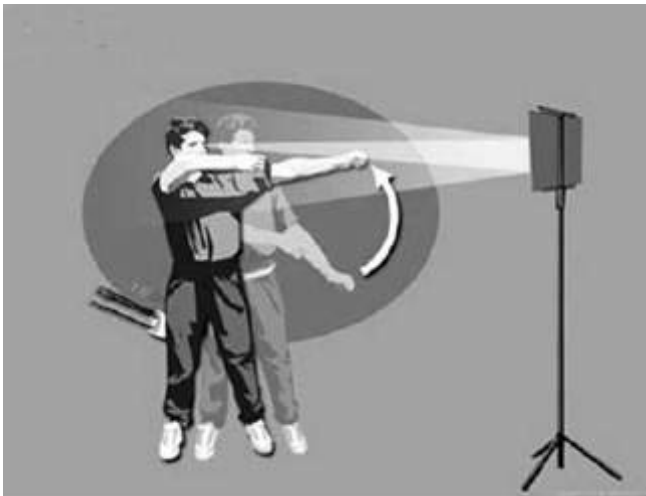


Normal range of motion allows the arms to be raised up to 45 degrees, without lifting the shoulders or changing the back position.

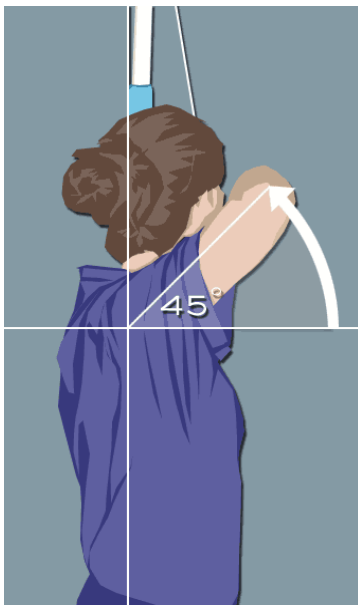
1.2. With the hands unclasped, preferably in front of a mirror, have the novice simulate raising them as if they were raising a bow, while maintaining:

- The shoulders as low as possible;
- A flat back.

Once raised up, notice that the upper part of the string arm (not the forearm) makes an angle of about 45 degrees. At this step, the string forearm is at the level of the eyes, as well as both hands and the imaginary arrow.



Maintaining body positioning, especially low shoulders during bow arm elevation.



The string arm making an angle of approximately 45° from the vertical without lifting the shoulders.

1.3. Repeat the previous simulation with an elastic band attached to the string elbow (or held in the string fingers), and in the bow hand. Continue to attend to all the points dealt with previously throughout the whole session.



Similar to the previous illustration but under an elastic tension.

All throughout this session, be conscious of the previous aspects that have been dealt with, i.e. attention should be directed as follows:

- Start by lowering the centre of gravity by using a powerful belly;
- Feel the proper balance on the feet;
- Lower the shoulders;
- Keep the head erect while looking at the target;
- Maintain a flat and straight back.

At this point the top triangle (between the aiming eye and both shoulders) is pre-set.

2. While shooting:

2.1. Observe the upper part of the bow arm while raising the bow. Look at the bow shoulder if possible. Feel the bow shoulder staying low and not rising. Once the bow is raised, look at the target butt, draw the bow, and shoot the arrow.

2.2. Similar to the above, but watch the raising of the bow in a mirror.

2.3 Similar to #2.1, but with eyes closed instead of watching the bow shoulder. Focus on the feeling of a low bow shoulder and scapula (shoulder blade).



Eyes closed.

2.4. Same as #2.1, but now with eyes open, looking up, and unfocused.



Eyes opened but unfocused.

2.5. Same as #2.1, but looking at a blank target butt.

2.6. Same as #2.1 but shooting at a target face.



The assistant will ask the novice to raise the bow up while pressing the armpits down on the assistant's fingers.

Instead of fingers, two arrows may be used, one under each armpit.

6.7. PRE-DRAW

6.7.1. Complementary Knowledge:

A large number of novices have a short pause at the end of the bow raising or a visible slowing down; this is known as the "Pre-Draw".

Type:

Preliminary action.

Objective:

This step allows for refinement of the pre-setting of the entire body; mainly the alignment of the upper body and the arrow in the shooting plane. Hence it refines the pre-positioning of the shoulders and scapulae, the head, chest, body verticality and height of the bow.

Form:

There are a few changes to the form described at the end of raising the bow. The string is now pulled back further than the bow elbow (refer to the illustrations further down).

The pre-draw can occur at different heights, depending on the height at which the novice raises the bow. The most popular ones are:

- Higher than the level at which the arrow will be while at full draw, up to eye level.



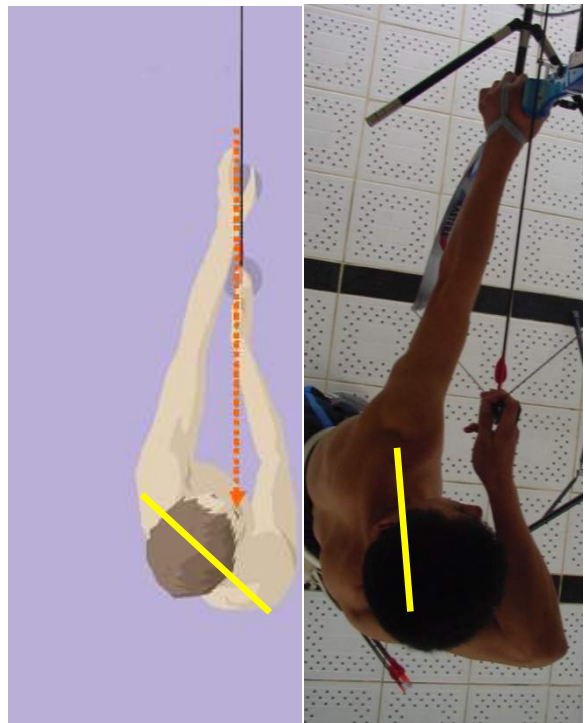
- Up to the level at which the arrow will be while at full draw.



Rationale:

During this step the efforts are transferred to the back of the novice and the pre-setting of the "Draw Force Line" is improved.

Note: The Draw Force Line (DFL) is the line of forces represented below by the archer's forearm and the elastic band.



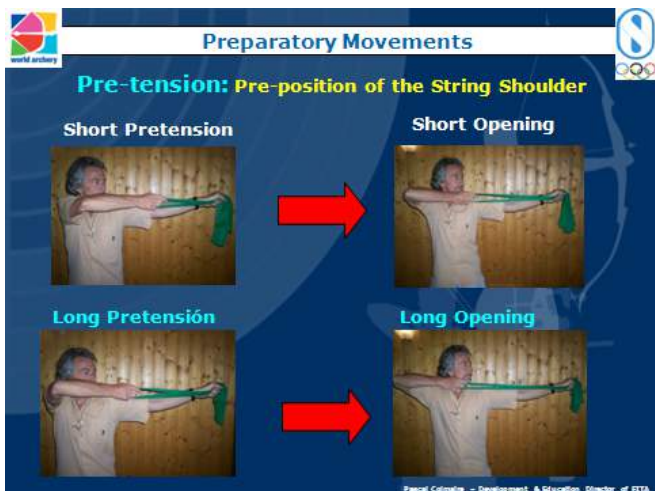
Without a pre-draw.

With a pre-draw.

The two above illustrations show that the string is brought to the pre-draw position through a body twist made in order to pre-align the two shoulders with the bow arm. Hence it is not only the muscles of the arms that pull the string back, nor is it only the muscles from the back. Many muscles in the upper body are used to draw the string back to the full draw position. An important goal of the pre-draw is to pre-align the entire body as closely as possible to the shooting plane.

Due to better body alignment achieved through a longer pre-draw, it is then easier to draw further back than with a shorter or no pre-draw.

From this position the string (in fact the aiming eye - see the explication under "String alignment") should already be aligned, i.e. viewed at the same spot on the riser or sight.

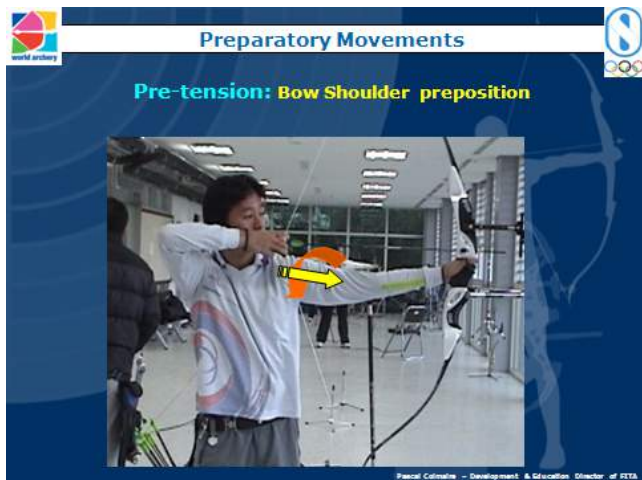


The Pre-draw is a critical step for properly positioning the bow shoulder.

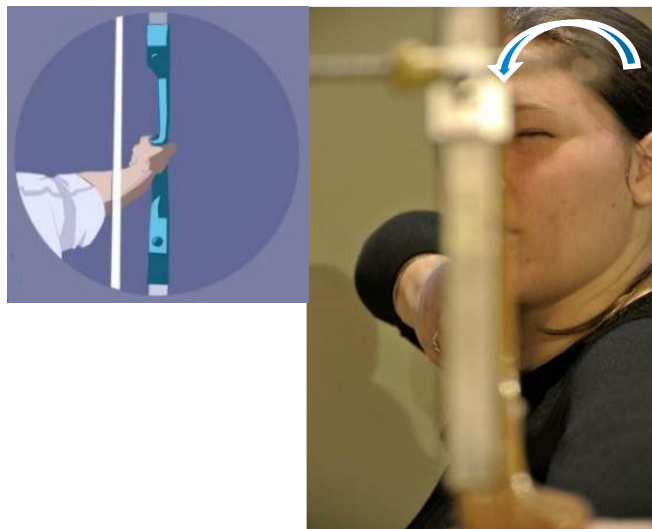


Common string alignment at the edge of the sight window.

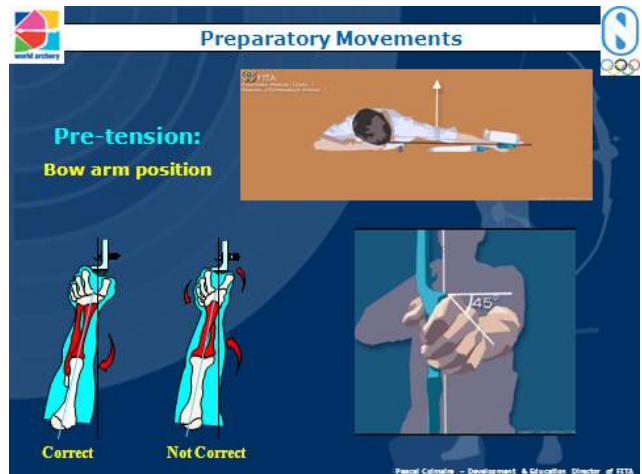
With a different head canting, the location of the aiming eye changes; hence the string is seen at a different place



When the humerus (upper arm) bone is properly rotated, the bow elbow should be also properly set and ensure proper string clearance. Furthermore the bow hand should also be properly set on the bow grip.



Head canting toward the toes to get the string aligned on the left hand side of the bow window.





Head canting toward the heels to get the string aligned on the right hand side of the bow window.



From the pre-draw, the novice's head is above the centreline of the body.



The head is kept stationary and centred over the body.

6.7.2. Exercises

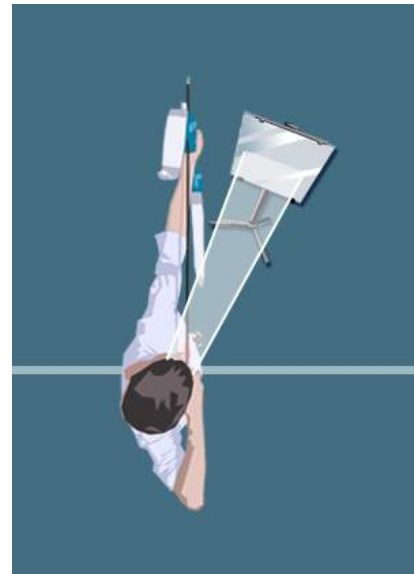
Pre-Draw and Body Pre-Setting – Exercise 1

1. Have the novices watch themselves by using a mirror as illustrated below.



Maintain body monitoring in a mirror.

Note: For all exercises with a mirror, the mirror should be placed in such a way that the novice can see them self without having to move their head.



Therefore, the mirror should be at the level of the archer's face and very close to the aiming plane - about 10" (25 cm) between the arrow shaft and the edge of the mirror. A mirror on a tripod (or any type of stand) is ideal; otherwise an assistant can hold the mirror.

2. Same as above but with eyes closed to focus on the feel of the shot.
3. Same as above but with eyes open, shooting at a blank butt.
4. Same as above, but shooting at a target face.

Pre-Draw and Body Pre-Setting – Exercise 2

This exercise helps novices who use too much energy in their upper body and has already been suggested in the "Body Pre-setting section.

Use a stick about one metre long, pressing on the belly. The other end of the dowel can be pressed against a wall or a partner – as shown in the "Powerful Belly" image below, or the stick can be placed between the novice's belly and the ground - depicted below in "Centre of gravity pressed down on a stick".



Powerful belly.



Centre of gravity pressed down on a stick.

Another way of achieving this is by putting a small ball (e.g. a squash ball or a golf ball) behind the archer's belt in the area of the navel.

Pre-Draw and Bow Shoulder – Exercise 1

To make the students aware of proper bow shoulder position, ask them to place their bow hand against a solid support (a pillar, door frame, etc.) while in their usual archery stance. The coach gently presses on the string shoulder.



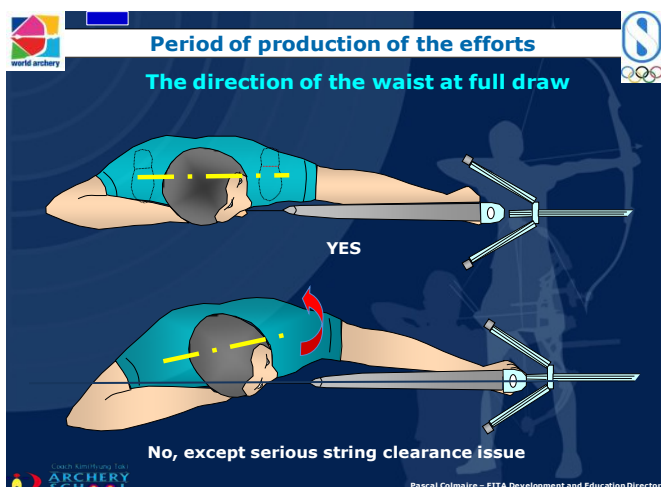
Instead of a solid support, these coach candidates have chosen to make a chain, a funny alternative.



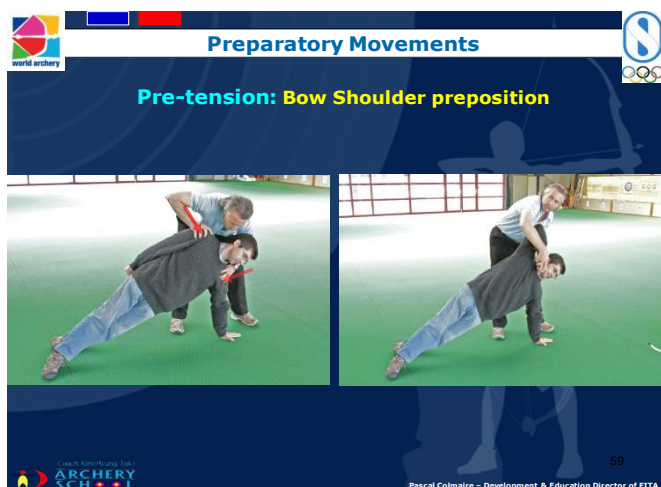
Same exercise with a bow, and the assistance from a coach who applies extra pressure to check if the shoulder has found the strongest position.

Ask the student to adopt two upper body alignments as shown in the next illustration:

- First, with the two shoulders aligned with the bow arm;
- Second, with the two shoulders not aligned with the bow arm.



The novice should be able to feel how strong the first position is when compared to the second one.



A tougher alternative on the floor.

Pre-Draw and Bow Shoulder – Exercise 2

Ask the student to put their bow hand on the assistant's shoulder and keep their bow arm relaxed.

Have the assistant take the top part of the beginner's arm as shown below.



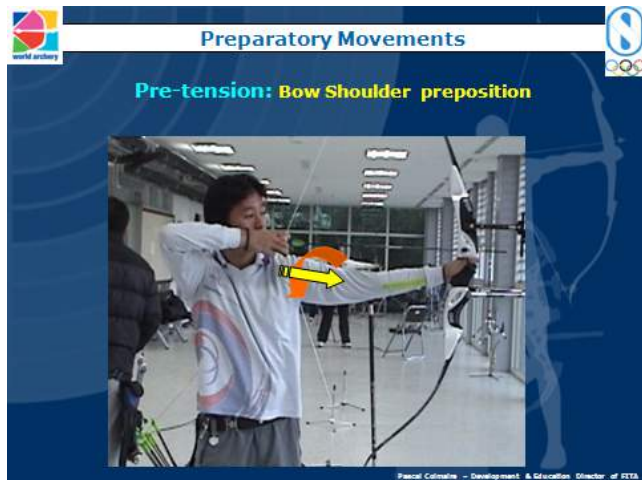
Rotate the upper bow-arm counter-clockwise (for a right-handed archer).



Then help them achieve a slight extension forward and down of the bow shoulder by pulling the arm and pressing the bow shoulder down.



This should help the student feel the bow shoulder positioning illustrated in the next picture.



Pre-Draw and Bow Elbow – Exercise 1

If the previous exercises on the bow hand and arm have been properly done, the elbow is probably well positioned. If so, fine. If not, propose this exercise to the students.

Volleyball player:



Simulate the volley-ball player position as shown above.



Now have the novice rotate their elbows so that the points are directed away from each other. This is the proper position of the archer's bow elbow while shooting. Repeat, with decreasing reliance on the linked hands, until they are able to do it with their hands separated.

Against a support:



For most people, an elbow pointing down generates poor string clearance. Have them rotate their arm, with help if necessary, to bring the bow elbow to the vertical position shown below.



This elbow position provides the optimum string clearance. Have the novice repeat the turning of the bow arm him/herself multiple times, decreasing the amount of assistance given. Let them continue the exercise with their eyes closed to better learn the feeling of the proper bow elbow position.

Next do it using a support and an elastic band. If properly done, the novice should be ready to adopt a correct bow elbow position on their bow.

6.8. DRAW

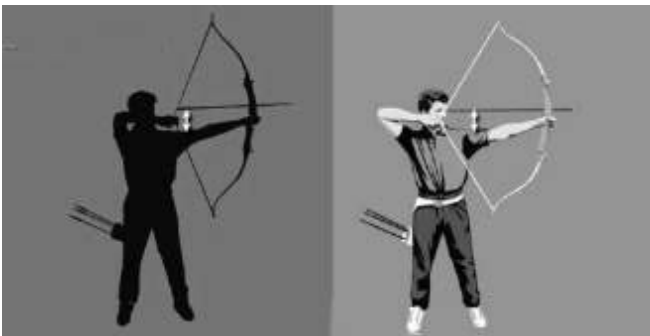
6.8.1. Complementary Knowledge

Type:

Force generating movements.

Objective:

To draw the bow without disturbing, and if possible, refining the pre-set position achieved through the preliminary elements. This draw action lasts until after the shot.

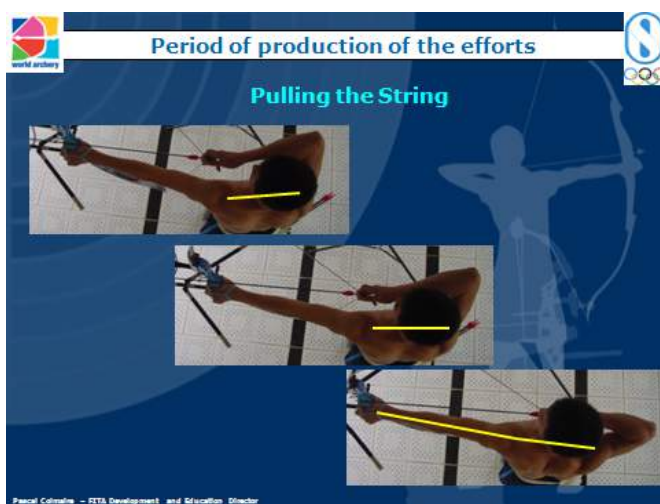


The draw from Pre-draw to Full draw.

Form:

Momentum movements are minimal, or non-existent with the novice staying in control throughout the draw. The initial phase of the draw happens relatively quickly to conserve energy. The closer the string comes to the face, the movement of the draw slows down until full draw is reached, but the motion never comes to a complete stop.

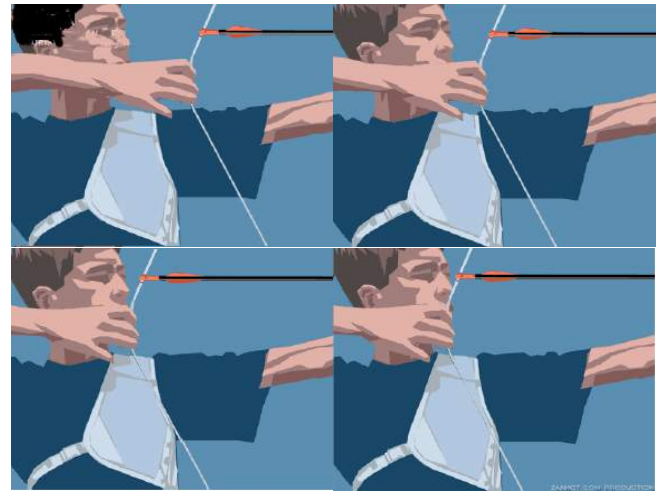
The torso is almost immobile. Only a slight rotation of the chest occurs, bringing the shoulders into the shooting plane; particularly if no pre-draw has been achieved.



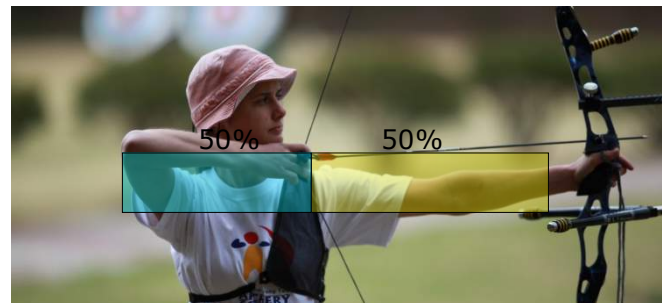
The body is vertical or remains at an original slight inclination.

The shoulders remain low.

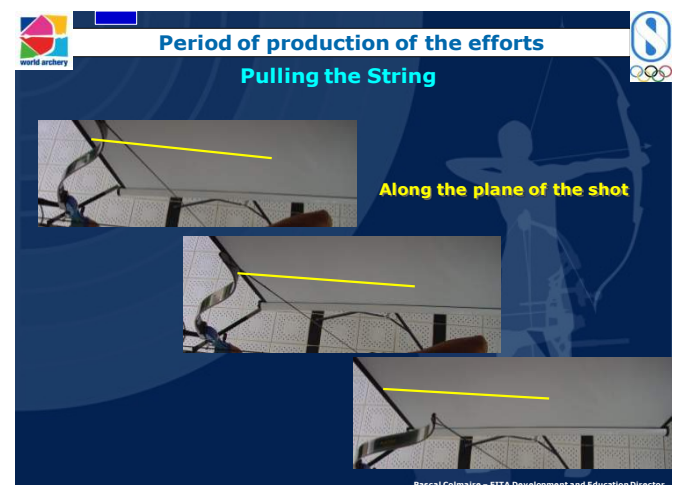
The head remains in place and extended up; it should not move toward the string at any point, but in particular during the last few centimetres of the draw.



During the draw the pushing and pulling forces must be kept in balance.



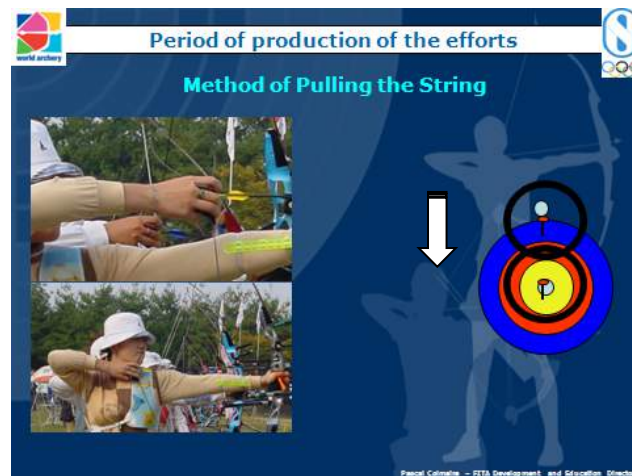
The string is pulled straight to the face in the shooting plane (see the illustration below), keeping the string continuously in front of the aiming eye.



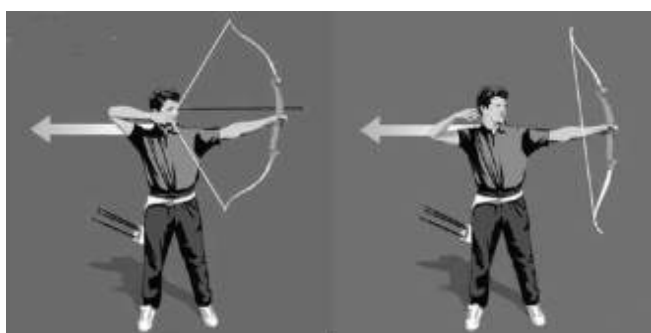
As already seen and as the following illustration demonstrates, the pull and push efforts are supported by the legs.



Left: String leg participation to the push effect.
Right: Bow leg participation to the pull effect.



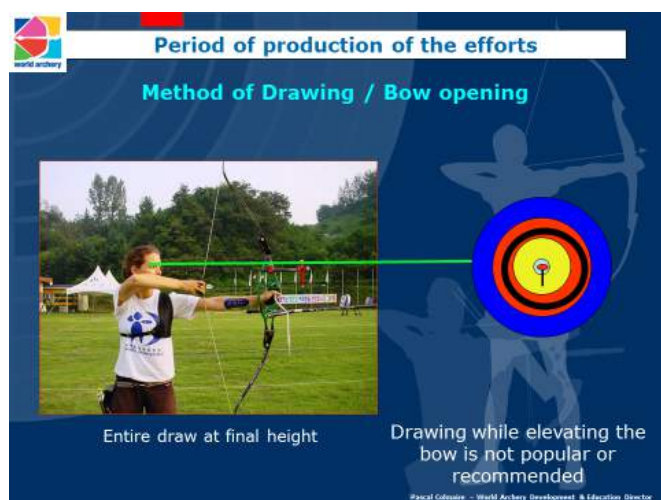
This method allows a better draw force line from the start of the draw, and better use of the big muscles located around the body and below shoulder level. On the other hand it requires some vertical synchronization between the two hands. Due to the short shooting distance of a beginner the hands should remain almost at the same level, and the arrow horizontal, all way through.



The continuous draw activity starts once the bow is raised, and ends when the arrow is flying.

There are 3 main drawing forms:

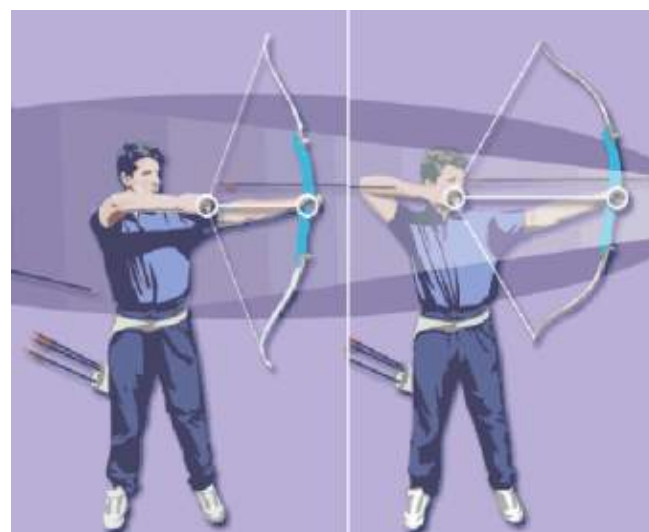
1) *At a constant level*



This method allows the archer to keep the sight pin close to the centre of the target all the way through. At short distance, the arrow should be always parallel to the ground.

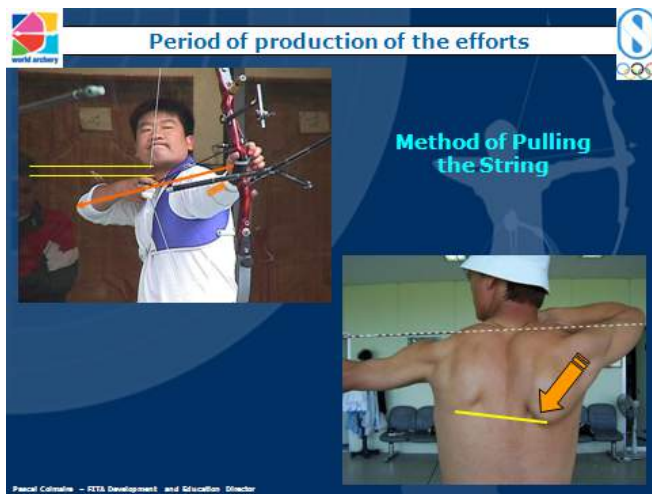
2) *Starting from an elevated position*

The draw starts with the hands between nose and eye level. At a short distance, the arrow should be almost parallel to the ground.



This style is easy to replicate consistently because the shot foundation is minimally disturbed and the movement is simple, thus control is easily achieved. Striving for symmetry of motion will keep the archer's balance intact. The production of effort is not centralized, but dispersed. It facilitates achieving symmetry, reduces local fatigue effects, and minimizes the risk of injury. The major muscles are used to generate the effort.

3) Finishing with a low string hand



This method emphasizes the use of the big muscles below the armpits, those located around the body and those below shoulder level. The string scapula moves down. The arrow may not be kept horizontal while drawing.

Caution:

Make sure that the arrow does not point so far up that it could fly over the target if the arrow is involuntarily released in the course of the draw. Such a draw angle is forbidden under international rules due to the danger and potential for injury.

Note: While opening the bow from the low position, special attention should be paid to the height of the bow shoulder, since the forces applied to the archer's body tend to push this shoulder upwards.

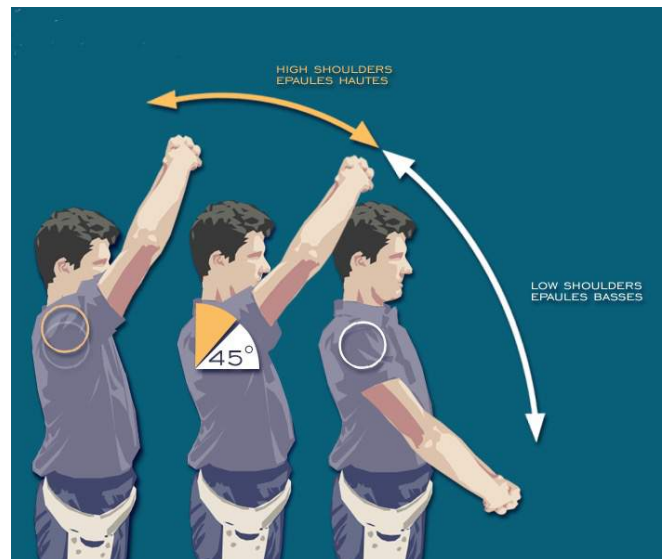
6.8.2. Exercises

The Start of the Draw - Exercise

This exercise starts like one of the exercises for teaching how to raise the bow up.

1. Simulations: Have the novice clasp their hands, with their fingers interlaced and palms up. The arms are placed in front of the body, slightly bent at the elbow. Have the novice lower their shoulders by using the pectoral muscles and generating a stretching feeling in the trapezius. They then raise their arms in front as high as they can while maintaining:
 - The shoulders in the lowered position;
 - A flat back.

The novice should finish with the arms raised at an angle of about 45 degrees and their elbows at eye level.



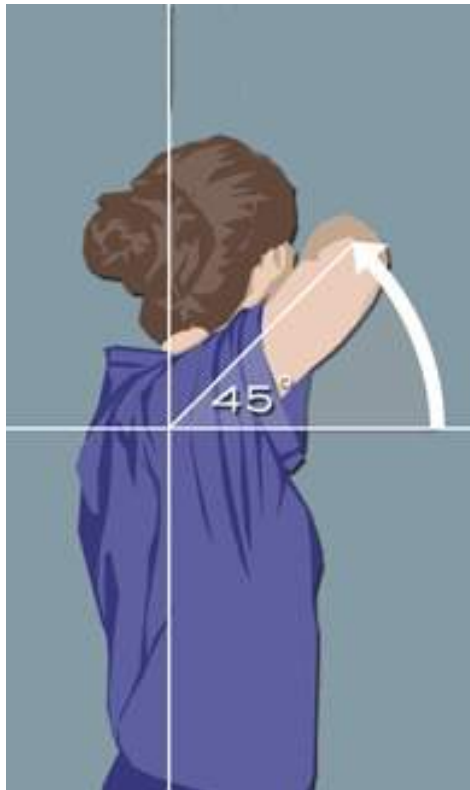
Normal range of motion allows the arms be raised up to approximately 45 degrees without lifting the shoulders.

Now separate the hands, and move the arms outwards and laterally, without changing the curve of the arms. The novice should feel that opening of the arms is like a fan. This opening motion comes from the shoulders, which move down and apart.



Feel the opening of the arms like a fan without changing the curve of the arms.

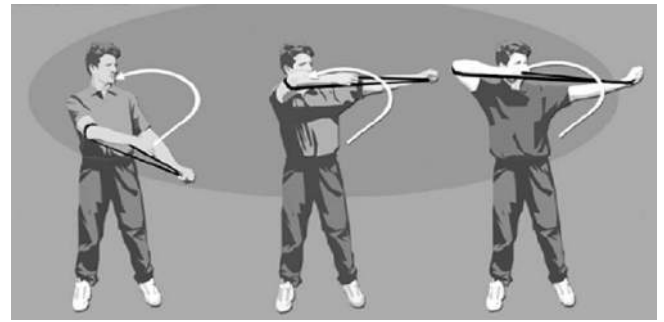
1.2. Simulate raising the bow without lifting the shoulders. Notice that the raised upper arm (string arm) makes an angle of about 45 degrees with the body. At this stage the string forearm is at about the level of the eyes, as are the hands and the imaginary arrow. At this step the "top triangle" (between the aiming eye and the two shoulders) is PRE-SET.



The string arm makes an angle of approximately 45° from the horizontal line without lifting the shoulders.

Let the novice focus mainly on the beginning of the draw. Then continue simulating the draw, changing the shape of the arms as little as possible to avoid using them for the draw action. At the start of the opening motion, the feeling should come from the shoulders, which move down and apart. Also, the novice should feel a sort of "opening" of the rib cage, a kind of expansion especially at the beginning of the draw. This exercise can also be done with eyes closed in order to better feel the effort and action.

1.3. Repeat the previous exercise with an elastic band placed around the string elbow and the other end of the band held in the bow hand.



Drawing exercise with elastic band placed around the string elbow.

1.4. Repeat the previous exercise with a harness on the string elbow connected to the string with a rope.



Focus remains mainly on the beginning of the draw. Repeat with eyes closed for a better feel of the action.

Throughout this session, the novice should keep all previous steps in mind, and should also follow these steps:

- Back straight and flat;
- Head raised while looking at the target;
- Low shoulders;
- Low centre of gravity (powerful belly) to get the feeling of proper balance on the feet.

2. Let the novice stand 5 metres from the target, have them raise the bow and begin the draw with the eyes closed, then at full draw have them open their eyes and shoot the arrow, if it is safe to do so.

3. In the next exercise, have the novice watch themselves in a mirror while raising the bow. At full draw, have them turn their eyes to look at the target butt.

4. With eyes opened, but not specifically focused, have the novice raise the bow and execute the beginning of the draw. Focus the eyes on the butt only when at full draw.

5. With eyes opened, have the novice raise the bow and begin the draw. Take aim and shoot whilst keeping focused on the aiming point. In this exercise, the focus should be on the aiming point.

Drawing in the Shooting Plane - Exercise

1. Let the novice stand in front of a mirror without an arrow on the bow. The mirror must be fixed on the target butt, or a wall.

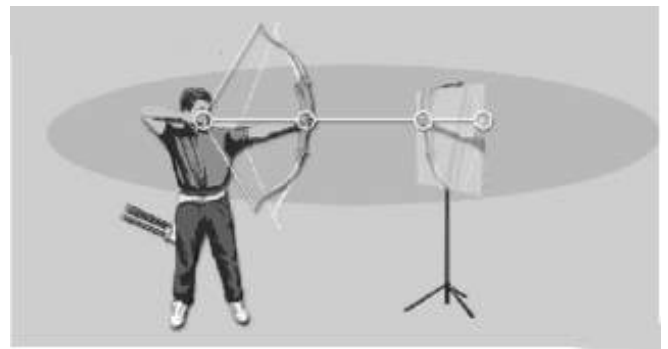
Have the novice stand very close to the mirror, so that – at full draw – the front end of the long stabilizer (if any) is about one foot or 1/3 meter away from the mirror; the body of the novice should be no more than 2 meters from the mirror.

During the raising of the bow, ensure that the string is aligned where it is normally aligned on the bow window or sight aperture.

At the start of the draw and while pulling the string back, the focus is on keeping the string:

- In proper alignment with the bow or sight;
- In front of the aiming eye.

Important: Never allow any movement of the head during the draw.



Control of the Draw plane in a mirror.

2. Let the novice repeat the same exercise but this time aligning the string only after raising the bow up and close their eyes at the beginning of the draw. At full draw, have the novice open their eyes and check if the string is still in front of the aiming eye and properly aligned on the bow or sight.

If not, check for the following:

- Possible head movement during the draw;
- The string being pulled away from the shooting plane;
- Twisting of the body during the draw;
- Leaning forward of the body (toward the toes).

3. Let the novice do the same as in #1, but this time have him shoot arrows at a blank butt at short distance of 10 to 18 meters (remember to remove the mirror from the butt).

4. The same as in #3, but shooting arrows at a vertical band on the target butt, from a short distance of 10 to 18 meters.

5. Repeat exercise #4, but shooting at a vertical band on the target from the regular shooting distance, as determined by the Beginner Award

level the novice is working on (see the Beginner Award Program).

6. The same as in #4, but shooting arrows at a regular target face, from a regular shooting distance.

The Path of the Hands During the Draw - Exercise

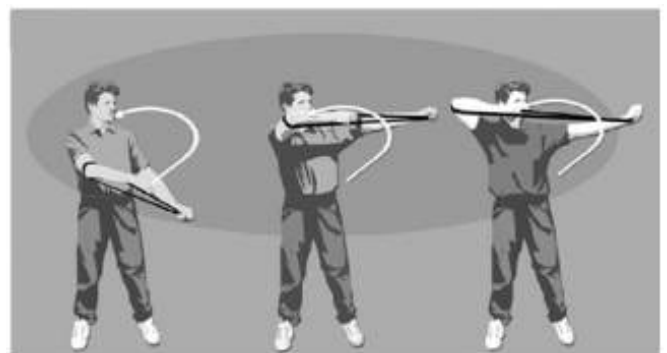
1. Let the novice assume the body's pre-setting, raising of the bow, and the draw positions. Ensure that the string hand follows a smooth curved line in the vertical plane to the end of the draw, i.e. until reaching the facial reference points. Throughout this movement both hands should remain parallel to the floor. This action should be progressive and in a continuous flow, avoiding staccato-like jerky movements.

2. Same as above, but standing in front of a mirror.



The novice visually checks the level of both hands in a mirror whilst simulating the draw.

3. Same again, but with an elastic band placed around the string elbow and the other end held in the bow hand. The band should remain horizontal during the draw process.



Line of forces should always be horizontal during the entire draw.

4. Same again, still standing in front of a mirror, but with the elastic band gripped in the string fingers.



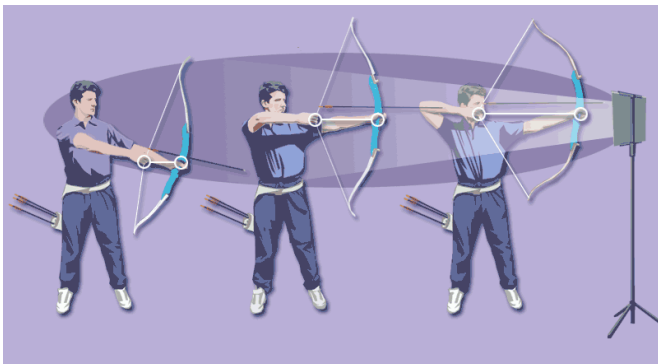
Simulate a draw ensuring the hands are always at the same level.

Throughout the entire practice session, continue to attend to all the points dealt with previously, i.e. the novice should follow these steps:

- Straight Body (vertical, flat back and body weight equally distributed on both feet);
- Erect spine (flat nape);
- Low chest;
- Low centre of gravity (heavy and powerful belly, low shoulders, flat chest, and a stretching feeling in the trapezius muscles);
- Fixation of the body around the hips (especially in the lower back);
- Entire body within the shooting plane (shoulders should be directly above the hips and feet);
- Head orientation facing the target (chin and nose pointed toward the target).

At this step, the top triangle (aiming eye and shoulders) is pre-set, hence the draw can start using the back muscles of the shoulder girdle.

5. Shooting arrows, starting with the raising of the bow, let the novice observe the string hand while the bow is being drawn; be attentive of the path of the novice's string hand. Be sure that the string hand remains at the same level as the bow hand and the arrow stays parallel to the ground. The use of a mirror will make this observation easier.



Let the novice come to full draw, aim at the target and continue the shooting sequence.

6. Same as above but with eyes closed instead of watching the string hand.

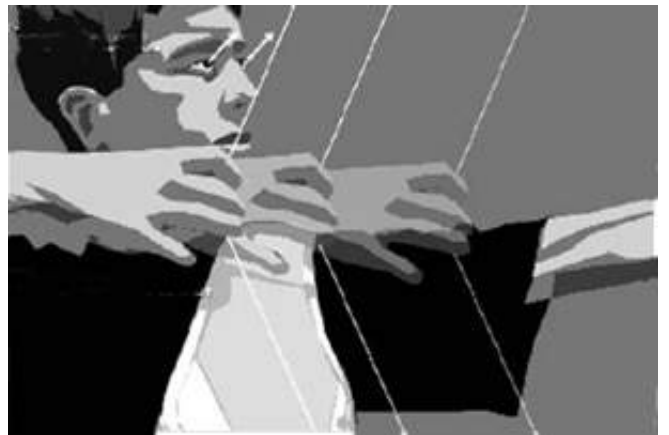


Drawing with eyes closed.

The novice should focus on the feelings of:

- A smooth, continuous, and progressive movement of the string hand;
- An action coming from the muscles of the back and posterior part of the shoulders (not from the arms).

7. Have the novice raise the bow and begin the draw with the eyes open but not specifically focused. Focus on the butt only when at full draw.



Drawing with unfocused eyes.

8. Let the novice raise the bow and begin the draw with eyes open and focused on a blank butt. Shoot whilst maintaining the focus on the blank butt.

9. Let the novice raise the bow and begin the draw with eyes open and focused on a target face. Let him take aim and shoot whilst remaining focused on the aiming point.

Low Centre of Gravity - Exercise

Objectives:

- To improve body stability by having as low a centre of gravity (CoG) as possible.
- Be able to draw the bow back while keeping the shoulders (and CoG) down.

Situation:

Have the target at a nominal shooting distance and a partner assisting.

Equipment:

Basic equipment set-up and a piece of wooden rod about one meter long.

Instructions:

The partner faces the novice and places one end of the stick just below his belly button and the other end placed just below the archer's belly button. The novice maintains the pressure on the stick from before the draw until two or three seconds after the release.

If the stick is long enough, one end can be touching the archer's belly just below the belly button and the other end could be placed on the ground about 1½ meters in front of the archer. See illustration.



Lower the centre of gravity by maintaining pressure on the stick.



Centre of gravity pressed down on a stick.

Motionless and Stable Head - Exercise 1

Prepare a mirror as shown in the pictures below.



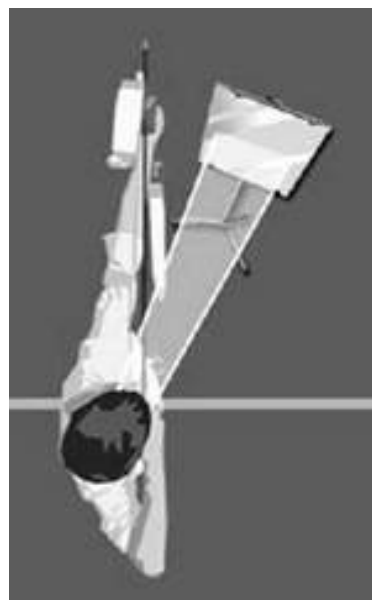
Self-control of the head (and torso) position during the draw with an elastic band simulation.

a) Simulations with an elastic band:

Let the novice pre-set his body and start the sequence toward the target. As soon as he has started the draw action, let him move his eyes toward the mirror without turning his head and let him observe his upper body (the top pyramid - in other words the head and shoulders); they should remain immobile and passive.

b) Same as above, but with a bow and arrows:

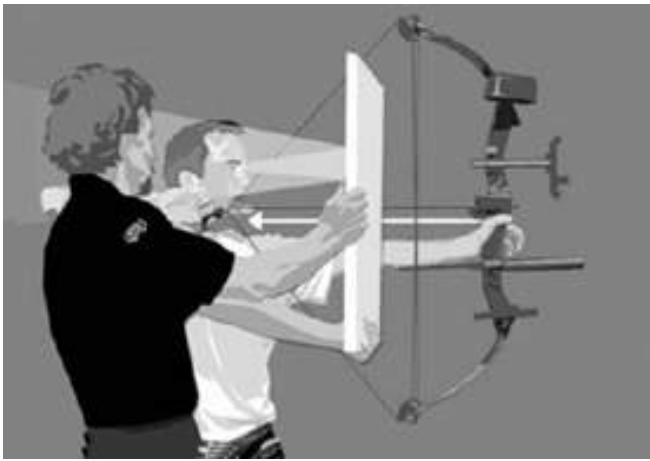
At this time do not pay too much attention to the consistency of the facial marks



Observing the head stability using a mirror on a stand.

At full draw, let the novice move his eyes back toward the target and continue the shooting sequence.

If a mirror stand is unavailable, ask an assistant to hold it.



Observing the motionless head in a mirror held by an assistant.

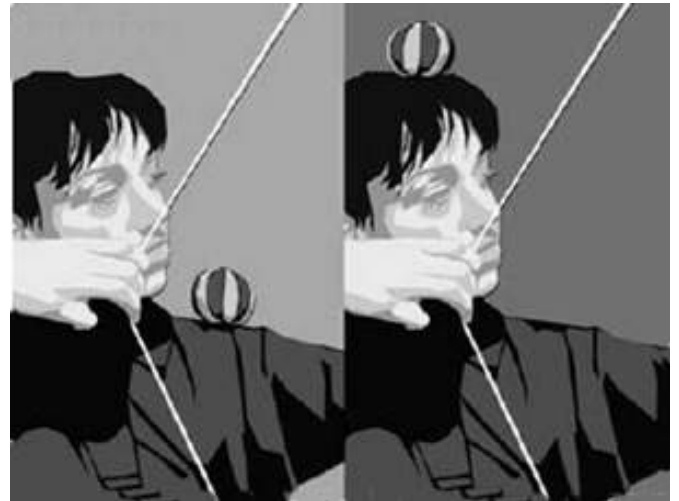
- c)** Put away the mirror and have the novice repeat with the eyes closed. At full draw, let the novice open his eyes toward the target and continue with the shooting sequence.
- d)** Let the novice alternately do one simulation in front of the mirror, and one with eyes closed.

Motionless and Stable Head – Exercise 2

This exercise should be done as an immediate follow-up to the previous one.

The novice can start this exercise with an elastic band instead of the usual archery equipment.

- 1.** As soon as the novice has started to raise his bow or during the pre-draw, have someone put a soft juggling ball (filled with rice) or something similar on top of the novice's head and/or the bow shoulder, as illustrated below.

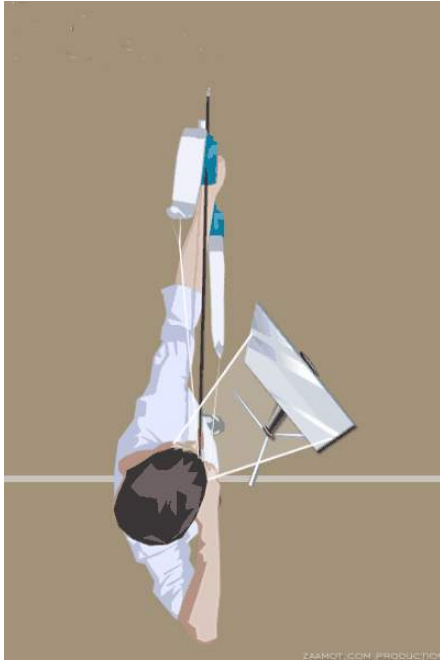


A juggling ball is used to control the upper body movement.

As shown above, the control can be extended to the upper body with the use of a ball placed on the bow shoulder, since forward head motion is sometimes associated to the bow shoulder creeping up.

At the same time, let the novice move his eyes, towards a mirror that is very close to his face, without moving his head; observe the string approaching and landing on the novice's face, while his face, lips and chin remain passive.

At full draw, let the novice move his eyes back to the target prior to completing the shooting sequence. The ball should remain on the novice's head without falling off. The coach can remove the ball before the release, since the checking of a stationary upper body is complete.



2. Similar to the previous exercise, but with eyes closed, or with the novice watching them self in the mirror.
3. Same again, but with unfocussed eyes.
4. Same again, but looking and shooting at a blank butt.
5. Same again, but shooting at a cut-out target face, only showing scoring zones 1 to 5. See picture below.



A cut-out target face.

6. Same again, but shooting at a cut-out target face, only showing scoring zones 1 to 6.
7. Same again, but shooting at a cut-out target face, only showing scoring zones 1 to 7.



8. Same again, but shooting at a cut-out target face, only showing scoring zones 1 to 8.
9. Same again, but shooting at a cut-out target face, only showing scoring zones 1 to middle of the 9.
10. Same again, but shooting at a cut-out target face, only showing scoring zones 1 to 9.
11. Same as #10, but shooting at a complete target face.

Note: The above exercise uses all of the various steps of the Standard Teaching Process (STP) from the stage of self-observation until shooting at a regular target face from a regular shooting distance and under some stress or challenge (a match, an elimination game, etc.)

Still Upper Body - Exercise

Objective:

To control and make the novice aware of the possible collapse of the upper body at the end of the draw.

Situation:

Usual shot, with partner assistance.

Equipment:

Basic equipment set-up plus a mirror.

Instructions:

The partner is positioned behind the novice at shoulder height. The partner places one hand on the bow shoulder and the other against the archer's chin. Forming a solid square angle shape, both hands remain in position and act as stops, making the novice feel any upward movement of the bow shoulder or head movement toward the string.



The partner's hand provides a feedback on the constant distance from the chin to bow shoulder.



This exercise should be completed using the standard teaching process. Hence the next stage uses visual feedback. During the draw and especially at the end of the draw, let the novice look in the mirror for immobility of the upper portion of the body, then bring the eyes back to the target and aim. For this stage and the

following ones, it is suggested that the assistant only use his/her hands every second arrow.

Instruct the novice to repeat the exercise:

- looking up;
- watching the blank butt;
- By shooting at increasingly complete targets.

Self-Observation for the Maintenance of the Upper Body Form During the Draw - Exercise

Objective:

To let the novice develop the ability to maintain body position during a partial and full draw.

Situation:

Standing about 5 meters from a blank target butt.

Equipment:

Elastic band, basic archery equipment set-up, a target, a set of target faces with cut-outs, and a mirror. This can be set on a stand or held by an assistant.

Instructions:

Have the mirror positioned so that the novice can easily see their reflection without turning the head, only their eyes.

Simulations:

They should be conducted with an elastic band. Have the novice pre-set the body and start the shooting sequence. As soon as he has started the drawing action, let the novice turn his eyes to look towards the mirror without turning the head, ensure that the upper body and face remain immobile and passive. At full draw, let him move the eyes back toward the target and continue the shooting simulation.

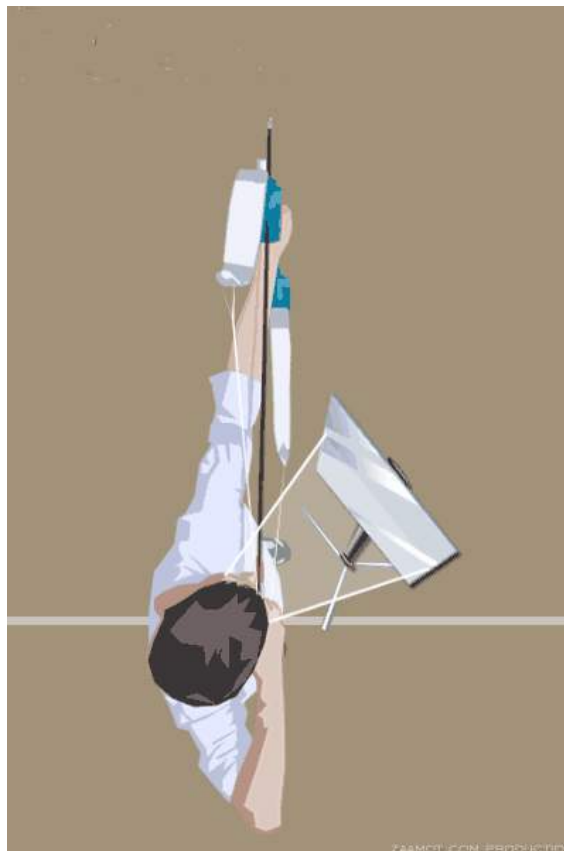


Self-control and the maintenance of the pre-set body during the Draw step.

Repeat with eyes closed. Alternate one simulation looking in the mirror and one with eyes closed.

1. Set the blank butt at 5 meters. With the normal shooting equipment, have the novice pre-set the body and start the sequence toward the target; as soon as he has started the draw action, let him move his eyes, without turning the head, ensure that the upper body and face remain immobile and passive. At the moment, ignore differences in the facial marks. At full

draw, have him move the eyes back toward the target and continue the shooting sequence: expansion, release and follow through.



Self-checking of the draw.

- 2.** Repeat the actions explained in #1, but with eyes closed instead of letting the novice watch himself in the mirror.
- 3.** Repeat the actions explained in #1, but with unfocussed eyes (upward) instead of watching self in the mirror.
- 4.** Set the target at 10 meters and have the novice repeat the actions explained in #1, but shooting at a blank butt.
- 5.** Repeat the actions explained in #1, but shooting at a target face that has the middle cut out and showing only scoring zones 1 to 5.
- 6.** Repeat the actions explained in #1, but shooting at a target face that has the middle cut out and showing only scoring zones 1 to 6.
- 7.** Repeat the actions explained in #1, but shooting at a target face that has the middle cut out and showing only scoring zones 1 to 7.
- 8.** Repeat the actions explained in #1, but shooting at a target face that has the middle cut out and showing only scoring zones 1 to 8.
- 9.** Repeat the actions explained in #1, but shooting at a target face that has the middle cut

out and showing only scoring zones 1 to middle of the 9.

10. Repeat the actions explained in #1, but shooting at a target face that has the middle cut out and showing only scoring zones 1 to 9.

11. Repeat the actions explained in #1, but shooting at a complete target face. The focus here is on maintaining a still body and head, and making sure the face stays relaxed during the draw.

Drawing with Bow Shoulder Down - Exercise

Have the novices place their bow hand in the grip and get their normal string grip and then lift their bow arm to about 45 degrees above the horizon.

Let them feel the bow shoulder settle into joint. Then have them pull the bowstring behind the neck as if doing a 'Lat pull-down' exercise.



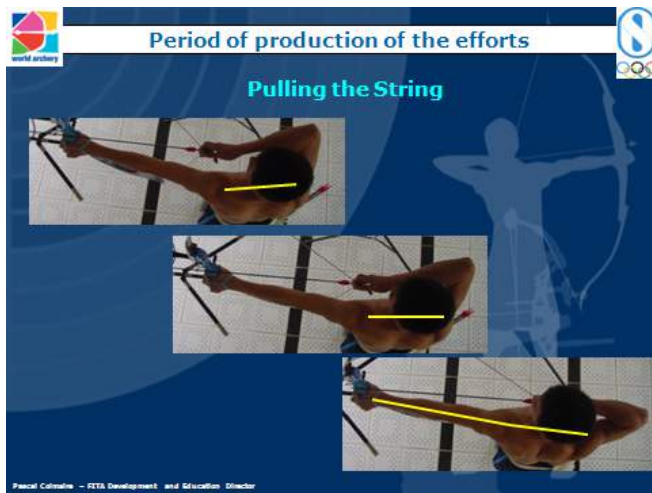
10 Sets of 5 Reps with 30 seconds' rest between sets.

This exercise strengthens the front shoulder and makes it easier to keep or learn to keep the bow shoulder down.

Drawing while Maintaining Shoulder Alignment - Exercise

Objectives:

To keep the pre-set form and shoulders aligned with the hips while drawing, avoiding any motion of the bow shoulder and arm toward the string path.



Note that a slight improvement in shoulder alignment, i.e. the bow shoulder moving a little towards the string path, is acceptable.

The image below shows a coach checking an archer with good shoulder and bow arm alignment.



Situation: Shooting with an assistant

Equipment:

Regular archery equipment and one extra arrow or stick.

Instructions:

1. As soon as the novice has achieved his/her pre-set form (at the end of the pre-draw), the coach places an arrow vertically against the bow shoulder of the archer on the string side. The coach holds the vertical arrow by the ends and strives to keep it in the same spot throughout the draw.



The novice can feel the contact of his/her bow shoulder with the arrow. Shooting with eyes closed is recommended to enhance the feeling of the shot. The novice draws the string back while striving to keep the same pressure on the arrow from their bow shoulder. A slight increase is acceptable if it is the result of a refinement in the alignment of the shoulders.



Drawing in the Shooting Plane – Exercise with an Elastic String

Objectives:

Get the novice to provide effort directly opposed to the bow action, reducing or avoiding any torque and/or lateral forces in the shot.

Situation:

Anywhere.

Equipment:

Bow and an elastic string.

Instructions:

1. Fit the elastic string to a braced bow. Let the novice hold the elastic string and raise the bow up and align the elastic string and the bow string. Draw the elastic string while keeping the two strings aligned.

2. Same exercise with eyes open and then continue with the other stages of the Standard Teaching Process.



2. Let the novice hold the elastic string, raise the bow and look at the string in front of the aiming eye. Have him close his eyes and draw the elastic string back. At full draw have him open his eyes; the two strings should still be aligned.



Because the objective is to have the student learn to draw the actual bow string in the shooting plane, when the archer regularly succeeds at this exercise, proceed to the exercise entitled "Drawing in the Shooting Plane with Regular Archery Equipment – Exercise."

Self-observation of the Draw in the Shooting Plane - Exercise

Objectives:

Get the novice to produce effort directly opposed to the bow action, reducing or avoiding any torque and/or lateral forces in the shot.

Situation:

Anywhere.

Equipment:

Bow and a mirror.

Instructions:

1. Let the novice stand in front of a mirror with the bow but no arrow. Raise the bow up and see – in the mirror – the string in front of the aiming eye. Draw while keeping the string always in front of the aiming eye.



2. Again, in front of a mirror, using a bow without an arrow. Let the novice raise the bow and see – in the mirror – the string in front of the aiming eye. Close the eyes and draw the bow back. At full draw open the eyes; the string should still be in front of the aiming eye.

Because the objective is to have the student learn to draw the actual bow string in the shooting plane, once the novice is proficient at this exercise have them proceed to the exercise entitled "Drawing in the Shooting Plane with Regular Archery Equipment - Exercise."

Drawing in the Shooting Plane with Regular Archery Equipment - Exercise

Objectives:

Have the novice produce efforts directly opposed to the bow action, reducing or avoiding any torque and/or lateral forces in the entire archer/bow unit.

Situation:

Regular shooting on a range.

Equipment:

Regular archery equipment.

Note: At least one of the two previous exercises should be implemented before this one.

Instructions:

Have the novice stand in front a target, with a bow and arrow. Have him raise the bow and see the string align on one part of the bow, usually along the vertical part of the sight window, but any part will do. Once the string is aligned, have him close his eyes and draw the bow back. At full draw have him open his eyes; the string should still be seen on the same spot.



Drawing with a Consistent String Hand and Finger Position - Exercise

Objectives:

Have the novice produce the draw mainly with the back and posterior part of the string elbow, with a minimum change in the string fingers.

Situation:

While shooting with an assistant.

Equipment:

Regular archery equipment.

Instructions:

From the pre-draw, the assistant gently holds the unused two fingers of the novice (thumb and little finger).



Note:

The assistant should respect as much as possible the natural relaxed shape of the two unused fingers, and not move them to another position.



Even at full draw the two unused fingers should still be in the same positions and quite relaxed, although a little extra stiffness is acceptable.

Alternative:

If no assistant is available, the coach can ask the beginner to visually check the string hand close to the face, between pre-draw and full draw.

Involvement of the Three String Fingers - Exercise

Objectives:

Many novices have a finger, often the ring finger, which does not grip the string properly; it slips on the string. Several problems may ensue from such a string grip: such as an inconsistent string grip, contraction of the wrist, or one or two fingers becoming painful. Below is a tip to avoid these problems and get a consistent string grip.

Situation: Drawing the bow.

Equipment: Regular archery equipment.

Instructions:

When gripping the string, slightly reduce the tension on the middle finger (less than in the illustration below where it is exaggerated for a better understanding); start the draw with this modified string grip.

The forefinger and ring finger get well hooked on the string.



Keep drawing the string back and let the middle finger grip the string when and how it wishes.



At full draw, all three fingers are well hooked on the string.

Body Weight Distribution on the Legs - Exercise

This exercise is for novices who place too much weight on one foot or the other during the draw process. It is usually due to either their strong focus on the target resulting in more weight on the bow foot or leaning back to ease their draw effort and thereby placing more weight on the string foot.

Objective:

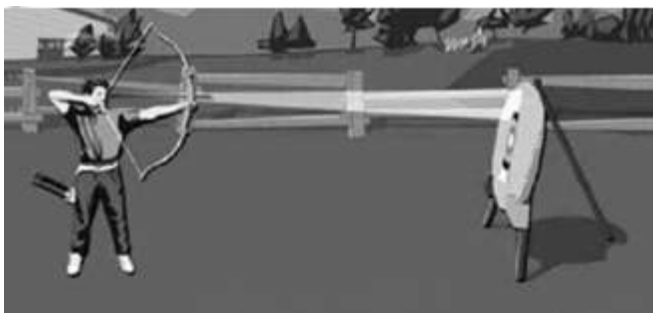
To control and increase awareness of the body weight distribution on lower limbs.

Equipment:

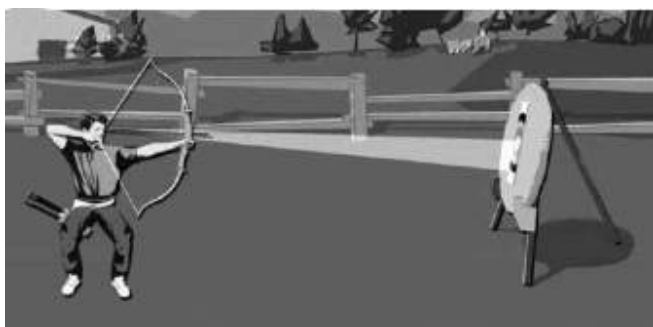
The basic equipment set-up. Attach a vertical strip of target face on the butt to use as a reference guide.

Instructions:

At full draw, let the novice aim at the top of the strip, then close their eyes and flex their knees to move slowly down. When in a full squat, the novice opens their eyes. If the body weight is evenly distributed over both legs, the sight or the arrow, depending on the aiming method, will be at the bottom of the strip.



Aiming at the top of a vertical strip.



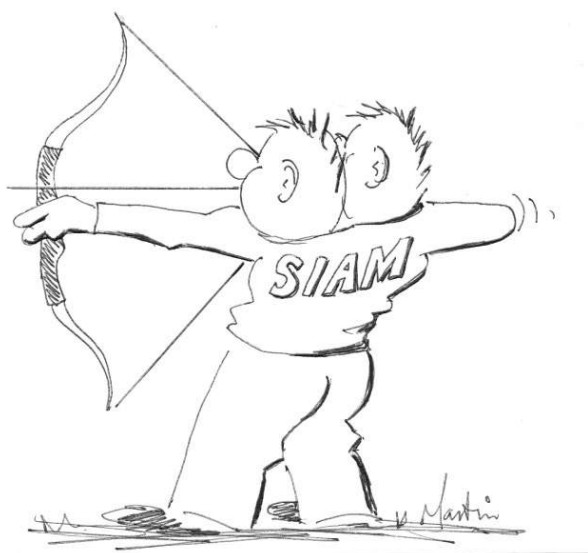
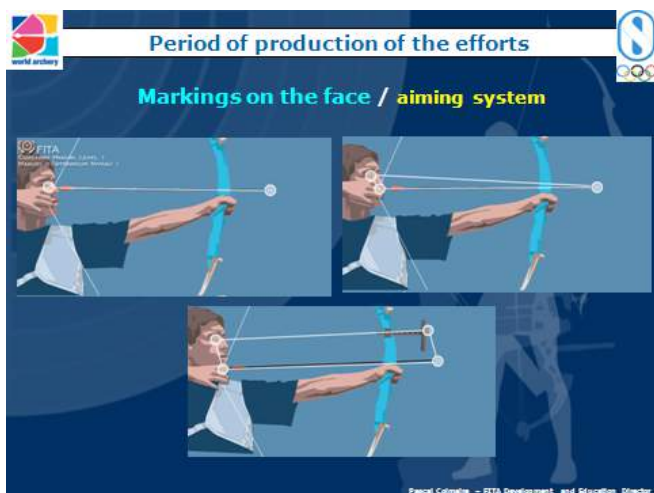
Good body balance allows the sight to move down the strip.

A right-handed beginner, who has a more weight on the bow leg, will drift to the right while moving down. With more weight on the string leg, the drift will be to the left.

6.9. FACIAL MARKS (or REFERENCES) and AIMING SYSTEMS

6.9.1. Complementary Knowledge

The term "Facial Marks" is used instead of "Anchor" as the latter implies that the draw motion stops, whilst shooting a bow is actually a continuous movement. Furthermore in the straight line aiming method, there is no specific anchor. Some other wordings are used, among them: "Rear sight position" and "Reference points". They all refer to the spatial positioning of the arrow's nock with respect to the aiming eye.



**Look, we gotta stop bickering
about the anchor point!**

Type: Preliminary action

Objective:

To let the novice repeat, with accuracy and simplicity, the orientation of the arrow in reference to the aiming eye.

Forms:

There are three geometrical forms generated by the various facial marks: straight line, triangle, and quadrilateral.

a) Straight line (The simplest form)

This is recommended for "Come and Try" events and the first few sessions, particularly in a recreational environment or short entry-level program.

This method involves aiming along the shaft of the arrow. At full draw, the shaft is on the aiming axis (line from the eye to the target), with the nock at about 2.5 cm in front of the aiming eye. To allow comfortable aiming, the space between the nock and the forefinger of the string hand is about two fingers' width or roughly 4 to 5 cm.

Rationale:

This method makes learning the following actions simple:

- 1 Consistent positioning of the arrow at full draw without the need to develop sensitive facial reference marks.
- 2 Control of the position of the aiming eye with no string alignment required.
- 3 Aiming. This very simple way of aiming and visual alignment allows the novice to:
 - be consistent and precise with ease, thus obtaining encouraging results;
 - better understand the movement that begins with the draw and concludes after the release, reducing the temptation to stop between drawing and aiming.
- 4 Alignment of the string forearm with the arrow (line of forces).

This form, also called "Apache" or Shaft aiming", achieves satisfactory results for novices when the target is at the distance below:

AGE	Shooting Distances
7 & less	4 - 6 M
8 - 10	6 - 10 M
11 - 12	8 - 12 M
13 & +	10 - 15 M

These shooting distances should be adapted to the physical size of the person; age as the only reference is not enough.

Depending on body size and draw weight of the bow, this method can be used at distances up to 15 m or in rare cases up to 20 m.

This method is only intended to be used as a starting method. Even so it is not a mandatory starting method but it does provide good results quickly and easily.

With the shaft aiming method, any difference in the draw or any slight creeping has a less of an effect than in the triangle method (see below).



In the straight line aiming method the arrow is visually positioned while the aiming eye position is ensured.

b) Triangle (The intermediate and least accurate form)

This is probably the most ancient archery aiming technique after the instinctive shooting. The "triangle" is a simpler geometrical design than the "quadrilateral". However, a simpler geometrical design does not mean easier to repeat and learn. This form is the most difficult and least accurate aiming style to master in archery. The arrow is positioned using two reference points;

- Arrow point, by visual placement on the target;
- Arrow nock, through contact of the string hand on the face.

To ensure a consistent repetition of the triangle the novice has to:

- maintain a constant draw;
- position the aiming eye using a string alignment technique.

While shooting a given distance, the novice's string fingers are at a constant distance from the nock, usually just below it. At full draw, the string hand is always placed at the same spot on the novice's face, for example the tip of the forefinger touching the corner of the lips and the top of the hand laying just under the cheek bone.

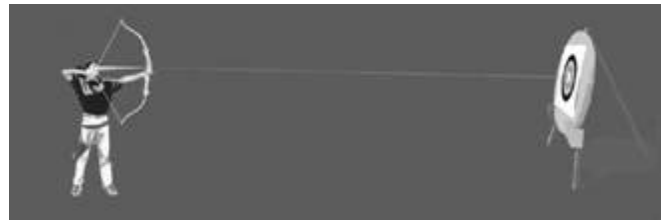
Rationale:

This method highlights all the difficulties and pleasures of archery. The difficulty with this method is that aiming occurs using the arrow point which is:

- Quite large, making an inaccurate aiming mark;
- Not as stable or consistent as a fixed sight pin - especially for a beginning archer.

It is also difficult to get a consistent string-finger mark on the jaw.

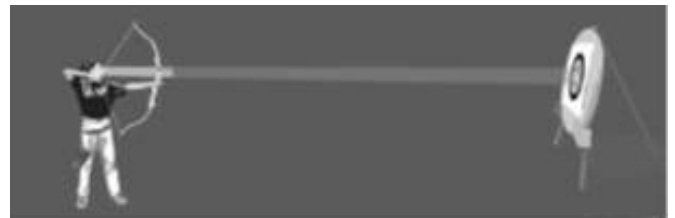
However it is of interest, both academically and practically, since it is similar to the original archery form. It is important to teach it to novices because it may be the style of archery he/she likes best. This form is usually taught after the straight-line, but before the use of the quadrilateral. The novice discovers the ballistic effects of an arrow's trajectory and the importance of consistently reproducing the nock position and aligning the bow string.



Facial marks for the use of the triangle method.

Once these technical elements have been learned, the quadrilateral form can be considered.

c) Quadrilateral (The most common and accurate form)



The arrow is positioned by two reference points:

- A sight (pin or ring) is visually positioned in the aiming line in accordance with the target centre rather than using the arrow point as a sighting aid as in the triangular method.. Hence, the proper use of a sight needs to be introduced before practicing this method;
- The drawing fingers around the arrow nock through tactile placement of the string hand on the face.

Furthermore, to ensure the consistent repetition of the quadrilateral, the novice must maintain:

- The bow in the vertical plane, or consistently canted the same amount;
- A consistent draw length;
- A consistent aiming eye position to allow string alignment.


world archery

Period of production of the efforts

Markings on the face / search of stability

Almost motionless but feel:

- String pressure increase on face
- String hand pressure backwards



Facial Control - FITS Development and Education Director

the side of the chin or front-centre, and touching the tip of the nose.

We have just covered the 3 main types of facial marks existing in target archery. Since the most accurate one (quadrilateral) is not the simplest one to learn or teach, we can think as follows.

Question #1: What is a more simple form than a quadrilateral form (with 4 sides and 4 angles)?

Answer #1: A triangle (with 3 sides and 3 angles).

Question #2: What is a more simple form than a triangle (with 3 sides and 3 angles)?

Answer #2: A simple straight line (no angles, just a line).



String alignment is required with the triangle and quadrilateral method.

By imagining how difficult it is for a novice to repeat all these tasks with consistency, a coach will understand why it is recommended to run a lot of mimics and simulations (sometimes with an elastic resistance), before allowing the first shots. The "Mediterranean" string grip type, sometimes called the "cigarette" string grip, is the most common one used with the quadrilateral method. The forefinger is just above the nock, while the middle and ring fingers are below. The forefinger usually touches the top of the nock without applying pressure. The middle finger of the novice is usually kept away from the nock in order to keep it from lifting the arrow shaft off the rest at full draw. Usually the string hand is below the lower jaw, with the string in contact with the chin, either to

Markings on the face / aiming system

	Linear: Aim along the shaft	Triangle : Aiming with the arrow point	Quadrilateral: Aiming using a sight
Line of Forces	Too High	High	Low
Alignment of Forces	Perfect	Excellent	Poor
Arrow Position = Exact	Very easy to do visually	Very Difficult: both extremities	Very Difficult: Nock by touch Exact in the end
Alignment of the String	Not required	Required	Required
Finger position on the string	Comfortable but inconsistent location on the string	Comfortable. Not always consistent location on the string	Uncomfortable. Pressure on the arrow & slips on the string
Markings on face	Not required	Required - Inexact Nose hit on release	Required Difficult to achieve
Based on other styles	Not complete Permits progressive learning	Difficult in the beginning but permits shooting well in any style	Difficult at the beginning and then to change to another style
Equipment Cost	Economical	Economical	More expensive
Participants	Group & Individual & Come-and-try	Group & Individual	Group & Individual

Pascale Colquhoun – World Archery Development & Education Director

These questions lead us to consider teaching archery from the simplest form (straight line) to the most complex one (quadrilateral), which is a logical educational progression with obvious benefits. The above chart shows the advantages of each aiming system in Green and their disadvantages in Blue. The elements in White are neutral.

Teaching the forms from simplest to most sophisticated allows the novice to experiment with at least two types of archery - with and without a sight - allowing them to choose which type of archery they prefer.

Tips for linking the 3 methods:

Linking the various facial marks and aiming systems in an entry level program can be done as follows:

- Teach the novice the straight line method at a short distance, as indicated above in "a) Straight line (The simplest form)."

AGE	Shooting Distances
7 & less	4 – 6 M
8 – 10	6 – 10 M
11 – 12	8 – 12 M
13 & +	10 – 15 M

These shooting distances should be adapted to the physical size of the person; the age as the only reference is not enough.

The straight line method reduces the number of unusual reference points, such as string against the chin, string-hand below the lower jaw, cheek bone, or against the jaw, and allows the novice to focus on learning the real fundamentals.

- When the novice's score improves (for example, 115 points for 15 arrows shot at an 80 cm target face), increase the distance being shot by 5 m; less for the youngest, and so on until they are shooting 30 m. Along with the progression of the shooting distance, allow the novice to experiment with the 3 aiming systems.

- Use the straight line method only for distances at which the novice can still aim somewhere in the top half of the target face. If the shooting distance requires the novice to aim above the face, switch to the triangle method.
- In the case where a novice cannot reach 115 points at a distance with the triangle aiming system, or when the novice can score an average of 24 points out of 3 arrows at 20 or 25 metres, depending on the novice's skill, teach the quadrilateral method.
- It is usually while learning the quadrilateral method that the novice chooses their preferred shooting method, which is usually either returning to the triangle method (without sight) or going on with the quadrilateral method and using a sight.

For the facial marks used in instinctive/intuitive aiming, see chapter 8, "Starting With a Traditional Bow".

Complementary Knowledge:

String alignment is a key element for aiming since all the components of the complete archer/bow unit must be aligned and kept aligned as the archer proceeds through the next steps in the shooting sequence

Clarification on a possible confusion:

String alignment is a title which is open to misinterpretation because many beginners think that the string should be moved to the "proper" spot. In reality, the string does not move; on a Recurve bow, it is always in the centre of the bow. The string appears to be at different locations when the aiming eye moves with respect to the string and the bow.

Even if "string alignment" is a poor title, we will use it because it is the common name of this technical element in archery.

Purpose of the "string alignment":

The novice adjusts the position of the aiming eye with reference to the string and the bow in the shooting plane to ensure the arrow is properly and consistently directed towards the target.



A common string alignment, especially with no sight.

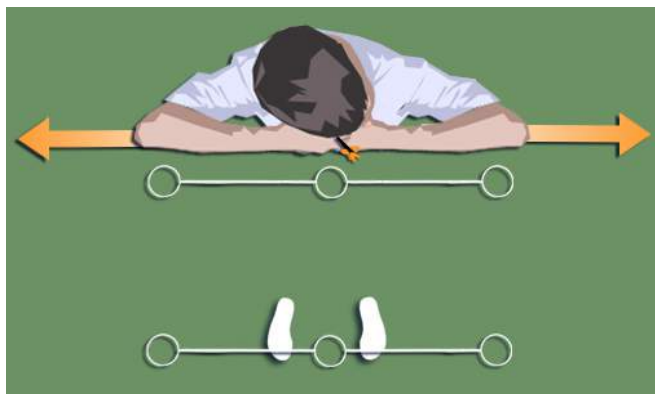
6.9.2. Exercises

Facial Marks and String Forearm Alignment - Exercise

Objective:

To determine when, during the draw, to reach the facial mark in order to achieve a good alignment of the drawing and push forces.

Situation: Simulations.



In this situation the two forearms are aligned.

Equipment: Mirror.

Instructions:

The string fingers grasp the bow forefinger that is vertical and pointed toward the ground. Alternatively, as shown in the picture above and in the next exercise, the novice can grip a vertical arrow with his fingers. Draw using both hands bringing:

- the tip of the string forefinger to touch the centre of the mouth between the lips, for straight line and triangle methods;
- the enlaced fingers under the chin and in front of the neck for the quadrilateral method.

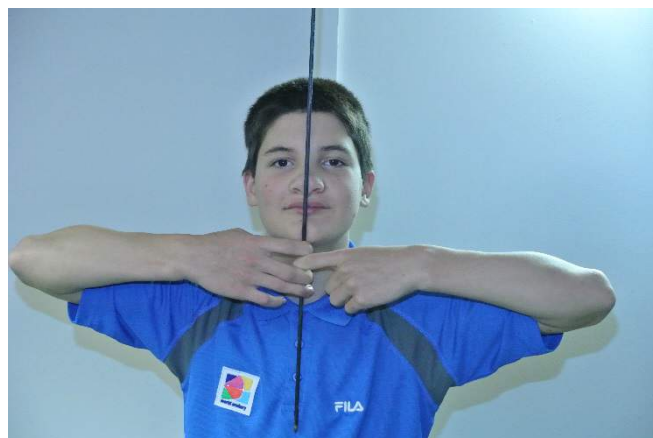
The forearms form a horizontal line. The head is turned towards the target. Imagine an arrow in the place of the bow forearm; the string forearm and arrow are in perfect alignment. Leave the string hand where it is and disengage the bow hand. Note this location as the facial reference for when the novice shoots. Using a mirror for visual feedback helps the novice locate the facial reference mark during practice when a coach is not available.

Repeat this exercise having the novice stand in front of a mirror and drawing a bow that is strung with an elastic string. Ensure that the archer draws to the facial marks determined in the first step. When they consistently draw to the same facial marks, continue with a normally strung bow.

Facial Marks and String Forearm Alignment for Sight Users - Exercise

The following set of exercises helps the novice identify the facial references that allow good alignment of the arrow and the string forearm.

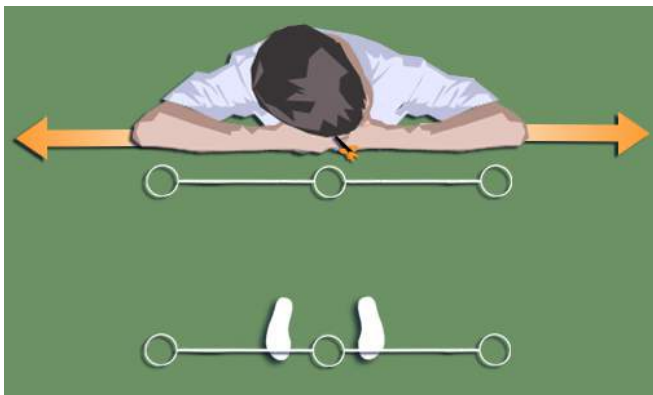
1. Let the novice assume the shooting position whilst on the shooting line. Have an assistant on the line with the novice, holding a mirror at face level, one meter away from the archer.
2. Have the novice grip a stiff stick, thin arrow, or pencil with his fingers, using a grip as closely resembling the position normally used on the string as possible, in the first joint, or a little deeper.
3. Let them use the forefinger of their bow hand to represent the normal position of the arrow, for instance between the forefinger and middle finger for the quadrilateral aiming system, as shown in the illustration below.



As in the previous exercise, let the novice bring the fingers that are gripping the stick to a good facial mark whilst watching along the shooting line (or in the mirror). The stick should be vertical and right in the middle of the novice's face, touching his nose.

At this stage:

- Make sure the shoulders are kept low;
- The arms, forearms, and wrists are relaxed;
- The forearms are be on the same horizontal line at about mouth or chin level;
- Observe that the forearms are aligned in all planes using the ideal force alignment as illustrated below.



Natural perfect alignment of both forearms through this simulation.

Let the novice reproduce this ideal form whilst simulating full draw with the bow.

4. Let the novice turn his head gently towards the target.



Novices without a sight should now feel the tip of their forefinger somewhere near the corner of the mouth, as shown in the next illustration.



For those using a sight, they should feel the contact of their forefinger under their jaw, as well as the string contact with their chin as shown below.



The assistant will move the stick to bring the top part to the middle of the nose, as in the picture below, so that the arrow/stick imitates the position of novice's string at full draw.



Ask the assistant to place a mark on the novice's chin where the string should be. Due to the bow weight and the collapsing or stretching of some parts of the body while at full draw, the string location will be about half a centimetre (for entry level bow weight) to the target side of the stick. A good way to mark this location is to affix a piece of tape on the novice's chin with the rear edge at about 5-6 mm ahead of the stick, as illustrated below.



5. Let the novice, using a bow fitted with an elastic string, come to full draw. Have the elastic string and fingers touch the face according to these marks. Use a mirror to let the archer see that the elastic string goes just a little further back than the piece of tape.



Position the mirror so that the archer does not need to move their head to see.



To make the observation easier, let an assistant hold the mirror. Since feeling the touch is more important than seeing it, have the novice close their eyes. Repeat several times until the string and the string hand are located correctly and regularly by feel alone.

6. Optionally, an arrow may be loaded on the elastic string so the assistant can check the draw length, watching where the arrow point finishes.

7. Have the novice use a bow and come to full draw.

Important: make sure that novice's head is not tilted toward the target or string at any time. Maintain the preliminary positions of low shoulders and upright head throughout the process.

Try to have the string and fingers touching the face and chin according to the identified marks. Once more use the mirror to check that the string goes just a little further back than the piece of tape. Have the novice close their eyes to get a feel for the proper string hand position. When the novice can repeat the facial marks reliably, move to the next step with or without the tape on his chin.



Facial References Versus the Arrow / String Forearm Alignment - Exercise

8. Continue as follows repeating each step several times as agreed with the coach:

- Have the novice come to full draw with eyes closed and then open their eyes to look in the mirror. If the string is located correctly, have the novice shoot the arrow. If not, have the novice let down and start again.
- Come to full draw while looking at the base of the top bow limb. Then look in the mirror. If the string is at the proper facial mark, shoot the arrow. If not, then let down and start again.
- Come to full draw while looking at a blank butt. Check in the mirror to see if the string is located correctly. If it is, shoot the arrow. If not, then let down and start again.
- Rotate through each of the above exercises in sequence. Whilst at full draw in each case take a quick look in the mirror to ensure the string is correctly located. If it is, shoot the arrow. If it is not, let down and start again.
- Same exercise but introduce a fourth step: drawing the bow towards a regular target face. At full draw look quickly in the mirror to ensure that the string is correctly located and, if so, shoot the arrow. If not, let down and start again.
- Finish by shooting at a regular target face and alternating the arrows as follows:
 - One arrow - checking in the mirror that the string is correctly located and, if it is, shoot the arrow. If it is not, let down and start again; and:
 - One arrow - shoot the arrow without looking in the mirror. However, if the location of the string feels wrong, let down and start again. The coach should be watching the facial marks in order to reinforce the archer's sense of feel.

This exercise builds on the previous one by adding a check for proper alignment of the string forearm in the shooting plane. This additional check starts at step #6.

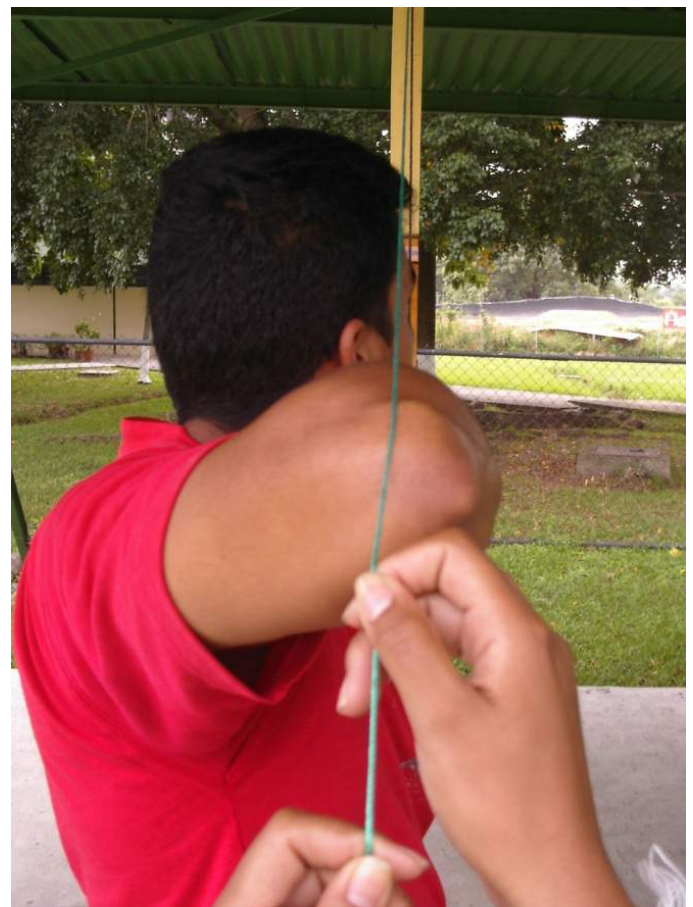
Equipment:

As for the previous exercise, plus a thin cord, 1.5 m in length, with a loop at one end (similar in size to a bow string loop) or a spare bow string.

Step #1 to 5: See previous exercise

- 6.** Same as for the previous exercise but with;
- An assistant standing behind the novice;
 - The loop of the cord over the bow's upper limb tip.

The assistant aligns the rope with the elastic string in the middle of the bow. Keeping this alignment, the assistant moves the cord until it touches the novice's string elbow.



If necessary, move the location of the tape on the novice's face until the cord is as close as possible to the tip of the elbow. Depending on the shape of the body and face, it may not be possible for everyone to get a well-aligned string elbow and a "reasonable" location of the

tape; for these exceptions some compromises must be made.

Note: If over the next steps, the novice feels some friction of the string on the face upon release (particularly on the chin), it is because the tape is too far back. If so, move the tape a forwards (towards the centre of the face) in small increments until the release is painless, then move the tape 2 additional mm forwards.

7. Optionally, an arrow can be loaded on the elastic string and the assistant can check the draw length, watching where the arrow point comes to.

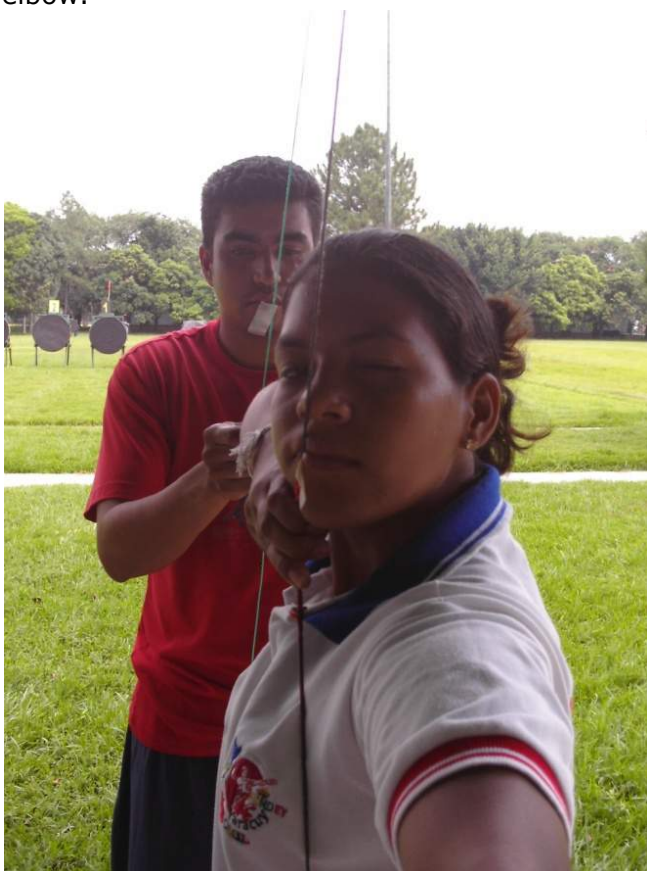
8. Have the novice take the bow and come to full draw. It is important that the novice not lean his head toward the target or string at any time and maintain the preliminary positions of low shoulders and straight head throughout the process.

Let the novice have the string and fingers touch the face according to the previously determined facial marks. The assistant continues to check the position of the cord on the archer's string elbow.

When the novice can repeat the facial marks reliably, move to next step with or without the tape on the archer's chin.



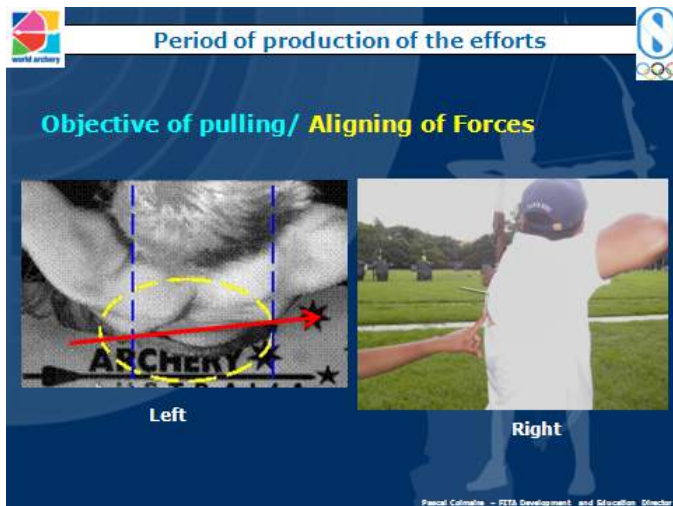
End the exercise as the previous one by alternating shots: first checking in the mirror, then going by feel alone. Even though they are not necessarily related to the facial marks, now is a good opportunity to check the other criteria that determine the correct body alignment at full draw.



Have the novice use a mirror to check that the bow string goes just a little further back than the piece of tape, then close their eyes to concentrate on feeling the touch.

Alignment of the Shoulder Blades - Exercise

With the novice at full draw with a light draw weight bow or an elastic band, the assistant places a stick horizontally across the two shoulder blades. In proper alignment, this stick should angle slightly towards the archer's bow rather than being parallel to the arrow on the bow. If the stick points away from or too far in towards the bow, have the novice adjust their alignment until the correct position is obtained. Repeat this process until the novice regularly achieves proper shoulder alignment by feel alone.



Horizontal String Forearm Alignment - Exercise

1. The assistant attaches a rope to the pressure point on the bow grip.
2. The assistant then extends the rope in the direction of the archer's string elbow, lining it up near the middle finger on the string, without changing the previous alignment.



- If the novice grips the string with three fingers together, like most bare-bow archers, the rope should pass right in the centre of the middle finger.
 - If the nock is between the forefinger and the middle finger, like most archers who use a sight, have the rope pass at the level of the top quarter of the middle finger.
 - If the novice does not use the ring finger, or only uses it a little, move the rope up by $\frac{1}{4}$ of a finger width.
3. The rope should pass close to the elbow tip, proving that the archer's forearm is on the line of force created by the novice (from bow to string). Very often the rope is just below the "ball" located at the tip of the string elbow.

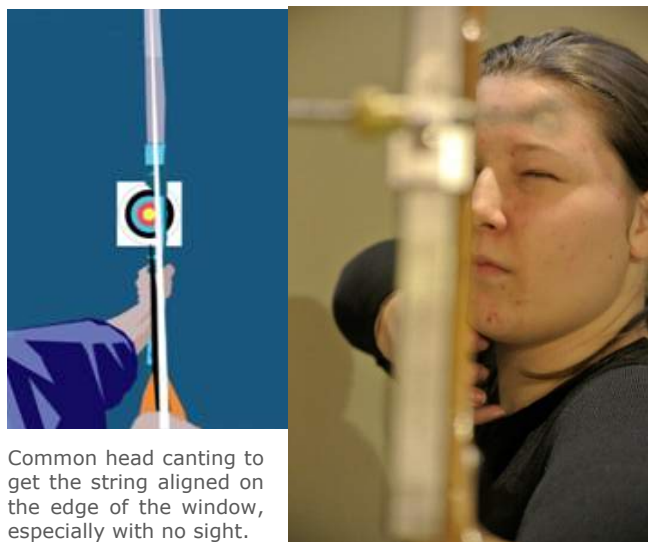
To correct a too high or low string elbow, first try having the novice remove some tension around the string shoulder blade area. It is usually the string shoulder height that influences the height of the string elbow.

Note that moving the string elbow height could change the alignment of the archer's string forearm with the arrow.

String Alignment Discovery - Exercise

Objective:

To settle in the shooting plane using the triangle or quadrilateral aiming geometry during the draw extension period. This system is not used for the shaft aiming system.

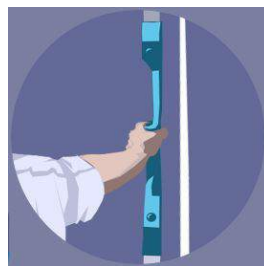


Common head canting to get the string aligned on the edge of the window, especially with no sight.

Instructions:

At full draw, have the novice tilt the top of the head from right to left while watching where the string lines up with respect to the bow.

Head canting toward the toes to get the string aligned on the left hand side of the bow window.



Head canting toward the heels to get the string aligned on the right hand side of the bow window.



The novice should notice that the string image seems to be moving from left to right on the riser.

This exercise can be done with an elastic string, in which case the novice will see the elastic string moving to the left then to the right of the bowstring.

In the chapter on Draw extension, a similar exercise entitled "AWARENESS of HEAD CANTING - Exercise" will show the visual changes with respect to the target with different head canting.

Neck and Shoulders Relaxation - Exercise

Objective:

To control the level of tension or relaxation in the neck and shoulders.

Situation:

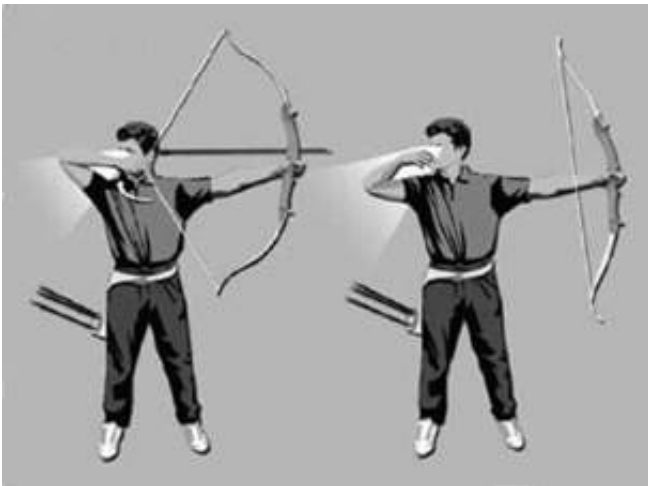
The usual shooting situation.

Equipment:

Bow. No arrow is to be used in this exercise

Instructions:

At full draw ask the novice to turn their head until they are looking in the direction of their string elbow.



Rotating the head improves neck relaxation.

The first time attempting this exercise, some novices are so stiff in their upper body that they cannot turn their head. This exercise will help them learn to relax the upper part of the body.

Note: If the novice uses an arrow, they should not release with the head turned away from the target, unless they are less than 4 meters from the target. Even so, the novice should only release under the supervision of a coach.

6.10. DRAW EXPANSION

6.10.1. Complementary Knowledge

Other common names for this essential technical skill: "Full draw efforts", "Draw increase", "Extension/expansion"

Type:

Force generating movements.

Objective:

- Stability of body and equipment for effective aiming and holding the bow at full draw without creeping or collapsing due to the spring effect of the bow;
- Extending the draw length – for novices using a clicker, or using back tension;
- Produce an efficient release.

The actual movement (*) in the draw expansion phase is quite small. The largest displacement is produced by clicker users and is in the neighborhood of 4 to 6 mm, or 2 to 3 mm per side. Therefore we are referring to micro movements; almost isometric muscle contractions. In the following exercises one often moves the string shoulder blade 10 times more than the required range, with a move up to 2 to 3 cm. While this seems like too much, it is done so the novice can learn the feeling of the proper motion.

* **Note:** The terms "move" and "moving" will be used to describe the action of the shoulder blade (and consequently the progression of the elbow) during the draw expansion phase. Moving is not the most appropriate word, because when watching the back of a topless archer, it is very difficult to see any blade displacement. This action (expansion) should not generate any movement of the string on the chin, face or chest. Nevertheless "move" or "moving" are the terms generally used in archery for lack of better ones.

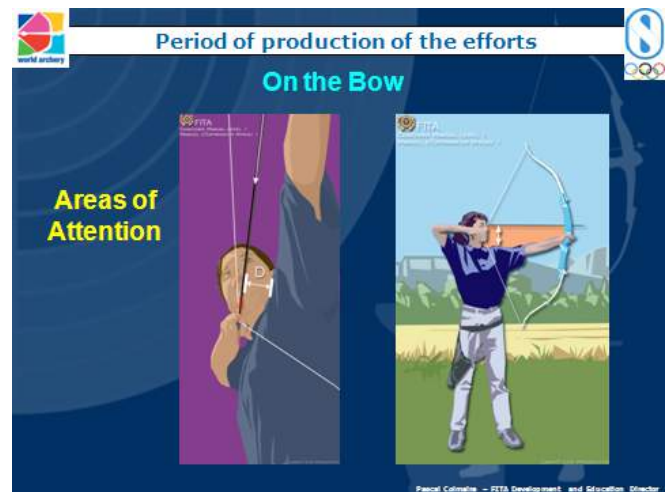
Form:

The complete bow/archer unit should maintain its alignment and orientation within itself as well as externally and with respect to the target. The torso is upright and immobile. The body is in an upright position with the chest flat and low. The spine and head are erect. The shoulders should be exerting a slight but constant pressure downwards while contributing to the increase of the draw length.

A balance must be struck between the push and pull forces. These efforts are supported by the legs, causing a slight compression of the abdominal area. There is no need for a large range of motion, as explained above.

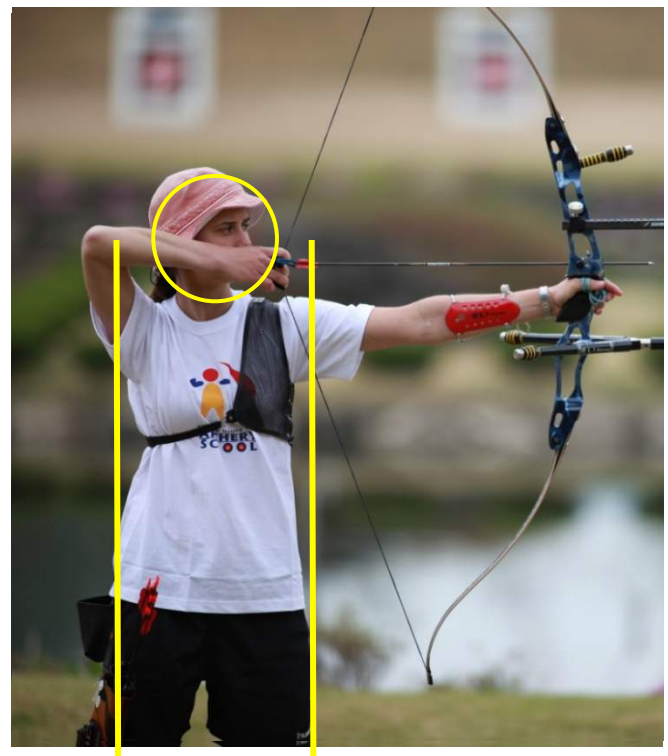
Whatever the technique applied on the string side and/or the bow side, during this step/action, the constants are:

- Consistent height and alignment of the shoulders;
- Consistent position of the bow shoulder;



No displacement of the bow shoulder upwards and/or inwards.

- Consistent spacing between the arrow and the bow shoulder in the horizontal plane;
- Consistent spacing between the arrow and the bow shoulder in the vertical plane;
- Consistent spacing between the chin and the bow shoulder;
- The body should remain upright and the head centred on the body, when viewed face-on (along the vertical plane);



- The body should be upright, with the head centred and vertical when viewed from behind (in the shooting plane) and the bow should be vertically positioned.



The draw expansion is achieved with no movement of the fingers, wrists or arms, but through the balanced action of both scapulae.

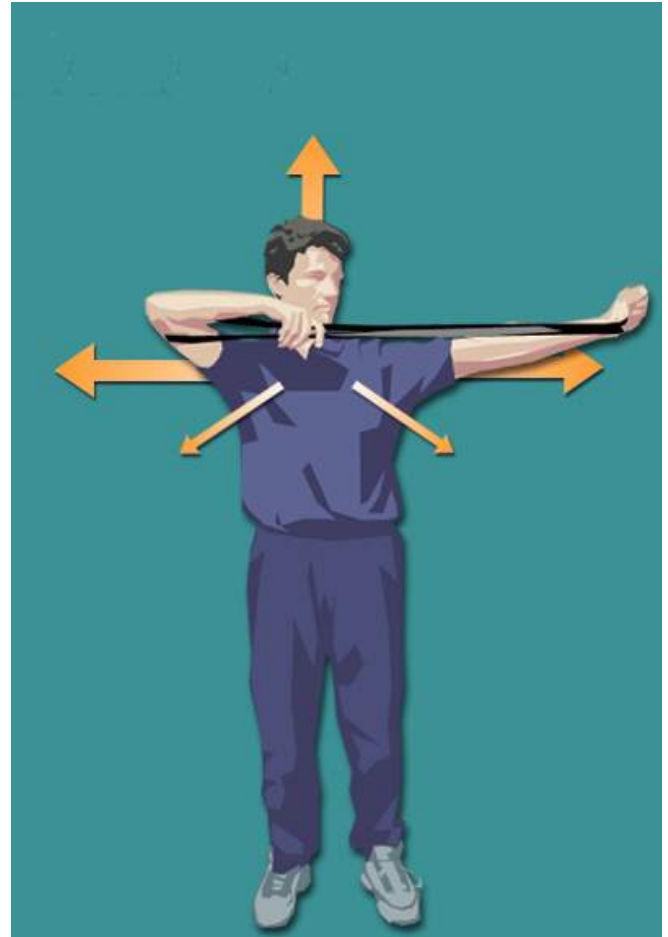
Rationale:

Due to the spring effect of the bow at full draw, the novice must withstand the tendency to let the upper body collapse as shown in the image below.



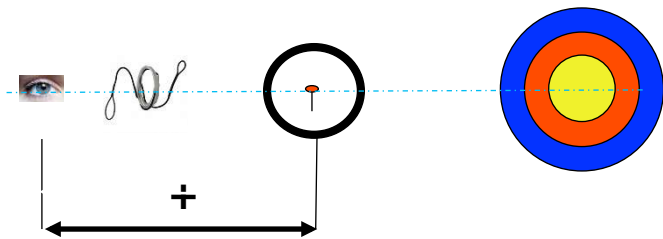
A typical collapse due to the spring effect of the bow.

Insufficient strength and/or poor alignment are likely causes for collapse under the spring effect of the bow. Using proper form, a bow with light enough draw weight, and the major muscles to generate the necessary power are the keys to resisting this collapse. Hence, whatever the draw extension technique selected for the archer, some sort of upper body expansion, as shown in the next picture, is required.



Stretching the spine upward helps it stay erect and vertical. Flattening the chest and lowering the shoulders lowers the centre of gravity. This low centre of gravity makes the body more stable and contributes to better string clearance as well as helping the archer be more relaxed. The combination of the above actions contributes to maintaining the draw length and helps to keep the head and the aiming eye at a constant level.

The production of effort should be symmetrical in nature to reduce local fatigue effects and minimize the risk of injury. During the draw expansion, the arrow orientation should be perfectly maintained with no deviation. Thus the aiming eye must be kept still and the proper alignment of it with respect to the string, the riser/sight and the target must be maintained.



Since several different techniques are used by the world's elite archers to increase the draw length, we will present some of the most popular and/or biomechanically available options.

It is up to the coach to work with each novice individually to find out the most efficient technique for them. By efficient we refer to the following criteria:

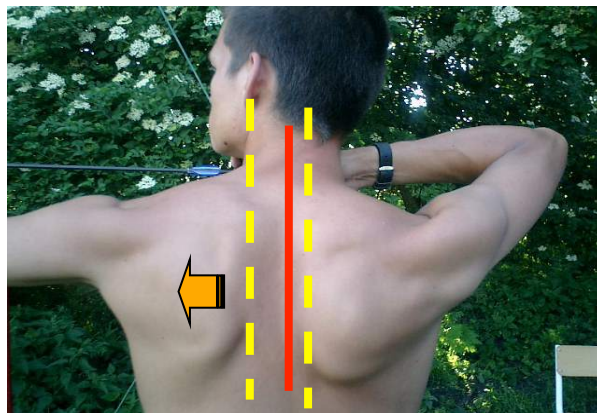
- No "level effect" – that is, no change in the pre-settled form, particularly the "big pyramid" (the top of the pyramid is the aiming eye – the base is made of the archer's feet);
- Smooth and regular progression of the arrow point;
- Very light and smooth increase of the string pressure on the face;
- Very little and slow sliding friction of the string hand against the chin when using a low facial reference;
- Relaxed string arm, forearm, wrist and hand (these elements do not generate the draw increase; it comes from the back and posterior part of the string shoulder);
- When a clicker is used, 2 - 3 seconds to get through the clicker.

In conclusion, the effect of the draw expansion step is to extend the draw length a little; hence to slightly deform the body. But this small extension should not disturb the orientation of the bow/archer unit in reference to the target. For each archer, the coach has to find the proper combination of draw extension techniques to allow an in-line extension.

The following sections describe where the movement of the draw expansion can be generated.

Bow Scapula action:

The bow scapula should progress toward the target while the archer's body stays vertical, as shown below.



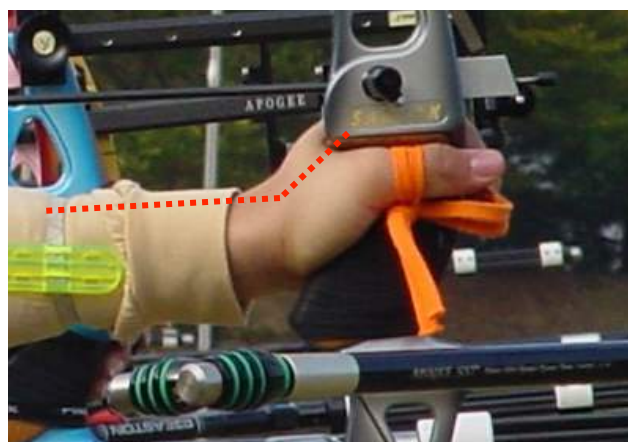
Note: The concept of squeezing the two blades is not relevant, since the novice reduces the draw while squeezing the bow blade towards the spine.

When teaching how to extend the bow shoulder, the coach must pay attention to maintaining proper orientation of the bow/archer unit including: height and line of the shoulders, upright body, head, and verticality of the bow. Additionally, the following errors are commonly encountered while learning this specific technique:

- The bow elbow should remain in the same orientation:
When pushing, many beginners rotate their elbow down; such a modification should be avoided.



- The bow hand should also remain in the same position on the bow grip, particularly in height, i.e. keeping the same angle as shown in red in the illustration below.



The Various String Scapula Actions:

On the string side, there are several ways to increase and extend the draw:

- the string scapula moves toward the spine;
- or away from the spine;
- or does not move at all.

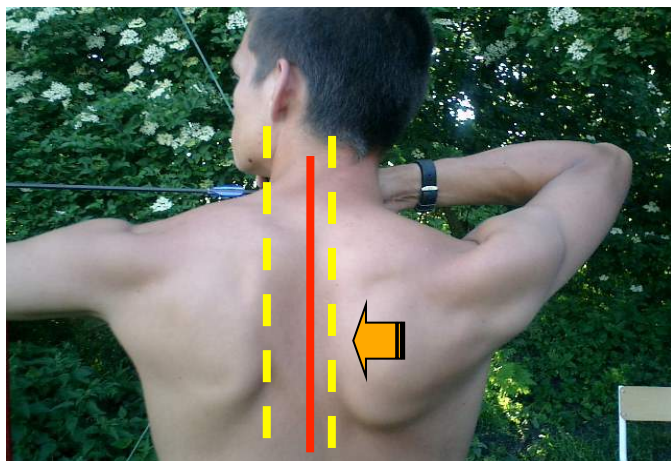
For the two first alternatives there are three variations in height: horizontally, a little upward or a little downward. All of them can be observed at the string elbow level, but are generated from the string scapula. If the archer's back is not fully covered, the scapula motion can be observed.

We recommend teaching a horizontal extension to the beginners first. Due to the potential issues for each method, using a technique that has a change in height should only be used in specific cases where it is necessary.

Let us detail these various techniques on the string side.

1. The string scapula moves toward the spine

1.1. The string elbow moves horizontally towards the back, parallel to the vertical plane; it does not move away from the target at all. This movement is generated by squeezing the string shoulder blade towards the spine, pulling the string elbow a little toward the spine as well.



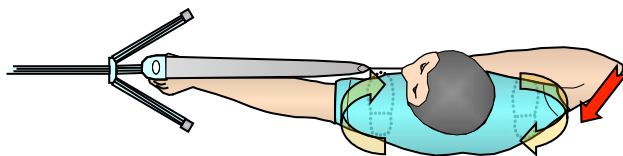
This technique is popularly known as "Back Tension".

Advantage:

- It provides a nice release: lively, dynamic, in-line, and originating from the string shoulder.

Potential issues:

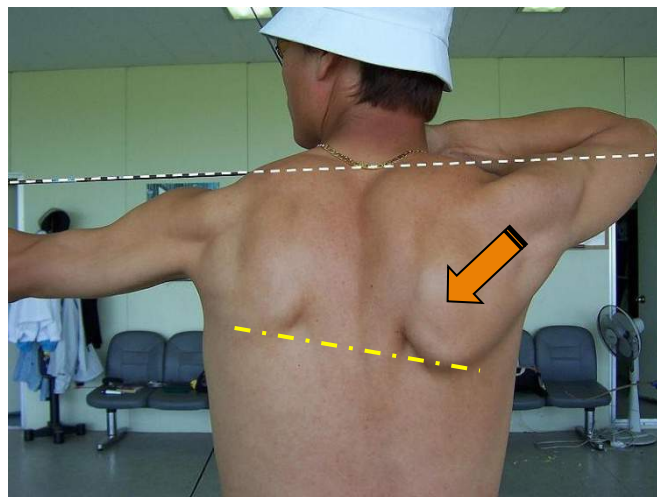
- Requires a strong core to avoid rotating the upper body (horizontal level effect) and keep the release hand from pulling away from the neck;



- Misalignment of aiming eye, string, bow/sight, and target may occur due to the possible body rotation mentioned above.

1.2. The string elbow moves diagonally down towards the archer's coccyx.

This movement is generated by the string scapula moving down and towards the spine.



In this technique big, and therefore powerful, muscles are used. It requires a strong core to avoid canting the entire body (vertical level effect, body leaning away from the target) and dropping the bow arm.

Advantages:

- Good ring finger grip on the string;
- Improved forefinger/chin contact.

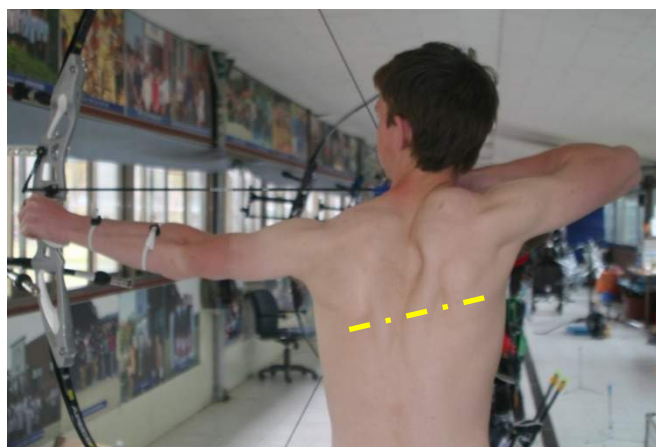
Potential issues:

- Decreased contact between the rear part of the string hand and the jaw;
- Entire body could lean away from target.

1.3. With the string elbow moving diagonally upwards.



This technique displaces the string scapula toward the spine with the use of the intermediate and posterior bundles of the string deltoid muscle; hence it is a technique using some muscular activity above a line passing through the top of the shoulder joints.



Advantage:

- Improved contact between the string hand and the jaw.

Potential issues:

- Ring finger may slip on the string;
- Contact between the forefinger and chin may be lost;

- Head may lean down and forward.

2. The string scapula moves away from the spine

2.1. The string elbow moves horizontally backward (away from the target) along the draw force line.

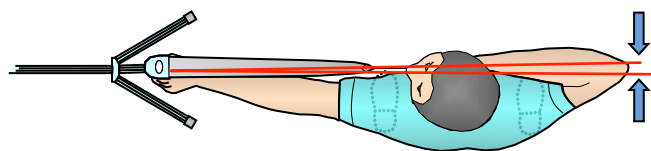


This movement is generated by spreading the blade away from the spine. This is the natural motion done when pulling on our hands as show in the illustration below.



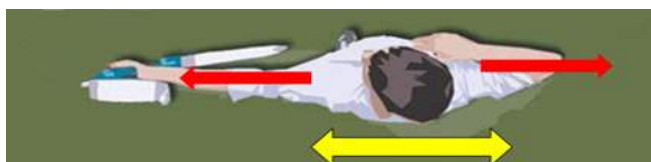
Advantages:

- Favours the body alignment during the extension (no body twist and/or canting);



Scapula moving horizontally away from the spine enables almost perfect maintenance of the alignment of the forces in the shooting plane throughout the expansion process.

- Facilitates alignment during the release as well, since the movement is along the arrow axis;
- Combined with the push (bow shoulder blade moving away) both sides of the novice work symmetrically.

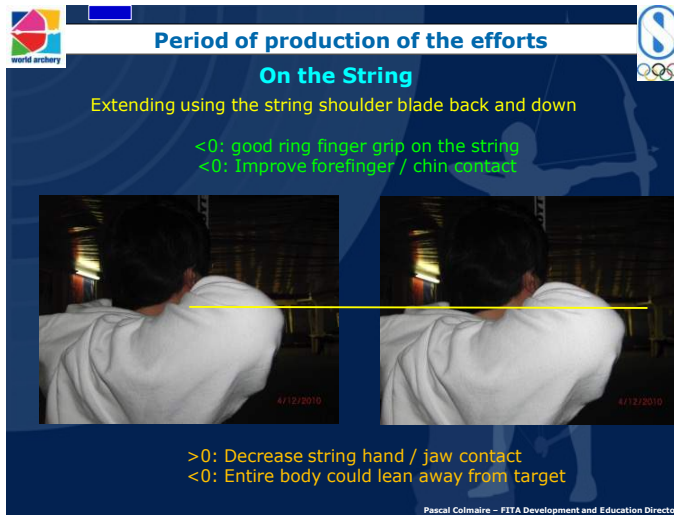


Potential issue:

- Implementation is sometimes found difficult or awkward.

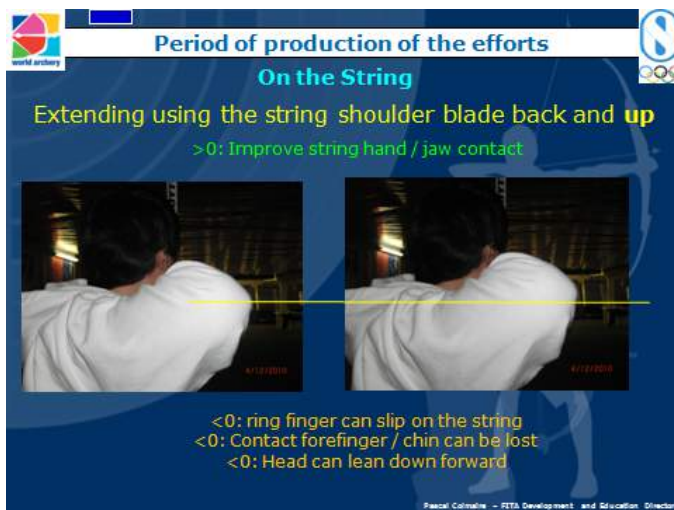
2.2. The string elbow moves backward (away from the target) and a little downward.

This technique uses the same effort as described in section "2.1. The string scapula moves horizontally backward (away from the target) along the draw force line," but with an additional muscular activity from some muscles located below the armpit.



The advantages and potential issues of this method are the same as those in #1.2 above.

2.3. The string elbow moves backward (away from the target) and a little upward in the shooting plane. This movement is generated by pivoting the scapula as it slides away from the spine. The lower point moves up and away from the spine creating the upward motion of the elbow.

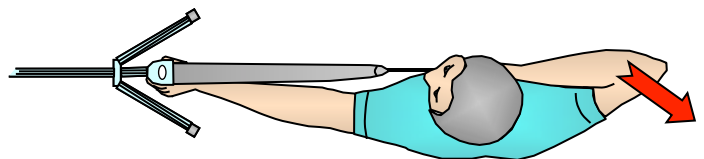


The advantages and potential issues for this method are the same as those in #1.3 above.

3. The string scapula does not move

This method is not generally taught, although it is often naturally used by many archers. The string scapula remains stationary or, in some cases, it flattens slightly.

The string elbow must move horizontally for this style. Any upward or downward displacement is not compatible with a static string shoulder blade, since those motions would make the string shoulder blade move. The direction of the displacement of the string elbow comes from a combination of the elbow movements of two previous methods, i.e. away from the spine/target and toward the back.



Advantage:

- The action contributes to keeping a good body orientation.

Potential issue:

- Fatigue of the posterior bundle of the deltoid.

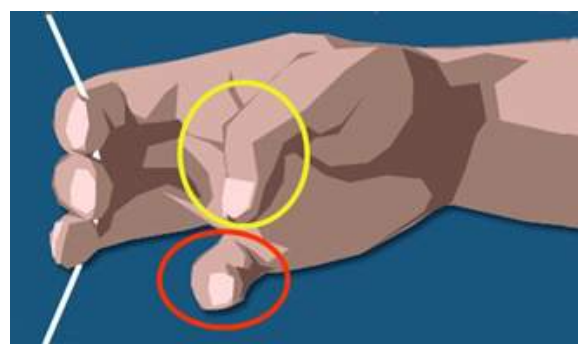
For any Draw Expansion Technique:

When teaching any technique on how to extend with the string shoulder, the coach must pay attention to the orientation of the bow/archer unit, including the height and line of the shoulders, upright body, head, and verticality of the bow. In addition, special attention must be paid to the following issues that are commonly encountered while learning this specific skill:

Consistent string hand with:

Relaxed unused fingers:

- Tension in the unused fingers often increases during the learning phase. This should be avoided to enable better use of the muscles in the back and posterior part of the string shoulder.

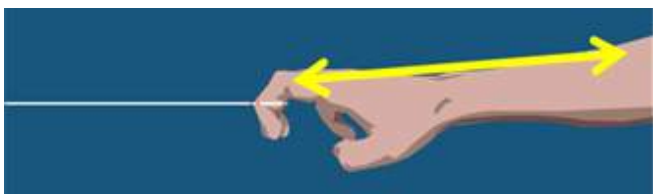


The coach can check by touch how relaxed the unused fingers are, as shown below.

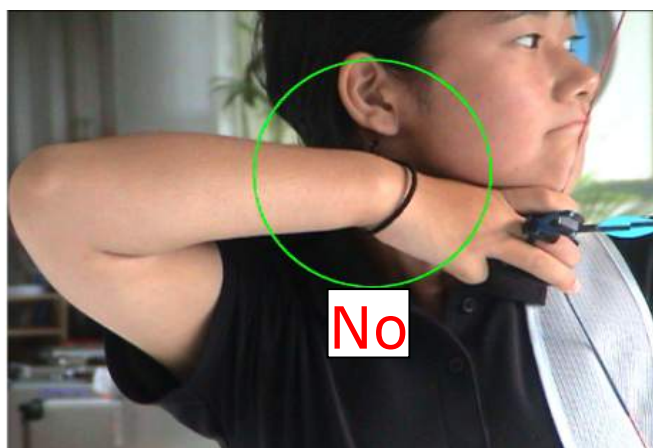


Flat wrist and back of hand:

- The back of the hand should remain flat. The knuckles should not point out and the wrist should not bend.



During this period, beginners often have the wrist bending out. This should be avoided to enable better use of the muscles in the back and posterior part of the string shoulder.

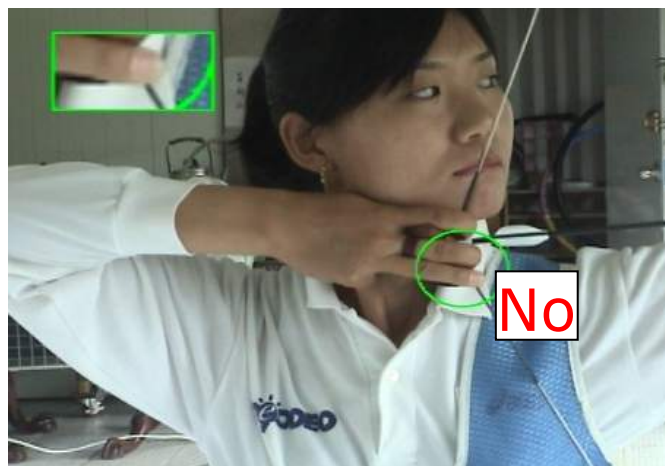


The string wrist bending out during the full draw effort is evidence of an imperfect pull effort.

Consistent string grip (hooking):



During this period, beginners often have one finger slipping off the string. This should be avoided to enable better use of the muscles in the back and posterior part of the string shoulder.



The ring finger is slipping off the string during the full draw effort is evidence of an imperfect pull effort.

Maintenance of facial marks:

- No space should appear between the string hand and the jaw and neck. There is no need to see the string moving back on the face or jaw.



String location on the chest:

- The string should move very little on the chest or chest guard. Some coaches even believe that it should not move at all.

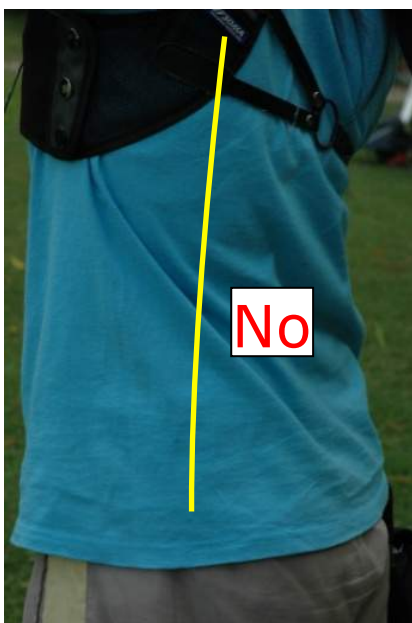


Steady head position:

- Moving the string, the string hand and the head backwards as a unit is also a common error.

Straight and erect spine:

- Another frequent deformation while pulling the string is a progressive leaning backwards of the entire body when the beginner is learning the draw extension.



No leaning backwards of the body.

6.10.2. Exercises

Note: Several of the following exercises employ the same process, but are focused on a different aspect of the Draw Expansion effort. We have chosen to repeat the entire process each time, allowing the coach to bring only the pages related to a single exercise to the range, and avoiding referring back and forth among the pages of various exercises.

Lowering of the Shoulders - Exercise

Objective:

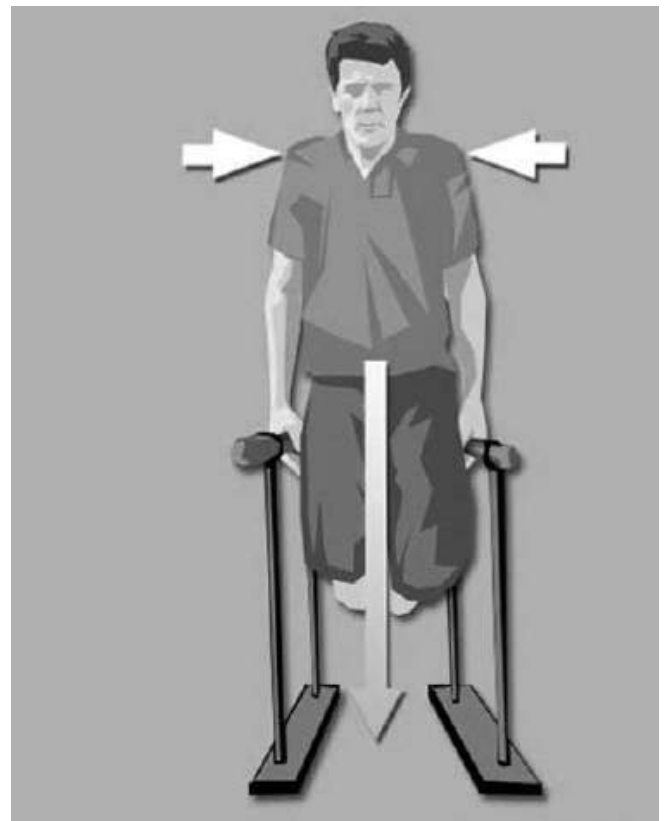
Discover some of the effort needed to counteract the compression caused by the tension of the bow and generate form with efficient muscle usage.

Equipment:

Two supports, placed 70 cm apart and 70 to 120 cm high (e.g. two chairs with a person sitting on each chair to keep the chairs from moving or tipping over.)

Instructions:

Support the body with the hands, have the feet off the ground, shrug the shoulders, and lower the body. The width of the shoulders will now be at a minimum.



Collapsed chest shrinks the triangle between the shoulders and aiming eyes, the shoulder span is reduced.

This position can be compared to that of a novice collapsing under the spring effect of the bow as shown below:



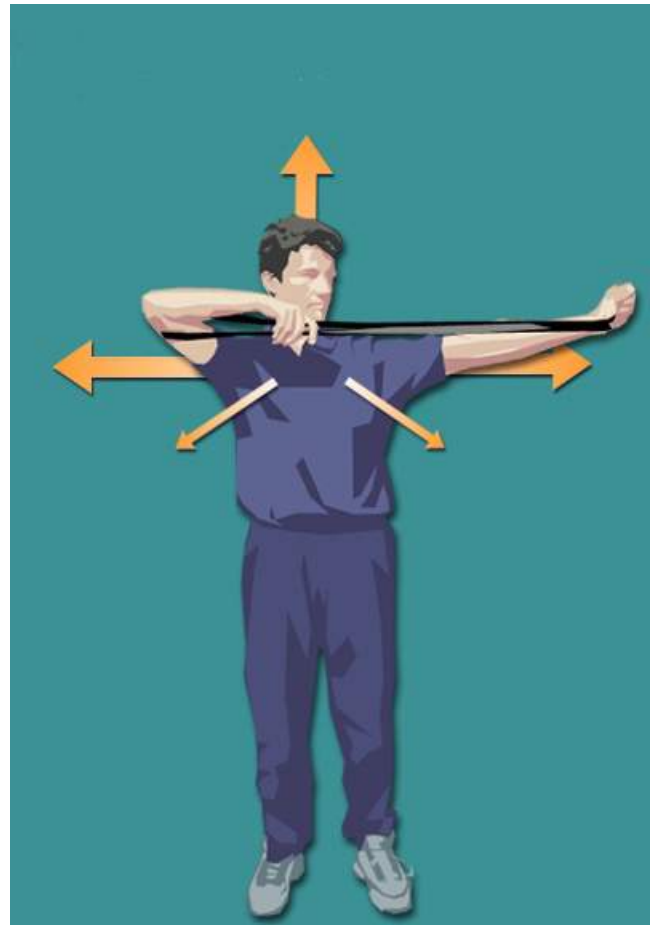
A novice with a high bow shoulder

Move the shoulders down and lift the body up. The width of the shoulders will increase to the maximum position.



Chest expansion clears the head from the shoulders and increases the shoulder span.

This position can be compared to a novice at full draw trying to increase the draw length, as shown below.



While shooting, and if produced gently, continuously and slowly, this increase will be enough to counteract the compression of the shoulders by the action of the bow, and will generate good muscle tone in the form.

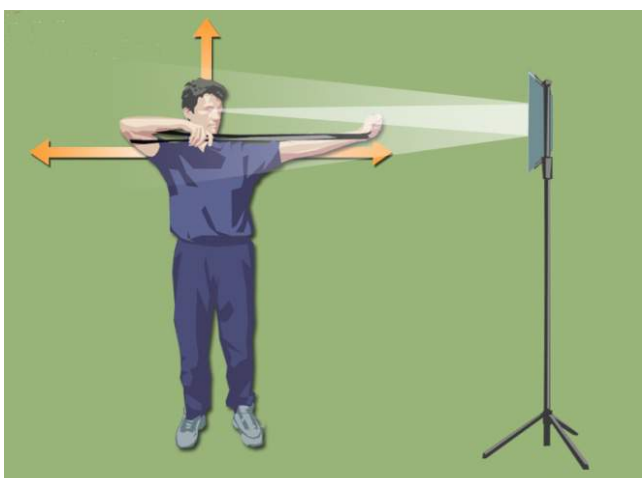
Vertical Extension - Exercise

1. The novice lengthens the body vertically and performs the "pigeon neck" movements, in front of the mirror. For this the novice needs to flatten the neck while stretching it up. During this action the chin moves inwards, the chest is flattened down while the shoulders move downwards and a little backwards. The entire body becomes more powerful in the vertical axis. This latter feeling is called Vertical Extension.



Nape stretching: "The pigeon neck".

2. In front of a mirror, with an elastic stretch band held in the bow hand and attached to the string elbow, the novice comes to "full draw", and then tries to stretch the elastic even further through the action described in the previous step without moving the arms, rather through an increase of the vertical extension.



Care must be taken when doing this exercise in case the novice has a history of health problems in the neck or spine.

This exercise can be pursued with the standard teaching process, i.e. ask the novices to watch the neck and chest activity during full draw using a mirror, then instruct the novice to repeat the exercise with the eyes closed, looking up, looking at the empty butt, and finishing by shooting at increasingly complete targets.

Note: Stretching the head up also helps to maintain the body in a straight vertical position and balance the body weight evenly over both feet. Nevertheless, ensure that the novice maintains a flat chest and a low centre of gravity; the energy should not be moved up to the top of the chest.

Upper Body Expansion - Exercise

This exercise should be introduced only after the novice has tried the two previous ones as it includes elements from each of them.

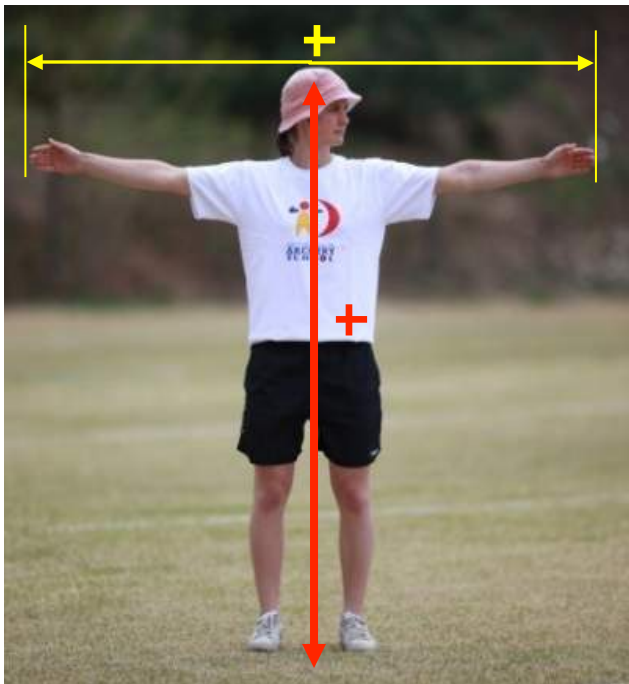
Objective:

To teach the effort that is to be provided by the upper body:

- To fight the spring effect of the bow;
- Where the push and pull efforts will be applied.

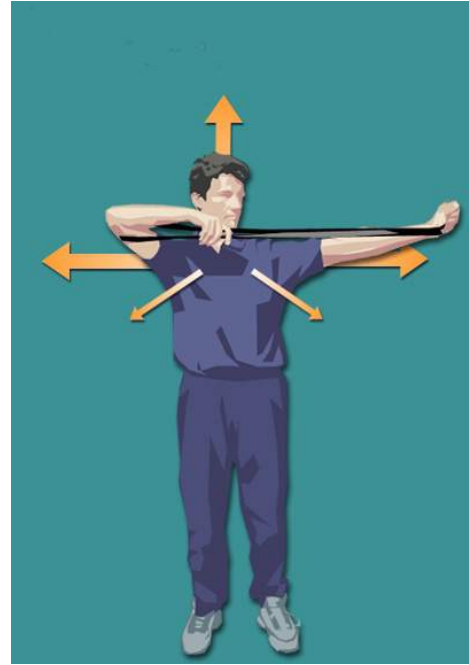
It consists in spreading both shoulders down and apart, at the same time flattening the chest, stretching the head up and lowering the belly down.

1. The novice stands upright, raises their arms to the side in a cross shape, and then strives to increase the arm span and get taller.



Make sure that the novice keeps the energy low in the torso. Ask the novice to flatten the chest.

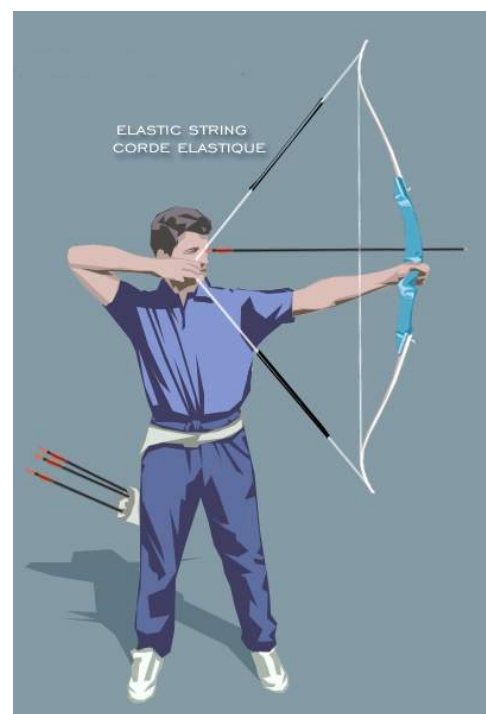
2. The novice simulates the upper body expansion with an elastic band attached to the string elbow and held in the bow hand.



Upper body expansion with an elastic band.

Through the extension, the elastic band should be stretched a little in its original axis. The novice should not twist or deform the body. Rather than being forceful, the novice should have the feeling of relaxing the shoulders in a down and outward movement whilst stretching the head upward.

3. Repeat the exercise with an elastic string over the braced bow.



4. Repeat with a bow.



Enlarging the top pyramid.

The action should mainly come from the large muscles around the rib cage, allowing a decrease of the muscular activity in the arms. Have the feeling of expanding the triangle formed by the aiming eye, bow shoulder and string shoulder.

- 5.** Continue with the standard teaching process, i.e.:
- Shooting with eyes closed, from a very short distance;
 - Shooting with eyes looking up and unfocused;
 - Shooting while looking (not aiming) at a blank butt;
 - Shooting at cut-out spots or faces;
 - Shooting at a regular target face;
 - Shooting at a regular target face under some pressure from a scoring round, a match or a game.

Note that shooting with self-observation in a mirror is not suggested here. This is because the movement is so small that it is very difficult to see.

Push Awareness - Exercise

Objective:

Help the novice discover the effort to be generated on the bow side and the muscles and body parts involved.

Situation:

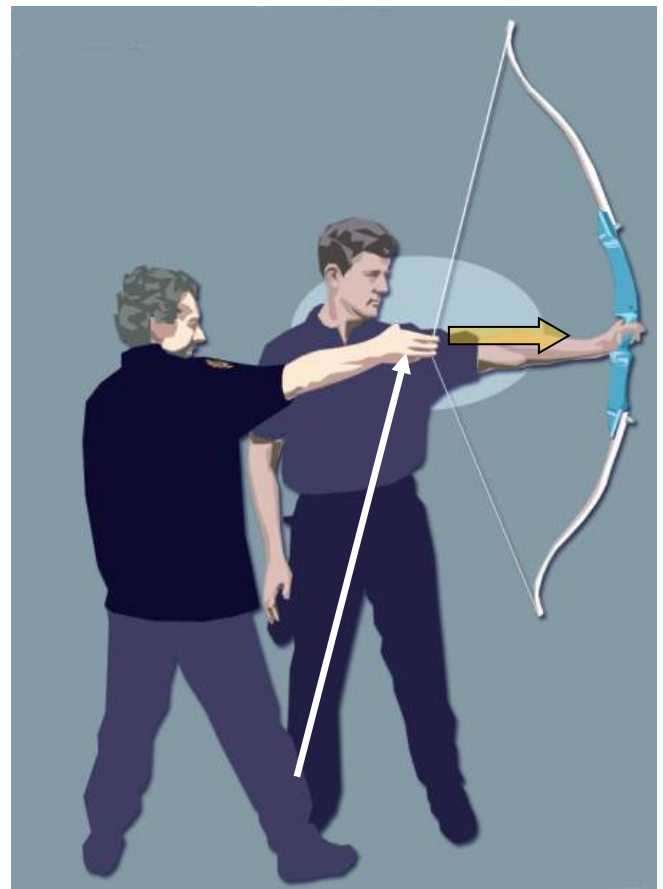
In pairs or with an assistant.

Equipment:

Bow.

Instructions:

- 1.** The novice stands as if shooting and raises the bow in the direction of an imaginary target without holding the string.
- 2.** The assistant pulls the string back a little, no further than the midway between the elbow and shoulder of the novice.



- 3.** The novice should feel the push effort originating from the string leg, crossing his/her body and extending along the bow arm. Have the beginner close his/her eyes to better feel the effort.

Pull Awareness - Exercise

Objective:

Help the novice discover the effort to be generated on the string side along with the involved muscles and body parts.

Situation:

In pairs or with an assistant.

Equipment:

Bow.

Instructions:

1. The assistant holds the riser and moves accordingly to allow the novice to grip the string and come to their usual facial marks.
2. The assistant pulls the riser forward about 20 cm (it is exaggerated in the illustration below). Do not use a Compound bow for this exercise!



3. The novice should feel the pull effort originating from the bow leg, crossing his/her body and extending along the string arm.

4. The novice may have a support for the bow hand, using the assistant rather than the bow riser, as illustrated below:



The two previous exercises help the novice understand the importance of a firm/strong belly, since this is where the strength line crosses the body.



Any modification of the location where the strengths lines cross themselves would modify the entire chain of muscles engaged in the bow/archer unit and a completely different shot would occur.

Bow Shoulder Extension - Exercise

Objective:

Teach the beginners the action (movement and effort) of the bow shoulder.

Reminder: we refer to a micro movement of 2 to 3 mm. In the following exercises one often moves the bow shoulder blade 10 times more than the required range, up to 2 to 3 cm. While this may seem like too much, it is done so the novice can learn the feeling of the proper motion.

1. The novice stands upright, raises their arms to the side in a cross shape, and then strives to increase their wingspan.



Ask the student to feel the shoulder blades moving away from the spine. Closing the eyes can help them get a better feel for the blades' displacement.

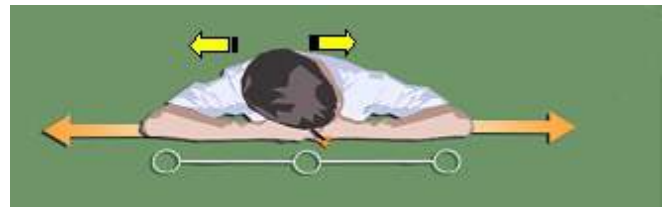
Lower the string arm down along the side of the body and repeat with the bow arm only.

2. Grip the middle finger of the bow hand, which is vertical and pointed down, with the string fingers. Raise the enlaced hands up to throat level, with the elbows slightly above the horizontal



Bow shoulder blade extension discovery.

Have the student pull the hands apart quite strongly. Ask them to feel the direction of their bow shoulder blade movement as it moves away from the spine.



3. Alternate steps #1 and #2.

4. Have the novice assume their shooting stance at a distance allowing the bow hand to be in contact with the shoulder of a partner. The novice gently pushes the partner while keeping perfect vertical body position.

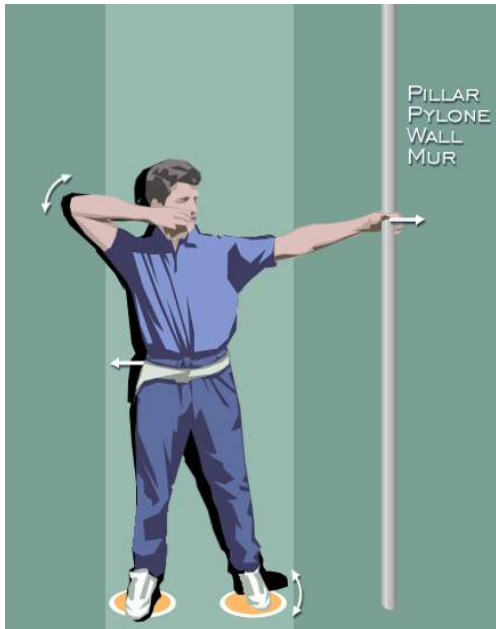




Bow shoulder extension on a partner.

Have the novice use their string hand on their bow shoulder to check that it stays still in height and horizontal position. As they slide the shoulder blade away from the spine they should only feel a down and away movement of the shoulder

5. The novice simulates the extension of the bow shoulder using a door frame or any other pillar.

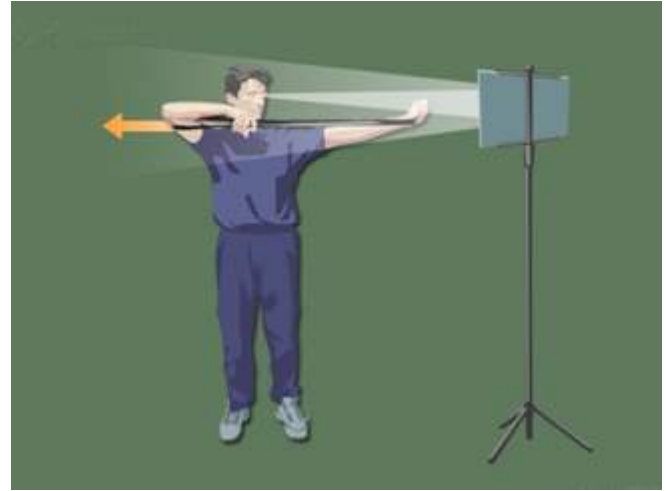


Push simulation on a pillar.

Try to move the body away from the wall in the shooting plane.

6. Repeat #5, with the addition of an elastic band attached to the string elbow and held in the bow hand.

7. While standing in front of a mirror, simulate the push action with an elastic band attached to the string elbow and held in the bow hand.



Push simulation stretching an elastic band.

Make sure the novice stays focused on the bow shoulder. During the following exercises, the novice should not be concerned about the string shoulder activity. The action on the bow side should come mainly from the shoulder and back muscles, not from bow arm, wrist or hand.

Extra tension can be applied, as shown below:

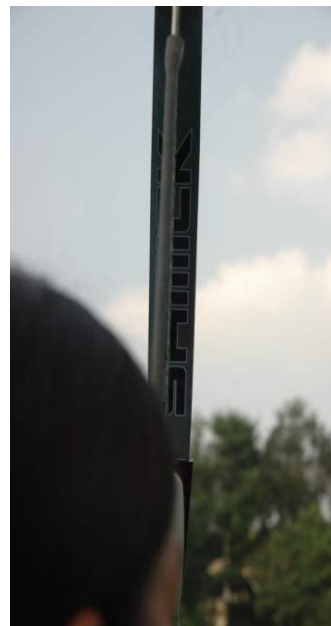


From now on, with an elastic band or a bow, the coach must pay attention to the positions that must be kept constant, i.e. orientation of the bow/archer unit including the height and line of the shoulders, an upright body, no movement of the head, the bow being vertical, bow elbow orientation and the height of the bow hand.

8. Put an elastic string over the braced bow. Pull the elastic string back.



An elastic string over a braced bow.



Close the eyes and provide a gentle push for at least 3 seconds.



Open the eyes and check if the two strings are still aligned.



Align the elastic string on the bowstring.



If so, the push is efficient, extending the bow shoulder whilst keeping the aiming eye, string, sight and target aligned. This exercise is not efficient for checking vertical deviation.

The suggestions below can help the novice understand how to extend the bow shoulder and keep the two strings aligned.



The safety concern is obvious here. The assistant's hand stretching the light elastic band must be well below the arrow path. With the other hand, the assistant should help the archer to maintain body stability.

- Experiment with the way of extending the bow shoulder until the novice has the two strings aligned when they open their eyes.
- Make sure that the novice does not move the bow shoulder laterally while pushing. This is checked by applying an arrow inside the novice's bow shoulder as shown below. While the novice is extending, no significant increase of the pressure of the bow shoulder on the arrow should be felt.



- Use an isometric push, i.e. with no forward displacement of the shoulder – just maintaining the bow shoulder in its original position.

9. Checking the maintenance of the alignment.

a) For a group or in pairs:

While shooting, an assistant applies a stick flat across the top of the novice's back just above the shoulder blades. At full draw (not during the draw), the assistant looks along the stick while the novice extends the draw length (with a clicker), or opposes the tension of the bow (without a clicker). The stick should stay, as much as possible, in the same orientation (the orientation of the stick does not matter in this current exercise).



An assistant checking that the push action has no effect on the line of shoulders.

One alternative:



Use bands to position an arrow above the shoulder blades. Do not have the arrow directly on the shoulder blades, because during most of the draw and extension technique at least one shoulder blade will move.

b) Affix a laser pointer to the archer's head. The laser dot should be visible somewhere on

the target, but it does not need to be in the centre of the target face.

This exercise should be done with only one novice at a time as care must be taken that the laser is switched off before the novice leaves the shooting line to avoid the laser being shone into the eyes of other people in the area.



At full draw (not during the draw), the assistant looks at the laser spot while the novice extends the draw length (with a clicker). The dot should remain, as much as possible, in the same location.

10. While standing in front of a mirror with the archery equipment watch the bow shoulder while pushing to extend the draw length from full draw. No twisting should be observed in the bow shoulder and the distance between the arrow and the bow arm/shoulder should remain constant.

11. Same exercise as in step #10 but concentrating on the feeling with closed eyes and no mirror.

12. Same exercise as in step #10 but with eyes looking up and unfocussed.

13. Same exercise as in step #10 but watching and shooting at a blank butt.

14. Continue this exercise but aiming at cut-out spots or faces.

15. Adjust the sight or pick a good aiming point to group the arrows close to a vertical line drawn on a target face or strip of tape fitted down the centre of the target.



Then close the eyes as soon as the draw is completed with the sight (or point or shaft, depending on the aiming method of the novice) in the proper place.

Extend the bow shoulder for at least three seconds, and then open the eyes. If the aiming device (sight, point or shaft) is still on the vertical band, the lateral extension of the bow shoulder was efficient.

16. Same as the exercise above, but shooting at a target face or any mark. Release the arrow at the end of three seconds (minimum) of extension of the bow shoulder with eyes closed. If the arrows hit the mark, the lateral extension of the bow shoulder was efficient.

For safety reasons, have the novices shooting with their eyes closed at a distance 5 to 10 meters closer than the distance they are now allowed to shoot according to the World Archery Beginner Awards Program.

For each step, the number of repetitions should be predetermined and adjusted by the coach. A dozen is the bare minimum number of repetitions for the exercise to be effective. Several sessions could be required to get a decent implementation by some novices. When coaching a group, a compromise will have to be reached between the fast and slow learners.

String Shoulder Blade Moving Away - Exercise

This exercise is directed towards moving the string elbow straight backward (away from the target) and horizontally.

Objective:

Help the novice discover the effort to be provided on the string side, i.e. the movement of the string shoulder blade.

Situation:

Various.

Equipment:

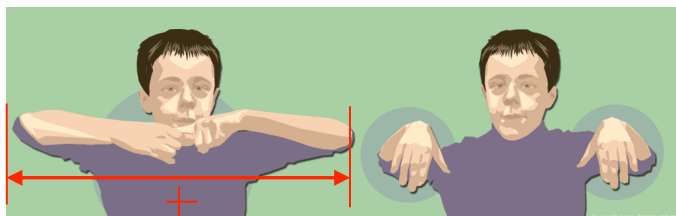
Elastic band, mirror, elastic string, archery equipment and optionally a laser that can be fitted to the head of the archer.

Instructions:

Reminder: we refer to a micro movement of 2 to 3 mm. In the following exercises one often moves the string shoulder blade 10 times more than the required range, up to 2 to 3 cm. While this may seem like too much, it is done so the novice can learn the feeling of the proper motion.

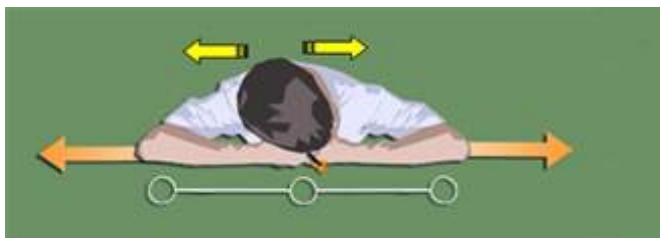
Simulation:

1. Ask the novice to hold the forefinger of their bow hand with their string fingers as shown in the left side of the image below.



String shoulder blade extension discovery.

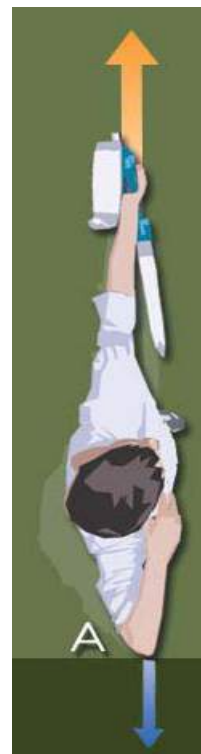
2. Ask them to pull their hands apart quite strongly. Have them feel the direction of their string shoulder blade motion; it moves away from the spine as shown in the picture below.



3. Have the beginner stand so that their string elbow gently rests against a wall and simulate the extension of the string elbow



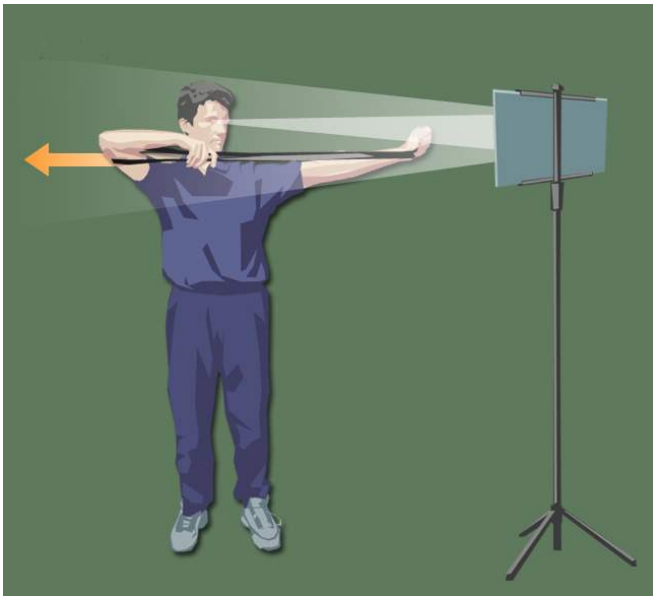
Pull simulation in the shooting plane - simulation on a wall.



The body should move perpendicularly away from the wall.

From now on, keep the novice focused on the task at hand. During the following exercises the beginner should not be concerned about the bow shoulder extension (the action towards the target). The action of the string side should mainly come from the shoulder and back muscles, not from the string arm, wrist or hand.

4. Standing in front of a mirror, simulate the pull action with an elastic band attached to the string elbow and held in the bow hand.



During the pull extension, there should be no change in distance between the elastic band and the bow shoulder.

Some extra tension can be applied, as shown in the picture below:



From now on, with an elastic band or a bow, the coach must pay attention to the positions that must be kept constant, i.e. orientation of the novice and bow as a unit, including the height and line of the shoulders, upright body, stability of the head, verticality of the bow, relaxation of the unused fingers, flatness of the string wrist and back of hand, string grip (hooking), facial marks and string location on the chest.

5. Put an elastic string over the braced bow and have the novice come to full draw.



At full draw the novice should align the elastic string with the bowstring.



deviation. If there is some vertical deviation, other exercises will be necessary.

The exercises described below will help teach the beginner how to properly extend the bow shoulder.



Have them close their eyes and provide a gentle extension for at least 3 seconds.



- Place a soft elastic loop in the crook of the archer's string elbow. The assistant holds the archer's body with one hand (very important) and gently stretches the elastic band along the pull axis provided by the archer, in line with the string forearm.
- Change the way of extending the string shoulder until the novice has the two strings aligned when they open their eyes.
- Use an isometric pull, i.e. with no displacement of the shoulder away from the target, rather maintaining the string shoulder's position. This technique is not usually recommended by many archery coaches, because it produces a static, and quite often inconsistent, release.

Then let them open their eyes and check if the two strings are still aligned.



If the strings have stayed aligned, the pull is efficient, since the string shoulder can be extended while keeping the alignment of the aiming eye, string, sight and target. This exercise is not efficient for checking for vertical

6. Checking the maintenance of the alignment

a) In a group and/or in pairs:

While shooting, an assistant applies a stick across the top of the archer's back, just above the shoulder blades. At full draw, not during the draw, the assistant looks along the stick while the novice extends the draw length (with a clicker) or opposes the tension of the bow (without a clicker). The stick should keep, as much as possible, the same orientation (the actual orientation of the stick is not important for this exercise).



An assistant checking that the pull action has no effect on the line of shoulders.

Alternatively use bands to position an arrow above the shoulder blades:



It is important to not have the arrow applied on the shoulder blades, because during most of the draw and extension technique, at least one shoulder blade moves.

b) Fix a laser on the archer's head. The laser dot should be visible somewhere on the target, but it does not need to be in the centre of the target face. This exercise should be done with one novice at a time as care must be taken to switch the laser off before the novice leaves the shooting line, to avoid the laser being shone into the eyes of other people in the area.



At full draw, not during the draw, the assistant looks at the laser spot while the novice extends the draw length (with a clicker). The dot should remain, as much as possible, in the same spot (the actual place where the dot is located is not important for this exercise).

7. Same exercise as step #4 but with the archery equipment. At full draw, alternate the area of focus with every other arrow between watching the string elbow and the bow shoulder. For the string elbow, ensure that it moves straight backward, away from the target. With respect to the bow shoulder, no movement should be observed and the distance between the arrow and the bow arm/shoulder should remain constant.

8. Same exercise as step #7 but concentrating on the feeling, hence with closed eyes and no mirror.

9. Same exercise as step #7, looking upwards with unfocused eyes.

10. Same exercise as step #7, but watching and shooting at a blank butt.

11. Continue this exercise but aiming at target faces or spots with decreasingly cut-out centres.

12. Adjust the sight or select an appropriate aiming point for grouping the arrows close to a line drawn on a target face or strip of tape fitted down the centre of the target.



Then close the eyes as soon as the draw is completed and the sight (or point or shaft, depending the aiming method of the novice) is at the proper place.

Extend the string shoulder for at least three seconds then open the eyes. If the aiming device (sight, point or shaft) is still on the vertical band, the string shoulder draw extension is "in line."

13. Same exercise as #12, but shooting at a target face or a mark of some kind. Release the arrow after the three-second (minimum) extension period, with the eyes still closed. If the arrows hit the mark, the extension of the string shoulder is efficient.

For safety reasons, have the novices shooting with their eyes closed at a distance 5 to 10 meters closer than the distance they are now allowed to shoot according to the World Archery Beginner Awards Program.

For each step, the number of repetitions should be predetermined and adjusted by the coach. A dozen is the bare minimum number of repetitions for the exercise to be effective. Several sessions could be required to get a decent implementation by some novices. When coaching a group, a compromise will have to be reached between the fast and slow learners.

String Shoulder Blade Away and Up – Exercise:

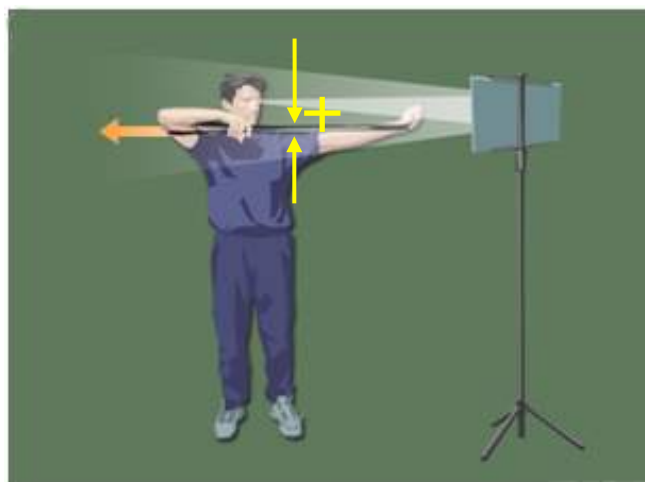
Use the "String Shoulder Blade Moving Away" exercises with the following modifications:

1. Move the string elbow straight backward and upward during all the simulations. When simulating the action of the string shoulder elbow against a wall, the string hand does not remain at the same height any longer; it moves down.



Pull simulation in the shooting plane - against a wall.

2. Simulating the draw action in front of a mirror with an elastic band attached to the string elbow and held in the bow hand. When coming to the full draw position, the vertical distance between the elastic band and the bow shoulder could increase slightly.



3. At full draw (not during the draw), a stick placed flat across the top of the novice's back, just above the shoulder blades, could angle down when the novice is pulling to extend the draw length (with a clicker).



With this pulling method, the stick could point down while the novice is pulling.

String Shoulder Blade Away and Down – Exercise

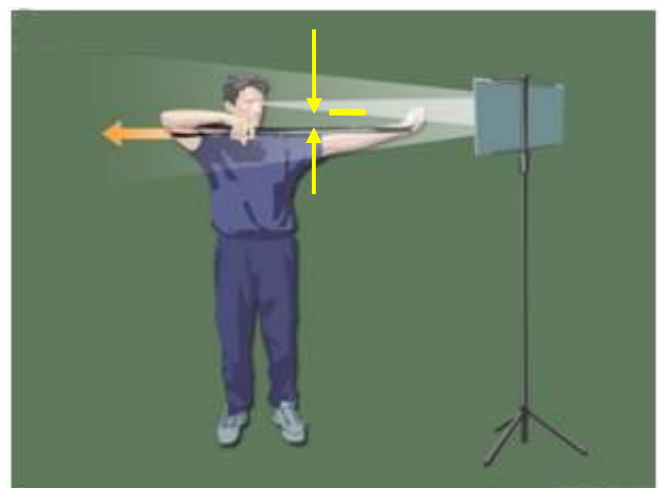
Use the “String Shoulder Blade Moving Away” exercises with the following modifications:

1. Move the string elbow back and down during all the simulations. When simulating the action of the string shoulder elbow against a wall, the string hand does not remain at the same height any longer; it moves up.



Pull simulation in the shooting plane - against a wall.

2. When simulating the draw action in front of a mirror, with an elastic band attached to the string elbow and held in the bow hand, the vertical distance between the elastic band and the shoulder could decrease slightly.



3. At full draw, not during the draw, the stick placed flat across the top of the novice's back, just above the shoulder blades, could angle up when the novice is pulling to extend the draw length (with a clicker).



With this pulling method, the stick could point up while the novice is pulling.

Moving the String Shoulder Blade Horizontally Toward the Spine - Exercise

Objective:

Help the novice discover the effort used on the string side to move the string shoulder blade toward the spine.

Situation:

Various.

Equipment:

Elastic band, mirror, elastic string, archery equipment and optionally a laser to be affixed on the head.

Instructions:

Reminder: we refer to a micro movement of 2 to 3 mm. In the following exercises one often moves the string shoulder blade 10 times more than the required range, up to 2 to 3 cm. While this may seem like too much, it is done so the novice can learn the feeling of the proper motion.

1. Simulation

Have the novice simulate the movement below:



Starting position

Action

The novice places the knuckles of their string hand on the sternum, and then moves their elbow around and back. The fingers uncurl and stay in contact with the chest.

When moving to the position on the right, the string shoulder blade of this left-handed novice moves toward the spine.

Another simulation that helps to feel the shoulder movement is shown below. First, have the novice hold an arrow against the front side of their body and near the string shoulder.



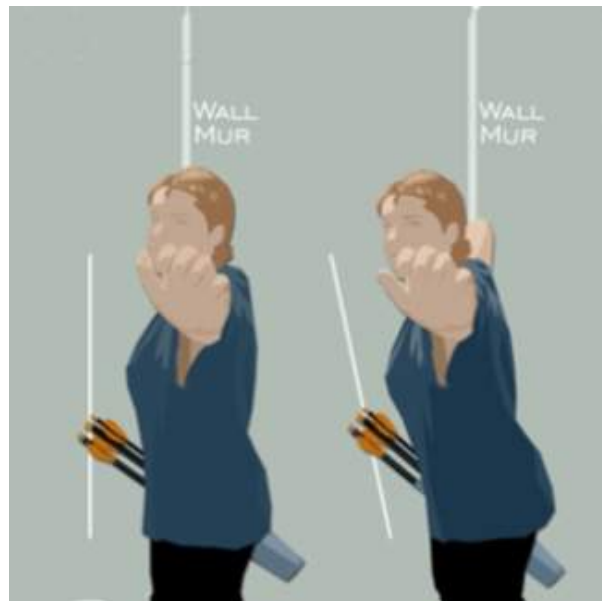
Second, while keeping the arrow stationary on the chest area, move the shoulder to create a gap between the arrow point and the string shoulder.



2. Have the novice stand with their string elbow gently touching a wall and simulate the string shoulder blade motion. Their entire body moves toward the toes and the heels may lift off the ground.



Pull simulation in the shooting plane - simulation on a wall.

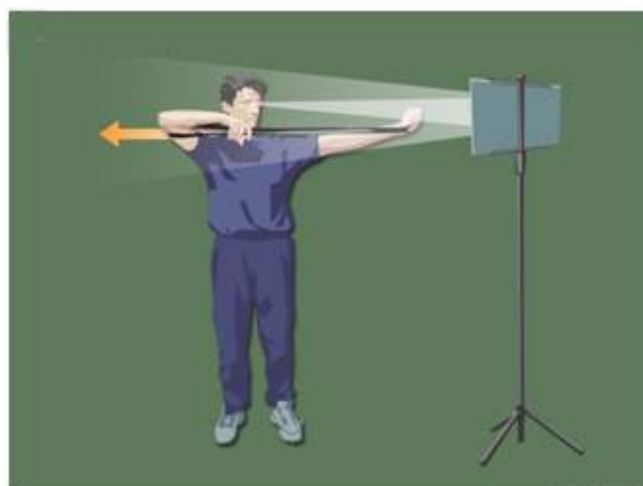


The body should move in a plane parallel to the wall, toward the toe.

Have the novice repeat this exercise with an elastic band attached to the string elbow and held in the bow hand.

From now on, keep the novice focused on the task at hand. During the following exercises the novice should not be concerned about the bow shoulder extension (the action towards the target). The action of the string side should mainly come from the shoulder and back muscles, not from the string arm, wrist or hand.

3. Have the novice stand in front of a mirror and simulate the pull action with an elastic band attached to the string elbow and held in the bow hand.



During the draw extension period, the novice should see the elastic band approaching the chest but the chest itself should stay stationary. This movement produces a decrease of the distance D in the illustration below.



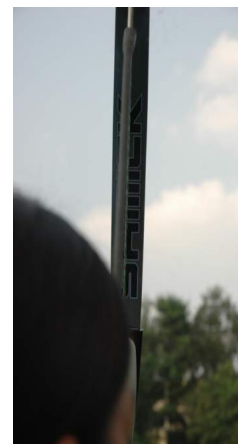
Extra tension can be applied, as shown below:



From now on, using an elastic band or a bow, the coach should pay attention to the positions that must be kept constant, i.e. orientation of the novice and bow as a unit including the height and line of the shoulders, upright body, stability of the head, verticality of the bow, relaxation of the unused fingers, flatness of the string wrist and back of hand, string grip (hooking), facial marks and string location on the chest.

Ask the novice to align the elastic string with the bowstring.

4. Put an elastic string over the braced bow and have the novice come to the full draw position.



Have them close their eyes and gently squeeze the string shoulder blade toward the spine for at least 3 seconds.



Allow them to open their eyes and check if the two strings are still aligned.



If the strings have stayed in alignment, the novice has an efficient pull, since they can squeeze the string scapula toward the spine while keeping the aiming eye, string, sight and target aligned. This exercise is not efficient for checking the vertical deviation. If there is vertical movement, use other exercises to teach the novice how to move the string scapula towards the spine. Some examples are suggested below:



- Position a soft elastic loop around the archer's string elbow. Have the assistant hold the novice's body with one hand (very important) while gently stretching the elastic band along the pull axis provided by the novice. In this case the direction is horizontal and almost parallel to the shooting line in the direction of the novice's heels, as shown in the picture above.
- Change the way of extending the string shoulder until the novice has the two strings aligned when they open their eyes.
- Have the novice pull in an isometric way, i.e. with no displacement of the shoulder – instead, maintaining the string shoulder in its position. This technique is not usually recommended by many archery coaches, because it produces a static, and quite often inconsistent, release.



5. Checking the maintenance of the alignment.

- In a group and/or in pairs:
Whilst the novice is shooting, an assistant positions a stick flat across the top of the novice's back just above the shoulder blades. At full draw, not during the draw, the assistant looks along the stick while the novice extends

the draw length (with a clicker), or opposes the tension of the bow (without a clicker). The stick should stay, as much as possible, in the same orientation (the actual orientation of the stick itself does not matter). This is a critical point with this draw technique, because a lateral drift (to the right for a right-handed novice) is common.



An assistant checking that the pull action has no effect on the line of shoulders.

Alternatively, use bands to position an arrow above the shoulder blades.



Avoid having the arrow placed on the shoulder blades, because during most of the draw and extension technique at least one shoulder blade moves.

b) Fix a laser on the novice's head. The laser dot should be visible somewhere on the target, but it does not need to be in the centre of the target face. This exercise should be done with one novice at a time as care must be taken to switch the laser off before the novice leaves the shooting line, to avoid the laser being shone into the eyes of other people in the area.



At full draw, not during the draw, the assistant looks at the laser spot's location while the novice extends the draw length (with a clicker). The dot should remain, as much as possible, in the same spot (the actual location of the dot is not important for this exercise).

6. Same as step #3, looking into a mirror but using archery equipment and shooting an arrow. At full draw, have the novice alternate the focus of observation for every second arrow. First have them watch as the string elbow rotates backwards (clockwise from above the novice for a right-handed archer). Then have them observe their bow shoulder in a mirror while pulling to extend the draw length. There should be no movement of the bow shoulder and the distance between the arrow and the bow arm/shoulder should remain constant. This is a critical point with this pulling technique.

7. The same exercise as above, but concentrating on the feeling, hence no mirror and with eyes closed.

8. The same exercise as above, but with eyes looking up and unfocused.

9. The same exercise as above, but watching and shooting at a blank butt.

10. Continue this exercise but aiming at spots or faces with decreasingly cut-out centres.

11. Adjust the sight, or find the proper place to aim with the arrow point or shaft, to group the arrows close to a line drawn on a target face or

strip of tape fitted down the centre of the target butt.



As soon as the draw is completed and the sight (or point or shaft, depending the aiming method of the novice) is at the proper place ask them to close their eyes.

Have them squeeze the string shoulder blade toward the spine for at least three seconds then open the eyes. If the aiming device (sight, point or shaft) is still on the vertical band, the draw extension is "in line."

12. Repeat the exercise above, but shooting at a target face or other mark. Have the novice release the arrow at the end of the three-second (minimum) extension period, with their eyes still closed. If the arrows hits the mark, the draw extension is efficient.

For safety reasons, have the novices shooting with their eyes closed at a distance 5 to 10 meters closer than the distance they are now allowed to shoot according to the World Archery Beginner Awards Program.

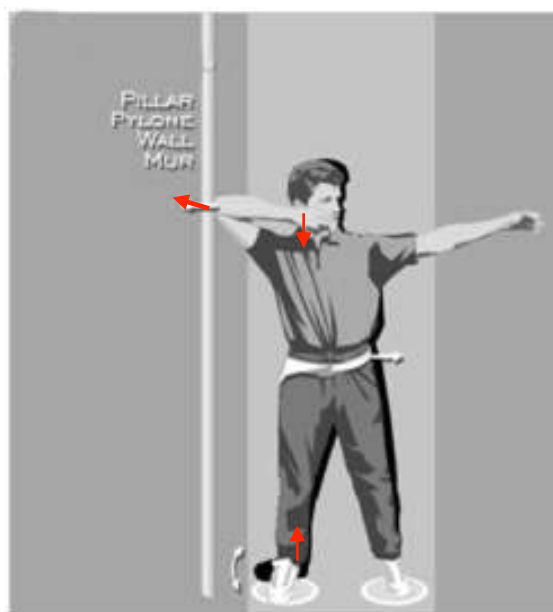
For each step, the number of repetitions has to be predetermined then adjusted by the coach. A dozen is the bare minimum number of repetitions for the exercise to be effective. Several sessions could be required to get a decent implementation by some novices. When coaching a group, a compromise will have to be reached between the fast and slow learners.

Moving the String Shoulder Blade Towards the Spine and Up - Exercise

Use the exercises from "Moving the String Shoulder Blade Horizontally Towards the Spine" with the following modifications:

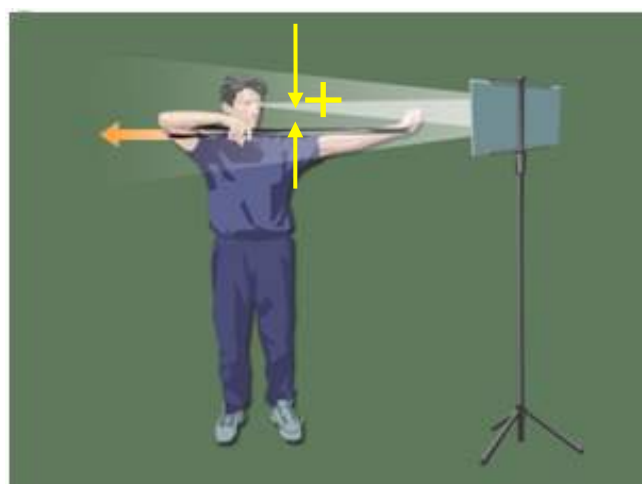
1. Move the string elbow back and up during all the simulations.

During the simulation against a wall, the string hand does not remain at the same height any longer; it moves down.



Pull simulation in the shooting plane - against a wall.

2. When simulating the draw action in front of a mirror with an elastic band attached to the string elbow and held in the bow hand, the vertical distance between the elastic band and the bow shoulder could increase a small amount, while the horizontal distance between the band and the bow shoulder decreases considerably.



3. At full draw, not during the draw, a stick placed flat across the top of the novice's back

just above the shoulder blades, could angle downward and inward when the novice is at full draw and extending (when using a clicker).



With this pulling method, the stick could angle downward and inward while the novice is pulling.

Moving the String Shoulder Blade towards the Spine and Down - Exercise

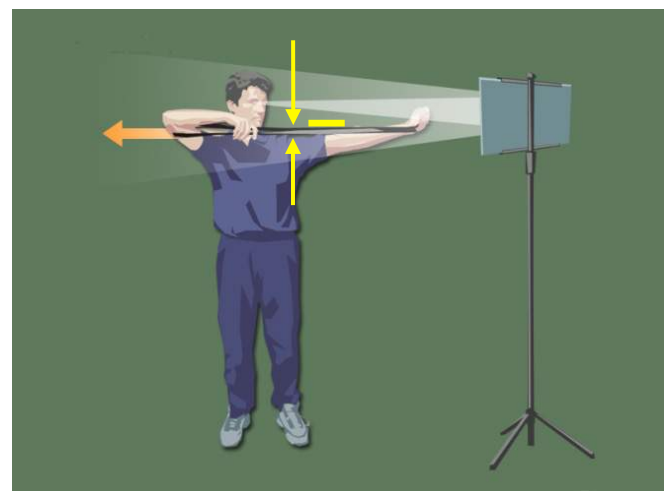
Use the exercises from "Moving the String Shoulder Blade Horizontally Towards the Spine" with the following modifications:

1. Move the string elbow back and down during all the simulations. During the simulation against a wall, the string hand does not remain at the same height any longer; it moves up.



Pull simulation in the shooting plane - against a wall.

2. When simulating the draw action in front of a mirror, using an elastic band attached to the string elbow and held in the bow hand, the vertical distance between the elastic band and the bow shoulder could decrease slightly.



3. At full draw, not during the draw, when the stick is positioned flat across the top of the novice's back just above the shoulder blades, it could angle up and inward when the novice is

pulling to extend to the draw length (with a clicker).



With this pulling method, the stick could angle up and inward while the novice is pulling.

Efficient Draw - Exercise

Objective:

To be able to draw without any head or upper body movement.

1. Simulate the selected draw method on the string side with an elastic band attached to the novice's string elbow and held in the bow hand.



Simulating the selected draw method.

The novice should feel the micro-progression of the string hand pressing slightly backward against the chin or jaw; no movement should be visible.

2. Repeat the above exercise using a bow, but with no arrow and without releasing. The novice tries to feel either:
 - The string hand pressing slightly backward under the chin or against the jaw;
 - The string pressure increasing on the face, usually on the chin and nose;
 - A combination of the above feelings.
3. Repeat the exercise using an arrow and releasing with eyes closed from a very short shooting distance and under supervision.
4. Repeat the exercise while shooting at a very short distance and with a mirror in place so the novice can see their face whilst at full draw and releasing. The novice should strive to see a remaining string-print on their chin and/or nose right after the release. Video recording may help in seeing the line.



Upon release one can still see a string-print on the archer's face.

Since it is a micro-progression that is almost not visible, a slow motion video (with the camera on a stand) may be required. The coach should be able to assess the efficiency of the pull by watching the string pressure on the face. For instance, in the two next two pictures it is evident how strongly the string is pressed on the face.



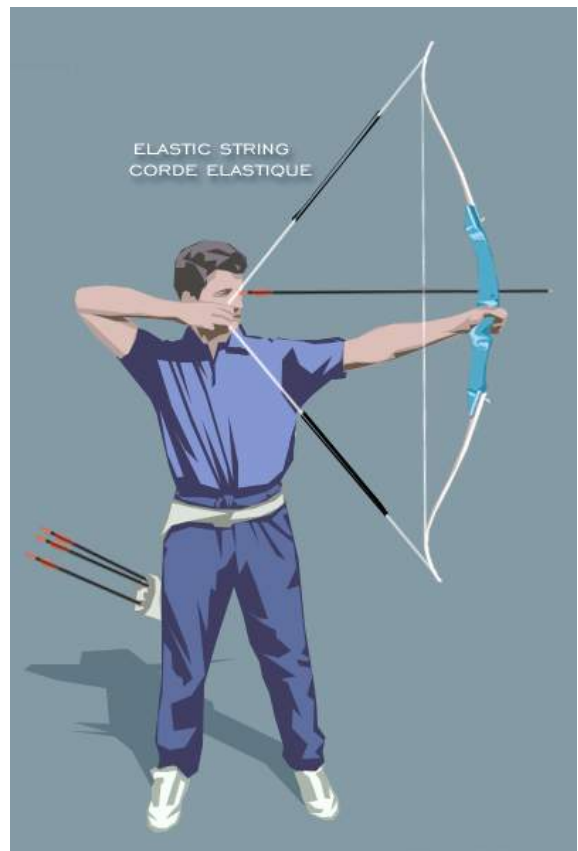
Complete the Full Draw Action - Exercise

Objective:

Combine the "push action" on the novice's bow side with the "pull action" from the novice's string side.

A brief review of the efforts experienced on the bow side and on the string side may be beneficial prior to starting these exercises.

1. The novice simulates the complete draw extension (both sides simultaneously) alternating between watching in a mirror and with their eyes closed.
2. Same as above but with an elastic band attached to the string elbow and held in the bow hand.
3. Put an elastic string over the braced bow and have the novice come to full draw.





Ask them to align the elastic string with the bowstring.



Have them close their eyes and gently provide a smooth and well-balanced draw extension from both sides for at least 3 seconds.



Then let them open their eyes and check if the two strings are still aligned.



If the strings have stayed in-line, the novice has a complete full draw action, since they are extending/increasing the draw while keeping the aiming eye, string, sight and target aligned. This exercise is not efficient for checking for vertical deviation. If the novice cannot keep the above four elements aligned when completing this action:

- Check if the novice is generating some body twist, canting, leaning, etc.
- Check if there is a good balance between the action on the string side and the bow side of the novice;
- Try another combination of techniques, perhaps on the bow side, but more likely for the string side.

Note: During the process the coach may need to manipulate the novice in ways similar to those depicted below but always get permission before touching the archer.





An assistant checking that the draw extension has no effect on the line of shoulders.

Alternatively, use bands to fix an arrow above the novice's shoulder blades.



Do not position the arrow on the blades, because in most of the draw extension techniques at least one shoulder blade moves.



4. Checking the maintenance of the alignment

a) In a group and/or in pairs

An assistant places a stick flat across the top of the back of the novice, just above the shoulder blades. At full draw, not during the draw, the assistant looks along the stick while the novice extends the draw length (with a clicker), or opposes the tension of the bow (without a clicker). Due to the small scale of the motions of the two blades, the stick should stay, as much as possible, in the same orientation (the actual orientation of the stick is not important).

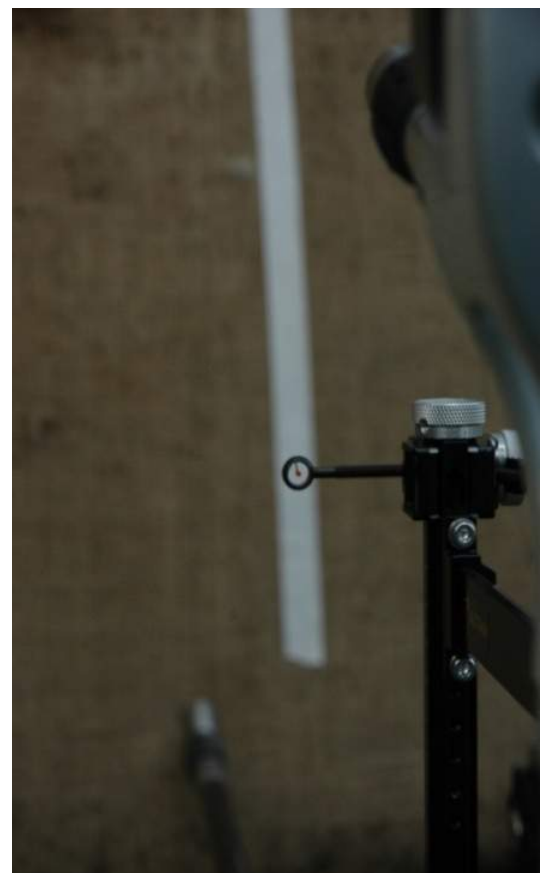
b) Fix a laser on the novice's head. The laser dot should be visible somewhere in the target, but it does not need to be in the centre of the target face. This exercise should be done with one novice at a time as care must be taken to switch off the laser before the novice leaves the shooting line to avoid the laser being shone into the eyes of other people in the area.



- 6.** Have the novice remove the elastic band and shoot with eyes closed.
- 7.** Similar to the exercise above but with eyes looking up and unfocused.
- 8.** Similar to the exercise above but looking and shooting at a blank butt.
- 9.** Continue this exercise but aiming at spots or faces with increasingly complete centres.
- 10.** Adjust the sight or find the proper place to aim at with the arrow point or shaft to group the arrows close to a line drawn on a target face or strip of tape fitted down the centre of the target.

At full draw, not during the draw, the assistant watches the laser dot while the novice extends the draw length (with a clicker). The dot should remain, as much as possible, in the same spot (the actual location of the dot is not important).

Attach an elastic band to the string elbow and pass it over the top of the bow until it sits at the bow grip between the novice's bow hand fingers, as shown in the illustration below. Using this tool requires the archer to use more effort to draw the bow. Consequently the bow seems lighter when the elastic band is removed.



Then, as soon as the draw is complete with the sight, point or shaft in the proper place, have the novice close their eyes.

Have the novice extend the draw for at least three seconds, and then open their eyes. If the aiming device (sight, point or shaft) is still on the vertical band, a good "in-line" draw extension has been made and the novice can release.

11. Similar exercise to the one above, but shooting at a target face or any mark. Have the novice shoot the arrow at the end of the three seconds (minimum) of draw extension with their eyes still closed. If the arrows still hit the mark, the novice has provided an efficient draw extension.

For safety reasons, have the novices shooting with their eyes closed at a distance 5 to 10 meters closer than the distance they are now allowed to shoot according to the World Archery Beginner Awards Program.

For each step, the number of repetitions has to be predetermined then adjusted by the coach. A dozen is the bare minimum number of repetitions for the exercise to be effective. Several sessions could be required to get a decent implementation by some novices. When coaching a group, a compromise will have to be reached between the fast and slow learners.

Draw Extension Stability - Exercise

Objective:

Self-Control and stability of the line of draw extension.

- 1.** Fix a mirror to the target butt at a height and angle where the novices can see themselves when at full draw. Ideally the novice should be able to aim at the reflection of their aiming eye in the mirror.
 - a. Have the novice take the bow (without any arrow) and stand approximately 2 meters from the mirror. Let them draw the bow, while looking at the reflection of their aiming eye in the mirror and strive to maintain the best possible alignment of the eye, string and sight.



Self-observation of the draw extension stability.

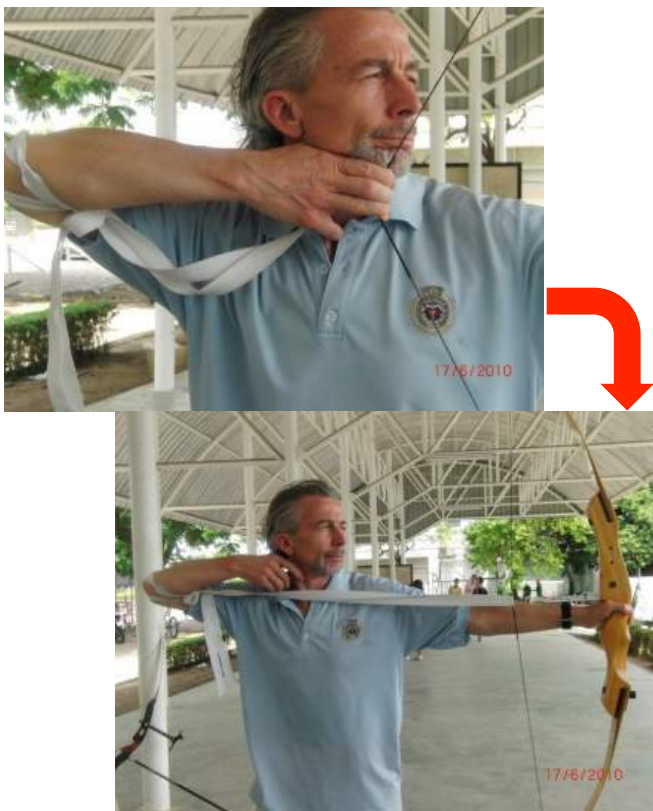
An alternative is to replace the mirror with an assistant.



Timing test of the draw extension stability.

The use of “dry fire enabling” systems (i.e. string or elastic attached to the drawing elbow and the bow string, or a pneumatic dampener positioned between the riser and the string, or other similar device), is recommended to minimize the effect of inadvertent release.

The following alternative using a simple and cheap elastic band will also protect the bow:



1.5 meters of good quality elastic band (for use as underwear waistband, for example) works well for entry level bows. Use a 1" width for men and 3/4" for women and youth.

6.11. AIMING

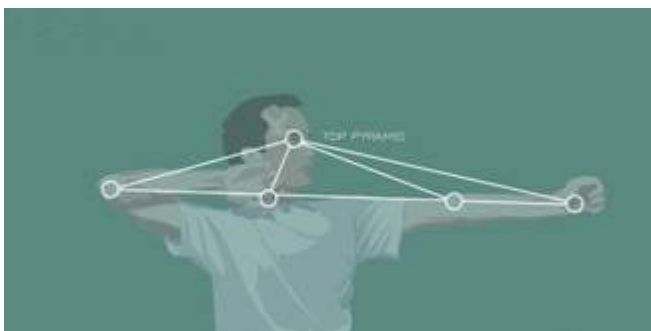
6.11.1 Complementary Knowledge

A matter of balance between two modes of attention

A novice thinks that aiming accurately is the main task to do in order to get the arrow into the centre of the target. As an experienced archer, the apprentice-coach already knows that this is not correct, since the feeling of a proper shooting sequence, form, mental predispositions, etc. are fundamental performance factors. Hence the main difficulty that archery coaches face is the over-aiming attempted by novice archers, many intermediate, and even some advanced ones. Most archery coaches organise training sessions without using a target face to force the novice to be focused on the control of his/her body and state of mind, i.e. to be internally focused. Aiming requires some external focus in order to align some visual references. In other words, an efficient shot requires proper balance between the internal and external focus.

Source of stability

A novice often states that his/her bow arm is not stable because they see their sight or arrow point moving. While it is possibly a bow arm issue, that is usually not the actual reason. First of all, a sight cannot be totally motionless. A "stable" sight is generated by good specific strength, body balance, technical control and so on. When seeing the sight moving, the novice often re-centres the sight by consciously modifying the channel of forces in the upper body/top pyramid (mainly the bow shoulder and arm), which generates a change in the launch-pad and results in a different shot.



Without clicker: While aiming, the shape of the top pyramid must be maintained.

With Clicker: the top pyramid should be slightly stretched out in its longitudinal axis.

The importance of keeping the shoulders and hips directly above the feet

It is common to sway a little forward or backward but the important thing is to keep the entire body within the shooting plane and avoid any left or right twist.

The image below depicts an archer shooting at a 122 cm face at approximately 30 metres, as seen from 5 metres behind.



Clearly, the archer is aiming straight at the centre of the target.

The following picture shows the same archer being moved a few centimetres forward (in the direction of his toes) due to a body swing or a wind from left to right.



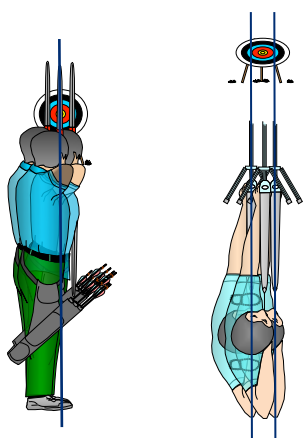
Let us suppose that the feet are still in the same position and the archer has kept his form with the shoulders directly above the hips and feet, but the sight is now aiming at the red/blue on the right.

Next we see the same archer being moved backward (in the direction of his heels) due to a body swing or a right to left wind.



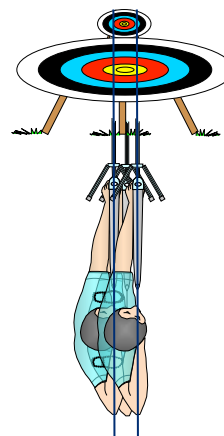
Once more we suppose that the feet are in the same position and the archer has kept his form with the shoulders directly above the hips and feet, but the sight is now aiming at the red/blue on the left.

The next diagram shows the three previous pictures collated into one picture looking from behind, also looking down from above.

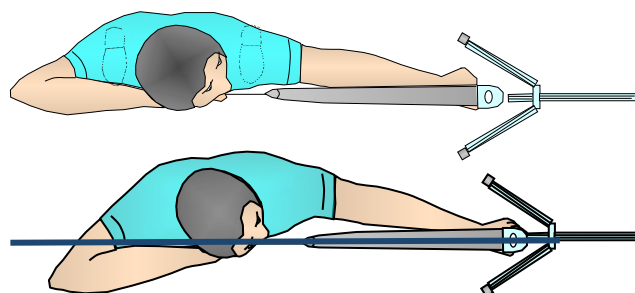


This shows that the sight could be moving across the target face from red-to-red, or even blue-to-blue in extreme conditions.

In the last image, we superimpose a 122 cm face up close to the archer. It is clear that, even though the archer has moved left or right these few centimetres, as long as the archer has held the form, when they release the arrow it will still hit the gold.



Due to the shooting distance, the target appears smaller than it really is. So a small left or right movement of the body will look as if it is a massive movement with reference to the target, and the sight will move from the gold out to the red or even to the blue depending on what distance the target is set at. This is only an optical illusion and is a serious trap for the novice. When he/she sees the sight away from the gold, the novice usually brings it back into the centre of the target by moving the bow arm instead of bringing back the entire body into the shooting plane and keeping the shoulders directly above the hips and feet. By moving the bow arm, the novice creates a shooting angle and breaks the alignment of the forces, as illustrated below.



Hence one of the most important things for an archer to do during adverse weather conditions is to keep their form with the shoulders directly above the hips and feet. A strong core is therefore of paramount importance.

When it is windy, therefore, it is best to consider the conditions, pick an aiming spot, come to full draw, and shoot from solid and strong foundation.

6.11.2 Exercises

Awareness of Head Canting (String Alignment) – Exercise

Objective:

To keep the triangle or quadrilateral aiming geometry in the shooting plane during the draw extension period. This exercise is not necessary while using the shaft aiming system.

Situation: Shooting situation.

Equipment:

Regular target face, or a vertical strip, or even three vertical strips attached to the target. Strips are 10 cm in width, 10 cm apart.

Instructions:

1. Ask the novice to come to full draw and align the string along the edge of the sight window.



Common head canting to get the string aligned on the edge of the sight window.

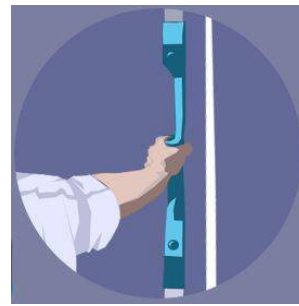


2. Without letting go of the string, have the novice look at the string and bow while moving the top of the head from right to left.

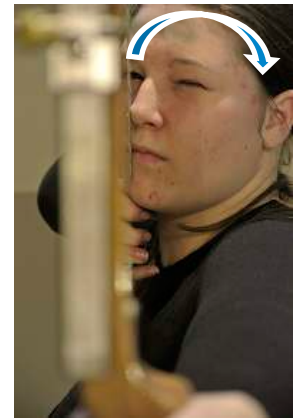
Head canting to get the string aligned on the left hand side of the bow window.



The novice should notice that the string image seems to be moving from right to left of the riser.

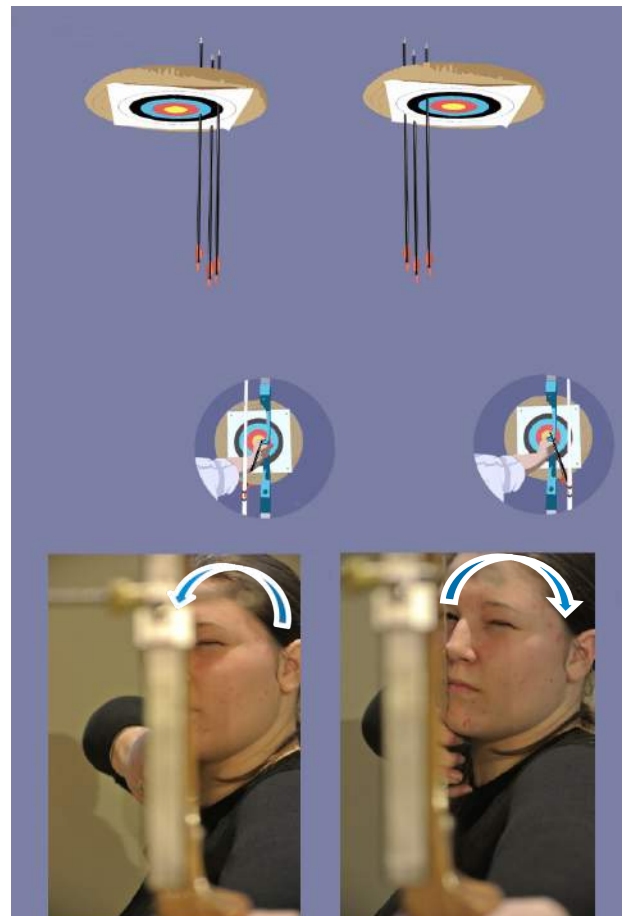


Head canting to get the string aligned on the right hand side of the bow window.



3. Shoot at the usual distance at a butt with a full size face pinned to it.

Keeping the sight pin aiming at the centre of the target, have the beginner line up the string on the left side of the bow riser. Notice the arrows impact on the right side of the target.

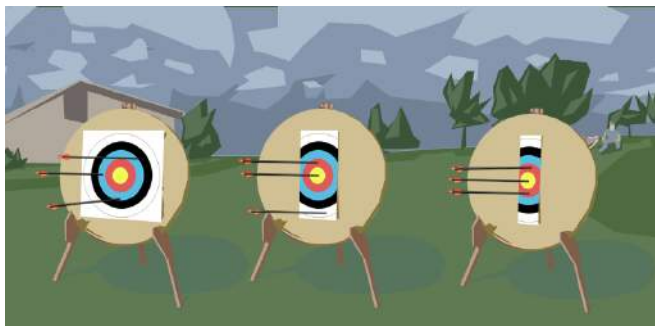


a) If the head is canted to the right, the string is seen on the left side of the riser, and impact point is towards the right side of the target.

b) If the head is canted to the left, the string is seen on the right side, and impact point is towards the left side of the target.

Then have them shoot while lining up the string with the right side of the bow riser. Notice the arrows impact on the left of the target.

Continue by organizing a game requiring good lateral precision (e.g. shooting at a folded target face, or divided into columns.)



The width of the target face is reduced after each end.

Use of the Waist in the Aiming Process – Exercise

1. Mark a horizontal line across the butt, for example with 1" masking tape.

a) Have the students draw their bows and aim at the left end on the line. While at full draw ask them to move their sight slowly along the horizontal line toward the right while extending their body and activating their clicker/trigger (if any) and releasing.

Ask the novices to identify which part of the body allows the sight to follow the line. The novices should have realized that it is not their bow arm, or even the upper body that allows this displacement.

b) Same as #1a, but follow the line from right to left.

While they are shooting, ask the novices to identify which part of the body allows the sight to follow the line.

The novices should have already felt that this movement comes from the lower body.



2. Repeat the above but with a vertical strip.

a) Follow the line from top to bottom.

b) Follow the line from bottom to top.

In each case, ask the novices while they are shooting to notice which part of the body allows the sight to follow the line.



The novices should have identified that the majority of the movement comes from the waist and a little from the hips.

This discovery is very important for field archers in particular, but it also teaches all novices how to re-centre the sight after being disturbed by a gust of wind. The entire upper body should be maintained as a single unit; it must not be deformed as a result of the re-adjustment process.

3. Repeat the above but with 2 diagonal lines.
 - a) From high left to low right.



- b) Then reverse the action going from low right to high left.
 - c) Then go from high right to low left.
 - d) Finally, reverse the action going from low left to high right.

While they are shooting, advise the novices to follow the line "with their belly", rather than their arm.



4. Now do the same using a circle, or use a target face and follow a line between 2 colours;
 - a) First go clockwise.
 - b) Then reverse and go anti-clockwise.



While they are shooting, ask the novices to follow the line "with their belly", rather than their arm.

5. Same exercise using a sinusoidal or doodled line; the length of each segment of the sinuous line should make the archer change direction at least three times while at full draw.
 - a) Follow the line one way.
 - b) Then go the reverse way.

While they are shooting, advise the novice to follow the line "with their belly", rather than their arm.

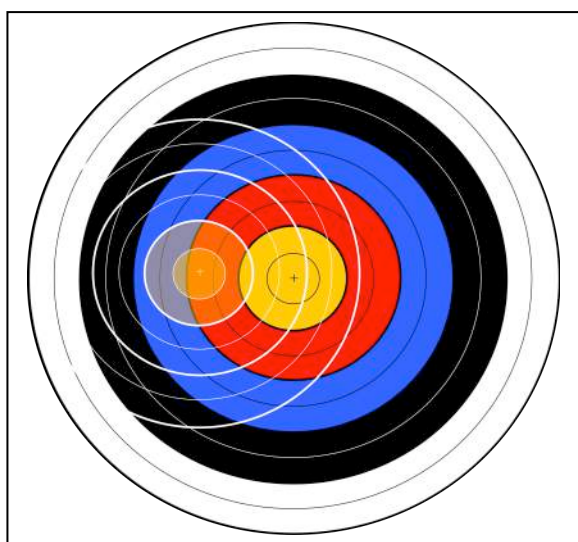
Aiming Off from Centre - Exercise

With a sight:

When shooting with a sight, aiming off from centre exercises must be introduced because novices sometimes have difficulty understanding that it is possible to aim at one point and achieve results in another location. To overcome this way of thinking, have the novice move their sight pin a few turns to one side and then aim-off accordingly to get groups in the centre of the target.

Without a sight:

Draw the rings of a target face with thin lines on a target face but with the "gold" off centre; let us say with the centre in the 7 zone scoring area at 9 o'clock. These thin lines should not be visible from where the novice is shooting.



Suggested offset rings on a target face.

Have differently drawn target faces and/or turn them a few degrees once in a while between ends, but let the students know where the "off centre" centre is located. It will then be possible to evaluate the success of the exercise.

Shoot and score a round using the off centre scoring rings, perhaps even at different distances.

Shooting in the Wind - Exercise

Objectives:

Introduce the novice to shooting in windy conditions.

Situation:

Windy conditions if possible.

Equipment:

Shooting equipment and a weight attached to a string or an elastic stretch band which is to be attached to the bow. The weight should be free and hanging below the bow.



Instructions:

An assistant moves the suspended weight.



The novice should resist as much as possible with the body not just using his or her arms.

Sight Adjustment Learning by Observation of Bow Deviation - Exercise

Objectives:

Learn the function of the sight and how to adjust it.

Situation:

Shooting simulation in pairs.

Equipment:

Bow strung with an additional elastic string.

Instructions:

Height adjustment:

Position the sight at its maximum height. The novice draws the bow without an arrow and chooses something to aim at.



Starting position: the novice aims through the arrow point.
Because the "sight" is high, the bow arm is low.

a) The effect of moving the sight down.
The assistant lowers the novice's sight, whilst the novice is at full draw. Ask the novice to bring the sight back to the same aiming point as above and have them notice that the bow arm moves up.



When the "sight" moves downward, the bow arm moves upward to bring the "sight" back to the centre.

Conclusion 1: "When I lower my sight, my arm and arrow go higher, thus my arrow hits higher on the target".

b) The effect of moving the sight up.
Do the reverse process, i.e. the assistant moves the sight up to a very high position from a low setting. Ask the novice to bring the sight back to the same aiming point as before and have them notice that the bow arm moves down.



When the "sight" moves upward, the bow arm moves downward to bring the "sight" back to the centre.

Conclusion 2: "When I raise my sight, my arm and arrow drop, thus my arrow hits lower on the target".

Combined conclusions 1 & 2: "I have to move my sight in the same direction my arrows are away from centre, because my arm and my bow move the opposite direction"

Lateral (windage) adjustments:

The assistant holds an arrow horizontally at the level of the sight block with the arrow point extending about 2 centimetres into the sight window. The novice aims at the target using the arrow point as the sight; essentially the arrow replaces the sight pin.



Starting position: the novice aims through the arrow point.

c) The effect of moving the sight pin out. The novice maintains full draw while the assistant slides the arrow 10 cm further into the sight window.

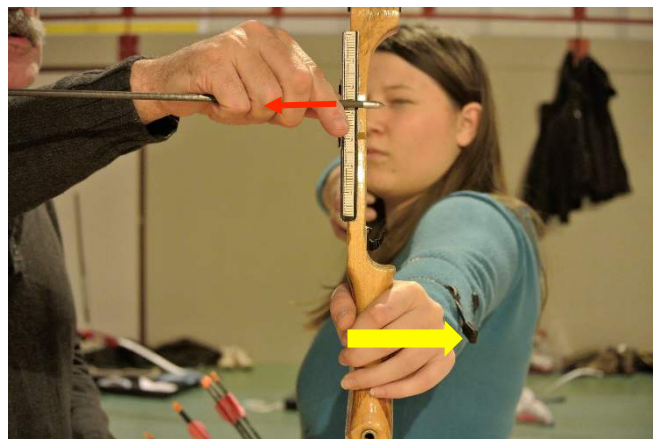


View from the archer: when the "sight" is moved to the left, the bow arm moves to the right to bring the sight back to the centre.

Have the novice adjust to bring the arrow point back to the aiming point and notice the movement of the bow arm to the right (viewed from the position of a right-handed novice).

Conclusion 3: "When I move my sight to the left, I move my arm and my bow to the right, therefore my arrow hits right on the target".

d) The effect of moving the sight pin in. Reverse the process, i.e. the assistant slides the arrow 10 cm towards the bow window. Have the novice readjust the aim to bring the arrow point back to the aiming point, noticing the movement of the bow arm in the process.



View from the archer: when the "sight" is moved to the right, the bow arm moves to the left to bring the sight back to the centre.

Conclusion 4: "When I move my sight to the right, I move my arm and my bow to the left, therefore my arrows hits left on the target".

Combined conclusions 3 & 4: "I have to move my sight in the same direction my arrows are away from centre, because my arm and my bow move the opposite direction"

Note that the conclusions are the same in both the vertical and lateral scenarios; the sight must always be moved in the direction that the arrows are away from centre in order to bring them back to the middle.

Sight Adjustment Learning by Observation of the Impacts Deviation - Exercise

Objective:

Learn how sights work and how to adjust them.

Situation:

Shooting situation.

The basic equipment set up with a butt and a target face with a grid drawn on it.

Instructions:

1. Help the novice to set the sight in order to get shots centred on the target.

2. Afterwards adjust the sight in one direction then ask the novice to observe where the shots group.

Re-centre the sight and then move it in another direction and have the student notice where the arrows group.

Since the shots group in the opposite direction of the sight displacement - for instance when the sight is moved to the right, the impacts deviate to the left - help the novice develop a simple rule.

Start with the conclusion "When the sight pin is moved right, the arrows went to the left" In other words, if the arrows are grouping to the right, the sight pin should be moved to the right. Hence the simple formula is to move the sight in the same direction of where the arrow impacts on the target.



Checkerboard target face.

Aiming Adjustment in Bare-bow Shooting (the Triangle Method) - Exercise

Objectives:

Teach the novices who do not use a bow sight how they can aim, i.e. which elements they should change to hit the centre of the target, particularly when shooting from different distances.

Here are some exercises for the two most popular aiming techniques without a sight: String walking and Face walking. For more details on bare-bow, please refer to the specific chapter on bare-bow in the WA level 2 coaching manual.

STRING WALKING:

It is recommended that novices in the bare-bow discipline start with string walking, which is the most accepted style. String walking refers to the process of varying the novice's fingers position vertically on the string when changing the shooting distance and using a consistent anchor point (reference point). A popular facial reference point is having the tip of the forefinger touching the corner of the mouth while having the rest of the finger located firmly underneath the cheekbone, as shown in the pictures below.

The closer to the target, the lower the novice's fingers are located on the string and the closer arrow nock is to the eye.

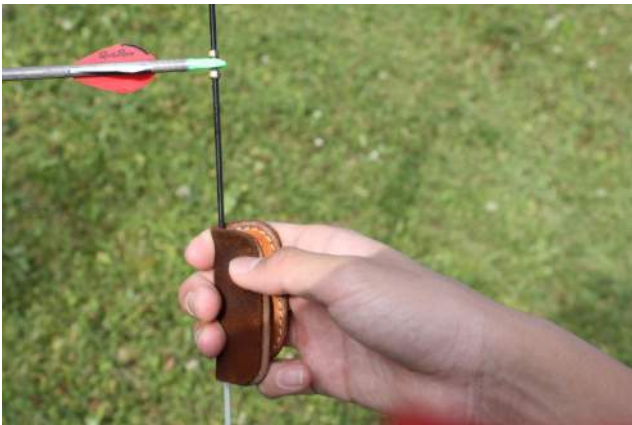
The further away from the target, the closer the fingers are to the nocking point on the string, and the arrow nock is lower with respect to the eye.

Equipment:

A mirror and a braced bow fitted with an elastic string.

Instructions:

1. With the string fingers far down from the nock (10cm), come to the full draw position and aim at a target with the point. Look at the eye-arrow distance and the slope of the arrow in the mirror - it is probably almost parallel to the ground.



For a short shooting distance.



Repeat the exercise but with the string fingers close to the nock. The arrow should now show an upward slope. Imagine the arrow trajectory in relation to the previous position.



For a long shooting distance



Conclusion:

The string fingers at a distance from the arrow nock orients the arrow parallel to the ground or sloping slightly down. The string fingers close to the arrow nock orients the arrow upward.

2. Follow up using these various exercises while shooting at approximately three meters. Have the novice notice the inverse correlation between the location of the fingers on the string and the height of impact.

Then organize a game requiring good horizontal precision from various distances, or even from the same shooting distance, and therefore requiring proper positioning of the fingers on the string. One example of such a game is shooting at a folded target or a line drawn on a target face.

FACE WALKING:

Anchor points/facial marks are usually described as being high or low on the face. An anchor point/facial mark low down the face is identified as low.



A low facial mark orients the arrow upward.

An anchor point/facial mark on or underneath the cheekbone is called high.



A high facial mark orients the arrow downward.

Both types of anchor points/facial marks can be used effectively for any kind of bare-bow shooting.

Situation: Various simulations.

Equipment: A mirror and an arrow.

Instructions:

In front of a mirror, hold an arrow by the nock, between the string fingers. Place the front part of the arrow in the depression between the thumb and forefinger on the bow hand. Simulate a full draw position with a high facial mark and aim at a particular spot with the point. Look at the eye-arrow distance and the slope of the arrow in the mirror.

Do the same thing but with the string hand positioned at a lower location on the face. Imagine the arrow trajectory in relation to the first position and to a situation where the position would be very close to the eye.

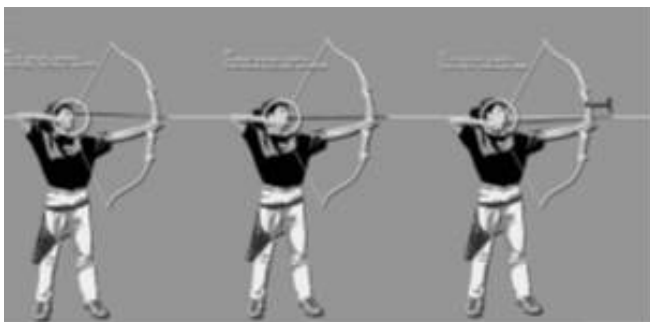
Conclusion:

- A high facial mark orients the arrow downward;
- A low facial mark orients the arrow upward.

Variation:

This exercise can be accomplished with an arrow drawn on a:

- bow fitted with an elastic string;
- regular bow.



A high facial reference orients the arrow point downward, and low facial reference orients the arrow point upward.

Follow up using these various exercises while shooting at approximately three meters. Have the student observe the inverse correlation between the height of the facial reference point and the height of impacts.

Then organize a game requiring good horizontal precision from various distances or even from the same shooting distance, and therefore requiring proper positioning of the fingers on the string. One example of such a game is shooting at a folded or lined target.

6.12. RELEASE

6.12.1. Complementary Knowledge

Type: Critical moment.

Element: The release of the shot.



The propulsion of the arrow.

Objective:

Propel the arrow the same way shot after shot, while maintaining all the activities that have been engaged so far: Physical, Visual, Attentional, etc.

Form:

Before progressing to the form of this step, review the picture below illustrating some of the important predispositions to a proper release.



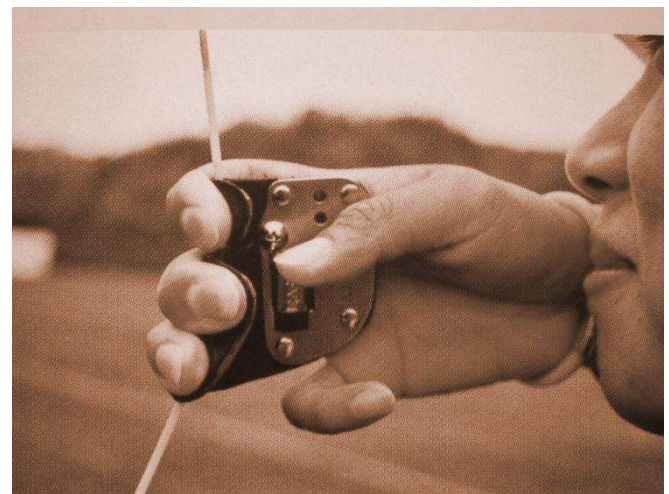
As these predispositions are very difficult to change once they have been established, it is of the highest importance to have the novices implementing them properly from the start.

These predispositions to release are not limited to Recurve archers, or even archers drawing the string with their fingers.



These predispositions are also valid for release users.

The non-used fingers (generally the thumb and the little one) keep their initial shape and stay as relaxed as possible.



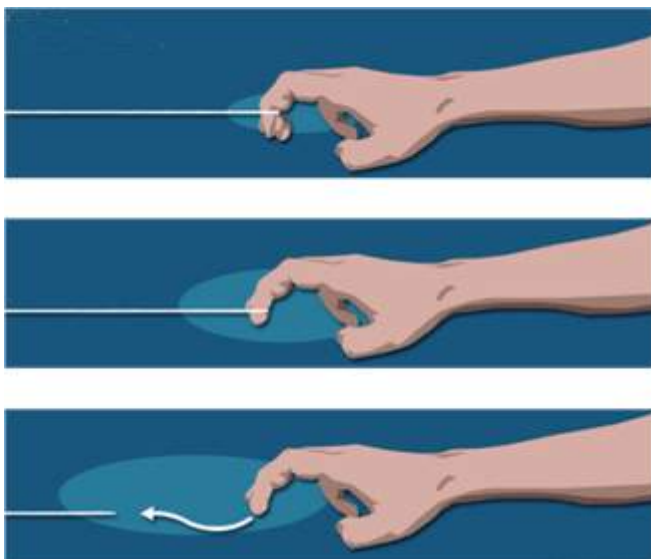
The classic proper form for a string hand that should be kept during the entire release process; including after the release.

The shot must take an observer by surprise; no tell-tale signs of the impending shot should be visible.



The string fingers keep their curled shape during the release. During the release, the string fingers abruptly relax while keeping their curled shape. As a

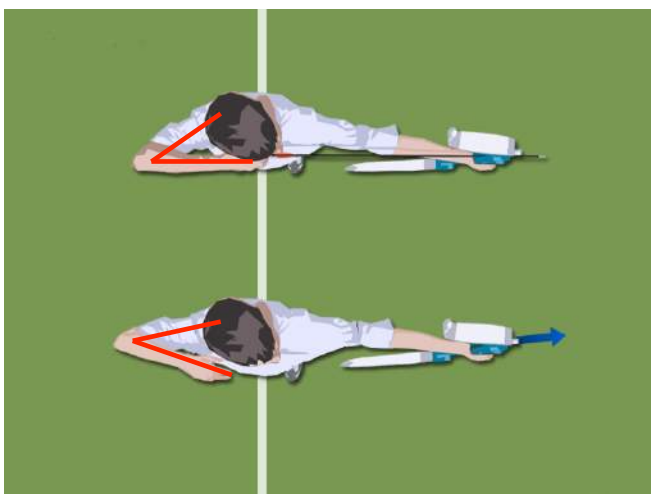
consequence, the string deviates laterally while rolling off the finger tips.



The string rolls off the finger tips.

The wrist should also maintain a consistent shape before, during and after the release.

Since the release is a continuation of the shoulder motion and the forearm/arm unit is primarily a simple relay between the string shoulder and the string, the angle between the string forearm and upper arm changes very little, if at all.



The form of the release can be influenced by:

- the posture of the novice at full draw, particularly the overall body alignment;
- the dynamism of the draw extension, particularly on the novice's string side;
- the draw extension technique adopted by the novice;
- the bow weight.

Hence there are various release shapes, depending on skeletal differences and type of muscular action at full draw.

It is easy to visualise the effect that variations in the draw extension on the string side would have on the release:

- little or no expansion at full draw generates quite a static release, i.e. the string hand does not move backwards very much;
- a strong expansion at full draw generates a lively release, i.e. that the string hand moves backward quite fast.

The various draw extension techniques discussed in the previous sections will affect the release action as follows:

Remember that the terms "move" and "moving" when used to describe shoulder blade action may not refer to a visible motion. Rather they describe the feeling and intent as experienced by the archer.



The release form generated by the string elbow moving horizontally whilst squeezing the string shoulder blade toward the spine.

With the string elbow moving horizontally and the string shoulder blade moving toward the spine, the string fingers stop just behind the sternocleidomastoid, the muscle going vertically from the collar bone to the ear.

Note: On the above elite archer it is very easy to verify that the string hand has kept the same shape as at full draw



The release form generated by the string elbow moving a little up whilst squeezing the string shoulder blade toward the spine.

With the string elbow moving diagonally a little up and backwards, the string fingers will come to rest on the upper chest just below the string side shoulder.



The release form generated by the string elbow moving a little down whilst squeezing the string shoulder blade toward the spine.

The string elbow moving a little down while the shoulder blade moves towards the spine extension technique generates a very different form of release. Because the string elbow keeps going diagonally down **and** backward, the string hand ends up behind the archer's head.



The release form generated by the string elbow moving horizontally backward due to the string shoulder blade moving away from the spine.

When the string elbow moves horizontally and the shoulder blade moves away from the spine, the string fingers stop just in front of (or against) the sternocleidomastoid, the muscle going vertically from the collar bone to the ear.

Two variations of the above technique:

- For a release generated by the string elbow moving a little up whilst moving the string shoulder blade away from the spine, the string fingers end up on the collar bone at the base of the sternocleidomastoid muscle.
- For a release generated by the string elbow moving a little down whilst moving the string shoulder blade away from the spine, the string fingers finish their movement near the string ear.

Since the shoulder blade motion is difficult to feel by many novices, the coach can refer to the direction of the string elbow as a guide.

The area where the string hand ends is called the "back end".

If the novice is using one draw expansion technique, but their release action corresponds to a different expansion technique, they are executing a movement upon release instead of "following-through" the muscular activity of their actual expansion technique. These are not proper releases and the artificial release movement must be corrected.

6.12.2. Exercises

Hands Free Mimics – Exercise

1. Pulling the string elbow

With the bow hand, the novice holds the string elbow and resists the backward pull of the draw extension technique.



The novice abruptly releases the string elbow, which follows-through in a simulation of the muscular activity from the posterior part of the string shoulder and the back during a release.



Repeat with the head turned in order to watch the string elbow during the simulation of the release. With a natural effort (i.e. no specific technique), the string elbow should:

- move backward and horizontally;
- keep the same angle.

The motion should come from the shoulder joint rather than the arm.

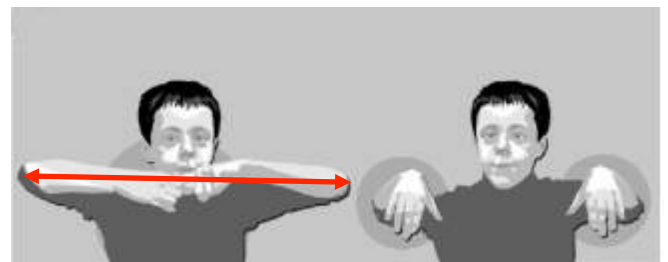


Watch the string elbow during the simulated release.

2. Pulling on hands:

Point downwards with the middle finger of the bow hand and hook the string fingers on it as if they were gripping the bow string. Raise the enlaced hands up to the throat level with the elbows slightly above the horizontal. The string wrist and hand should be aligned with the forearm. Ensure that both forearms are aligned elbow to fingers to elbow. The back of the string hand should be flat (the knuckles should not point out). The unused fingers must be relaxed. The drawing hand should be "twistable".

Simulate a release while watching the drawing hand, using a mirror to make observation easier if desired. At the end of the simulation, be sure that both hands are relaxed, the wrist should be bent down, and the fingers completely relaxed.



Simulation of relaxed hands through the release.

Note: The illustration above exaggerates the wrists' relaxed final state. The string hand will not be dangling after the release of an arrow. This exercise is just to ensure that the novice simulates the release by relaxing the hands, rather than by opening the fingers. This excess relaxation of the wrists will disappear over the next steps, and in particular under the effort of handling a bow.

Repeat with the head turned in order to watch the string elbow during the simulation of the

release. Using a natural effort (i.e. no specific technique), the string elbow should:

- move backward and horizontally;
- keep the same angle.

The motion should come from the shoulder joint rather than the arm.

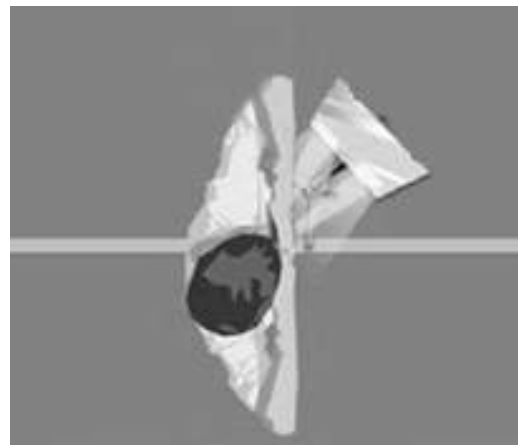


Watch the string elbow during the simulated release.

Then repeat with the head turned in the direction of a target (even a fictitious one). Here again, simulating in front of a mirror makes it easier to observe the release.



The novices can simulate their shot, doubling as a learning situation for the draw action.



Watching a simulated release.

While looking toward the target, the string hand should slide along the neck and end up more or less below the ear (when using a natural effort, without any specific technique).



End of the travel for the release hand for the quadrilateral method.

3. Release simulation with opposite thumb:

The string fingers of the novice grip the thumb of the opposite hand, which is vertical and pointed up. The novice pushes the thumb forward "through" the string fingers.



Repeat the simulation but pulling with the string fingers instead of pushing the thumb.



Then repeat both simulations from a proper “full draw” position, as shown below:



In the latter two alternatives, upon the simulated release, the string hand moves suddenly toward the novice and inward. The string fingers keep their shape.

4. Release simulation on a panel:

Use a flat rectangular or square panel, depending on the size of the novice. A rectangular item may fit two different-sized novices, depending on its orientation. Even the mirror that is so useful for coaching may be used for this exercise.

Have the novice place one edge of the panel against their body and grip the opposite edge with their string fingers as shown below. Keep the thumb and little finger inside the string hand in a similar shape and position as when shooting.



Have the novice apply a regular, continuous pull and suddenly release.



When properly executed, the string hand slides along the panel toward the novice and has the same shape as before releasing.

Simulation in Pairs - Exercises

Objective:

To learn the continuity of the draw action.

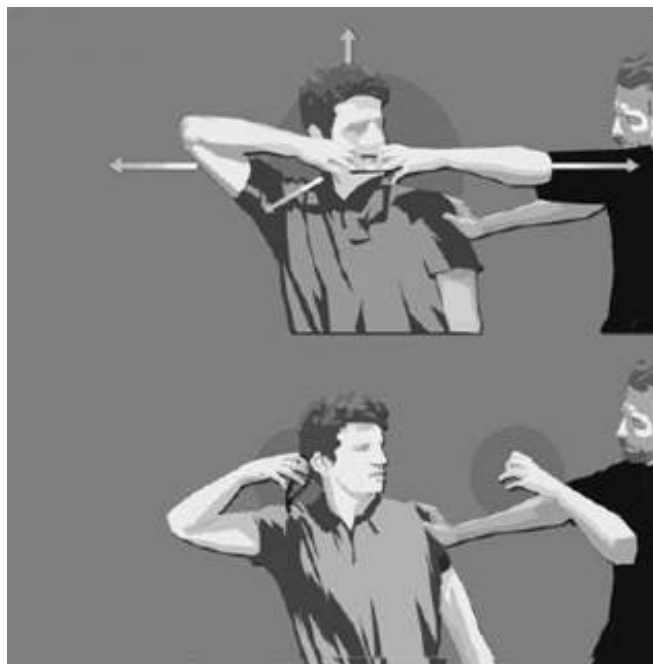
Equipment:

Two pieces of tube or hollow cane about 10 cm long with a cord loop threaded through.

Situation:

The assistant emulates the bow; the novice assumes the shooting stance but leaves their bow arm down at their side.

The novice grips the loop as if it was a bow string and the assistant holds the other piece of cane or tube. The novice assumes a "nearly-full-draw" position with their string arm while the assistant puts their other hand on the novice's bow shoulder, as illustrated below.



The novice pulls the loop toward the neck, while the assistant slows down the pull and releases at the completion of the full draw position.

Instructions:

The novice applies a slight drawing pressure on the cord with the assistant giving minimal resistance by pushing lightly on the novice's shoulder. The novice doubles the effort. The assistant slows the novice's action as the cord nears the novice's face. When the novice has completed the draw extension, the assistant lets go of the cane. Notice the recoil or backwards movement of the novice's string arm and the pressure applied on the assistant's body.

Many other simulations are possible, such as the following two using assistants that are self-explanatory:



Release Mimics with an Elastic Band - Exercises

1. Vertically

The novice stands on the two loose ends of an elastic band and grabs the loop of the elastic in the string fingers. The length of the elastic should be such that the band is a little stretched when the novice stands upright with the loop in their string fingers. The drawing wrist and hand are flat and the unused fingers are relaxed and soft. The finger tips should be against the side of the thigh. Throughout the exercise, maintain a vertical body, avoiding the temptation to lean to one side.



Left (below): with a straight arm (i.e. keeping the elbow straight) start a slow and continuous, small (a few millimetres at most), upward pull from the string shoulder.



Right (above): During the vertical pull, release the elastic. The string hand should follow-through upward along the thigh without changing shape.

2. Horizontally

The novice holds the ends of the elastic band in their bow hand and grips the loop using their string fingers. The length of the elastic should be such that there is a light stretch when the novice is at full draw. The drawing wrist and hand are flat and the unused fingers are soft and relaxed.



Above: The novice comes to full draw and executes their draw extension technique.

Below: The novice releases the elastic band and completes their follow-through with relaxed string fingers and wrist.



Repeat with the head turned in order to watch the string elbow during the simulation of the release. Through a natural expansion (i.e. no specific technique), the string elbow should:

- move backward and horizontally;
- keep the same angle.

The motion should come from the shoulder joint rather than the arm.

Important: The head must be turned while at full draw in order to observe the string elbow before, during and after the release process.



Watch the string elbow during the simulated release.

Finally, simulate the release with an elastic band in front of a mirror as illustrated below.

As before, have the novice come to full draw with the elastic band. With his/her head turned towards the target ask him/her to watch him/herself in the mirror. Eliminate unnecessary hand, wrist, and forearm muscle contractions as much as possible. Lower and spread the shoulders apart while keeping the back of the neck stretched to its maximum. Release the string finger grip and watch the hand separation as the rhomboid and trapezius muscles contract during the follow-through.



Drawing an elastic band while looking in a mirror.

Repeat the exercise with eyes closed. The coach strives to help the novice identify the feeling connected to a proper release, particularly:

- the sliding of the string hand along
 - the jaw (unsighted)
 - the neck and lower jaw (sighted);
- the direction of this sliding;
- the back end of the string fingers;
- the relaxed and curled shape of the string fingers at the back end.

[Checking the Proper Predispositions to Release – Exercise](#)

Instructions:

The novice stands upright and holds the bow by the string with the string arm down along their side as illustrated below.



The assistant holds the novice's string forearm in one hand and the riser in the other hand.



The assistant pushes down on the bow, to generate a little tension in the novice's string forearm.

Then the assistant brings the bow in front of the novice, as it would be in pre-draw.

Discovering the Feel of the Release - Exercise

Instruction:

The novice stands upright and holds the bow by the string, with the string arm down to the side as illustrated below.



The novice observes the shape of the wrist, hand and fingers.



The assistant holds the bow by the grip and pushes down on the riser a little while the novice maintains a relaxed string hook. Suddenly the assistant presses down much more and the string escapes from the fingers of the novice.



The string elbow of the novice can bend, if needed, to get the string hand in front.



The string hand of the novice should still have a relaxed hook shape.

Relaxing of the String Fingers for Releasing - Exercise

Situation:

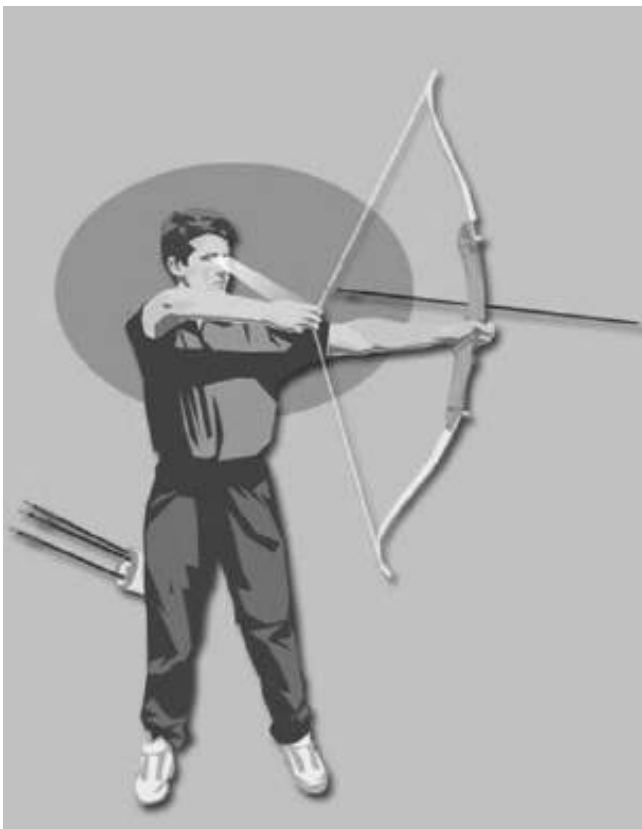
After the above simulations, have the novice set up to shoot at 3 or 4 meters from the target.

Equipment:

The basic equipment set-up. Do not use a clicker even if it has already been introduced.

Instructions:

Raise both hands and the arrow to shoulder height, not above. Start drawing the string slowly (about 10 cm), towards the breast bone to avoid hitting the chin upon release. Visually check the string hand, wrist and forearm, they must be in line and relaxed. Watch the slow movement of the string hand, forearm and elbow; ensure the elbow is held high enough.



Visually follow the slow motion of the string forearm.

Making sure the arrow is pointing at a target or a net, release the string while continuing to watch the string hand moving back. The release must be done during the draw, so do not stop the drawing action.

The first release can be achieved through a slow progressive relaxation of the fingers, but the speed of relaxation should increase as the novice progresses through the exercise until relaxation is instantaneous (but still a relaxation, not a finger opening!)

To practice this exercise the release must occur at an increasing draw length:

- At 1/2 draw;
- At 2/3 draw;
- At 3/4 draw;
- Just before the facial reference point is reached;
- At full draw, with nevertheless a micro progression of draw length.

Important: The draw must not stop; ensure a continuous backward motion of the string until the release.

Under the supervision of an assistant checking the shot direction, the novice watches the string hand throughout the entire release action, i.e. before, during and after the release..

Before the release, make sure the novice checks the proper predispositions to a good release: hand and wrist aligned with the forearm, flat back of hand (no knuckles pointing out), relaxed unused fingers.



After the release make sure the novice checks the relaxation of the string hand, it should be bent slightly downwards.



It is better to finish with an "overly-relaxed" string hand, as shown in the above illustration,

than with any stiffness. The excess of relaxation will disappear gradually during the learning process. It is fundamental, however, that the novices implement the release by relaxing the finger flexors or at least by reducing their level of muscular contraction.

For each successive arrow, increase the draw a little, until full draw is reached. When the string hand can no longer be directly observed because the string hand is under the chin, use a mirror to observe the hand during and after the release.

During release the eyes follow the string hand's follow-through. After release, the eye's focus is on the string wrist's final position, as shown in the previous picture.

Once the exercise has reached full draw, repeat it for a few ends. After some ends, the clicker can be introduced, if desired.

The string hand should slide along the neck or jaw depending on the aiming system, never away from the neck or face.

Always keep the string hand as relaxed as possible.

Note: Try a deeper string grip if the novice cannot avoid either:

- the knuckles standing out on the back of the string hand; or
- The string wrist bending out.

Continue this exercise following the standard teaching process:

1. Shoot with the eyes closed while concentrating on the string hand.
2. Same as 1, but with eyes open, looking up and unfocussed.
3. Same as 2, but looking and shooting at a blank butt.
4. Same as 3, but shooting at cut-out faces, starting from the 6 zone and continuing with smaller cut-outs right up to using a face with no cut-outs.

The Follow Through on Release - Exercise

Objective: Release with constant string arm shape at the elbow.

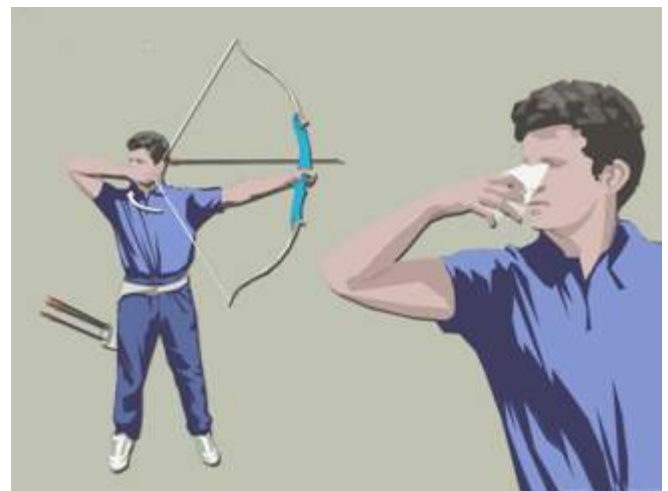
Rationale:

The backward movement of the string arm is due to the follow-through of the activated muscles, i.e. mainly from the muscles from the posterior part of the string shoulder and from the back. Because the muscles from the string arm are not particularly involved, the arm shape should almost remain the same through the release process.

Instructions:

Standing about 4 meters from the butt, turn the head at full draw to observe the string elbow while ensuring:

- The constant angle at the elbow;
- The string elbow moves back in the same horizontal plane (more or less);
- The pivoting/rotation motion of the string arm is at the shoulder joint.



The above is valid for a natural expansion effort. If the novice is using a particular draw extension technique, the form of the release will vary accordingly.

The Release at Reduced Draw - Exercise

Equipment:
A bow.

Instruction:

- In pairs;
- The novice just hooks the string as usual;
- The assistant holds:
 - The bow with one hand;
 - The forearm of the novice with the other hand.
- The assistant pulls the bow a small distance away from the novice and counts to three.



- At three the novice must release while the assistant gives follow-through assistance to the novice's string hand.



The Relaxation of the Unused Fingers - Exercise

Have the coach or assistant verify the relaxation of the thumb and small finger as done earlier, but this time with the focus being on a proper release: The string fingers relax with a minimum of other changes in the string hand.



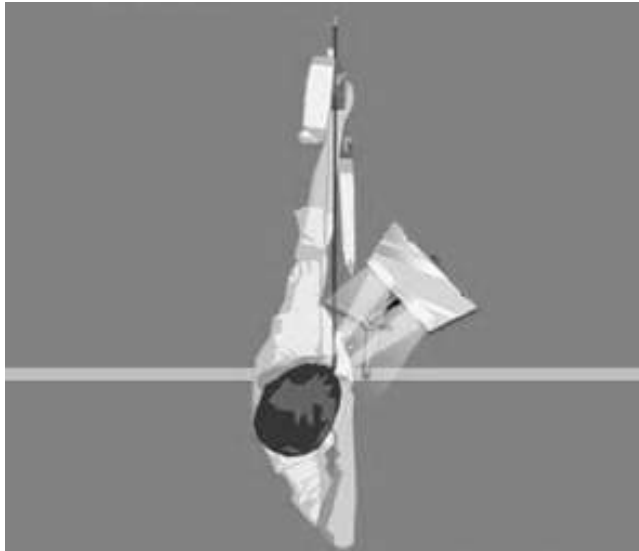
An assistant, by touch, brings the novice's attention to the level of relaxation of the thumb and the little finger.



The thumb and the little finger should be relaxed and keep the same position and shape throughout the release process.

Visual Control of the Release - Exercise

Set up a mirror close to the novice and at an angle so that the novice can see their image whilst at full draw and aiming at a blank butt. The novice should be able to turn their eyes, without changing their form, to see the reflection of their facial reference point and the direction the string hand travels close-up, as illustrated below.



Self-observation during the release.

- 1.** Have the novice use the mirror to observe the release form. Keeping the string hand as relaxed as possible, ask them to release while watching the string hand and arm in the mirror.
- 2.** Have them shoot with eyes closed, while concentrating on the release and feeling that the body and release remain in the shooting plane (no twist).
- 3.** Do the same as 2, but with their eyes looking up and unfocused.
- 4.** Do the same as 3, but have them looking and shooting at a blank butt from a normal shooting distance (18 meters).
- 5.** From a normal shooting distance, shoot at a set of decreasingly cut-out faces (five cut-out target faces and one complete face).

Assisted Release - Exercise

Objective:

Allow the novice to feel the physical follow-through.

Situation:

If the body sizes allow, the assistant holds the novice's bow wrist and wraps the other arm around the novice's back, with his/her arms overlapping the novice's arms, as in the image below, while shooting at a butt at close range.



Manual assistance helps the novice to better understand what should be done.

Equipment:

The basic equipment set-up.

Instructions:

The assistant applies a slight drawing pressure on the novice's arms, substantially increasing the physical expansion.

During the release, the drawing action is sustained by the assistant to make the novice aware of the appropriate physical follow-through.

Repeat the exercise while decreasing the degree of assistance.

Continue this exercise following the standard teaching process. Instruct the novice to repeat the exercise with eyes closed, looking up, looking at a blank butt, and then by shooting at increasingly complete targets.

Various other forms of manual assistance are possible. Two are depicted below.

Facial References During the Release - Exercise

Objective:

To discover facial reference marks during the follow-through of the string hand.

Situation: Simulations.

Equipment: Mirror.

Instructions:

The string fingers hook either a loop of rope, or onto the forefinger of the bow hand that is vertical and pointed toward the ground. The archer then applies a simulated drawing action to both hands and brings the string fingers to:

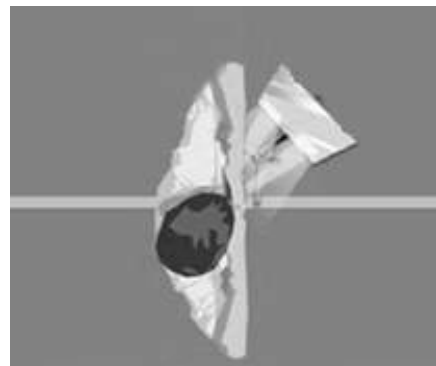
- The mouth for straight line and triangle methods;
- The neck for the quadrilateral method.



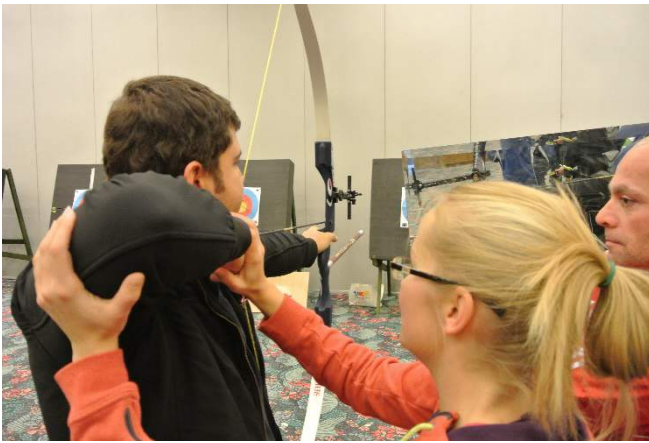
A novice simulates the shot, doubling as a learning situation for finding the facial reference point.

The forearms form a straight line. The head is turned towards the target and the novice is looking in the mirror. Eliminate unnecessary hand, wrist, and forearm muscle tension.

Lower and spread the shoulders apart while keeping the back of the neck extended. Have the novice notice the increased tension in the fingers.



Watching a simulated release and backward movement of the string hand.



Assistance from the expansion (above) until the release (below)



Assistance from the expansion (above) until the release (below)

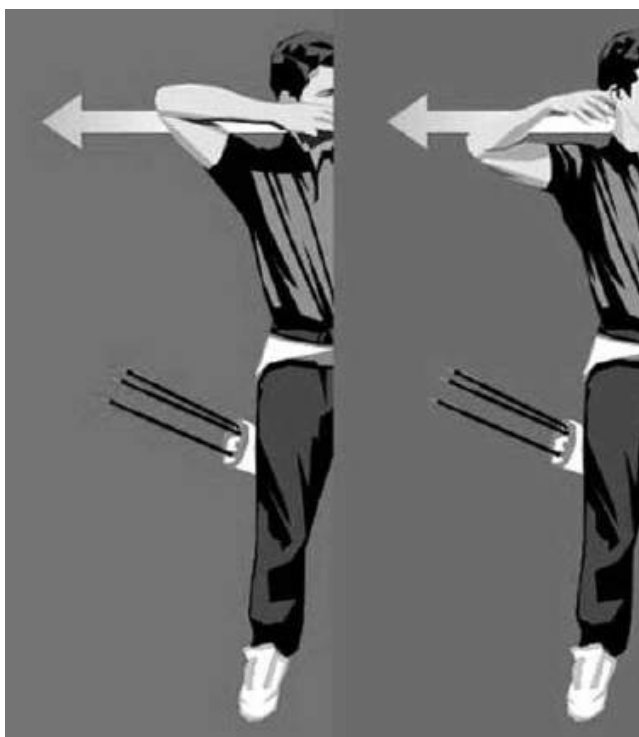


Release the string finger grip suddenly and observe, in the mirror, the sliding of the string hand/fingers along:

- The cheek for straight line and triangle methods;
- The neck for the quadrilateral method.



String fingers slide against the neck in the quadrilateral method.



The string hand continues the follow through.

Repeat this exercise with eyes closed.

Repeat again with a rubber band, with a bow fitted with an elastic string and, then follow up by actually shooting with the normal equipment, at first while looking in the mirror.

After the novice has shot the bow while looking in the mirror, follow the standard teaching process. Instruct the novice to repeat the exercise with eyes closed, looking up, looking at

a blank butt, and then by shooting at decreasingly cut-out target faces.



The novice's face stays passive.

Reminder:

During the release, the string arm moves according to the expansion technique used by the novice while at full draw. This is because, from a purely physical perspective, releasing is a continuation of the muscular activities with one change - the decrease in intensity of the contraction of the finger flexors.

Release in the Arrow Axis - Exercise

An assistant holds one hand a few centimetres from the back of the string hand of the novice at full draw.



The string hand or fingers of the novice should not hit the hand of the assistant during the release.

The Direction of the Release - Exercise

A light elastic band is looped around the string elbow of the novice. The assistant holds the elastic with one hand; with the other hand he/she braces the novice's body.

When the novice is at full draw, the assistant pulls lightly and consistently on the elastic in the direction of the novice's draw expansion technique (refer to the various motions of the string shoulder blade and elbow described earlier in this chapter).

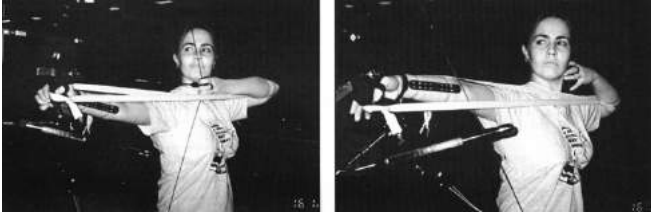


Upon release the assistant continues the pull on the elastic band in the same direction to help the novice release with a good follow-through.

Making the Release More Dynamic - Exercise

Equipment:

- Regular shooting equipment;
- A loop of light elastic attached to the string elbow and passing in front of the bow.



Instructions:

- The novice shoots as usual, but with the elastic band in place.

For most of the expanding techniques, at the end of the release the elastic band touches the collar bone at the base of the sternocleidomastoid.

Notes:

- The elastic band finishing away from the above final contact point is usually evidence of an incorrect release;
- This is an excellent exercise to erase any slight creeping that happens during the start of the release process and which is so common and damaging to the shot;
- For a lasting effect, this exercise should be done for 40 minutes (or more).

Making the Release More Dynamic with a Harness - Exercise

Equipment:

- Regular shooting equipment, but no arrow;
- A harness to be affixed on string elbow and attached to the bow string with a rope (or sometimes elastic).

Note: the harness and rope (or elastic) must be strong enough to bear the load of the draw weight of the bow.

Instructions:

- The novice comes to full draw.



- Then releases after the usual expansion process.



Notes:

- Care should be taken when using a rope to ensure proper shoulder alignment and muscle engagement in order to reduce the possibility of injury to the athlete.
- The bow string pulling the string elbow out of line is evidence of an incorrect release.

6.13. STRING CLEARANCE

6.13.1. Tests

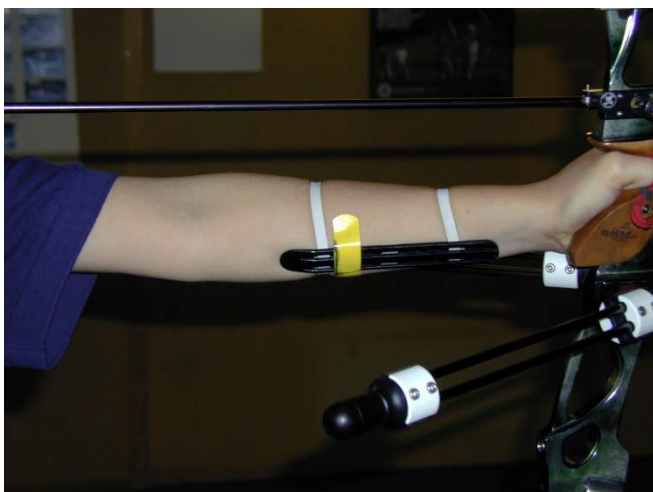
String Clearance of the Bow Forearm - Test

With no hand on the string, raise the bow and check where the string is located on the armguard or forearm. About 12 mm in front of this spot (i.e. towards the bow) affix a piece of tape or an adhesive bandage which protrudes about 2 mm in the middle (bridge shape). The bridge of the tape should be fixed vertically, across the bow forearm/armguard, parallel to the string.



A bridge of tape is an efficient way to check string clearance.

Mark the side of the tape closest to the string with a pen (it is best to make the mark before sticking the tape on the armguard). This mark will help to identify if the string hits the tape while pushing the arrow or on its way back.



Shoot an arrow with this tape in place - make sure the tape-bridge is not flattened out before the draw. After the shot, look at the tape and analyse any damage to it (if any).

String Clearance at the Chest - Test

Either with the novice watching him or herself in a mirror, or with the help of an assistant, observe at full draw where the string touches the chest, if it does. About 12 mm in front of this spot fix a piece of tape that has a bridge shape - 2 mm raised in the middle (an adhesive bandage is fine).



Checking chest clearance with a bridge of tape.

The most critical point is the edge (hem or trim) of the chest guard surrounding the bow shoulder. The bridge of tape should be fixed parallel to the string on the chest-guard. Shoot one arrow with this tape in place - pay attention to not flatten out the "bridge" part during the draw. After the shot, analyse any damage done to the tape.

The following exercises will help to improve form and generate better string clearance. It is possible that poor string clearance may be caused by more than one issue. Thus it may be necessary to use several of following elements to attain good string clearance.

6.13.2. Rectifications and Some Exercises to Improve the String Clearance

If poor string clearance has been detected using one or both of the above tests, proceeding with the following rectifications and/or exercises in the following order is suggested.

Clothing Issue at the Chest or Sleeve - Rectification

Tighten the garment sleeve at the forearm and at the top and along the bow arm at shoulder level using pins, bands or tape.



The use of a chest-guard is often efficient as well.



Bow Shoulder Alignment – Rectification

The bow shoulder joint should be kept in line with the string shoulder and bow hand, not pushed in towards the string.



The bow shoulder should not be more toward the toes than in the example above. Below are some reminders on how to teach proper bow shoulder positioning.

At the pre-draw:

The joint should remain above the hipbone on the bow side. Moving this joint toward the string drastically reduces the string clearance. The bow arm may rotate clockwise (for a right-handed archer) in the shoulder joint, so long as the joint remains in the correct location.



It should also be pushed down and forwards.

Ask the novice to put the bow arm on an assistant's shoulder. Have the assistant manipulate the novice's bow arm with an inward rotation of the humerus head and a gentle pull away from the body.



Ask the novice to close his or her eyes in order to better feel this shoulder positioning.

Then ask the novice to implement this form while using an elastic band.



The assistant may manipulate the arm again if necessary. When correctly positioned, ask the novice to close their eyes to get a better feeling of the correct posture. Then use a mirror to allow the novice to see their arm properly positioned.

Repeat with the bow but no arrow; then with an arrow and shooting.

The coach must check that the bow shoulder is not brought too much inside (towards the arrow) during the draw and during the extension (full draw) actions, a common error for novices. The following exercises can help correct a bow shoulder that moves too far to the inside.

During the draw:



Position an arrow vertically against the front side of the bow shoulder of the novice during the pre-draw, holding the arrow with one hand at each end. Keep the arrow as still as possible during the draw action. A slight inwards motion

of the bow shoulder is acceptable for getting the bow arm and the shoulders aligned, particularly in case of a short pre-draw. That said, the bow shoulder should remain above the hip, not further inwards (towards the toes). Ask the novice to draw with their eyes closed while the assistant helps with the vertical arrow to promote a better feeling of control and awareness of the bow shoulder position during the draw.

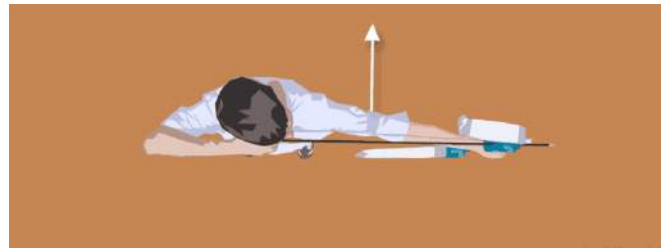
During the extension (full draw):



From the pre-draw, set up the shot as described in the previous situation. Once the novice is at full draw, firmly hold the arrow in place with one hand at each end. Keep the arrow still during the extension action, until one or two seconds after the release. Many novices have a tendency to twist their entire upper body instead of an extending in the arrow axis, particularly when learning to use a clicker. If this twist happens, the string clearance is dramatically reduced. Ask the novice to extend with the eyes closed while being assisted with the vertical arrow; it will help to better maintain the bow shoulder (and entire upper body) while extending at full draw.

Bow Elbow Orientation – Rectification

The bow elbow should point away as shown below:



If the bow elbow is not properly oriented this exercise can teach the novice how to properly rotate it.

Volleyball player:



Simulate the volley-ball player position as shown above.
Now have the novice rotate their elbows so that the points are directed away from each other as shown below.



This is the proper position of the archer's bow elbow while shooting. Have the novice repeat this, with decreasing dependence on the linked hands, until they are able to do it with their hands separated.

Against a support:



For most people, an elbow pointing down generates poor string clearance. Have them rotate their arm, with help if necessary, to bring the bow elbow to the vertical position shown below.



This elbow position provides an optimum string clearance. Have the novice repeat the turning of the bow arm him/herself multiple times, decreasing the amount of assistance given. Let them continue the exercise with their eyes closed to better learn the feeling of the proper bow elbow position.

Next do it using a support and an elastic band. If properly done, the novice should be ready to adopt a correct bow elbow position on their bow.

Bow hand position – Rectifications

Bow Hand – Exercise 1

Objective:

To discover a bow hand position that is easy to replicate; solid, not tiring, relaxed, and allowing an efficient pursuit of the shooting process, including good string clearance.

Situation:

Shooting situation.

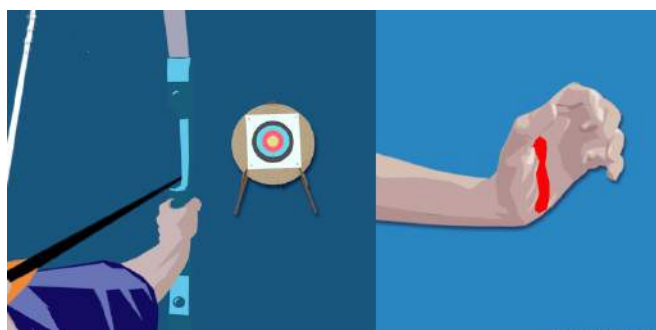
Equipment:

Bow.

Instructions:

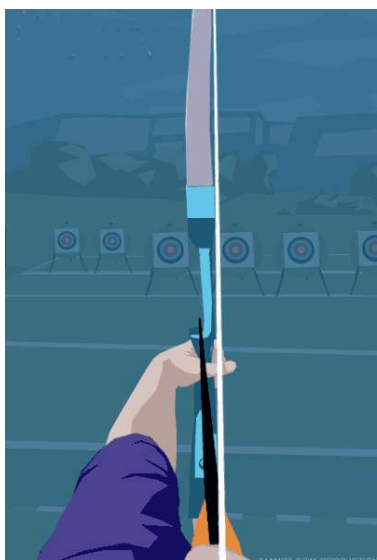
Have the novice try different bow hand positions, and notice:

- The obstructed string displacement when the palm of the bow hand past the life line presses against the bow grip; and



String clearance is poor when the palm on the little finger side presses against the bow grip.

- Any discomfort and the tiring nature of the position when the string is pulled slightly with the bow grip pressing against the base of the thumb.



An unstable and tiring grip occurs when the bow hand position is out too far and pressing the thumb against the bow grip.

Many beginners adopt the unavailing bow hand position shown in the previous illustration to avoid their forearm getting hit by the string. Since the pressure point on the grip is moved to the left (for a right-handed archer), it generates a bow torque during the propelling process that deviates the bow string toward the bow forearm; hence no gain, but still pain!

A recommended position is shown in the illustrations entitled "A good bow hand position"; this provides a support zone between the lifeline and the base of the thumb.



A good bow hand position.



A good bow hand position.

String clearance is optimal when the palm on the little finger side of the life line is not in contact with the side of the bow grip.



A good bow hand position.

Bow Hand – Exercise 2

Objective:

To discover a stable bow hand position that allows an efficient pursuit of the shooting process, including good string clearance.

Situation: Simulation.

Equipment: A piece of string or a bow.

Instructions:

To discover the contact zone on the grip-hand, ask the novices to pull a rope or rubber tube as shown in the next illustration:

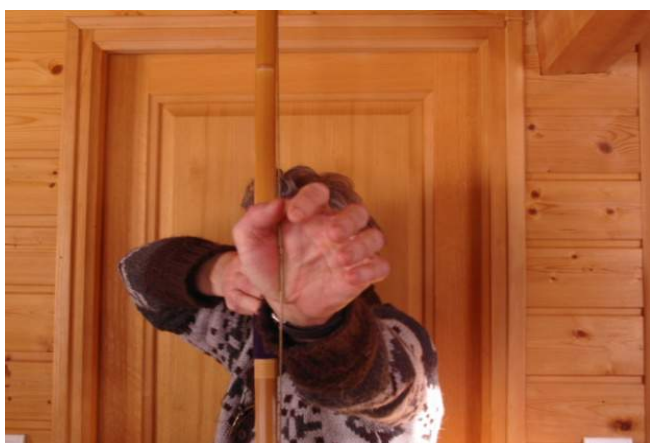


The coach should check if the rope is pressing on the proper part of the bow hand. If necessary, correct the location of the rope or rubber tube.

The novice should feel:

- The stable alignment of the bow hand;
- Where the pressure zone is located on the hand.

Then ask the novice to use a bow back to front, with the bow hand holding the string and the string hand holding the bow.



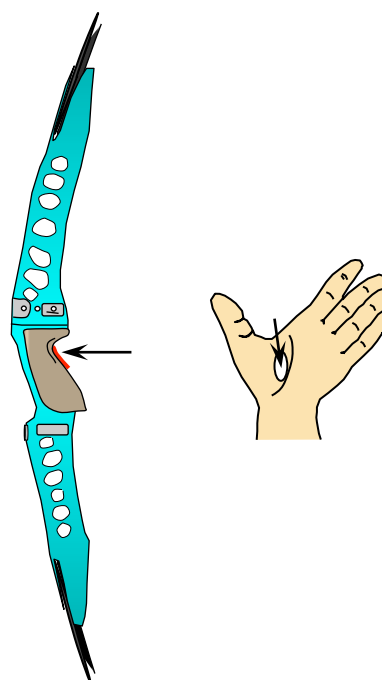
If the string is properly placed, the novice can keep the bow hand relaxed and the bowstring does not roll out of the bow hand.

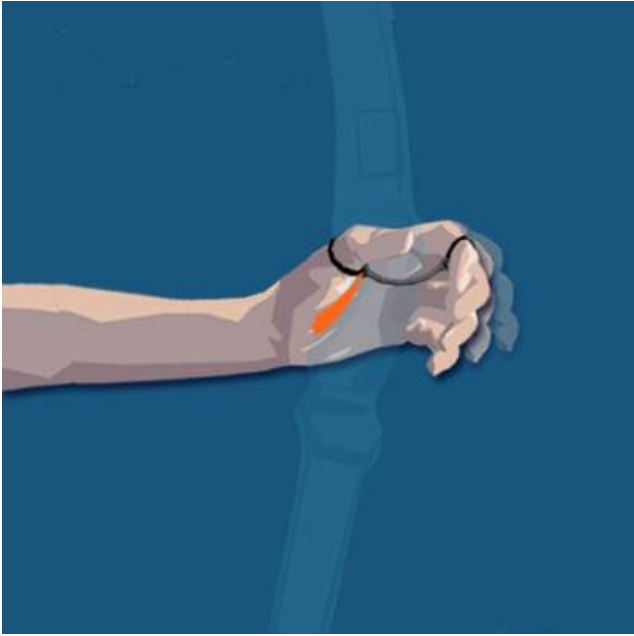
Another simple and efficient teaching aid is shown below:



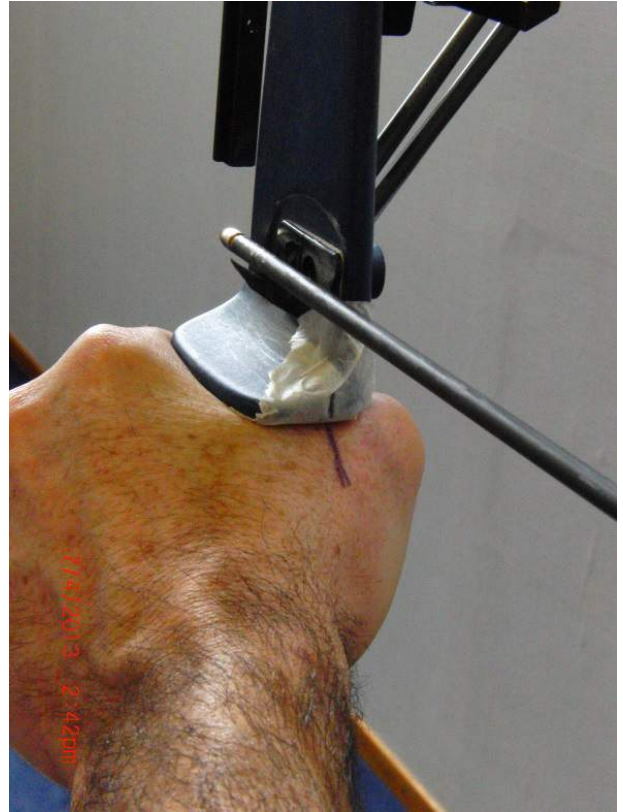
At this point, ask the novices to demonstrate a proper bow hand position with their bow.

Have them shoot with their eyes closed to feel the correct bow hand position.



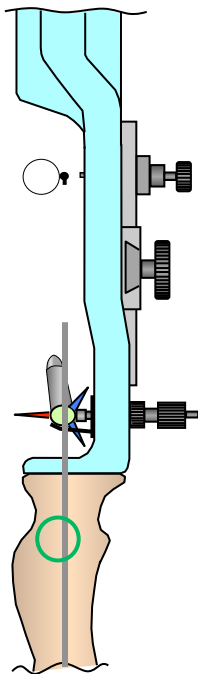


Another visual aid in consistent bow hand positioning is a line drawn on the bow hand and the bow, as shown below.



Reminder: The use of a bow sling is fundamental to the proper setting of the bow hand on the bow grip. Without a bow sling, the novices usually grip the bow with too much force.

The pressure of the bow hand on the riser should not be on the window side, but rather a little on the opposite side of the bow grip.

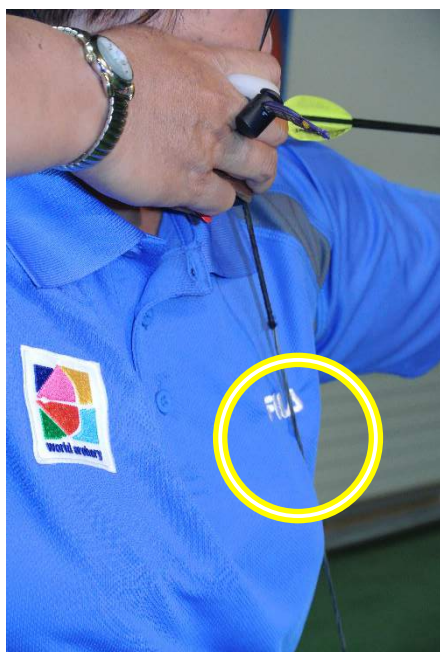
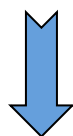


If necessary, glue a piece of thin sandpaper to the main pressure area of the bow grip. This will help the novice set the bow hand in the same location on the grip for each shot.

Canting of the Body with Respect to the Target – Rectification

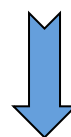
Note: The following pictures show exaggerated leaning for visual impact and ease of understanding.

When leaning back (towards the string foot)...



... the string often presses into the chest.

When leaning forwards (towards the bow foot)...



... the string presses less on the chest.

Thus, attention should be paid to an upright and erect body position and spine in order to generate good string clearance.

Leaning of the Body Forward/Backward (toes/heels) – Rectification

Note: The following pictures show exaggerated leaning for visual impact and ease of understanding.

With a lot of body weight on the heels...



... string clearance is often poor at the chest.

With more body weight on toes than on heels...



... there is often a better string clearance at the chest.

In general, the weight should be slightly more towards the toes than the heels for optimal stability and string clearance. Be aware that too much or too little weight shifted forwards results in reduced body stability, so the correct balance must be found for each archer.

Positioning of the Lower Back – Rectification

A curved lower back often generates string pressure on the chest because the chest is raised and inflated.

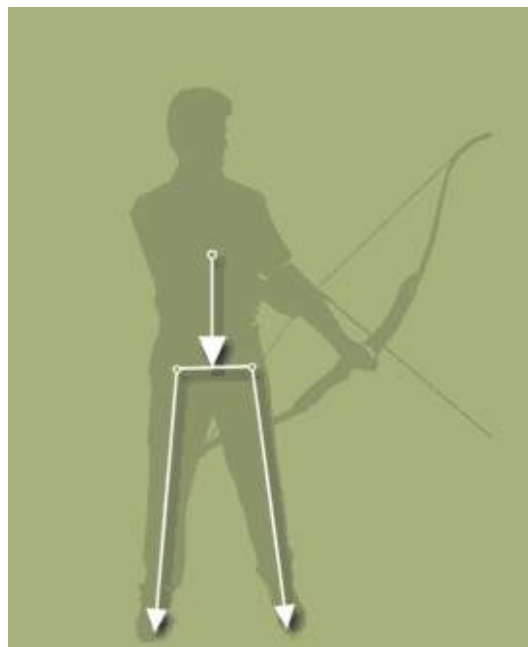


Shooting with a flat back often clears the chest from the string path, because the chest is usually flat and low.



Height of Energy – Rectification

Lowering the energy in the belly helps to flatten the chest, and is also good for body balance (because it creates a lower centre of gravity) and for staying relaxed.



To promote a low centre of gravity, place a long stick between the ground and the novice's belly. Ask the novice to keep a "heavy" belly in order to apply some pressure on the stick.



The belly pressure on the stick must be maintained for the duration of the shooting sequence.

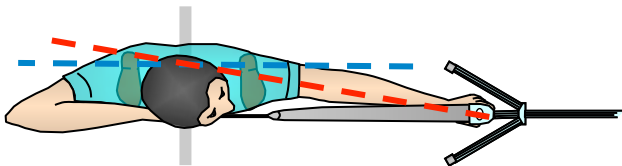
The goal is to keep the energy and centre of gravity down for body stability. It also contributes to a flat chest and low shoulders.

The Angle Between the Bow Arm and the Line of Shoulders - Rectification

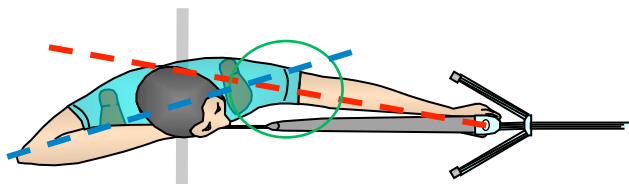
If, despite attempting all of the above, there is still poor string clearance - and only in this case - consider creating an angle between the bow arm and the line of shoulders of the novice.

It is achieved by a change of stance:

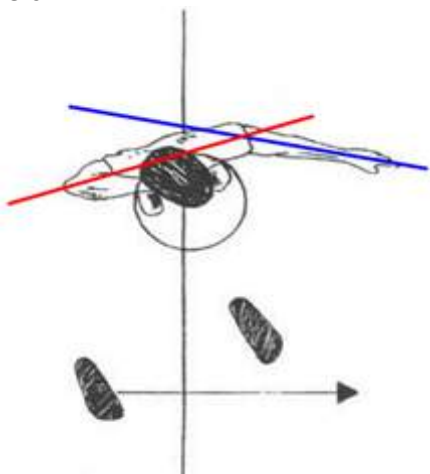
From:



To:



Whatever the change in stance, the novice should keep the shoulders above the hips and feet to move the bow shoulder away from the shooting plane (hence the path of the string) as shown below:



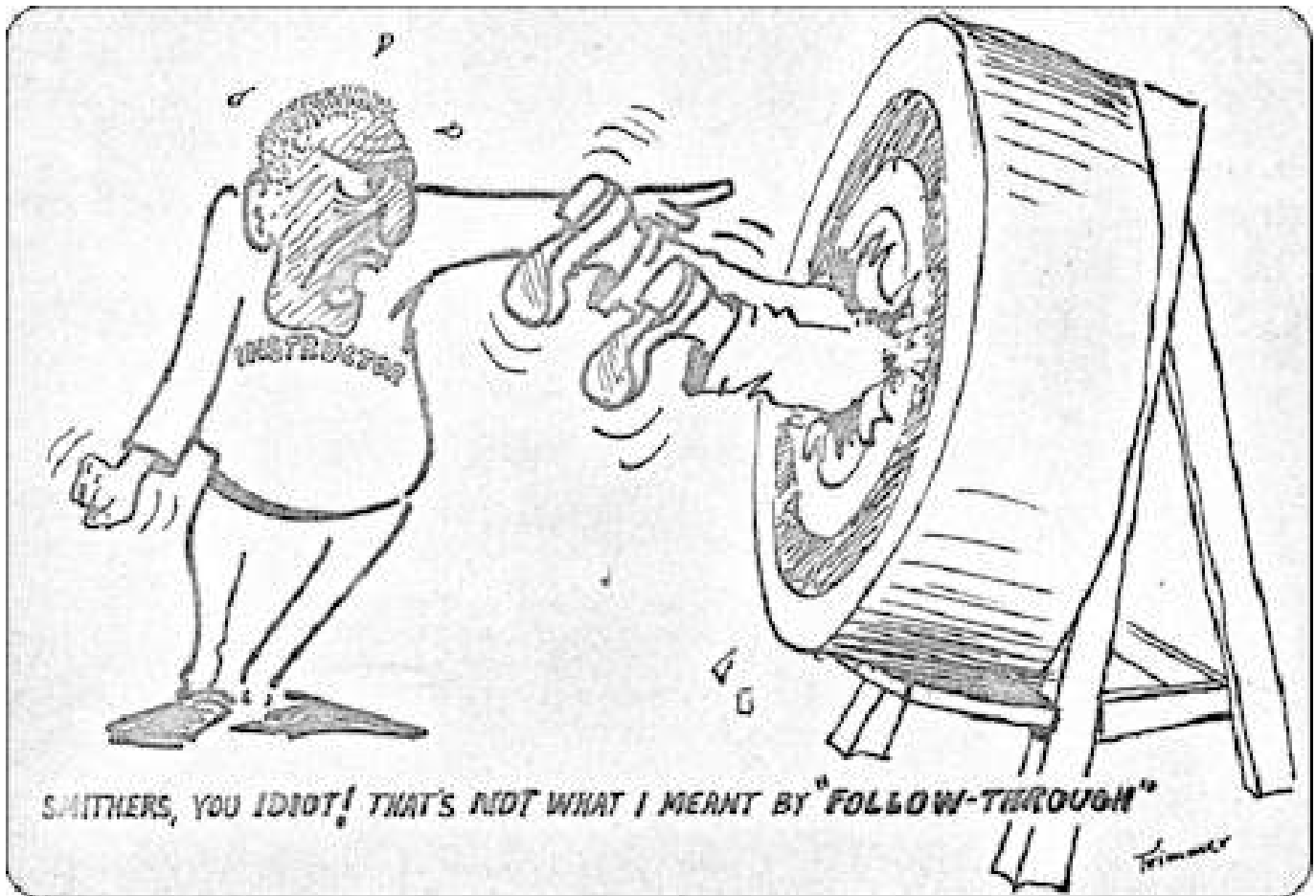
If, instead, the novice keeps the shoulders aligned with the bow arm and in the shooting plane, the string clearance will not improve; hence the change in stance will be ineffective.

This broken line between the shoulders and bow arm is mechanically, hence physically, much more demanding for the novice.

In the last illustration, the novice has moved both feet, to keep them parallel. This rotation of the entire body is a good alternative to keep optimal balance from toes to heels.

6.14. FOLLOW-TROUGH

6.14.1. Complementary Knowledge



Objective:

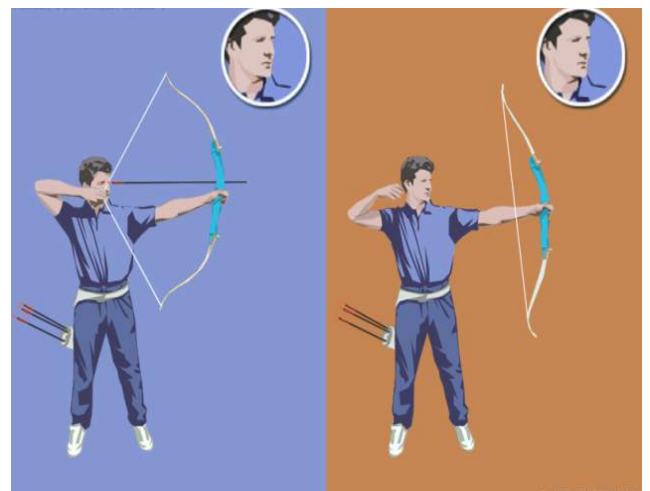
Maintain proper posture and muscular activity while the string propels the arrow away.

Form:

From the draw extension step, including aiming, until the end of the propelling process, the body, face, and gaze remain impassive before, during, and slightly after the action. The breathing motion remains unchanged.

Rationale:

The release can be considered as the physical part of the follow-through, but following through is not only physical, since the aiming process must continue while the arrow is being propelled. Aiming is not only a visual task, it involves body stability, the novice's concentration and his/her breathing as well.



The novice's concentration continues until the shot has been completed.

The arrow must be shot without interference to the visual concentration or any other activities the novice is undertaking during the execution of the shot.

6.14.2. Exercises

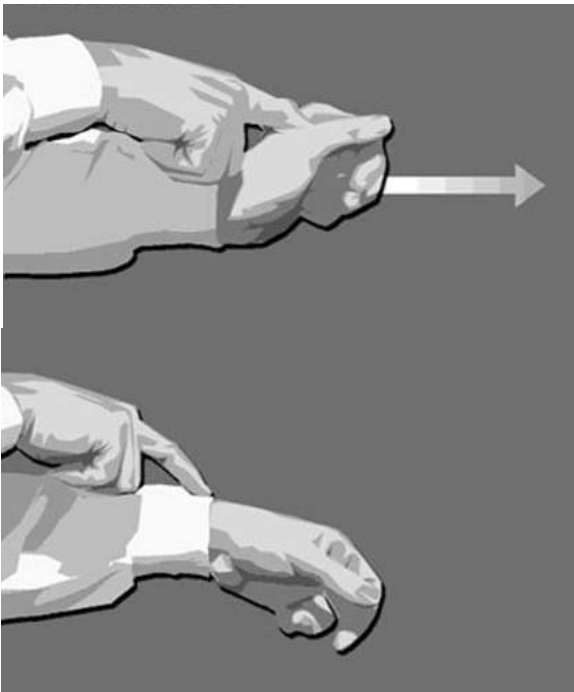
Keeping a Relaxed Bow Hand - Exercise

Objective:

Develop a passive bow hand and fingers that do not apply any force to the riser which could create torque in the bow at full draw or during the arrow propulsion period.

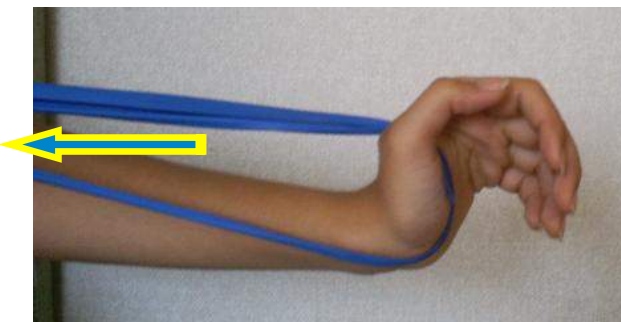
Simulations:

The bow hand wrist is relaxed on the grip. Therefore when the grip moves forward just after the release, the wrist bends down. See the illustration below: "Simulation of a relaxed bow hand at full draw and after release".



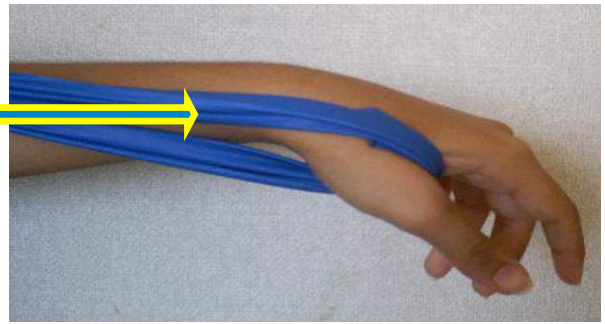
Simulation of a relaxed bow hand at full draw and after release.

The same exercise can be done with an elastic band:



Pull direction of the elastic band.

The wrist bends up when stretching the rubber band.



Relaxing the rubber band.

The wrist bends down when the tension is removed from rubber band.

The same exercise can also be done with a bow and an assistant:

With the one hand, the assistant presses the riser against the bow hand of the novice.



It is generally more convenient if the assistant works from behind the archer. The novice's bow hand should be completely relaxed and conform to the angle of the bow grip.



When the assistant suddenly pulls the riser away from the novice's bow hand, the relaxed hand bends down.

Launch of an elastic band - Exercise

An amusing exercise is to organise the novices in pairs facing each other, but a few meters away (3 to 5 meters depending on their size and the type of elastic band).

One elastic band will be shared between each pair.

Ask one of the novices to pull the band back as if it was a bow. Make sure that the bow hand is relaxed and bends backward.



Then the novice releases, sending the band flying toward their partner.



Once the elastic band propels away, the "shooting" novice's hand is relaxed and bent down. The other novice in the pair is now free to pick up the band and repeat the exercise towards his or her partner.

Suspended Bow - Exercise

This exercise is recommended prior the introduction of the bow sling.

1. With a strong cord, hang the bow from a solid high support located at a short distance from the target matt. The length of the rope should allow the novice to aim toward the centre of the target matt with only a little slack. Without using a bow sling, the novice shoots while watching the bow hand.



Shooting without a bow sling with a suspended bow.



2. Same as # 1, but shooting at a target face at a regular distance.
3. Using a sling, shoot with eyes closed at 5 m while staying focussed on the bow hand.
4. Same as #3, but with eyes looking up and unfocussed.
5. Same as #1, but shooting with eyes open at a blank butt at 18 meters.
6. Same as #5, but shoot at decreasingly cut-out faces.

Note 1: A slight tension in thumb **and** forefinger toward the target is acceptable, but not desirable.

Note 2: If the wrist is stiff after the release, relax it completely before lowering (with sling) or catching (with the bow free, but suspended) the bow.

The Use of a Bow Sling - Exercise

Equipment:

Shooting equipment, including a bow sling. Avoid using a sling that may slip off the bow hand, fingers, or bow. If the bow sling fails the bow could fall to the ground and it may get damaged. This exercise is performed without using a clicker if one has been introduced already.

Situation:

Standing three to four meters from the butt and working in pairs, the novice holds the bow. The assistant stands behind the novice, bracing against the novice's bow shoulder with one hand and the other hand holding the string. Raise the bow arm to shoulder level. The assistant draws the string just a little (around 10cm), orients the arrow toward the butt, and then releases the bowstring.



The assistant draws the string, and the novice looks at the relaxed bow hand fingers, and wrist.

Important: The assistant pushes against the string shoulder of the novice in order to generate the proper body balance of the novice.



Note to the assistant: Draw a little lower than normal, toward the novice's chest, to avoid hitting the novice in the face upon release.

The novice's task:

Observe the bow-hand and make it as relaxed as possible. When the assistant releases, the bow wrist should bend down smoothly and remain relaxed, the fingers should stay slightly curved and very relaxed.



A "good" bow hand position at pre-draw.



A relaxed bow hand after the shot.

2. When the novice has mastered the art of keeping the bow wrist and fingers relaxed, they can perform the exercise on their own.



Bow hand relaxation at reduced draw.

3. As above but increasing the draw progressively on each shot until the full draw position has been reached.

4. Do the same, but with using the clicker, if appropriate.

The final stage of this exercise involves following the standard teaching process. Instruct the novice to repeat the exercise with eyes closed, looking up, looking at a blank butt, and then by shooting at increasingly complete targets.

Catch the Bow - Exercise:

1. Without using a bow sling, shoot from a short distance (5 m) while watching the bow-hand and having an assistant catch the bow.



Shooting without a bow sling with an assistant catching the bow.

Note 1: Depending the type of over-draw or extended arrow-rest some Compound novices may not be able to participate in this exercise.

2. Same as # 1, but shooting at a target face at a regular distance.
3. Using a sling, shoot with eyes closed at 5 m while staying focussed on the bow hand.
4. Same as #3, but with eyes looking up and unfocussed.
5. Same as #1, but shooting with eyes open at a blank butt at the usual shooting distance.
6. Same as #5, but shooting at increasingly complete target faces.

Note 2: A slight tension in thumb and forefinger toward the target is acceptable, but not desirable.

Note 3: If the wrist is stiff after the release, relax it completely before lowering the bow arm or before the assistant returns the caught bow.

Maintaining Relaxed Bow Hand Fingers – Exercise 1:

Situation:

Working in pairs, the novice holds the bow and the assistant stands beside the novice, close to the bow hand fingers.

Equipment:

Bow, no arrow is necessary.

Instructions:

The assistant tries to make the novice's fingers move to make the novice aware of their relaxation level. The novice keeps the bow arm in a relaxed horizontal position and looks at the fingers, or closes their eyes, and tries to relax the fingers.



The assistant checks the relaxation of the bow hand fingers by touching them.

If the novice has difficulty in relaxing their fingers, first get them make a firm fist around the bow grip as if they are strangling it, and then let them open the fist and thus relax. By doing this they feel what relaxation actually means and can relax better and better. This is the basis of an exercise known as "Progressive Muscle Relaxation," which is explained further in the level 2 manual.

Maintaining a Relaxed Bow Hand Fingers – Exercise 2:

1. As an exercise to train the bow hand fingers to relax, have the novice hold a 2" nail between the bow thumb and bow forefinger, as illustrated below. The length of the nail may vary slightly, depending on the width of the bow grip and the archer's natural finger position. Roofing nails are usually ideal for this exercise.



Bow hand fingers holding a nail.

Watch the bow hand and fingers during the release. The nail should be pushed away by the riser and the novice should not have any residual feeling of the nail in any of the fingers.

2. For those who have some difficulty in implementing this exercise properly, add the following step. Watch the bow fingers in a mirror placed 50 cm ahead of the bow and a bit to the right (for right hand novices), showing the front of the riser and the fingers. Put the nail between the fingers every second arrow.

3. Shoot with eyes closed while concentrating on the bow hand.

4. Same as #3, but with eyes looking up and unfocused.

5. Same as #3, but shooting and looking at a blank butt.

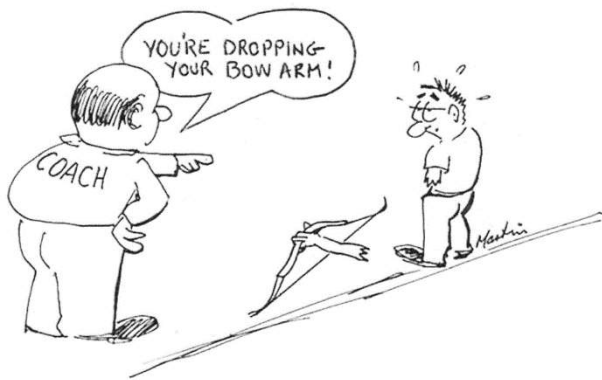
6. Same as #3, but shooting at decreasingly cut-out faces (5 cut-out spots and a regular face).

7. Finish by shooting all arrows without using the nail.

Note 1: A very slight tension in thumb and forefinger toward the target is acceptable, but not desirable.

Note 2: If the bow hand wrist is stiff after the release, relax it completely before lowering the bow arm.

Follow-Through of the Bow Arm - Exercise



Situation:

Working in pairs, the novice holds the bow; the assistant stands behind the novice's string shoulder.

The assistant braces one hand against the novice's string shoulder and draws the string slightly with their other hand, as illustrated below.

The distance from the target is four to five meters.



The novice's bow arm has a natural reaction when executing this exercise.

Important: The assistant braces one hand on the string shoulder of the novice in order to generate the proper body balance of the novice.

Note to the assistant: Draw a little lower than normal, toward the novice's chest, to avoid hitting the novice in the face upon release.

Equipment:

The basic equipment set up, using a bow-sling, but not using the clicker, and a blank butt.

Instructions:

The assistant pulls the string to roughly 1/2 draw, pushing on the novice's string shoulder to maintain balance. The assistant aims the arrow, which is at the novice's shoulder height, visually towards the butt. The novice remains in an upright position; with the bow shoulder lowered, and looking at the bow arm, not the butt. As the assistant releases, the novice's bow arm moves towards the side of the bow window and their body moves slightly towards the target. The novice continues this action alone while watching the bow arm at partial draw, then gradually increasing the draw length until full draw is reached. The novice continuously watches the bow arm during release, as shown below. To counteract the sideways movement of the bow arm the novice has to deliberately "push" the bow towards the target. This is an isometric push, without extension of the bow arm or elbow.



Self-Observation of the bow arm at increasingly longer draw lengths.

Finish this exercise by following the standard teaching process.

1. Shoot with eyes closed, while concentrating on the release, feel that the body and release remain in the shooting plane.

2. Do the same as 1, but with eyes looking up and unfocussed.
3. Do the same as 2, but looking and shooting at a blank butt from a normal shooting distance.
4. From a normal shooting distance, shoot at a set of decreasingly cut-out faces (five cut-out target faces and one complete face).

Observation Follow-Through – Exercise:

Whilst watching another target.

Objective:

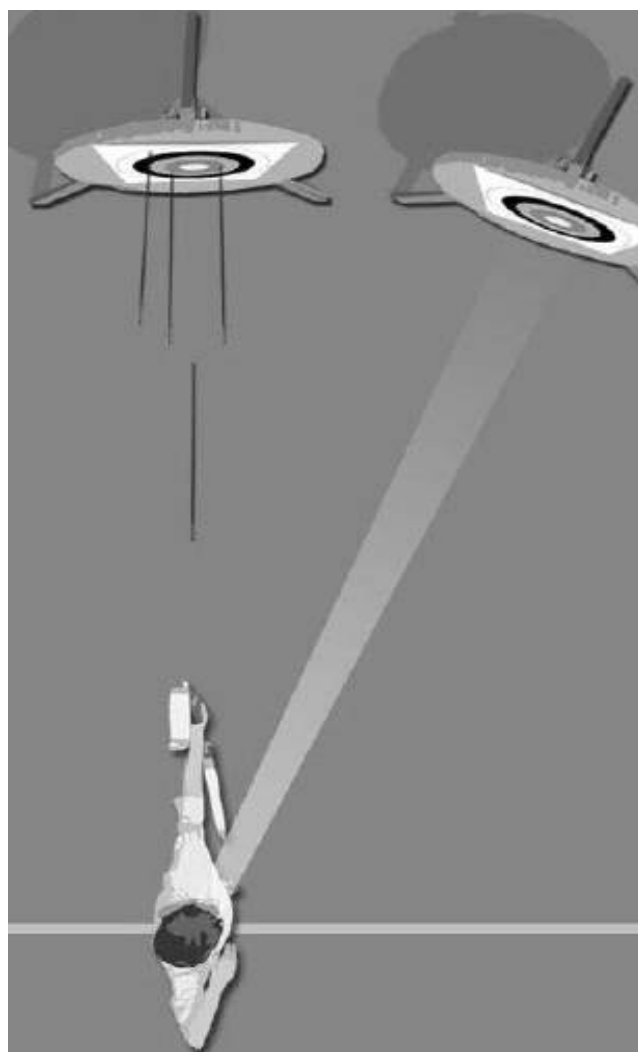
Looking at another target while releasing.

Equipment:

The basic equipment set up with two targets at least two meters apart.

Instructions:

At full draw, the novice aims briefly at the target directly in front of their shooting position. Then the novice shifts their visual focus to the second target and shoots. Visual activity should remain exactly the same during the shot. See the illustration "Shooting at one target whilst looking at another" below.



Shooting at one target whilst looking at another.

Repeat this exercise, but this time looking at the target that the arrow will hit.

Self-observation Follow-Through – Exercise:

Using a mirror.

Objective:

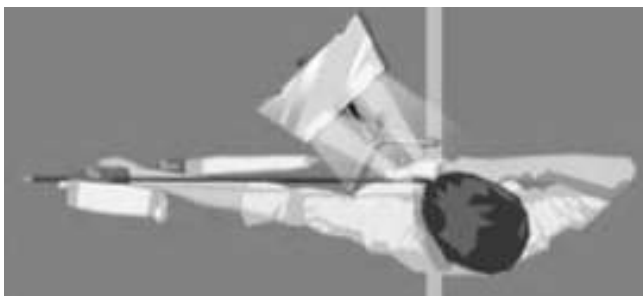
Learn to continue aiming during the release.

Situation:

Shooting at a short distance of five meters.

Equipment:

The basic equipment set up and mirror.



Control of visual impassiveness and follow through using a mirror.

Instructions:

At full draw have the novices look themselves in the eyes with the help of a mirror and then release while ensuring that the eyes, face, and torso remain passive during the shot.

Breathing Follow-Through – Exercise:

This exercise uses a particular breathing pattern while aiming in order to emit a sound from the throat. Please refer to the next section for more information on breathing.

Objective:

Keep the same mental activity from the point of reaching full draw until after the release.

Situation:

Simulations.

Instructions:

- With the string fingers, hold the bow hand middle finger that is pointed downwards;
- Each simulate the position at full draw - make a loud and continuous hum, like "Hhhhhuuuuuummm..." Simulate a release while maintaining the exact volume and intensity of the hum until two seconds after the release. Avoid any: "Hhhhhuu... uuuuummm..." (Interruption upon release) Or "HhhhhuuUUUuummm..." (Higher intensity upon release).

Goal:

The continuity and intensity of the sound should be exactly the same.



The same sound should be maintained during and after the release.

- Same as above, but with an elastic band;
- Same as above while shooting the bow;
- Same as above, but with eyes closed;
- Same as above, except the novice watches his or herself in a mirror;
- Same as above, but shooting at a blank butt at a regular distance, 18 to 25 meters;
- Same as above but shooting at (5) decreasingly cut-out faces;
- Same as above while shooting at a regular face from the regular distance;
- Same as above with no sound every second arrow;
- Same as above without any sound.

6.15. BREATHING

6.15.1. Complementary knowledge

When shooting, awareness and control of breathing is important as it influences the shooting process.

Most novices inhale while starting a motion, or just before it; for example:

- Moving to the shooting line;
- Taking an arrow from the quiver;
- Gripping the string/bow;
- Raising the bow.

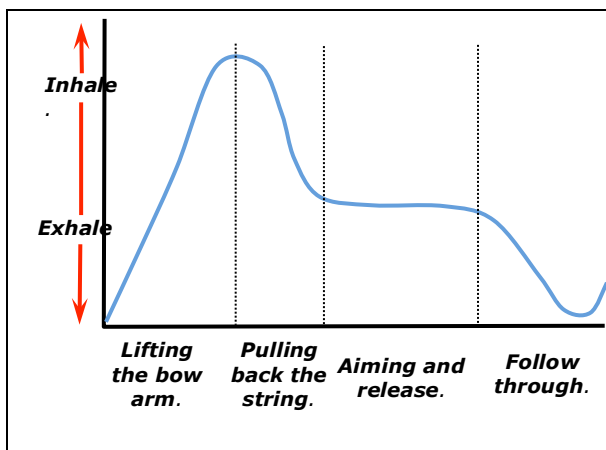
Accurate tasks are characterized by holding of the breath for a little while, and then followed immediately by an exhale. For example, most novices:

- Hold, then exhale while placing feet on shooting line;
- Hold, then exhale while loading arrow on the bow string;
- Hold, then exhale while placing the string-fingers and bow-hand;

Usually, while pulling the string back - a movement with effort - a partial exhale happens.

A common breathing pattern includes:

- Breathe in while raising the bow;
- Breathe out slightly while drawing;
- Hold the breath while aiming and releasing;
- Complete the exhale after the release.



Breathing pattern while shooting.

Continuity in breathing during the release:

The importance of the consistency and standardization of breathing throughout the shooting routine cannot be overemphasized. All archers and, in particular novices, should change their focus and muscular activity as little as possible while releasing the string. Ideally the only change is that the tension in the string finger flexors decreases suddenly as they relax and allow the release to happen. Maintaining a consistent breathing attitude from aiming through the end of the follow-through helps in the novice's overall consistency, especially while the arrow is being "guided" by the string out of the bow.

Most novices hold their breath while aiming and until approximately one second after release. If, however, the novice sometimes exhales just before or during the release, that indicates some change in the novice; usually a change in mental activity. Such changes should be minimised or avoided altogether.

Controlling breathing:

The coach should assist the novice in developing a breathing sequence that they can consistently implement, according to the above information.

Do not be surprised if, during the first sessions on breathing sequences, the novices face the following difficulties:

- Observing their current breathing pattern without modifying it;
- Focusing on breathing while simultaneously maintaining the other steps of the shooting process.

Often the novice says: "My shots are better when I leave my breathing alone." If this happens, do not be alarmed, if it were easy it would not be a skill that needed to be taught. Discipline, repeated observation, awareness, concentration, and feeling of the breathing movements ensure the skill is integrated correctly in the shooting process.

6.15.2. Exercises

No exercises are suggested for teaching the breathing sequence.

In conclusion:

This chapter has presented a large number of exercises, but by no means is this list intended to be considered complete and exhaustive. Many are similar or have multiple uses for working on different aspects of the beginner's form. While using them, it is likely that further variations and uses will be discovered by an open-minded coach. The sections are designed to be used on their own, or in combinations. Even an archer who has attained great skill in an area can improve through diligent training using these drills. As a coach, the challenge is to provide effective training for the beginners while keeping the experience enjoyable. There

should always be time for games or challenges so that the archers can see how they've improved through the drills they've completed. And of course there should be time for the beginners to shoot arrows just for the love of the sport, unencumbered by the pressures of an exercise or a competition. It is often during this free time that the archer most completely integrates the learning into their particular style.

CHAPTER 7: COMMON PROBLEMS

The role of the Coach when teaching archery basics is to promote a conventional/basic form of archery upon which an individual's style can be developed. While the basics are being developed it is the coach's responsibility to ensure that faults in the archer's style do not become established. This implies that the basics being taught are correct and will not require significant interventions later.

Most novices encounter common problems at some stage of their development as part of the learning process. Coaches should not only become familiar with these problems but also with the methods of overcoming them.

A coach should focus the archer's attention on the process not the result during training sessions.

7.1. The archer cannot close the non-dominant eye when aiming.



Shooting with both eyes open will eventually enable the archer to concentrate on the correct sighting process but developing this style of aiming can be frustrating in the early stages. Refer to Chapter 4, paragraph 4.2.2.1, for how to determine which eye should be used during the sighting process. If the novice is unable to close their non-dominant eye its vision should be blocked.

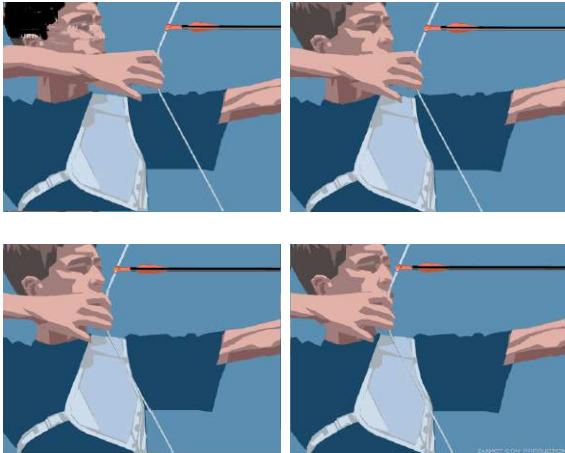
- a) An eye patch covering the non-dominant eye is one approach to solving the problem.
- b) Alternatively, a small opaque shield in a medium-density colour (beige or grey, for example) could be fixed to the peak of a cap or the brim of a hat and then lowered in front of the non-shooting eye. In this arrangement both eyes are open and fully able to focus, but the non-shooting eye has nothing to focus on, thereby allowing the shooting eye to focus on the target.

7.2. Shoulders moving up while raising the bow.



If the physical weight of the bow and attachments are too heavy for the archer to control while bringing the bow to the pre-draw position, the shoulders will rise to compensate for the downward load being applied to the archer's bow arm. To avoid this problem the coach has to teach the novice how to elevate the arm whilst keeping the shoulder low. Refer to chapters 6.5. "Body Pre-setting" and 6.6. "Raising the Bow" for details on how to solve this problem.

7.3. Drawing the bow with the arm instead of the muscles from the posterior parts of the shoulders and the back.



Drawing with the arm instead of the back is a very common problem faced by novices and one that cannot be solved while using a bow of any substantial draw weight.

To get the feeling of the correct action of drawing the bow using the muscles in the back, without a bow, the beginner should simulate the action from Pre-Draw to Full Draw while concentrating on movements of the blades. Keeping their eyes closed will help the archer feel and understand the correct draw action step properly.

Please refer to chapter 6.8. "Draw" for more information on teaching a proper draw action.

Care should be taken to ensure that muscular activity is felt in the back part of the shoulders while drawing the bow. With little or no activity in the muscles in the back the drawing action will be instigated using the muscles in the drawing arm, which is undesirable.

When the correct feeling has been established through mimicking without a bow, an elastic band should be used to introduce a light load to the drawing action. As confidence increases the load can be increased until a bow of appropriate weight can be used.

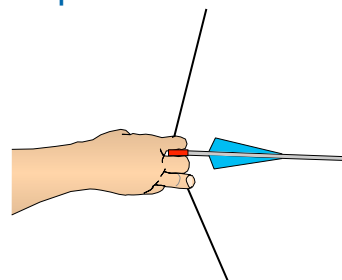
From there, the use of a harness connecting the string elbow to the bow string with a rope is suggested.



Focus should remain mainly on the beginning of the draw, followed by the eyes closed for a better feel of the action.

To enable the correct drawing action to be established there should as little tension in the drawing hand or arm as possible.

7.4. Variations of string fingers pressure on the string.



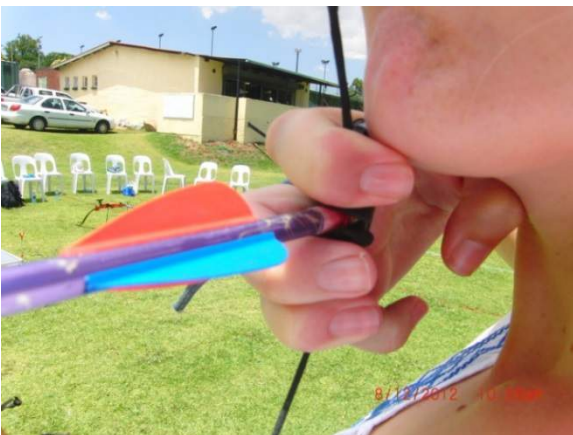
The most common reason for a finger slipping, lifting off the tab or not gripping the string consistently is a poor pre-setting of the wrist and fingers. Ensure that the archer is consistent in their drawing hand and wrist procedure.

To correct an archer whose finger slips or lifts off the tab or string, or just does not grip the string as firmly as the others:

- (a) Check for correct pre-setting of the string hand and wrist.
- (b) If the problem persists, ask the novice to lift the middle finger when gripping the string.



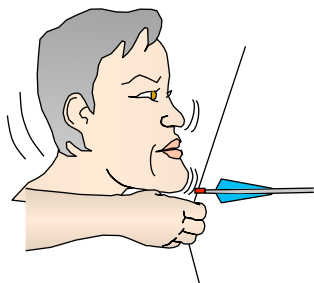
Let the middle finger lift, then get a grip in the string.



Now the three fingers "work" the same.

- (c) Another correction worth considering is to place the string in the first joint of the index and ring fingers, then place the middle finger on the string where the string lays naturally i.e. between the first and second joints.
- (d) Ensure that the draw elbow position is consistent. Variations in the draw elbow position will alter the pressure on the fingers of the drawing hand. A high elbow will cause more pressure on the ring finger while a low elbow will change the pressure to the index finger.

7.5. Moving head towards the string.



Moving the head towards the string can be attributed to:

- (a) The archer trying to find a correct facial reference, e.g. trying to get the string to touch the tip of the nose when using the quadrilateral method of sighting. The string should be drawn to the facial reference rather than the head moving towards the string.

Movement of the head towards the string uses more neck muscles, which increases tension in this area leading to muscular fatigue. If the muscles in the neck and shoulders are relaxed while drawing the bow, the head will not move towards the string. Refer to the "Neck and Shoulder Relaxation – Exercise" section in Chapter 6.9.2. for suggestions on how to improve head stability during draw.

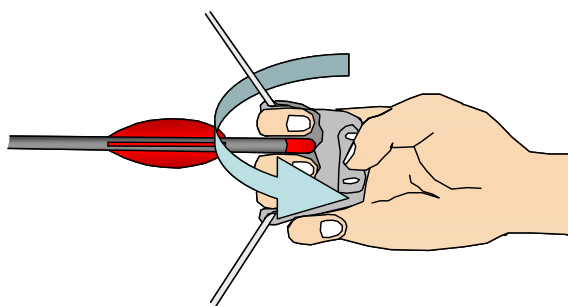
- (b) A bow that has a draw weight that is too heavy for the archer to control will cause the archer to tire. This leads to the archer not drawing the bow to the same anchor position and thus moving their head to achieve the usual facial reference.
- (c) Incorrect use of a kissers button can also contribute to this problem. The archer moves their head to the kissers button instead of the kissers button being drawn to the appropriate facial reference.

7.6. The arrow falls off the rest while drawing.

- (a) First the coach must check the body position. An overly tense right handed beginner may cant the top of the bow toward the left in the effort to pull the bow back. Beginners also often curve their back due to the physical weight of the bow, which can cause the arrow to drop down from the arrow-rest.

- (b) Another major cause of this problem is placing the fingers against the nock of the arrow prior to the commencement of the draw when using the Mediterranean Release, i.e. one finger above the arrow and two below. As the bow is drawn the angle of the string around the fingers becomes more acute causing the fingers to pinch the nock. The extra pressure of the middle string finger on the nock forces the arrow off the rest. This problem can be exaggerated by the use of a short bow by someone with a long draw length. The solution is to position the fingers, particularly the finger below the nock, so that there is no contact with the nock of the arrow prior to commencing to draw the bow. A finger tab fitted with a finger spacer between the index and second finger may help to correct this problem.

- (c) The next most common cause is increasing tension in the fingers or palm of the drawing hand while drawing the bow will cause the string to twist (anti clockwise for a right hand archer) which will cause the arrow to be pulled off the rest.



A tight nock fit on the string will exaggerate this problem. The novice archer needs to ensure that the fingers of the drawing hand are hooked far enough on the string to be confident that they will not need to increase the curve of the drawing fingers as the string is drawn. To minimize twisting the string, the drawing hand should be completely relaxed during the drawing process. Refer to Chapter 6 Para. 6.1.2.3.

and weight evenly distributed on both feet.

- (d) Refer to Chapter 6 Para. 6.1.2.4 for correct "Body Pre-setting".

7.8. Moving body weight onto the rear foot.

7.7. Moving body weight onto the bow foot.



- a) This problem is generally associated with a draw length that is too long causing the archer to overdraw, especially if a clicker is being used on a Recurve bow.

- (a) This problem is generally associated with a bow that is too heavy in draw weight for the novice or has a mass (weight in the hand) that is too heavy for the archer to lift to the correct height (and is more common with archers shooting compound bows). To compensate for the increasing draw weight of the bow the novice pushes the front hip forward instead of pushing forward with the bow shoulder.



- (b) The coach must place emphasis on the archer having equal weight on both feet at full draw.
- (c) The use of a light draw weight bow, elastic band or elastic string will enable the novice to practice the drawing action while maintaining an upright posture with the spine erect

- b) This problem can also be encountered on a compound bow if the draw length has been adjusted so that the draw length is too long. Overdrawing causes the archer's weight to be transferred to the rear foot.

- c) A facial reference (anchor) needs to be established that will enable the

archer to come to full draw without moving their weight towards the rear foot. The use of a light draw weight bow, elastic band or elastic string will aid the development of a draw length and facial reference that is appropriate for the archer. The archer should be encouraged to ensure that their weight is evenly distributed on both feet at full draw.

- d) A bow that is too heavy in draw weight may force the archer to use the entire upper body in drawing the bow causing the body to lean away from the target i.e. the weight being transferred onto the rear foot. This is particularly noticeable in archers shooting compound bows that have an excessive peak weight.
- e) Failure to push the bow shoulder forward to take the force generated by the bow being drawn will also cause the archer to lean towards the rear forcing body weight onto the rear foot.
Refer to Chapter 6 Para. 6.1.2.4 for "Body Pre-setting".
- f) Emphasis should be placed on an upright posture being maintained while raising the bow to the pre-draw position. The physical weight of the bow can cause the archer's weight to be shifted to the rear foot to compensate for the weight of the bow being held at arm's length from the body i.e. the archer's centre of gravity moves backwards towards the string foot. This can also occur in more experienced archers who have too many or too long, attachments on their bows and lack the strength that is needed to hold the bow in the correct position.
- g) Lack of strength in the abdominal muscles can also cause this area to collapse during the drawing process allowing the archer to transfer weight towards the string foot. Strengthening of the abdominal muscles is essential to maintain correct posture.

7.9. Bow shoulder moving upwards and backwards.



The most common reasons for the bow shoulder moving upwards and backwards is:

- (a) Commencing the draw with the draw arm below shoulder height. As the load increases, the shoulder will shift to an unstable position. The draw should be commenced with the bow arm level to or above shoulder height. This ensures that, as the draw weight of the bow is exerted on the shoulder joint, the head of the humerus is pushed firmly into the glenoid fossa. This way the forces applied are taken efficiently by the skeletal system without the use of muscular activity. Section 6.6 "Raising the Bow" in Chapter 6 deals with this issue in greater detail.
- (b) The bow shoulder should be relaxed and held down. Refer to section 6.5.2 "Exercises" for practical techniques to properly set the shoulder.
- (c) Pushing forward with the shoulder while keeping the bow arm relaxed will enhance the position of the shoulder.

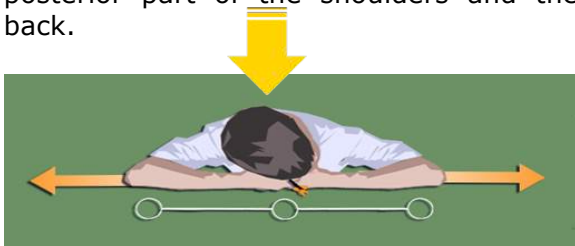
7.10. Expanding at full draw with the arm instead of the muscles from the posterior parts of the shoulders and the back.

Like drawing (see section 7.3.), at full draw expanding with the arm instead of the back, is a very common problem faced by novices and it cannot be solved while using a bow of any substantial draw weight.

To get the feeling of the correct full draw expansion using the muscles in the back, without a bow, the archer should locate the string hand at their normal facial reference point and then concentrate on drawing the string shoulder blade towards the spine.



The focus of the novice should be on the posterior part of the shoulders and the back.



See Chapter 6.10. "Draw Expansion" for a more detailed description.

Care should be taken to ensure that muscular activity is felt in the back. Without activity in the muscles in the back the expansion action will be instigated using the muscles in the drawing arm, which is undesirable.

When the correct feeling has been established through mimicking without a bow, an elastic band should be used to introduce a light load to the extension action. As confidence increases the load can be increased until a bow of appropriate weight can be used.

From there, the use of a harness connecting the string elbow to the bow string with a rope is suggested



Eyes closed should help the novice to remain focused on the action of the muscles from the posterior parts of the shoulders and the back.

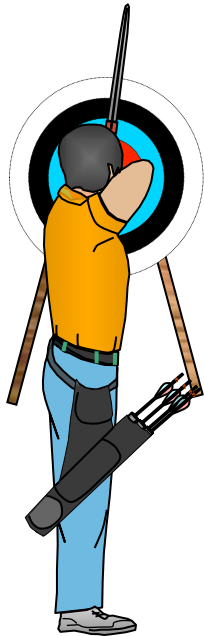
To enable the correct extension action to be established there should a minimum of tension in the drawing hand or arm.

For exercises for introducing a proper Draw Extension, please refer to section 6.10. in chapter 6.

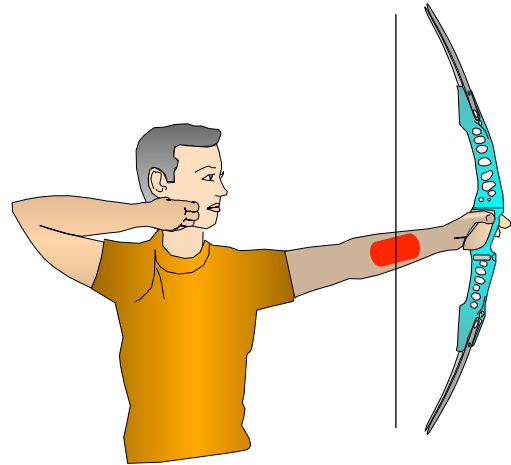
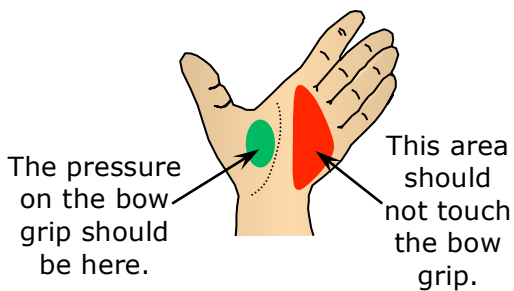
7.11. Canting the bow whilst aiming.

- An overly tense right handed beginner may cant the top of the bow toward the left in the effort to pull the bow back. Beginners also often curve their back due to the physical weight of the bow, which can cause the arrow to drop down from the arrow-rest.
- Many novices cant the bow whilst aiming, generally to the right if a right handed archer and to the left if a left handed archer.

7.12. The string hits the bow arm, elbow or forearm.



This is primarily due to the bow hand not being set correctly on the bow grip during the set-up procedure. This in turn is generally caused by a novice gripping the bow with the bow hand because they are afraid of dropping the bow when the shot is made. The pressure point on the hand should be as shown in the illustration below, along with the bow elbow being rotated so that the elbow joint is at right angles to the bow. This means that the hollow of the elbow joint is parallel to the bow string.



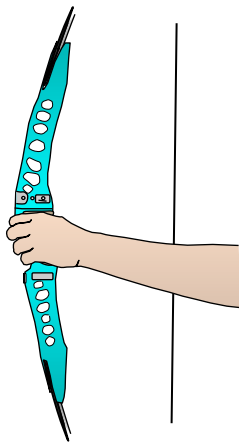
If the string hits any part of the arm it can be very painful and impede the archer's progress by creating anxiety that the string may hit the arm on the next shot. This leads to the novice distorting the position of the bow arm to try to ensure string clearance. This problem can be caused by:

- (a) Bows with a low brace height, which will allow the string to make contact with the lower part of the forearm. It is better to have the brace height on the higher side of its range for novice archers to ensure that the string travel is not interrupted by contact with the arm.
- (b) Incorrect placement of the hand on the bow. For correct placement refer to section 6.4.1 Complementary Knowledge from chapter 6.4. BOW HAND AND ELBOW The usual cause of this is the archer gripping the bow too tightly. The archer should place their hand in the bow with the fingers relaxed, the knuckles away from the bow at an angle of between 30° to 45° and the heel of the hand not touching the bow.
- (c) Incorrect position of the bow arm elbow. At full draw the elbow should not be pointed towards the ground but should be pointed at right angles to

the bow. For more details, please refer to the same section as in (b).

- (d) Allowing the bow shoulder to move forward or inwards (i.e. towards the bow) will bring the whole arm into the path of the string. The archer should set their shoulder low and push towards the target without allowing it to roll forwards or inwards. The coach should ensure that the archer understands that the push comes from the shoulder and not from the hand or arm.

7.13. Grabbing the bow upon release.

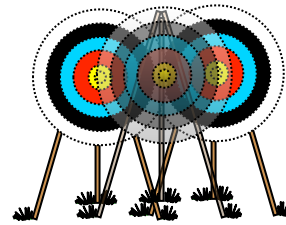


Grabbing the bow is usually associated with the archer being afraid of dropping the bow as it jumps forward on release. The bow's movement should be natural and dynamic on release, uninfluenced by the archer's bow hand.

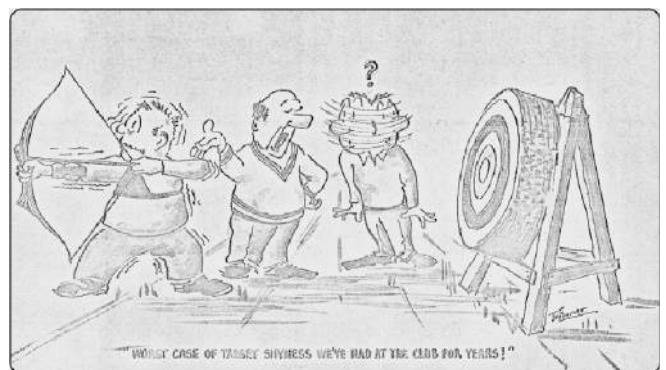
Introduction of a finger sling or wrist sling will help to alleviate the fear of dropping the bow and encourage a more passive bow hand. A very relaxed bow hand will promote a more consistent launch of the arrow and better results at the target. To encourage a more relaxed bow hand, refer to the exercises under section 6.14.2 from the chapter 6.14. "Follow-Through".

This problem can also be associated with the archer diverting concentration from staying focused on the process of "following-through" to watching the arrow impact the target. Ensure that the archer's attention remains on the execution of a good shot.

7.14. Target panic.



Target Panic is a psychological problem that takes on various forms when an archer faces the target. It is not generally associated with novice archers but can occur at any stage of an archer's development.



As all forms of target panic are psychological the only cure for the problem is to divert the archer's attention from the problem area and have them concentrate on other aspects of their form. It is imperative to correct any indication of target panic before it becomes established.

Some of the forms that target panic may take are:

- Inability to sight on the point of aim (Gold Shy).
- Involuntary release as soon as the sight nears the point of aim.
- Discontinuing the aiming process prior to release.
- Premature release.
- Inability to release the arrow.

Any of these problems rarely arise if the archer is taught sound basic form with the emphasis being placed on the process of shooting the arrow rather than the outcome or score.

Target Panic can be caused by lack of confidence in some part of the archer's basic form, which diverts the archer's

attention to the area of concern after the aiming process has been commenced. Confidence in the fundamentals of their basic style has to be established by the archer so that there is no cause for the archer's concentration to be diverted from the sighting task.

- (a) Practice with eyes closed at short distances from the target will help to alleviate areas of concern in the archer's basic form.

When shooting at close range with closed eyes, it is important for the novice to understand fully why they are doing it. Mindless repetition of shot after shot with no understanding will not lead to any progress. The reason for this shooting process is that at the short range the archer cannot miss the target and can, therefore, concentrate on all the other aspects of the performance of a good shot. In other words the archer has to be mindful of the feel of the good shot in his mind, to get to know the smooth flow of effort from the start of the draw to the follow-through. Ideally short-range shooting should involve guidance from the coach.

- (b) Emphasis should be placed on the archer maintaining their head in an upright position with both eyes firmly fixed on the centre of the target before commencing the drawing process. The act of aiming (aligning the sight with the target) should only commence after the archer has come to full draw and established their facial reference. Starting to aim too early in the archer's set up will inhibit their ability to maintain concentration on the process.

For example, if aiming is started as the draw commences the archer's focus is directed towards holding the sight on the target and other aspects of the archer's form are neglected. Starting too early can lead to focus on the aiming process being maintained over an extended period, causing a loss of concentration, leading to the aiming process being aborted prematurely.

After coming to full draw with the correct facial reference, obtaining the correct sight picture and releasing should take no more than 2 to 3 seconds for a recurve archer.

For archers using a sight, the removal of the post and pin from the sight and using the ring sight only alleviates the need to hold the pin on the point of aim. By doing this, the sighting process becomes less critical and allows the archer to concentrate on other areas of their form. Without a definite aiming point in the sight the subconscious mind will take over and centre the point of aim within the sight ring.

Placing too much emphasis on the sighting process is a major contributor to target panic. The archer should be encouraged to realize that sighting is only one of the stages that encompass the launching of an arrow towards the target and is not the critical area in the process

- (c) The inability to release the string may be caused by tension in the draw hand.



The exercise described in section 6.12.2 will allow the archer to become accustomed to relaxing the string hand while simulating the release action without the use of a bow. The novice can gain confidence in their release by practicing with an elastic band. Varying the length of the band to increase the tension as the archer's confidence in their release grows will help them transition to using a bow of

similar or equal draw weight to their own.

progressively allowing more shots with the original side.

- d) The archer should practice coming to full draw and then concentrate on increasing back tension i.e. expanding, while keeping the string hand relaxed. This exercise should start at 2 to 3 meters from the target, increasing the distance as the archer's confidence grows. During the release emphasis should be placed on relaxing the fingers rather than releasing the string.
- e) Some forms of target panic can be cured by the use of a clicker which is used as both a draw length check and release generator. The correct use of a clicker diverts the archer's attention from the sighting process to the use of the muscles controlling the drawing and release of the arrow. Emphasis needs to be placed on setting the clicker to the correct draw length of the archer and ensuring that the archer understands the procedure to draw the arrow through the clicker. A clicker gives an audible signal to release the string but should not be used as a trigger if the sight is not centred on the point of aim. Emphasis should be placed on the archer controlling the shot; if the shot is properly set up and executed the clicker will indicate the correct draw length.

That being said, a clicker should not be introduced until the archer's form is consistent and an understanding of executing the shot by the use of the muscles in the back is fully understood.

- f) Some other methods to try to cure the problem of "gold shy" are:
- Temporarily use a bow that the draw weight/poundage is lower than the bow normally used
 - Use the "dry fire" system, see section 5.2.1
 - Temporarily change the shooting side. When ease and confidence are encountered on the non-dominant side, alternate shots from side to side while

Comments:

Always make allowances for novices; remember people learn by “*doing*”.

Set the novice at ease and always be positive in your approach, but do not talk too much.

As archery requires a lot of co-ordination, concentrate on one point at a time to avoid overwhelming beginners.

Do not keep the novices at full draw whilst you make adjustments. Have them to let down, show them what you want, and then start again.

When dealing with novice archers keep this in mind. *They have not done archery before – what is simple to you may appear impossible to them.*

Conclusion

The process to a good shot can be full of complications for a beginner. Fortunately the majority of mistakes are commonplace and can be corrected easily when caught early enough. By keeping an eye on your novices and using these techniques, their progress towards good shooting technique will be smoother and easier

CHAPTER 8: STARTING WITH A TRADITIONAL BOW

This chapter is dedicated to introducing archery to novices using an unsighted traditional bow. Consequently, only the specific differences in the learning process as compared to the other forms of archery are covered. Refer to the other chapters of this manual for general archery coaching techniques and information.

8.1. Equipment

8.1.1. Bow:

WORLD ARCHERY defines a “traditional bow” as one that is contained in one of the following divisions: “English Longbow,” “American Flatbow,” “Longbow,” and “Traditional Recurve”. For competitions WA defines traditional bows as the following divisions: Longbow and Instinctive Bow. The WA traditional divisions are slightly restrictive as, in general terms, a “traditional bow” includes any bow from the primitive bent stick to a modern traditional recurve bow. There are other traditional bows that are not included in World Archery events, such as “Yumi” for Kyudo, bows used on horseback, etc. Broadly speaking, the more ancient and primitive the design of the bow, the harder it is to be precise while shooting. In other words, the same archer will almost always score better with a modern traditional recurve than with an English Longbow. The differences in performance are a consequence of the geometry, balance and efficiency of the different designs. Nonetheless, an archer can enjoy and strive to shoot their best with any traditional bow.



8.1.2. Arrows

Traditional arrows may be made of wood, aluminium alloy or carbon and maybe fitted with feathers or vanes. Shooting with vanes only works properly when the bow has an arrow rest. Feathers are much better when the arrows are shot from the shelf. For competition purposes, the archers must ensure that their arrows comply with the rules of the division in which they wish to compete.

8.1.3. String Finger Protector

A tab or shooting glove is a protective piece, usually made of leather that covers the string fingers while shooting. The bow string can put a large amount of pressure on an archer’s string fingers, causing pain – especially at higher draw weights. In order to prevent this discomfort, and its detrimental effects on the loose of the bowstring, some form of finger protection is necessary. A finger tab is usually the best solution for protecting the fingers while maintaining accuracy. However, some archers find a tab to be difficult to use or uncomfortable. In these cases a shooting glove that covers the string fingers may be used instead.



8.1.4. Bow Hand Armguard/Glove

Longbows often have a lower brace height than modern recurves. Thus it is quite normal for the string to touch or even hit the forearm on almost every shot. An armguard is a piece of protective gear that covers the forearm and prevents the string from striking it. Traditional archers usually use a large and substantial armguard to provide the tough protection that the forearm requires.



Additionally, a bow hand glove may be necessary for archers shooting some historical bows such as the English longbow. These bows are designed without an arrow shelf, so the arrow rests directly on top of the bow hand. Natural feathers in particular may have a rough quill that can hurt the archer's hand as the arrow leaves the bow. Usually bow hand gloves for traditional shooters protect only the thumb, forefinger and the space in between.

8.1.5. Bow Sling

A bow sling is a device used to promote a relaxed bow hand and prevent the archer from dropping his or her bow. Bow slings are permitted in all divisions, but are mainly useful in modern recurve bows with a pistol grip. The sling prevents the bow from jumping out of the bow hand during the action and reaction of the release. Archers who shoot a longbow tend to hold the bow with a light grip, preventing the bow from jumping out of the hand. This grip should be light enough to stop the bow from falling to the ground but not so tight as to cause torque to be applied to the bow.

8.2. Form

Reminder:

This chapter highlights a few key differences with the other forms of archery covered in the other chapters of this manual.

The archer's form when shooting a traditional bow must be kept as close as possible to the standard form any beginner would learn.

This being the case, most of the exercises to teach the correct shooting technique for a traditional bow can be taken from chapter 6.



8.2.1. Stance.

At least two different stances are used in traditional archery.

Some traditional archers adopt an upright stance, similar to the stance of target archers, and hold their bow vertically.



A traditional shooter with an upright stance

Others, particularly those shooting instinctively or intuitively, bend the knees slightly and flex the upper body slightly forward. In this stance, the bow is canted to maintain a right angle between the bow and the eye axis.



Traditional shooters using a tilted stance.
Note the right angle between the eye axis and the bow on the left picture from Dietmar VORDEREGGER

8.2.2. Binocular vision and Dominant Eye.



Shooting with both eyes open will help novices reach their best level in traditional archery, whatever the aiming method used, and it is especially important if unconscious references are used (i.e. intuitive or instinctive aiming). Hence shooting with both eyes open is recommended when shooting traditional archery. To be truly effective when shooting with both eyes open, it is paramount that the archer shoot according to their eye dominance. Binocular vision allows your brain to estimate distances while reducing anxiety and peeping/peeking tendencies that often result from the lack of a sight. The dominant eye focusses on the target and watches the direction of the arrow subconsciously. At the same time, the non-dominant eye completes the visual information, allowing the brain to estimate distance and trajectory.

Ways to determine the dominant eye can be found in chapter 4 of this manual. A method

recommended for the traditional archer to determine the dominant eye can be found in section 4.2.4.1. Based on this, the novice traditional archer should shoot right or left handed. Following the dominant eye criteria will stand the archer in good stead for better results in the future.

8.2.3. Bow Hand

The shape of the grip on a longbow usually forces the archer to have a low wrist. Nevertheless, the pressure exerted by the bow hand on the grip is more or less the same as in shooting an Olympic recurve.

Pressure must be kept on the top half of the bow's grip, with the bow hand and fingers as relaxed as possible. The archer should feel a uniform pressure of the bow in the web of the bow hand above the lifeline (i.e. between the life line and the root of the thumb). This pressure zone is in line with the radius bone in the forearm and allows the force of the bow's draw weight to be transferred efficiently through the hand and wrist directly in line with the arm bones.



8.2.4. Bow Arm/Elbow

Due to the “kick” of many designs of traditional bows the archer’s bow arm has to be straight, or almost straight but not locked. It must be straight enough to be consistent and stable for every shot, as well as staying steady when releasing the string. Keeping the arm not locked will help prevent future repetitive use injuries in the elbow and shoulder.



8.2.5. String grip

Most novices should start with the usual string grip with the index finger above and the middle and ring fingers below the nock on the string. The grip should hold the string between the second and third joints of the fingers.

For a novice struggling with this string grip, three fingers below the nock is an acceptable alternative.

8.2.6. Canting the Bow

Canting is the act of holding the bow so that the limb tips are not vertically aligned.



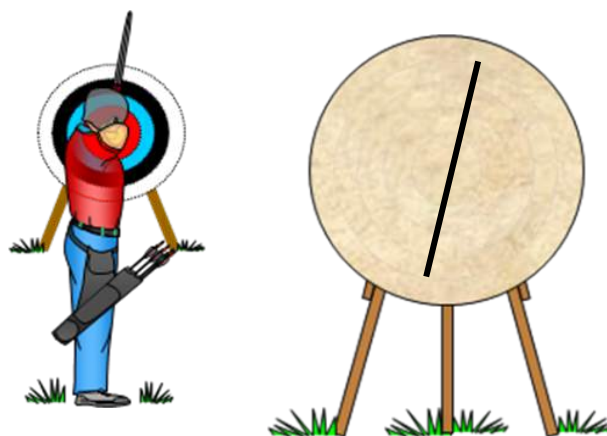
Common bow canting

Modern traditional recurve bows can be held and shot vertically, while ancient designs could need up to a 20-degree cant to be consistent. A slight cant of the bow allows the archer to see the aiming spot with both eyes and keep the arrow aligned with the dominant eye.

It is important to note that canting the bow doesn’t mean canting the hand. The canting should come from the inclination of the body toward the toes. The hand position must be as close as possible to the standard form by holding the bow with a relaxed hand, even on a straight grip longbow.

A right-handed archer will cant their bow “to the right,” meaning that the top limb tip is further to the right compared to the target than the bottom limb tip. If a right-handed archer were to cant their bow to the left, they would risk the arrow falling off the shelf, rest or bow hand with unpredictable and potentially dangerous consequences. Naturally, a left-handed archer will do the opposite. To determine the proper angle of cant, the archer should try to hit a line drawn vertically down the centre of the target. The more the archer cants the bow to the right, for a right-handed archer, the more the arrow will go to the right. Hence if arrows hit left side of the line, the canting angle is too small and vice-versa if an arrow hits on the right side. Naturally, left-handed archers will respond to the mirror-reflection of this concept. This canting of the bow will have very little effect on close targets but will have a large effect on mid-to-long range targets

American flatbows are designed to be canted until the window is vertical. Other bows without window or even arrow-rest has to be canted more because the arrow points more to the left (for a right-handed archer).



Novices can learn to use the same canting angle through the following exercise: Have the archer shoot from a distance of five to ten meters at a target butt that has a piece of visible tape affixed at the correct angle for the

bow. When the archer raises the bow, they can check the canting angle by comparing the bow with the tape and making any adjustments necessary to bring the bow into line with the tape. This exercise can also be done with closed eyes after obtaining the correct stance. The archer should open their eyes when the drawing hand reaches the anchor point.



8.2.7. Facial Marks/Anchor and Forces Alignment

The most common facial reference mark for a traditional shooter is to place the tip of the index finger next to the teeth and touching the corner of the mouth. This reference usually positions the arrow directly below the dominant eye when the archer is using proper form. Different face shapes, however, could lead to some differences in the ideal anchor position. To be most consistent, two more references are desirable; the thumb under the lower jaw and the first joint of the first finger below cheekbone.



To control the proper draw length, the coach should stand beside the archer, giving feedback on the archer's form and references. This should be repeated several times until the archer can feel the correct facial reference point. Using a mirror to let the archer watch and verify their own forces alignment (arrow / string forearm alignment) and anchor position will further reinforce this feedback. During this process the coach must help the archer to find the correct overall feeling and body sensations, including their bow arm, drawing elbow, shoulders, bow elbow, chest and upper body position, and back tension in addition to their facial marks.



Note that changing the facial marks (anchor) and/or using different arrow lengths, are not allowed during a single competition. Hence it is not recommended to teach the beginners to use two facial marks (a technique called "Face Walking"); one for short distances and one for "long" distances. Face walking is sometimes considered when shooting at longer distances with light bows in order to keep the point of the arrow close to the centre of the target while aiming. Similarly it is not recommended to have the novices use different sets of arrows for different shooting distances.

For the other components of shooting form please refer to chapters 1 and 6 of this manual.

8.3. Aiming methods

Through experience and depending on the shooting distance, beginners may use various references or aiming methods; here are the most popular ones in traditional archery.

8.3.1. Without Conscious References

Commonly known as “instinctive” (although there is no truly instinctive aiming in archery) or “intuitive” shooting, this method uses the natural abilities of humans to aim and throw things. Senses, perception, intuition, kinaesthetic sensations, and the brain’s calculating capacity all combine to aim the bow and arrow. They are the same abilities that are used in any ball sport or when throwing a simple paper ball into a trash basket, for example. It is based on practice, trial-and-error, correction, and repetition. It is the most natural and ancient method and it has allowed humans to use the bow and arrow as a weapon for millennia. One of the most important facets of intuitive aiming is that the position where the nock touches the string should be precisely aligned vertically under the aiming eye.

For this style of aiming, the coach must advise the archer to watch the centre of the mark, or the smallest spot visible on target as focal point.

Subconscious references are better for moving targets, speed shooting and close distances.



For beginners, the intuitive method is the easiest and most natural to learn, and allows the archer to enjoy shooting at its best.

8.3.2. With Conscious References

An archer using a conscious reference point has to first evaluate the shooting distance, and then, depending on the estimated shooting distance, has to set the arrow point a related place on the target face. From this point, two aiming options are possible:

- Focussing the visual attention where the arrow point is located;
- Keeping the arrow point in the peripheral vision and focusing on the centre of the target.

8.3.2.1. Visual focus on a particular spot of the target face

This aiming technique is also called Point-on Aiming Distance Method, or POD. The first requirement of this aiming method is to determine the shooting distance at which, in order to hit the target’s centre, the arrow point is visually positioned on centre of the target face or spot, when the archer is aiming at full draw. It is usually 30m or less if three string fingers are under the arrow and 30m or more with the Mediterranean string finger grip.

From this reference distance, the arrow point’s visual location while aiming changes in height as the archer moves closer to or further from their target. For closer distances, the archer chooses a location on the target face that is below the spot and focuses on this location. For longer distances, the archer chooses and focusses on a mark above the spot. In this method, once the archer has set the arrow point at the proper spot, he focuses on that spot, not the centre of the target (unless on POD).



The shooting distance allowing the archer to direct the arrow point at the centre of the target face

At a longer distance than the POD, like in Gap Shooting (see below), the arrow shaft covers the view of the centre of the target or spot. The advantage here is that the archer focusses on the high spot; hence is not disturbed by not seeing the centre of the target (as in Gap Shooting).

When the tip of the arrow is seen close to the centre or above, this aiming method is effective. However, when shooting a small target at 5m for example, the next method below in which the beginner focusses on the centre of the target often performs better than choosing a spot on the grass.

8.3.2.2. Visual focus on the centre of the target face

This method is known as “Gap Shooting”. It is when the archer consciously uses the distance (gap) between the tip of the arrow and the centre of the target as an aiming aid. In this aiming style the main visual focus is always on the centre of the target or spot.



This method works well from zero distance to the POD. Beyond this distance, the arrow shaft covers the view of the centre of the target, the gap disappears, and it becomes impossible for the archer to focus on the centre of the target or spot.

8.3.3.3. Aiming follow-through

It is natural for any archer to be tempted to watch the arrow in flight, but this is generally detrimental to the aiming process. Ideally, the archer’s focus will be always on the spot or reference chosen until the arrow hits the target.

8.4. Traditional Archery Training and Practice

The effect that the size and shape of the target face has on accuracy is tremendous for archers aiming intuitively. The Standard Teaching Process presented in chapter 6 of this manual is also valid for the level 1 traditional archery coach. The adaptation of the shooting skills and sequence of the traditional archer works best by initially shooting at targets that are easy to focus on and gradually progressing the archer through more difficult targets.

Small, three-dimensional, bright-coloured, centred single-spots against a large, dark background are the easiest targets to focus on and deliver good groupings quite naturally. For example a little red balloon or a tennis ball against large black paper or rubber backing is a good starting target.



In this case, the archer focusses automatically on the spot without any effort at all. This scenario makes the archer feel confident, with little chance of missing the butt, and allows easy tight grouping.

Multiple, un-centred, multi-coloured targets on similar backgrounds are the hardest to focus on, make the archer hesitate or have doubt about the result, and generally produce poor grouping.



A three-spot World Archery target face placed close to the edge of the butt is an example of a poor choice of targets for a beginner.

Always start with “easy” targets and at close distances until good grouping appears, and then change only one variable at a time.

After the archer masters consistent technique, different distances can be introduced. Start with shooting at 40-cm World Archery face at a distance of 5m. As soon as 3 arrows are constantly hitting within the red circles move the archer back to 7.5m, then to 10m and to 12.5m. At the distance of 15m and 17.5m the 3 arrows should hit within the blue circle. From 20 m, the increment of the shooting distance can be of 2.5 or 5m pending the accuracy of the beginner. At the distance of 20m, 25m and 30m the 3 arrows should be within the black circle and finally at the distances of 35m, 40m and 45m the 3 arrows should be within the white circle. This is a good exercise to go through every year before the outdoor season starts.

To develop and practice the ability to keep focused, have the archer shoot from different distances. Changing the shooting distance within a training session helps to develop the subconscious mechanism of adjusting the aiming references to the new shooting distance. When the archers have mastered controlling their focus at different distances, distractions such as flags, colourful balloons, ribbons, or similar items can be added to the targets. This helps to improve concentration, especially on a windy day. Since motion attracts focus, it is very difficult to keep these extra items from diverting the archer’s focus from the target.

8.5. Basic Tips for Maintenance of Traditional Archery Equipment

8.5.1. The Bow

A traditional bow will perform well for many years if a few simple procedures are followed to keep it well maintained:

- Between shooting sessions, traditional bows are best stored horizontally, unstrung and in a cool, climate-controlled room.
- Archers should always use a bow stringer when stringing and unstringing their bow.
- Ideally the bow will be kept at a consistent bracing height for each shooting session. An easy way to promote a consistent bracing height is to keep the same number of twists in the string. Thus, when unstringing the bow, it is a good idea to either leave the string on the bow, or to lock the string loops when taking the string off the bow. To lock the string loops, simply feed one through the other and then vice-versa. Doing this will keep the string at a consistent length and therefore a consistent bracing height. It is still a good idea to measure the bracing height from time to time, especially before tournaments, to make sure it is at the right level.
- Extreme heat may cause damage to the bow, so it should not be left in a car during summertime or near a heater, for example.
- Putting the bow in a breathable fabric cover will prevent damage during transport.
- In the case of a long journey, for example by plane, it is wise to put the bow (longbow or one-piece bow) into a plastic tube for extra protection. The equipment, up to 2 long tubes for bows and 4 smaller tubes for arrows, usually fit comfortably in a ski-bag.
- String walking (adapting the height of the location of the string fingers on the string to correspond with changes in shooting distance) with a traditional bow causes unequal stress to the limbs and may eventually cause a catastrophic failure of the bow.
- Only the owner of a traditional bow should shoot it. This is especially true when considering allowing archers with longer draw lengths than the owner to shoot the bow.

- For safety, check the bow regularly for damage or excessive wear.

8.5.2. Arrows

Traditional arrows require attention and maintenance to keep them straight and undamaged between shooting sessions.

- Arrows should be stored vertically with enough space for the feathers. This way they will not touch each other and cause damage. Ideally, traditional arrows are stored by hanging the arrows upside down with the point stuck to a magnet.
- Wet arrows should not to be left in the quiver. They should be dried while hanging or standing vertically with enough space for the feathers to be free from any contact.
- Storing natural feathers near a piece of cedar or using cedar shafts for your arrows will discourage moths from damaging them as they do not like cedar.
- The nock of the arrow has to fit the string. Nocks that are too loose on the string may slip off causing the archer to dry fire the bow, which can seriously damage the bow. Consequently, nocks that are too loose should be replaced.
- If the nock is too tight on the string there is the possibility of it breaking during release making the arrow deviate from its intended flight path. A nock that is too tight may also damage the string. In a worst case situation the string could be broken. Therefore, nocks that are too tight should also be replaced.
- Wooden arrow shafts require extra care for safety and consistency. Inspect all shafts for damage after use and discard if any damage is evident. An arrow breaking on release could damage the bow or cause a severe injury to the bow hand or forearm.
- If the quill of the feathers is injuring the archer's hand, then adding a drop of glue to the front of the feather or raising the nocking point may help.

8.5.3. The String

A bow string will shoot optimally for many arrows if it is maintained properly. Here are a few key elements to keep an eye on for ideal string maintenance and wear:

- A (Dacron) string should be waxed from time to time to keep the strands together.
- To avoid the string breaking it is recommended to check it regularly for damage. Depending on the string material, after several thousand shots, it will need to be replaced
- The string has to suit the bow, with the recommendations of the manufacturer being respected. The material and number of strands are related to the bow's draw-weight and construction. Care must be taken to ensure compatibility of these factors.

8.6. Conclusion

Like all archers, traditional shooters have the goal of shooting the centre of a target. Traditional archery comes with its own unique set of challenges, but the reward of hitting a target with minimal aids one that is respected by all knowledgeable archers. Using proper technique and efficient equipment maintenance, this most primitive form of the sport can be an effective and fun demand on the skill of any athlete.

CHAPTER 9: EQUIPMENT & FACILITIES

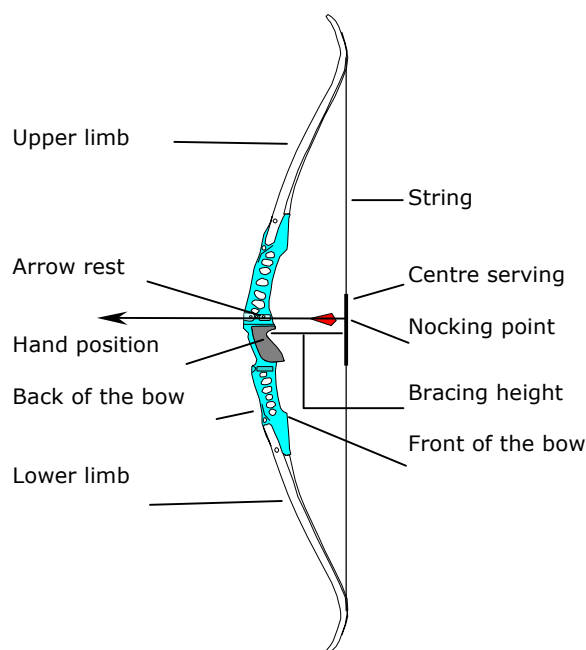
9.1. PRELIMINARIES

For an archery course to be successful, there are certain items that must be available, in good condition and ready for each lesson.

The coach must have the knowledge to properly set up and maintain the equipment throughout the program.

The coach must also progressively introduce and explain the equipment to the novices. Take care to not overburden them with too much information at once.

Since a certain proportion of athletes are left handed, about 20% of the available equipment should be for those who will shoot left handed and the rest for the right handed archers in the group. In some countries, and among some ethnic groups, this percentage has to be strongly modified.



9.2. SHOOTING SIDE

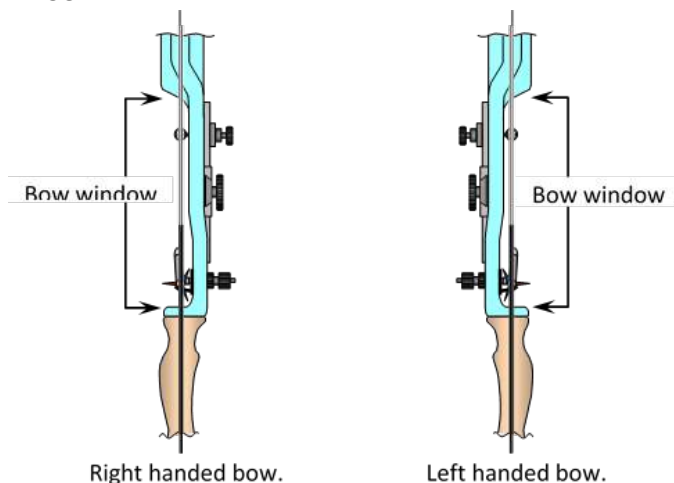
Since some shooting accoutrements are specific to the shooting side, each novice's shooting side should be identified before selecting their equipment. The shooting side can be selected either according to dominant eye or by dominant (preferred) hand. However the shooting side is selected, be sure that the novice can aim with the eye on that side. This means that either the eye dominance matches the shooting side, or the archer can close the non-aiming eye without interfering with the shot. In a pinch, an eye patch can be used to cover the non-aiming eye. See chapter 4.2.4.1. [Shooting side choice](#)

9.3. THE BOW

9.3.1. Bow description:

Refer to the illustration below while introducing the various parts of the bow to the novices.

Most modern entry-level bows are takedown recurves – i.e. the limbs can be removed from the riser and used in a right or left handed riser.



The risers are mainly manufactured for one shooting side only, though some manufacturers do make ambidextrous bows that can be used by both right handed and left handed archers. The obvious advantage of the ambidextrous bows is offset by some significant issues. For example, a riser with two windows above the bow hand may bend due to the thin material between these two windows. Another common issue is difficulty in properly aligning the arrow in the centre of the bow.

Ideally each novice will be assigned to his or her own bow for the duration of the session or program. However, it is also acceptable for two compatible novices to share a bow.

9.3.2. Bracing/Stringing a bow:

Stringing a bow should always be done using a proper bow stringing tool to ensure the safety of both the person and the equipment. The most common bow stringing device is pictured below and is available from most archery shops.



There are several other bracing methods, but we recommend these as the simplest and safest for novices.

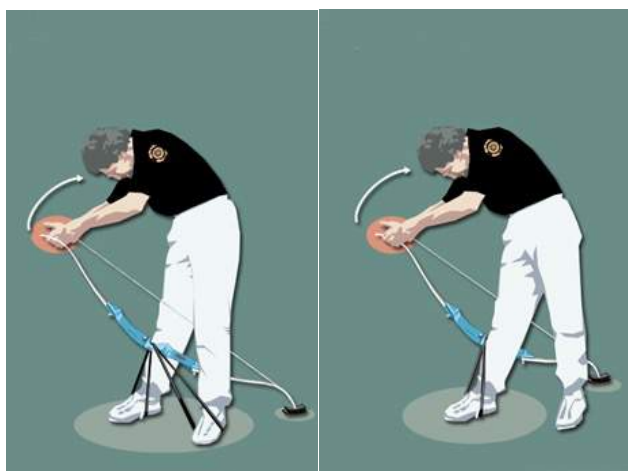
9.3.3. Brace height (also called string height):

A bow's brace height is measured from the deepest part of the bow grip to the string or from the string to the pressure button. Always check the manufacturer's recommendation to ascertain the correct measurement for the bow being used. If the information is not available, use the brace height chart below as a guide.



A simple loop of rope is much cheaper, convenient and safe as shown below. Note that when using this type of bow stringer, you must protect the limb tip that presses into the ground. A small rubber disk or a foam or leather pad will suffice to prevent damage to the limb tip.

Bow Height	Brace Height range	Brace Height (cm.)
64 inches	19,7 -22,9 cm	21,5 cm
66 inches	20,3 - 23,5cm	22 cm
68 inches	21 - 24,1cm	22,5 cm
70 inches	21,6 - 24,8cm	23 cm



In a permanent archery range there may be a "bow bracer" like the one pictured below fixed to a wall or a pillar.

Train the beginners to periodically check the brace height of their assigned bow. They should make sure it is the same or still within the range as strings, especially those made of Dacron, stretch and change over time. Also, twists may be unintentionally added or removed if the string is taken off the bow for storage or transport.

An excessively high bracing height will not be good for the bow and will shorten the power stroke, effectively reducing the power of the bow. Alternatively, if the bow is used with the bracing height too low, the bow will be unstable and the string will, more than likely, strike the archer's wrist. The bracing height can be adjusted by adding or removing twists in the bow string. Adding twists to the string reduces its length which in turn increases the bracing height. Removing twists lengthens the string, which in turn decreases the bracing height.

9.3.4. Bow length:

Bows come in different lengths, the most common lengths for recurves are 66 inch and 68 inch. Bows of these lengths can accommodate most novice archers. The 66 inch bow would be for those using arrows up to 27 ½ inches in length, and 68 inch bow would be for those shooting arrows for 27 ½ inches and more. The following chart shows a bow length suggestion for different draw lengths of the novice.

Novices Draw length	Bow length
Up to 18"	48"
18" to 20½"	52" (or longer)
20½" to 23½"	62" (or longer)
23½" to 25½"	64" (or longer)
25½" to 27½"	66" (or longer)
27½" to 29½"	68" (or longer)
29½" to 31"	70" (or longer)
More than 31"	72"

If a short bow is selected for a novice who has a long draw length the limbs will bend more than they are designed for and may even break if they are drawn beyond their limit. Also, the string will make a sharp angle at the point of draw and could pinch the fingers of the novice reducing the efficiency of the release. The illustration below shows the angle of the string for long and short bows drawn to the same draw length.



A bow that is too long for an archer that has a short draw length will not be very efficient because the recurves aren't opened enough. This would cause the arrow to drop more quickly, necessitating that the sight block be placed lower down the sight rack when longer distances are being shot and it could be harder to aim.

9.3.5. Bow weight:

Bows come in different draw weights, some are adjustable and some are set to predetermined poundage. Select a bow for each novice that is appropriate for their age and physique.

The chart below suggests bow weights based on normal age and gender ability levels, but be sure to account for each novice's specific needs.

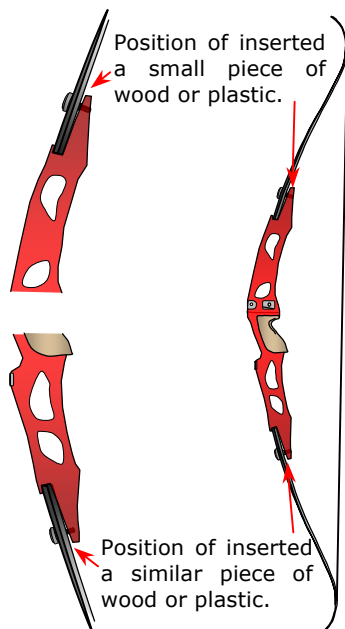
Gender	Age - years	Bow weight (max.)
Children	6 to 8	Up to 10 pounds
Children	8 to 12	Up to 12 pounds
Girls	12 to 14	12 to 16 Pounds
Boys	12 to 16	14 to 18 Pounds
Girls	15 to 17	15 to 18 Pounds
Boys	15 to 17	16 to 20 Pounds
Women		16 to 20 Pounds
Men		18 to 22 Pounds

Through practice, the novice will be able to progress to a heavier bow. Do not increase the draw weight of the novices bow too soon, and never increase the bow weight more than two pounds at a time. The following chart shows a test that can be used to check the "archery strength" of an archer:

Time in seconds	Action
1	Start elevating the bow
2 - 7	Complete opening the bow
8	Relax the bow down
9 - 10	Get a rest

The novice should be able to do the above 8 times without loss of form. If the novice can do this 10 or 12 times without any loss of form consider increasing the bow weight by 2 pounds.

It is sometimes possible to slightly change the bow weight of bows that are not fitted with a system of weight adjustment. Usually such bows have the limbs fixed to the riser with a large bolt. To adjust the weight, insert a piece of hard wood or plastic, approximately 1 to 2 millimetres thick, into the limb pocket to change the angle made between the limb and the riser.

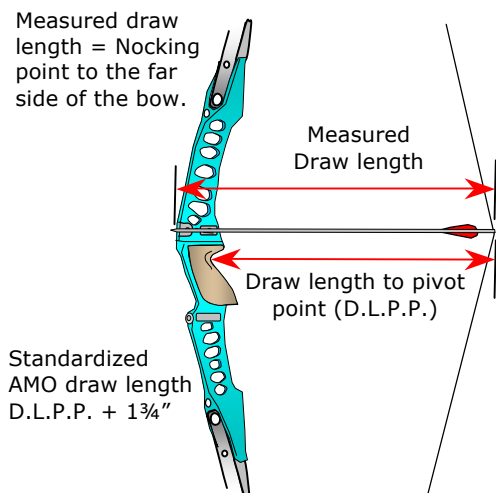


To keep the limbs balanced, a piece of the same thickness must be inserted in both the top and bottom limb pockets. By fitting these similar pieces of wood or plastic the bow will be made heavier. Be careful not to make the inserted piece too thick and always ensure there is enough of the fixing bolt threaded into the riser for safety.

Calculating Draw Weight:

The actual draw weight an archer achieves at full draw depends partially on their draw length as well as the marked weight of the limbs on their bow.

The Archery Trade Association (ATA) uses a standard measurement of 28 inches of draw length for determining the draw weight marked on limbs. The 28 inch length is defined as the Draw Length to Pivot Point (D.L.P.P) plus 1 3/4 inches. The D.L.P.P is the distance from the throat of the nock to the point on the riser directly above the pivot point of the grip. This method is depicted in the following illustration.



If an archer draws the bow less than the standard as shown above the draw weight will be reduced by 1½ to 2 pounds per inch of draw length difference. Conversely, if the archer draws the bow more than the standard shown above the draw weight will be increased by 1½ to 2 pounds per inch of the increased draw.

9.4. ARROWS:

9.4.1. Arrow description:

Refer to the illustration below to explain the parts of the arrows i.e. nock, point and fletchings etcetera. You must also tell the beginners how the arrows must be treated and carried to avoid any injury as the points and nocks may be quite sharp.



9.4.2. Arrow material:

The shaft of the arrow can be made of wood, fiberglass, aluminium, carbon and at advanced levels a combination of aluminium and carbon. Because wooden arrows break easily and fiberglass arrows are heavy, aluminium arrows and carbon arrows are the most popular at the entry level. Both have advantages and disadvantages.

Aluminium arrows are considered to be stable and forgiving, but they are a little heavy and slow. Also, they can bend, particularly the light ones used with light entry-level bows, when pulled out of the target by the novices.

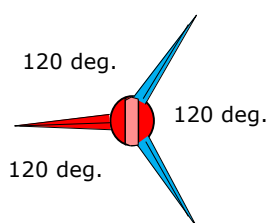
Carbon arrows are lighter, faster, and cannot be bent. If the carbon fibres are straight, they crack easily and can become dangerous. Nowadays there are many models made with crossed carbon fibres that are very resistant. Avoid nocks that fit on the outside of carbon arrows. If the arrows are improperly matched with the bow weight, they often hit the arrow-rest or even the bow window upon exit.

Be aware that if carbon arrows are used, all arrows that miss the target must be found before leaving the field. This is critical if the field is a multi-use sports field as broken carbon shafts can cause significant injury to the others using the space. Carbon arrows that do not have a metal core cannot be found using a metal detector unless the metal point is of a sufficient size that the metal detector is able to locate it.

9.4.3. Arrow identification:

Many arrow shafts look the same in most respects, especially to beginning archers. Thus it is important have a selection of arrows that are distinctive enough to be told apart by novices. The most common method for this is to have a set of arrows with a unique colour combination of fletching and nocks for each archer.

It is usual to have three fletchings on each arrow 120 degrees apart, with the cock fletching a different colour than the other two for easy recognition by the novice.

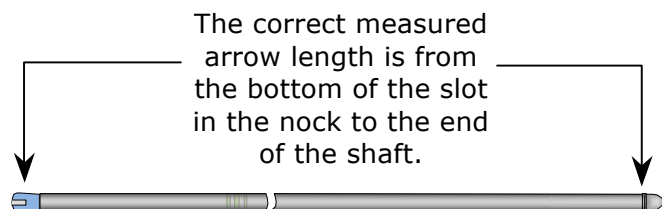


Use larger fletches or vanes for stability and to slow down the arrow flight for easier arrow finding should they miss the target. The recommended length of fletching or vanes is $2\frac{3}{4}$ " , or a little longer (up to 3").

A more advanced and time consuming method of making the arrows identifiable in groups is a process called "cresting." Cresting arrows involves creating bands of colours around the arrow shaft. Using unique patterns of colours makes the arrows different enough to be told apart from one another.

9.4.4. Arrow Length:

Please refer to section 4.2.4.2. "Determining draw and arrow length" for a description of how to ensure that arrows are a safe length for each archer.



Arrows are usually left uncut for safe usage by novices having varying draw lengths. An uncut arrow will often be 29 inches or more. While not optimal for performance, an archer can always safely shoot an arrow that is longer than his or her draw length. Also in this way a stiffer spined (*), and therefore more robust, arrow may be used to give a longer life span.

(*) See the following section for the definition of spine

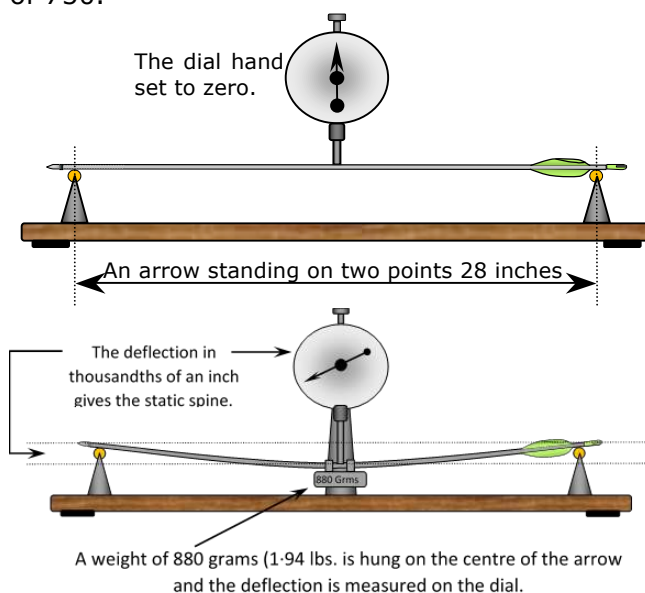
For taller archers needing longer arrows, carbon arrows should be considered since long aluminium arrows are too stiff for light draw weight bows. The lightest available spine for a 32" draw length, for example, is a 1916. Such a stiff arrow would not fly well out of a bow with a light enough draw weight for novices.

9.4.5. Arrow Spine and Size:

Arrow shafts have different spines. The spine is a characteristic close to flexibility. There are two standards to measure the spine of an arrow.

The ATA (Archery Trade Association) Standard:

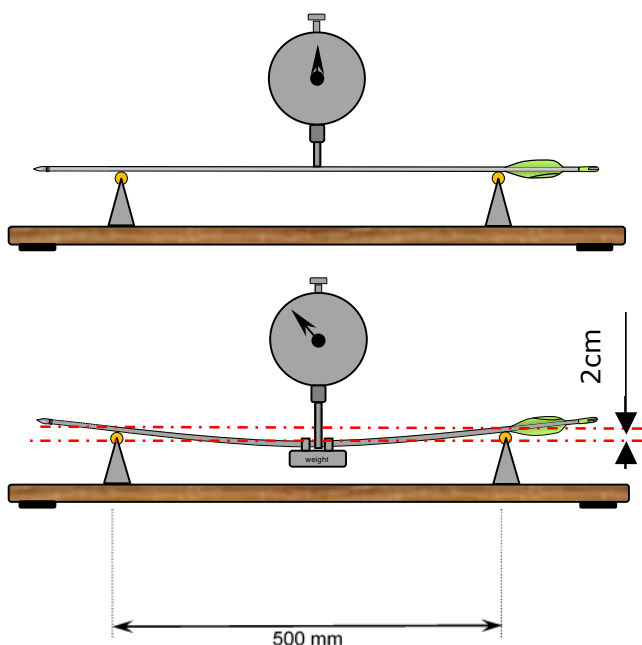
When measuring arrow spine rating an arrow of 29 inches is used, this is placed on two points 28 inches apart and a weight of 880 grams (1.94 lbs.) is hung in the middle. A dial gauge measures the movement from the home position of the arrow to the position now reached with the weight suspended. This measurement is calculated in 1,000ths of an inch to give the static spine rating of this particular arrow. I.e. an arrow that deflects a $\frac{1}{2}$ inch (0.5 of an inch) will have a static spine rating of 500 and an arrow that deflects $\frac{3}{4}$ inch (0.75 of an inch) will have a static spine rating of 750.



Be aware that some of the lighter (weaker) spined arrows are spined at 26 inches, also some manufacturers of wooden arrows use a static spine set at 26 inches.

The spining method as used by an Asian arrow making company:

An arrow manufacturing company in Asia uses metric measurements, and as such the numbers written on their arrows do not correspond to the ATA system, so care must be taken to ensure you are selecting the right arrows when making a purchase from companies that do not use the ATA system to spine their arrows.



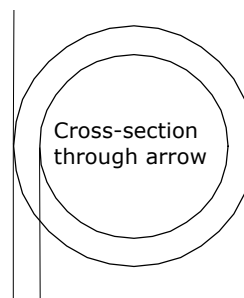
For this Asian company's the spine is determined by the weight required to deflect the shaft by 2cm with the shaft supported at points 500mm apart. The arrow is then given an identification to suit this finding. See table below.

Shaft number	Outside diameter (mm)	Weight for spine (kg)	Straightness per inch	Weight Grains/inch	Shaft length (inch)
1100	4.44	1.9	± 0.001	5.82	28.0
1000	4.52	2.1	± 0.001	6.14	29.0
900	4.76	2.4	± 0.001	6.36	29.5
800	4.79	2.5	± 0.001	6.56	30.0
700	5.25	3.0	± 0.001	6.80	31.0
600	5.32	3.2	± 0.001	7.14	32.5
500	5.38	3.6	± 0.001	7.49	33.0
400	5.54	3.8	± 0.001	7.88	33.5
300	5.65	4.7	± 0.001	9.03	34.0

A carbon arrow with an ATA spine around 1200 fits many beginners (if it is long enough), while a 1716 is recommended as the usual aluminium arrow for novices.

The numbers used to differentiate aluminium arrows are often different from the spine value of the arrow. They are useful, however, in indicating the relative stiffness and strength of the shafts in question. The arrow shown below using the ATA standard is a 1716. The tube diameter is 17/64ths of an inch with a wall thickness of 16 thousandths of an inch, e.g.1716.

Tube diameter, e.g. 17 thousandths of an inch



Wall thickness e.g. 16 thousandths of an inch

Be aware that the aluminium arrow is stiffer, heavier and slower. Also, whereas it is considered as more forgiving than the carbon shafts, it can take a permanent bend. 1716s can be loosed with reasonably straight flight with the lower weight bows used if left at the full uncut length of about 29". The more suitable 1616 will be quite fragile for general beginner use.

9.4.6. Arrow assembly & maintenance

9.4.6.1. Fitting the nock:

It is recommended that arrows be bought full-length. The shop will install the nocks if asked but you can fit them yourself if you wish to do so. Put a small amount of fletching glue on the swaged end of the arrow then fit an appropriate sized nock, twisting it a little to spread the glue around the swaging.



9.4.6.2. Installing the point into an arrow:

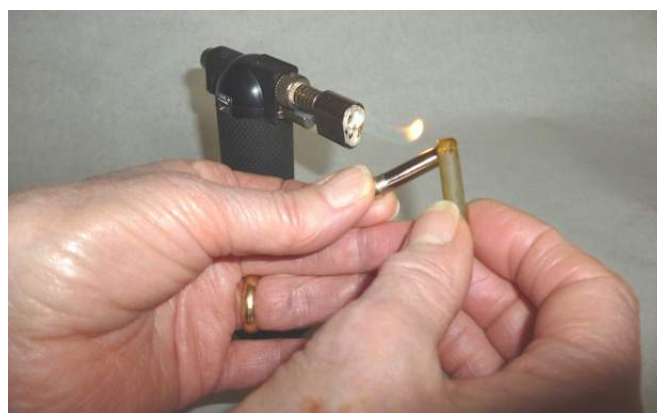
The next task is to fit the point. The shop will install the piles if asked but you can install them yourself if you wish to do so.



To do this you will need a small flame and some "warm melt" glue.



Warm the point of the arrow in the flame whilst holding the point with the fingers; only minimal heat is required. If the point is too hot to hold by hand, the heat may damage the front of the arrow when the point is inserted.



Rub some of the warm melt glue around the insert part of the pile and put a small ring of glue in the end of the arrow. Insert the pile into the end of the arrow with a slight twisting action until the shoulder on the pile fits up against the end of the arrow.



Should it be necessary to remove a pile, heat the point of the pile, not the arrow shaft. Then hold the pile in a pair of pliers and remove with a slight twisting action.

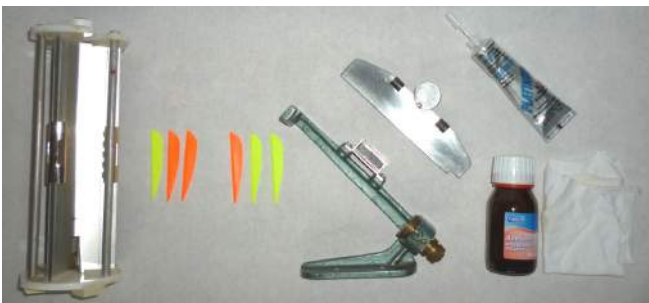


9.4.6.3. Fletching the arrow:

Now it is necessary to fit the fletchings. There are a few items needed to do this, including:

- A fletching jig
- Fletchings of choice
- Fletching glue
- Acetone and a clean cloth

Fletching jigs come in many varieties, some hold one fletching at a time while others hold three fletchings at a time. Versions of these jigs are pictured below.



To fletch an arrow, first put it into the fletching jig, making sure that the nock is well seated. Secondly, place the chosen fletching in the clamp. Most fletching clamps have some mark like a cut-out for lining up the back of the fletching. Clean the gluing edge with a clean cloth dampened with acetone. Put a thin layer of glue along this edge and put the clamp in the fletching jig with the glued edge of the fletching pressing against the arrow.



Wait the recommended time for the glue to dry enough to hold the fletch in place. When the glue is set, remove the clamp and turn the dial at the nock end of the jig to another position (120 degrees) and repeat the process until all fletchings have been glued to the arrow.

Make sure while fletching that the cock fletch is properly aligned with the nock. Most fletching jigs have an indicator to show where this alignment occurs.





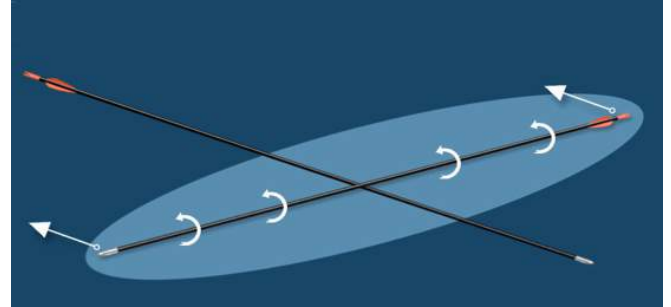
The fletching jig above shows all three fletchings being fitted at one time. Having a fletching jig such as this greatly reduces the time required to fletch a set of arrows.

When all three fletching have been fitted put a little bead of glue to the front and rear of each fletching where they meet the arrow shaft. This helps reduce the chance of the fletchings coming off should they miss the target and land in the grass.



9.4.6.4. Checking the straightness of the arrow:

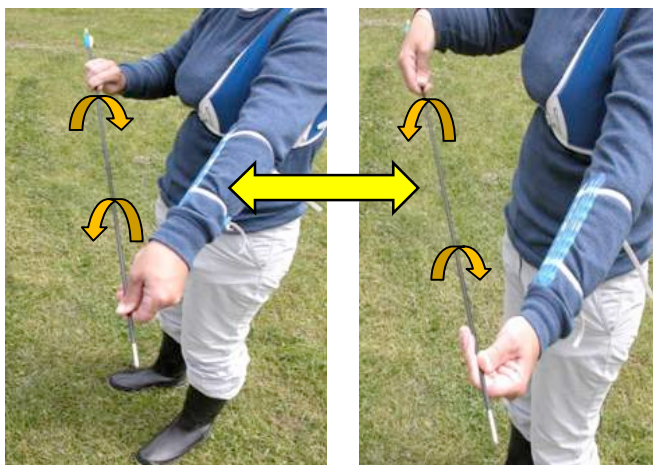
To check the straightness of the arrow, the suspect arrow can be laid and spun on another arrow. If the arrow is bent it will wobble and possibly make a vibrating noise.



If the arrow is bent, an arrow straightener will enable aluminium arrows to be straightened. There are several models of arrow straightener available commercially. Do not try to straighten carbon arrows as these will break and may cause injury if care is not taken.



If a carbon arrow is suspected of being damaged the following steps may help. Take hold of both ends of the arrow, twisting one end one way and the other end in the opposite direction. Then reverse the twisting action. If there is some damage you should be able to hear the carbon fibres rubbing on each other as the arrow twists. If this sound is heard discard the arrow as they are not repairable. Be careful when conducting this test. In fact it is advisable to wear good strong gloves and protective eye shields.



Checking a carbon arrow for damage.

Reminder:

A minimum of six arrows per novice are recommended

9.5. TAB

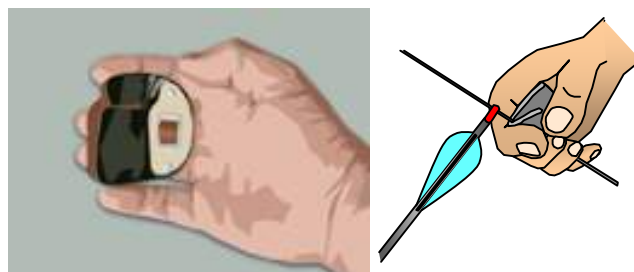
Using a finger tab is the most popular way to protect the string fingers from the friction of the string. There are many types of tab on the market and as the novice develops they will try many and then settle on one that suits them.



Differing types of finger tabs.

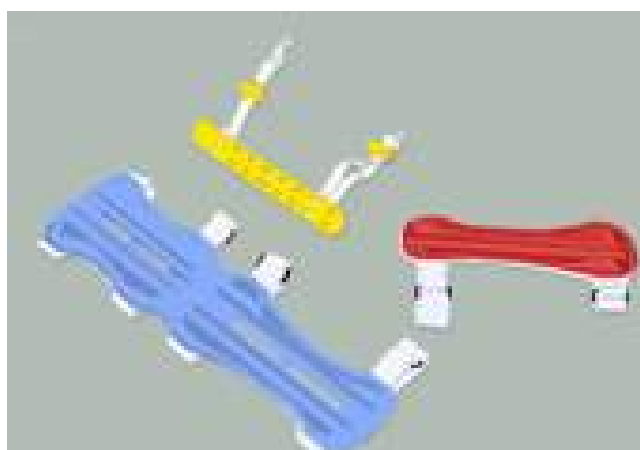
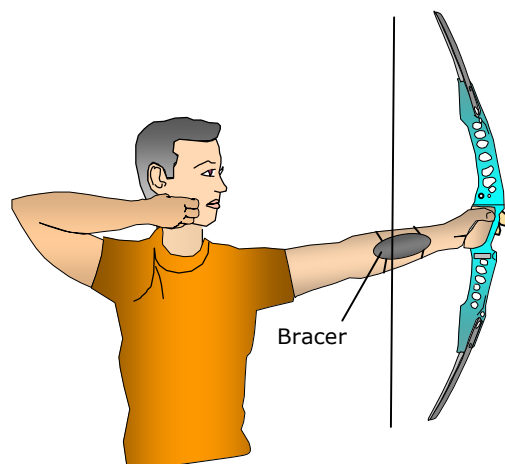
Many archery coaches do not introduce any finger protection right away in order to be able to check the proper string grip of the novice. When it is introduced, explain that the tab protects the fingers from any possible soreness or abrasions that the string may cause if one is not used. Also it allows for a smoother release of the string which produces better arrow flight and better arrow grouping.

Most beginners will start with a basic tab made from one or two pieces of leather and then may progress to a shelf tab with a finger spacer and possibly even a palm plate and/or fourth finger rest.



9.6. ARMGUARD (bracer)

An armguard is an essential part of a novice's kit and is mandatory for the first shots in order to minimize the risk of pain or injury to the novice. Show the class an armguard and how they are fitted. Explain they are worn to protect the forearm should the bow string inadvertently touch the arm during the shot and to keep any clothes away from the path of the string when the shot is made. There are many types of bracers on the market and as the novice develops they will try many and then settle on one that suits them.



Different types of armguards (bracers).

9.7. WRIST/FINGER SLING

A sling helps the archer to keep a relaxed bow hand and avoid the bow from falling to the ground upon release. There are two popular types of slings on the market. A “wrist sling” is attached to the archer’s wrist, while a “finger sling” (the most popular type) usually fits between the forefinger and thumb. A sling mounted on the riser is not recommended.



Wrist sling Finger sling



The hybrid Wrist-Finger sling is also an alternative

It is advisable to wait for the second lesson before introducing a bow or finger sling to the novices. If they are introduced to a wrist sling or finger sling on the first lesson it may confuse them with all the other things they have to remember.

The wrist sling or finger sling should be loose enough to allow the bow free movement when the shot is made but not so loose that the bow slips out of the hand.



With a sling that is too long the novice tends to close the hand upon the release to avoid the bow slipping down between the string and the bow-hand.

9.8. QUIVER

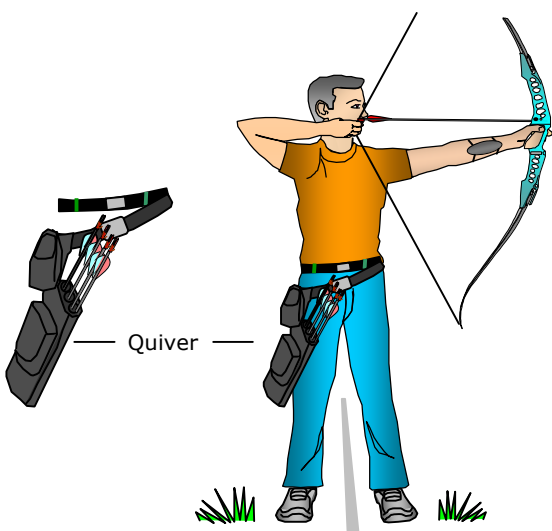
It is advisable for novices to use a quiver so that the arrows are in a safe place prior to shooting them. There are many types of quiver available, including belt quivers (shown in the next illustration), back quivers that hold the arrows above the archer’s head or shoulders, bow quivers that are attached to the riser, pocket quivers that fit in a hip pocket and ground quivers that rest on the floor. As the novices develop, they will select the one that best suits their needs. Two types of quivers are suitable for group instruction: the belt or side quiver, and the ground quiver.

Beginners with belt quivers quite often jab other archers with nocks because a beginner isn’t accustomed to having sharp sticks swinging off their bodies. Depending on what the novice is wearing, a quiver-specific belt maybe required. Basic belt quivers can be made to act as either left or right-hand by reversing the hook. They are suitable for indoor and outdoor shooting. This type of quiver avoids the beginners coming back from targets with arrows in their hands; a significant safety benefit.

Ground quivers come in two different types, indoor and outdoor. The indoor types have a flat base that does not mark the floor and is heavy enough to support the arrows upright. The outdoor type has a metal spike on the bottom so it can be driven into the ground to prevent the wind from tipping it over. Some ground quivers also serve as bow supports and have two curved prongs at the top to rest the bow. Floor quivers should be placed on the shooting line about 30 cm in front of the archer. There are five disadvantages to using a ground quiver:

- coming back from the butt to the shooting line archers must carry their arrows in their hands, which can be unsafe;
- they must be moved when moving the shooting line;
- it increases the space required per archer on the shooting line;
- two are required, one for indoor and outdoor; and
- they must be placed in exactly the same place each session to facilitate uniformity of the nocking procedure during the shooting process.

On another hand the ground quiver allows the archer to more easily know where to stand while shooting. It helps them to line up with the target but they are supposed to be shooting at. In addition, they're simple to use and to make (no need for belts or clips).



A chest guard



A simple loop of soft elastic wrapped around the arms



A band of tape keeping a loose sleeve out of the path of the string

9.9. CHEST-GUARD

When taking part in archery training sessions the archers should wear clothes that are reasonably close-fitting around the upper body and arms, though not so tight as to restrict movement. If the clothing is too loose or baggy in these areas the bowstring may snag on the clothing when the bow is shot, making the arrow deviate from its true line of direction.

The following illustrations show a chest guard in use and a piece of material wrapped around a baggy sleeve. Safety pins or some tape can also be used to keep loose clothing from the path of the bowstring.

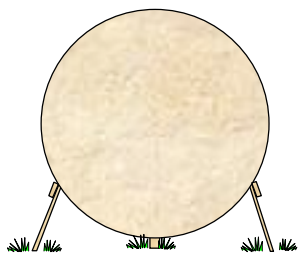
9.10. FOOTWEAR

The sport of archery requires the novice to be on his or her feet for long stretches at a time. Consequently, footwear that both promotes a stable stance and comfort during walking is ideal. An average athletic shoe works very well. While it is possible to shoot in most any footwear, it is essential that open toed shoes are not worn on the archery field. The archer

may accidentally walk into an arrow that is sticking in the ground, having missed the target, and cause a nasty injury.

9.11. TARGET BUTT

A target butt or butts will be required; the usual height of the centre point is 130 cm +/- 5 cm from the ground. It may be advisable to have the butt lower than this for the first lesson so that any arrows that miss the target do not travel too far. For the first lesson do not use a target face as the beginners need to concentrate on their form rather than their score.



For entry level, the centre of the target butt is often set lower than the official measurement for tournaments

Use a soft material for the target mat in order to avoid the arrows bouncing back on the beginners shooting from a short distance.

For further information on target mats and stand, see pages 10 and 11 of the document entitled "How to make an Archery Range" at [http://www.worldarchery.org/Portals/1/Documents/Development/Documents/How to make an Archery Range.pdf](http://www.worldarchery.org/Portals/1/Documents/Development/Documents/How%20to%20make%20an%20Archery%20Range.pdf)

9.12. BOWSTRING

9.12.1. String description:

A bowstring is the element connecting both extremities of the Recurve and Long bow. The arrow is nocked near its middle and the archer pulls it back then releases it.

A bowstring is made by a thread twisted up several times on its length, and strengthened by servings from another strand in the potential wear points.



There are many materials for bow strings on the market but Dacron is the preferred material for beginner's bows. To ensure that the proper amount of energy is transferred to the arrow, 8 strands of Dacron is ideal, but up to 10 strands may be used. Beware when choosing a different string material as some manufacturers do not guarantee their "beginner bows" if some of these "non-stretch" materials are used.

9.12.2. Making a string:

Whatever material is being used, the basic method to make a string remains the same. Care should be taken to have the number of strands suitable for the material being used as some materials are thicker or thinner than others.

The materials and tools needed to make a string are:

- a spool of Dacron (or other material)
- serving material (usually soft twist or braided nylon)
- string server
- scissors
- 2 markers (each a different colour)
- a ruler

AND

- patience
- time
- care
- the will to make a good string, even if it means starting all over again.

Installation onto the support device:

If you already have a bowstring that is the length of the new one you are about to make it is easier to make the new one the correct length on the first try.

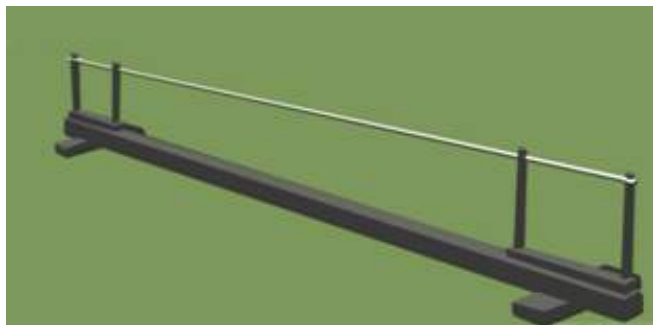
If you do not already have a string which is of the correct length there are procedures and measurements which will help get close to

the length of string required. This will be discussed a little later.

If you have a string that is the correct length:

Turn the string jig post carrier ends so that they are in line.

This part depends on the length of the string, but undo between 10 and 15 of the twists. Place it on, and adjust the string jig so that there is no sag on the string. Do not have the string too tight as this will have an effect on the string length that is being made. Take the old string off the jig.



If you do not have a string that is the correct length:

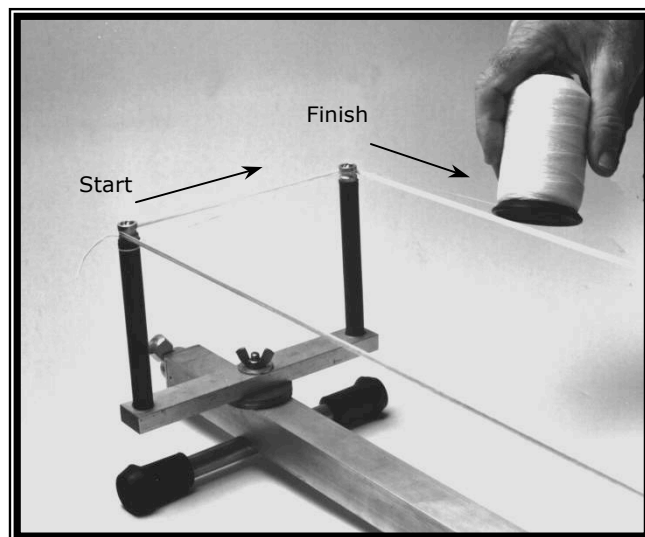
Set the distance between the outside parts of the string jig to a length that is 3½ inches (9 cm) shorter than the length of the bow. This measurement depends on the make of the bow but it will bring you close to the required length for subsequent string making.

Winding the new string material:

Turn the jig ends so they are square to the line of the jig. Loosely tie one end of the string material to a string post about 2 centimetres below the groove on the post which takes the string material. Then wind the string material around the posts, keeping to the groove at the top of each post. Make sure the rotation starts by going around the post that is the nearest to the post the string material is tied to. The secret to a good, reliable string lies in the equal tension of each strand. If the tension is not equal between all strands, the string performs poorly or may even break because the pressure is held only by a few strands. As the pressure of beginner bows is always less than 25 lbs, we recommend making strings using Dacron with 8 strands.

If you are making an 8 strand string wind around the jig 4 times. For a 10 strand string, wind around the jig 5 times. Always make sure the finishing end is tied lightly to the post that is past the post to which the start of the string material was tied. This allows an overlap of the

string material to be secured under the loop serving.

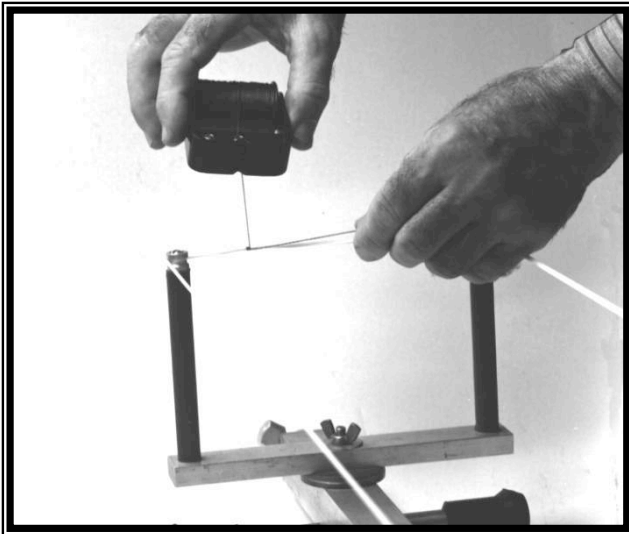


Making the first string end:

Make the first end of the string to be served the end of the jig that has the string material overlap. This will be beneficial and stop those ends coming loose as the string manufacture continues. Untie the starting end that was tied 2 centimetres down the first post and loop it round the post groove under the windings of the first string post.

Starting serving the loop:

Pass the end of the serving thread through the strands of the strand that are wound around the posts and, while holding the end of the serving thread along the string strands, serve over it for approximately 1cm. At this point cut off the excess loose serving thread and continue serving until you reach the required length that suits your limb width. All servings must be wound on the string in the same direction to ensure that they will not come loose when twists are added to the string for active use. One possible system is to always serve from right to left, having the serving tool come forwards under the string. If all servings are completed this way they will all be in the same direction.



Serving the end loop



When the correct length of serving has been reached, turn the string jig posts and continue to serve

The length of serving for the loop:

How long the serving should be before it is made into a loop depends on the width of the limb over which it has to slide when stringing the bow. On most of the entry-level bows, 6 centimetres is correct for the loop on the lower limb and 8 centimetres for the upper limb. It can vary depending on the width and thickness of the limbs. Mark the end of the selected length.

Line up the two ends of the serving rather than having one overlap the other. This provides for a thinner junction area of the string, which will fit nicely into the string groove in the centre of the limb ends.

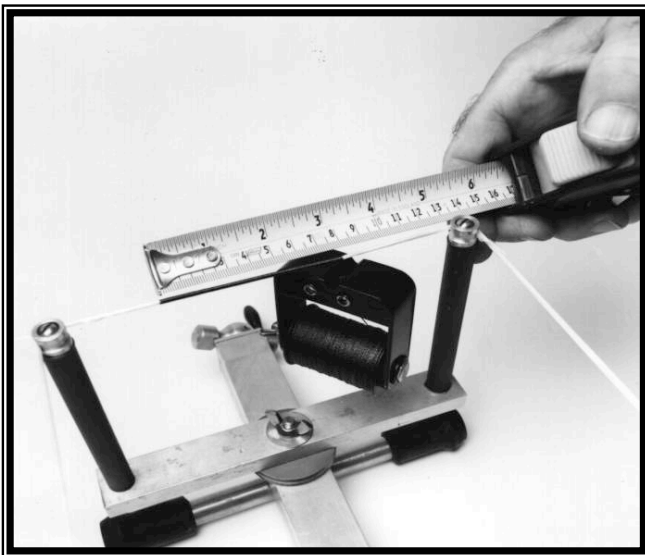
Continue serving the now-joined loop in the same direction as before. Make sure the two loose ends of the string material are held along this section and served over*. After about 6 centimetres the two loose ends should be cut off, making sure that there are at least 4 winds of serving between cutting off the first loose end and the second. This prevents the formation of a small step along the serving, which may wear and cause the serving to break during use.

(*) Because strings for entry-level bows are thin, in order to get a little more thickness under the centre serving and have a better nock pinch, you can attach the loose ends at opposite ends of the jig and have the two loose ends under the centre serving, instead of in one loop.

Serving to the correct length:

Wind the serving on to within 1 centimetre of the desired length i.e. about 10 or 12 centimetres. The exact measurement depends on the limb Recurve curvature, but it is necessary to have approximately 1cm of serving not touching the limb when the bow is at rest. Mark the end of the selected length. Keeping the tension on the serving, pull the serving tool away from the string and cut the serving thread leaving about a 40-centimetre length for finishing off the serving.

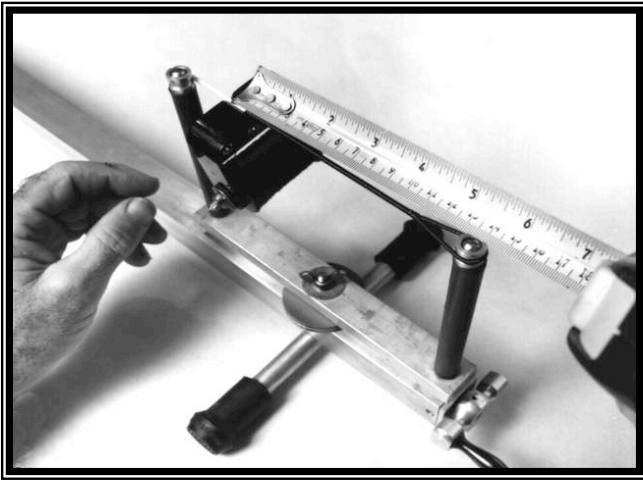
If you do not cut it, just make bigger the loop/bridge described below, in order to pass the serving tool below.



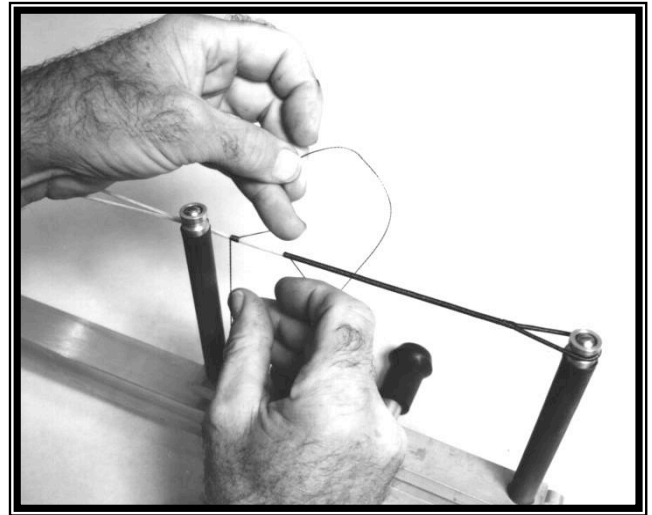
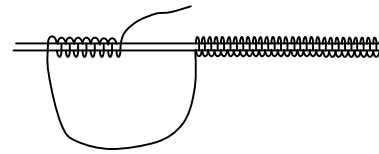
The length of the serving for the loop depends on the size of the limb tip

Creating and finishing the loop:

When the correct length of serving has been reached, untie the two ends of the wound string material, then turn the string jig posts 90 degrees. Slide the string around the jig so that the served section is now around the outside post.



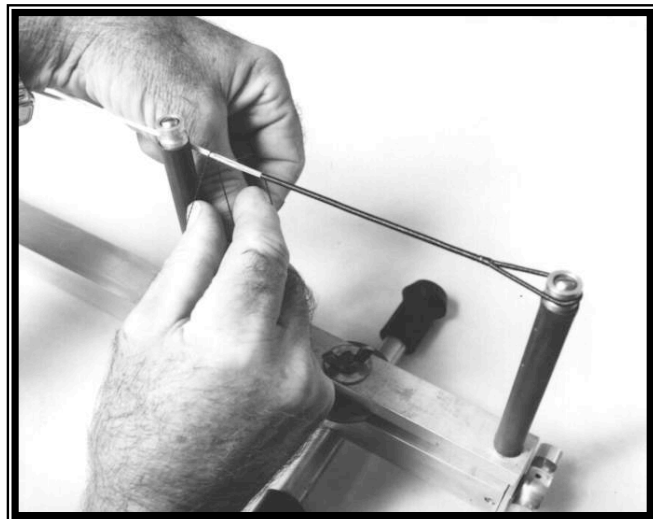
The length of the serving after the loop depends on the limb curvature



Serving manually back through the loop (under the bridge)

Making a neat end to the serving:

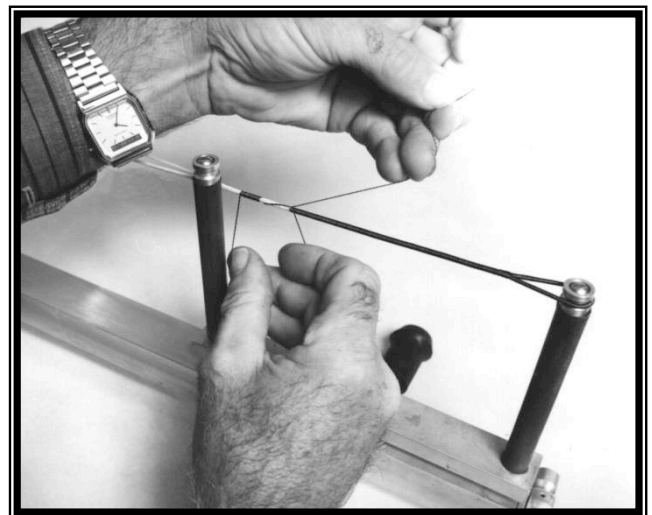
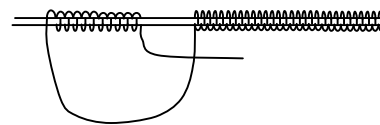
Make a loop or bridge with the tail end of the serving. Make sure that the two feet of the bridge are on opposite sides of the core of the string. Then wind the tail backwards around the string under the bridge and towards the loop end of the string.



End preparation by making a loop or bridge

Locking off the tail end:

Serve in this backward fashion for about twelve turns or until it is about 1 centimetre long. Place the tail end under the loop/bridge of serving thread just as it comes off the end of the serving already completed with the serving tool and lock it there by keeping pressure on the loop/bridge.



Serve back at least one centimetre and secure the tail end

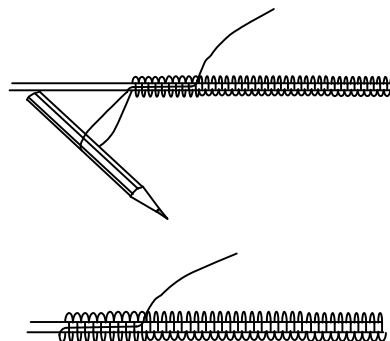
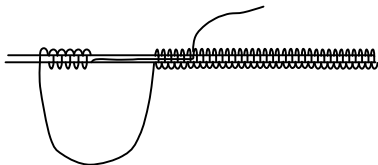
Serving back through the loop or bridge:

Continue winding the tail around the string in the same direction passing the tail end of the serving over the top of the string with the left hand to the thumb and forefinger of the right hand, bringing it through the loop/bridge and passing it back to the left hand. This part of serving will be running through the loop/bridge and toward the serving already done with the serving tool. This can also be done leaving the serving material still attached to the serving reel and passing the serving reel through the loop/bridge.

Finishing off the serving:

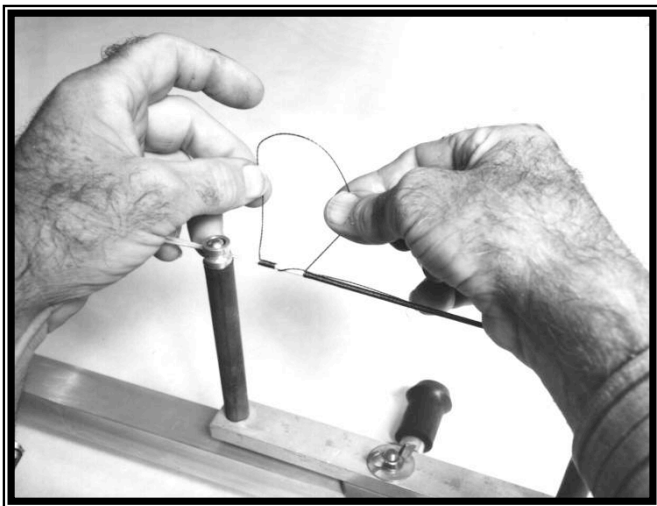
Once the tail end has been secured, continue on from the serving already done with the serving tool by winding the loop/bridge around the string, keeping tension on it. In this process the serving will get longer and the part that was wound through the loop/bridge will get shorter.

If the part that was wound through gets longer, it has been wound in the wrong direction. To remedy this, simply unwind the serving to free the loose end again and re-wind the section through the loop/bridge in the opposite direction.



Cutting off the tail end:

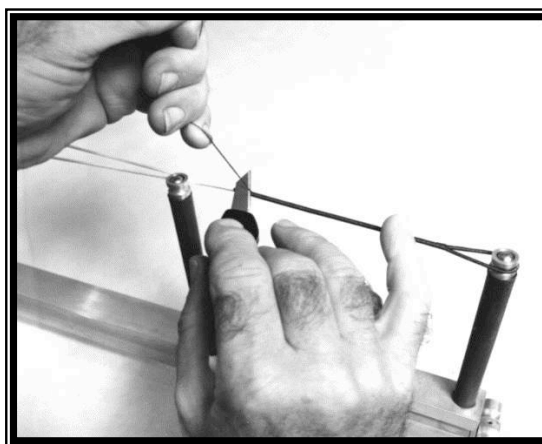
When the tail end has been pulled through and the serving is nice and tight the tail end can be cut off. Use a knife placed flat on the serving furthest from the loop to cut off the remaining tail, taking care not to cut the serving wound on the string.



By serving the right part manually over the tail end you unserve the left part

Pulling the end through:

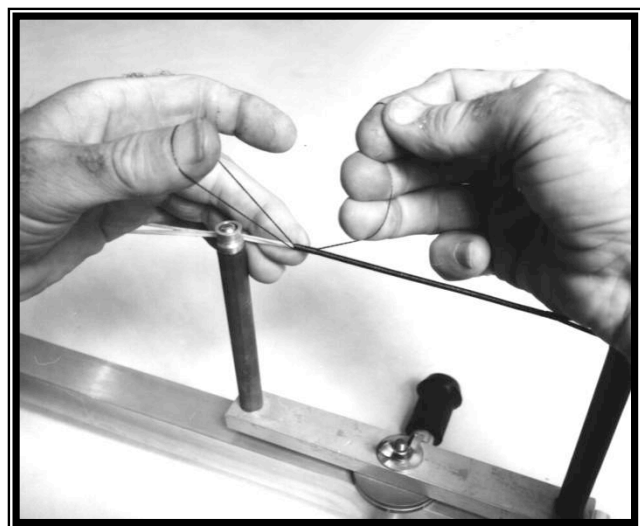
When all of the winds on the loop end have been undone, still keeping the loop tight, pull the tail end until the loop has completely gone. The thumb of the left hand or even a pencil can be used under the loop to maintain the tension whilst the tail end is being pulled through.



Cut off the tail end

Making the second end of the string:

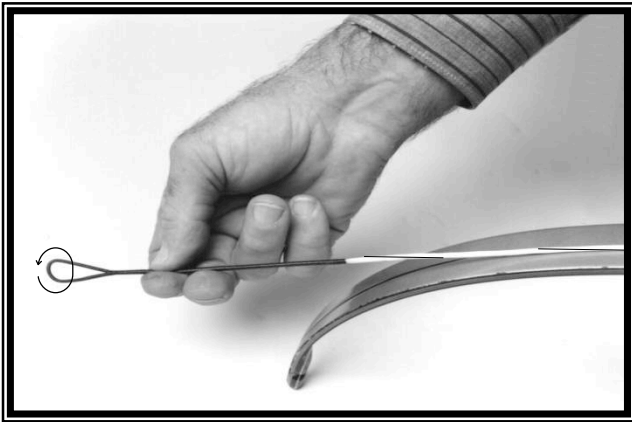
When the first end of the string is complete, turn the string jig around and repeat the above steps on the other end. The loop serving must be centred between the two posts to ensure that when the loop is being formed there is no (or a very small) overlap of the ends of the serving to ensure there are no bare string fibres showing. Bear in mind that the top loop of the string must be large enough to slip over the top limb when stringing the bow.



Locking off the end serving

Twisting the string in the correct direction:

When both end loops are completed, the string should be fitted to the bow so that the centre serving can be added. (It is also possible to do the centre serving on the string jig). To do this fit the top loop over the top limb and slide it down about 10 centimetres. Take hold of the loop for the lower limb and twist it for 10 to 20 turns (see next section entitled "Getting the correct Bracing Height").

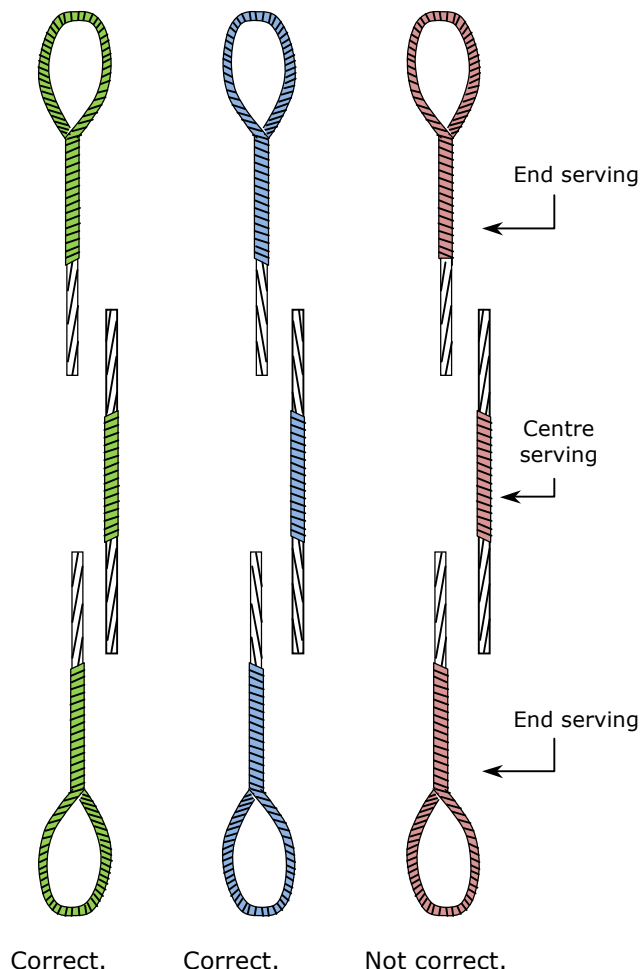


Twisting the string makes the strands unified

The direction of twist shown above is the correct direction for the direction of serving shown in this document.

If the string is twisted in the opposite direction to the serving, the serving will possibly come loose and may move during use. All three servings must be wound on the string in the same direction.

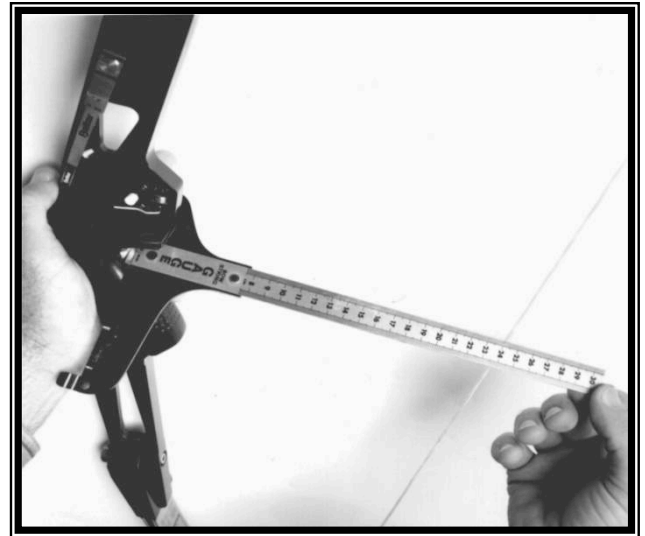
Some people serve their strings in a different direction than shown in this document. The following diagrams may help in determining the direction the string should be twisted in relation to the serving to stop any of the servings coming loose during use.



The string shown on the right is not correct as the string has been twisted in the opposite direction to the servings.

Getting the correct bracing height:

The Brace Height is the distance between the deepest part of the bow grip and the string.



Brace height measurement

If the new string is not the correct length for a given bracing height then the length may be adjusted by adding or reducing the number of twists in the string.

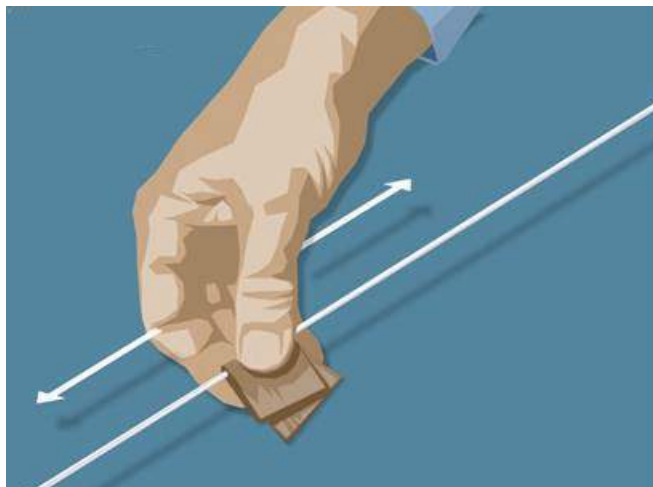
Bow Height	Acceptable range	Average brace height
64 inches	19,7 - 22,9 cm	21,5 cm
66 inches	20,3 - 23,5cm	22 cm
68 inches	21 - 24,1cm	22,5 cm
70 inches	21,6 - 24,8cm	23 cm

The minimum recommended is approximately 1 full turn every 7.5 centimetres or 3 inches. While there is no maximum number of turns, remember that, the more twists in the string the longer it will take to settle to its working length. More twists also means more "springiness" in the string, resulting in decreased speed.

Bedding in the wax:

Before bedding in the wax have the brace height 3 millimetres higher than the desired final height. The bedding process increases the string's length, thus lowering the brace height. Take a piece of leather, or a Dacron strand that is also waxed and fold it around the string. Rub up and down the full length of the string to generate heat and melt the wax, bedding it into the string. Be careful not to heat the string up too much or you may damage the strands. Most string materials do not need extra wax applied to the string before undertaking this task, but if the string material is un-waxed then a few rubs

of a beeswax block on the string will be necessary before the string is rubbed with the piece of leather.



Rubbing in the wax with a piece of leather



Or with a piece of Dacron strand

Making the centre serving:

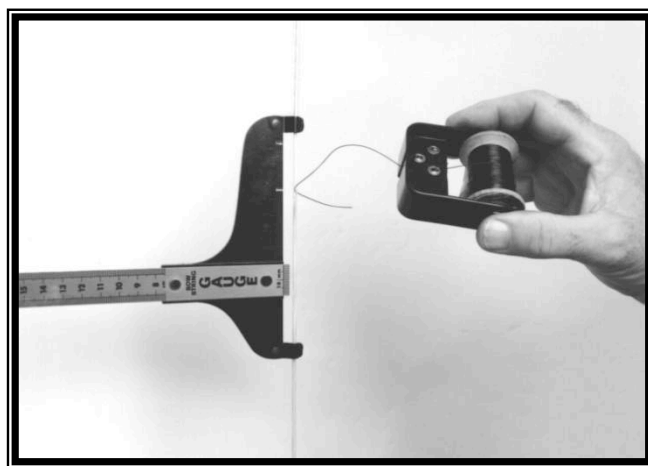
With the bracing height set to the desired height the centre serving can be applied.

Choose a serving material with a diameter to give the correct fit for the size of nocks to be used.

Mark and start the serving 4 – 5 cm above the desired nocking point position to give adequate string protection. Set the bow with the top limb on the right and remember to serve in the same direction that the end loops were served, i.e. from right to left taking the serving spool over the top of the string and away from you.

Just after the tail has come out at the start of the center check the nock fit on the serving. This will save having to build up the nocking area to get a good fitting nock or having to replace the serving because the nock is too loose or tight. See the section "Nock fit tips" further down.

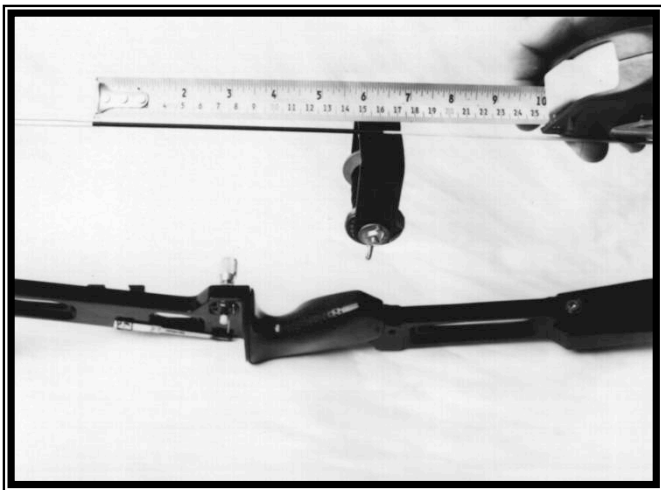
If it is a little too loose, try the nock fit on the part of the serving with the tail underneath. If that fits, simply serve over the tail. If it is still too loose, remove the serving and choose a bigger serving strand or add the required number of Dacron strands where the nock will go. If the serving is slightly too thick (which is unlikely with only 8 or 10 strands), try increasing the tension on the server. Otherwise, stop, remove the serving and choose a thinner serving strand.



Locate where the string serving will be and fix the start end of the serving material

Serving the required length.

Mark the end of the selected length. When the serving is 1 centimetre shorter than the required length, i.e. about 16 centimetres, depending on individual preference, and finish off the serving exactly the same as the top and bottom servings were finished. Remember the serving gives protection to the string should it contact the bracer during the completion of the shot.



Serving the centre to the correct length

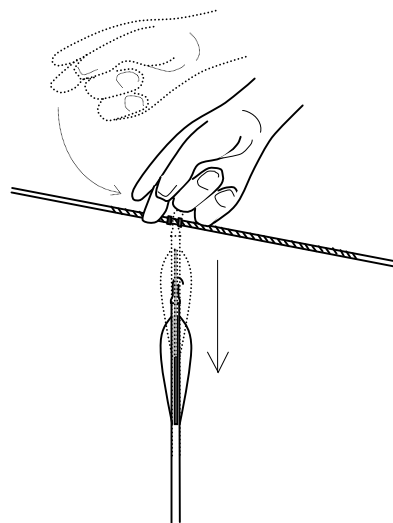
To ensure that the centre serving on the string is running the same way as the other serving done earlier, start the serving on the right and to work toward the left, taking the serving spool over the top of the string and away from you. When the serving is 8 to 10 millimetres short of the required length, pull the required length of serving off the spool to make a loop or bridge and pass the serving device underneath. Reduce the tension of the server before unrolling the end strand. This allows it to detach easily. Make sure that there is one "foot" of the bridge on each side of the string body. Serve back toward the serving through the loop just made. This serving does not need to be tight but the spool must be turned around the string in the same direction as the serving was applied. Make sure that the loop is always kept tight otherwise the serving on the right of the loop will come loose, which will cause a problem when the string is in use.



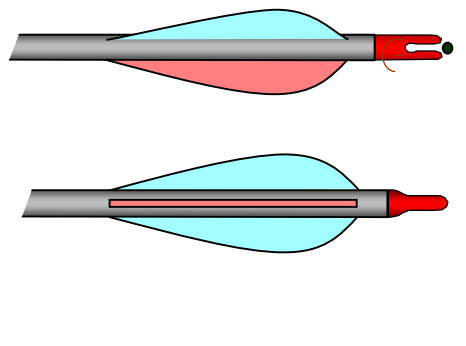
When this reverse serving is about 8 to 10 millimetres long, about 12 turns, bring the serving on the serving spool out and trap it under the right hand side of the loop. From this point, repeat the process of "Finishing off the serving" through "Cutting off the tail end" described above.

The nock should clip onto the serving with a distinct snap. The arrow should be able to hang from the string and only come off when the string is tapped lightly with a finger.

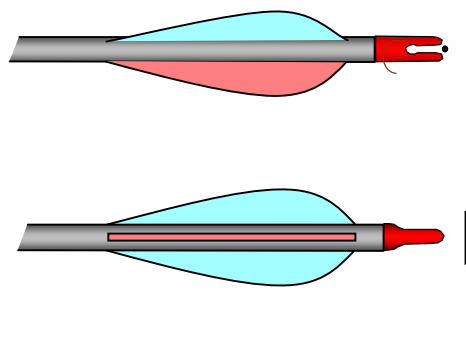
Nock fit tips:



If the nock is too tight on the string then the central serving should be removed and remade with a thinner serving material.



If the nock is too loose the centre of the nocking point can be built up with dental floss or some other similar thread.



9.12.3. Setting the nocking point:

To fit the nocking point, you must beforehand set the arrow-rest (explained further down) and decide the proper height of the knocking point. See "9.11.5. Initial nocking point setting."

There should be little space either side of the nock.



It is particularly important when shooting with all fingers under the nock to keep the nocking points from squeezing the nock or even bending the arrow down in the vertical plane. The arrow should be able to pivot as shown below.



Nocking points are preferable to nock-sets, which are brass clamps that are crimped onto the string. Nock-sets tend to wear out the finger tab and can injure the archer's forearm if they come into contact.

Testing:

- After each of the first few shooting sessions, re-measure the brace height. It will have most likely decreased.
- Make sure the nocking point is still in the correct position, adjusting it if necessary.

9.13. SELECTING THE BASIC EQUIPMENT:

9.13.1. Kit example

It is difficult to suggest the content of the equipment kit a coach could need, because it depends on the number and profile of the novices. For instance a kit for an elementary school will include lighter bows and softer/shorter arrows than a kit for military

people. The following example is for an average archery club and can be adjusted in characteristics and number of component items to suit the specific needs of a particular group:

12 entry-level bows: 1 RH 70"/ 22# - 1 RH 68"/24# - 1 RH 68"/22# - 1 RH 68"/22# - 1 RH 68"/20# - 1 RH 66"/20# - 1 RH 66"/18# - 1 RH 66"/16# - 1 RH 64"/14# - 1 RH 58"/16# - 1 RH 54"/14# - 1 LH 64"/16# - 1 LH 68"/22#

Accessories for each bow: 3 arrow-rests - 1 entry-level sight with a strong metal extension or one made of plastic - 2 Dacron strings (8 to 10 strands) - 1 extended clicker - 1 long and light stabilizer

For string making and maintenance: 1 spool of string material (Dacron) - 1 spool of serving material - 1 string jig - 1 string server device - 1 Bow square - 1 pair of Nocking Pliers - 1 stick of string wax - Optionally for those who do not want to make the nocking points from a strand: 4 dz. Nocking clamps

Arrows: 12 of 33" - 12 of 32" - 12 of 31" - 18 of 30" - 18 of 29" - 18 of 28" - 18 of 27" - 12 of 26" - 12 of 25" - 12 of 24"

For arrow making and maintenance: 1 x single fletching jig - 1 cement tube - 1 Fast Glue tube - 1 two-part epoxy glue for carbon arrow points - 1 stick of warm melt glue - 6 dozen spare vanes (various colors) - 6 dozen spare nocks (various colors), if nocks of different sizes are being used: 2 dozen per size - 1 dozen point (if points of different sizes are being used: 4 per size)

Archer's equipment: 29 tabs: 5 R/H small, 2 L/H small, 11 R/H medium, 3 L/H medium, 6 R/H large, 2 R/H large - 24 slings: 5 small, 12 medium, 7 large - 6 full-length armguards - 18 regular armguards - 24 ambidextrous quivers - 3 ambidextrous chestguards (one of each size)

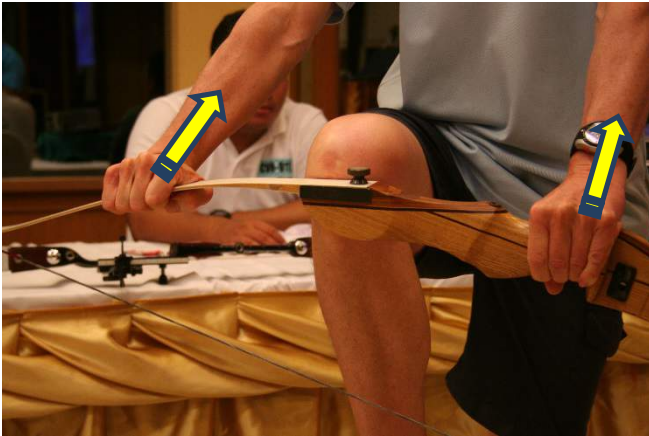
Other items: 15 80cm target faces - 1 set of Allen wrenches (9 sizes) - Screwdrivers - Pliers - Self-adhesive tape - Double-sided tape - Measuring tape - Heating source. Optionally: Bow scale

This example of kit does not include any teaching items such as mirrors, elastic bands, elastic strings, string elbow harness...

9.13.2. Selecting a bow

9.13.2.1. Selecting the bows limbs fitting (for take-down bows)

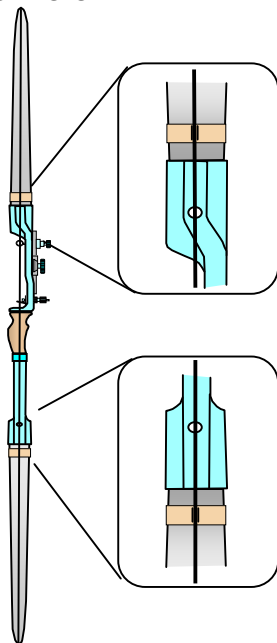
Entry-level bows are not fitted with an accurate limb adaptation system. Some of them even have a simple limb receiver made of plastic. Hence it is advised to check that the limbs are tightly attached to the base of the riser.



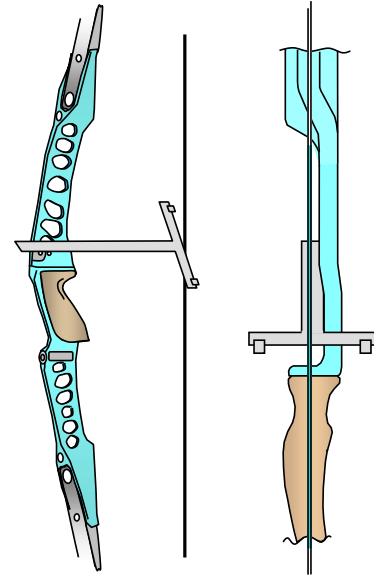
The limbs should move as little as possible.

9.13.2.2. Bow straightness

With the bow strung, stand the bow vertically and position yourself so that you can look from the string side of the bow. Visually the string should line up down the centre of both limbs and the riser. If the string does not line-up down the centre of the limbs and riser at the same time it is highly possible that the limb installation in the riser was wrong, or there is a defect somewhere.



Alternatively you can use the following check that is also related to the centre shot; i.e. the arrow shaft passing in the centre of the riser.



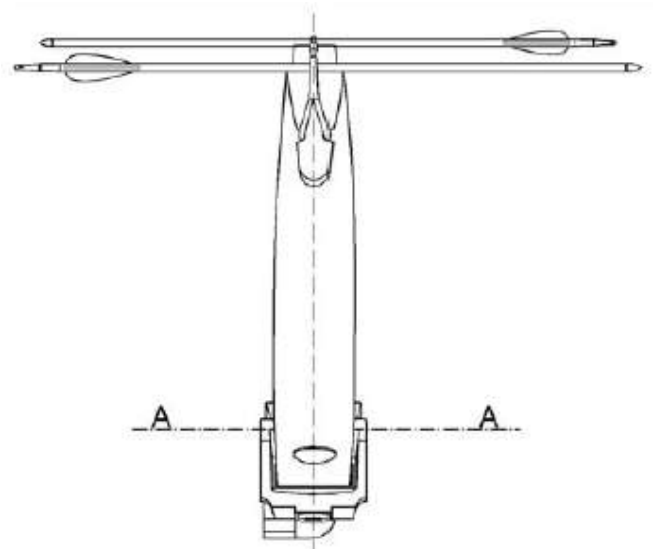
When the bow square is placed against the inside of the bow window at arrow level, the string aligned down the centre of the riser should be seen as parallel to the long edge of the bow square.

For both tests, be accommodating with an entry-level bow!

9.13.2.3. Limb straightness

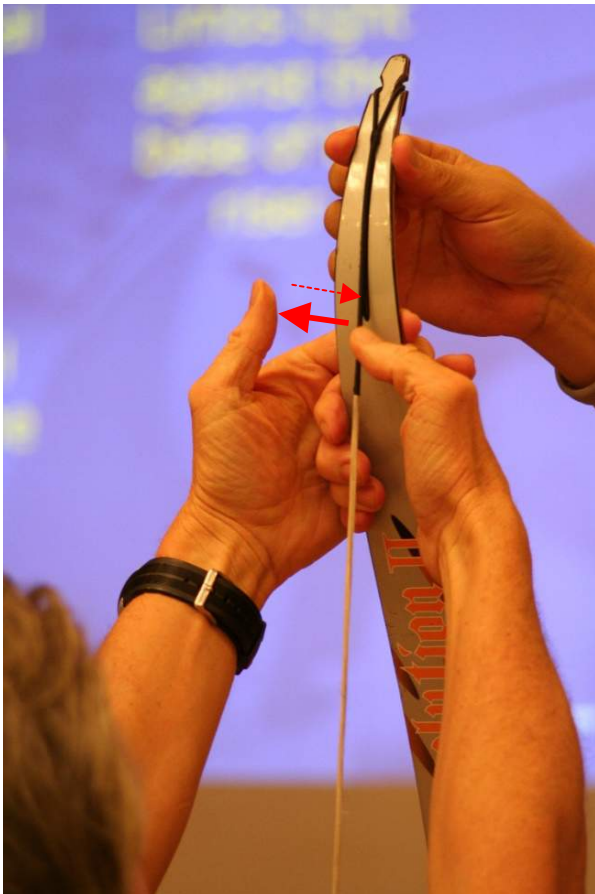
There are two simple checks to be sure that the limbs are not twisted:

Check #1 - With two arrows lightly wedged between the string and limbs at the ends, as shown below.



The arrows must be close to parallel.

Check #2 - The symmetrical return of the string into the limb groove. See below.



Both tests can be wrong due to lateral movement of the limbs on the riser. Do not expect perfect results on most entry-level bows.

A twisted limb on an entry-level bow can usually be straightened out using the following process:

1. Check in which direction the limb has to be straightened out. Then take it down.
2. Dip a long length of the limb in hot water for at least 5 minutes.
3. With a pair of gloves or pieces of rag, take it out of the water and counter twist it.
4. Hold the counter twist under a cold water tap for at least 30 seconds.
5. Wipe with a rag during the final cooling
6. Put back the limb in place on the riser.
7. Put the string on and redo the control.

You will likely have to redo the above process a few times before getting the limb straight.

9.13.2.4. Vertical string resistance

If you are undecided between some different models of bows that are similar in height and weight, you can make your choice using the following comparison.



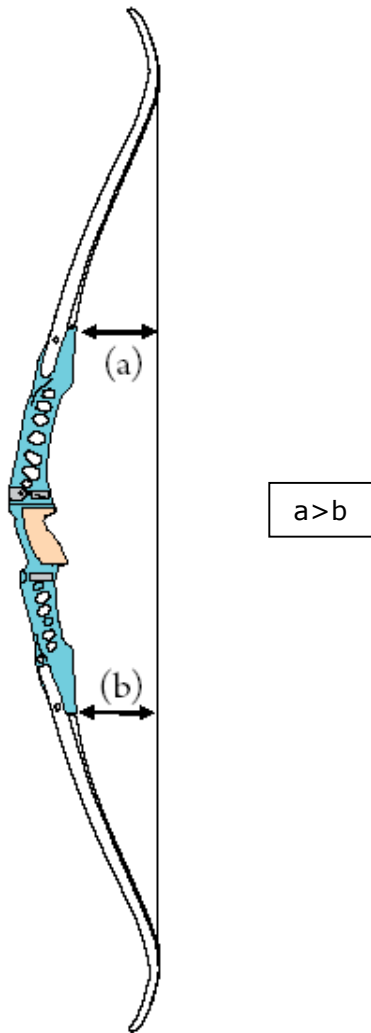
Block the riser, and move the string up and down. The model showing the best vertical resistance should have your preference. It will allow better vertical groups from the novice, by being more forgiving with the little changes of pressure at the bow hand and string grip.

9.13.2.5. Tiller

For a bow to be efficient both limbs have to work in unison. Upon the separation of the arrow from the string:

- If the top limb is ahead of the bottom one, the arrow exits pointing downward
 - If the bottom limb is ahead of the top one, the arrow exits pointing upward
- In both cases, the arrow will "porpoise".

To generate the synchronisation of the two limbs, the makers usually produce the bottom limb a little heavier than the top one. This weight difference distorts the geometry of the bow as reported in the illustration below.



that, usually, you cannot adjust the tiller. Hence just use the original one and set the nocking point (the lower part of the nock) about 1cm above square. Further details on nocking point height are covered in the section 9.11.5.

9.13.3. Selecting and fitting the arrow rest:

There are many models of arrow rests available. For entry-level archery, plastic rests work best because they are more forgiving than those with a metal arm on which the arrow rests.



A popular and satisfactory type of rest

To extend the life of such a rest, cut the curve end at the level of the Red line.

Hunting-type rests made of dark rubber-like plastic are more resistant, but the arrow usually rubs on these rests and after a while the fletchings become marked or damaged.

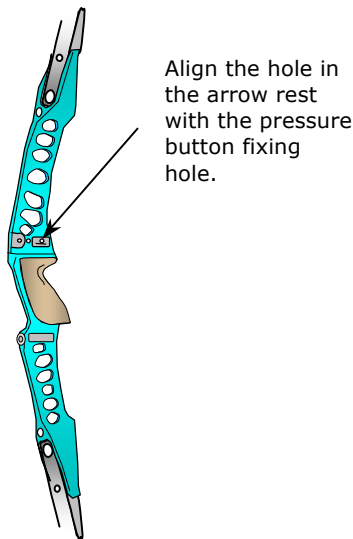


Because most entry-level bows are not fitted with a pressure button, the arrow-rest must have a lateral spacer for the arrow.

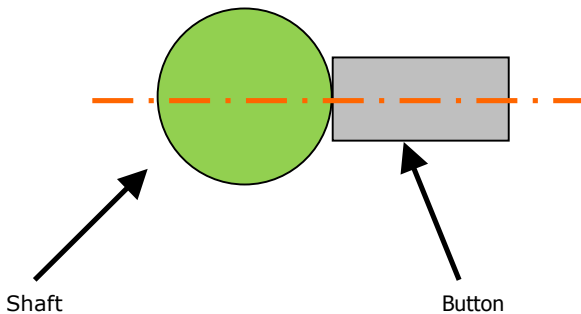
When the arrow rest is used in association with a pressure button, make sure that the hole in the arrow rest fits exactly over the corresponding hole in the riser during installation. If these two holes are not lined up the arrow rest may foul the pressure button plunger negating the efficiency of the button's operation.

The reason for this difference is that the archer applies more pressure to the lower part of the bow, since the bow hand and string grip are below the centre of the bow (particularly with 3 fingers below the arrow). Hence the bottom limb is stressed more than the top one, and has more distance to run back. This is one of the reasons for a high nocking point (to decrease the stress on the bottom limb, and stress a little more the top one). To cover this longer distance, the bottom limb must return faster back to the original position than the top one. The normal difference between the measures of distance (a) and distance (b) is a little less than half a centimetre for a bow used with one finger above and two fingers below the arrow.

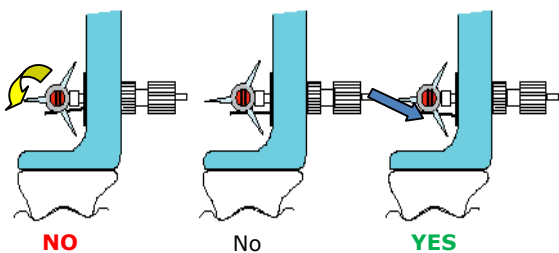
The first challenge with setting tiller on an entry-level bow, is that it can be used with different string grips (3 fingers at about 4cm below the nock, 3 fingers just below the nock, 1 finger above and 2 fingers below the nock). Due to this difficulty, an "intermediate" tiller that is higher than the manufacturers' recommendation should be set: the distance (a) about ¾ cm greater than the distance (b). But the second challenge with an entry-level bow is



Also, the arrow rest should be installed so that the arrow shaft is centred on the plunger button (in height).



If you decide to use a flipper-rest or any kind of plastic rest with a straight/horizontal rest surface for the arrow, make sure that the arrow rest arm does not slope down away from the bow. If it does, the arrow may slip down the arm and fall off the rest during the draw.

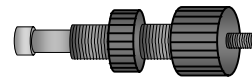


The arrow rest arm should be sloping slightly in toward the bow. This will help keep the arrow up against the pressure button or riser during the draw.

9.13.4. Pressure button:

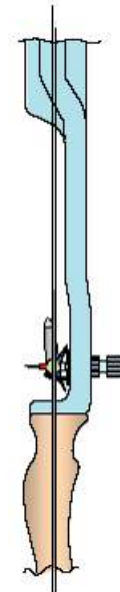
A pressure button, sometimes called a "plunger button," fits into the riser allowing the arrow to rest against the small end, which acts like a shock absorber for the arrow.

If the riser has the facility to fit a pressure button, install one as it could allow for better arrow flight.



Refer to the WA level 2 coaching manual to set it properly. On an entry level bow, strive to set up the button as follows:

- The pressure should be in the middle range of the stiffness of the inner spring
- The tip of the button should be such that the arrow shaft is in the centre of the bow. On an entry-level bow, the end of the shaft close to the point, can be very slightly out (left for a R/H archer)

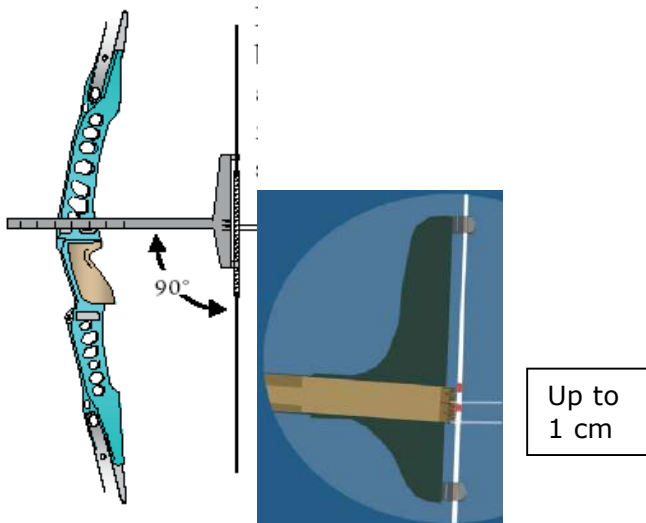


9.13.5. Initial nocking point setting:

Using a bow square (also called string or bow gauge) clipped to the string and lightly resting on the arrow rest, the lower part of the nock should be above square with the rest arm:

- Approximately 10 mm higher if the bow will be used unsighted, with the archer's three fingers about 4 cm below the nock.
- 5 to 6 mm high if the string will be drawn with one finger above the nock and two fingers below the nock.

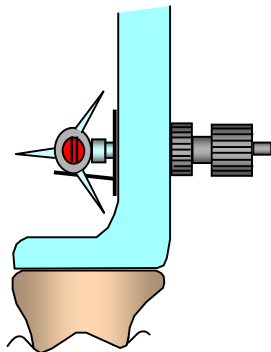
If the bow is to be used with various students using both string grips, it is better to use the higher 10mm nocking point position, or maybe an average measure of 8mm on the string. With this setting, the back of the arrow will pass above the arrow-rest, reducing the risk of the fletchings hitting it and causing the arrow to have an inconsistent flight.



9.13.6. Arrow selection

In section 9.3. several suggestions have been made regarding the selection of the arrow material, spine, length and nock. Now some words about the fletching.

Larger fletchings may cause some problems in getting them to clear the arrow shelf or the vertical part of the riser during the initial stages of the arrow flight. On the other hand, smaller fletchings may not give sufficient stability to the arrow during its flight.



It is better to use standard sizes:

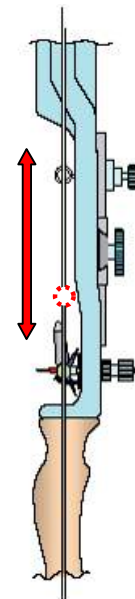
- Length (2 ¾"), or a little longer (up to 3")
- Height 1/2"

Note: Big and colourful fletching make finding arrows a lot easier when they miss the target and are in the grass!

9.13.7. Fitting the sight:

Affix the sight such that the sight moves vertically along the bowstring. A simple test consists of moving the sight pin from the top to the bottom of the sight rack and comparing its position with respect to the string at both locations to ensure the rack is lined up with the string.

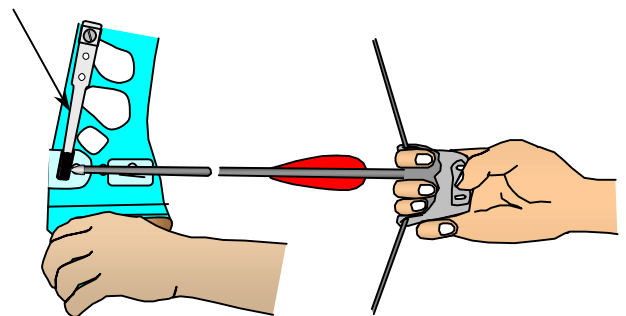
For the first shots, have the centre of the sight ring aligned on the string as shown below:



9.13.8. Clicker:

A clicker is a draw length check for the archer, when the novice has good form and their draw length is consistent the coach may invite them to fit a clicker to their bow. The clicker is a tool that helps the archer expand the upper torso at full draw and, hopefully, release during this expansion.

Clicker (draw length check)



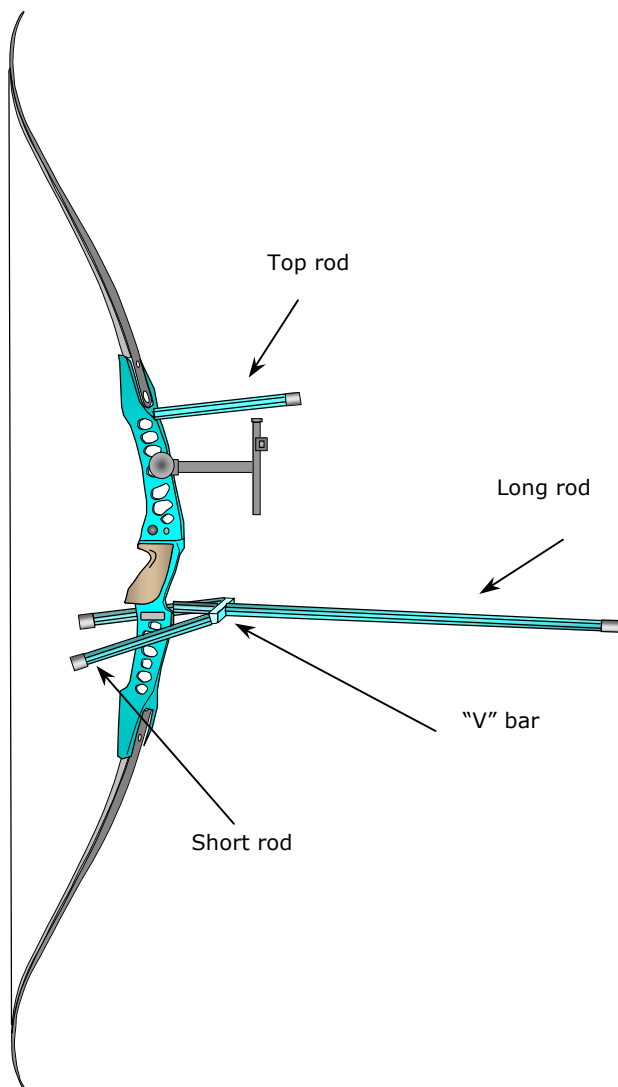
Using a fully adjustable clicker makes it easier to accommodate any draw length change that the novice may encounter as they develop.



The extended clicker on the left is fitted under the sight base, while the one on the right is set on the sight bar; hence it is more for level 2.

9.13.9. Stabilisation:

The drawing below shows a bow with an example of a stabiliser setup for an advanced archer.



9.14. HOW TO SET UP AN ARCHERY RANGE

WA has published a specific document on this subject. It can be found at:

http://www.worldarchery.org/Portals/1/Documents/Development/Documents/How_to_make_an_Archery_Range.pdf

It is quite common to start with fitting a "long-rod". It is likely that other accessories will be added as the novice progresses to higher levels of competence. The long rod alone helps to:

- Maintain the bow's orientation during the propelling phase;
- Minimize the hit of the string on the bow forearm;
- Avoid the bow leaning backward after release and hitting the head of the novice;
- Better bow hand relaxation (wrist bent down), particularly after the release when the bow moves forward and down.

Note that each attachment that is added will make the bow heavier.

CHAPTER 10: THE DISABLED NOVICE ARCHER

10.1. Introduction

Archery, as a recreational and competitive activity, offers an excellent opportunity for the physically challenged and able-bodied to participate on an equal basis. Thus, every effort should be made to accommodate people with disabilities who are interested in trying or competing in archery. To that end, coaches need to be prepared to adapt equipment in order to best suit the needs of every archer.

With little or no alteration to the equipment, effective shooting can be experienced by those with physical limits in their lower limbs and, with the arrival of compound bows, those with physical limits in upper body function may enjoy the sport. People with other kinds of disability, such as visual or hearing impairment, can also enjoy archery using adapted equipment. There is a wide variety of specialized gear available to assist the physically challenged archer.

Spend some time and talk to the novice about their disability (it is also important to find out what the person can do and/or their disabilities) in order to find out as much as you can about the individual's situation. They are the best person to inform you about any limitations they may have which may affect the way in which you teach or coach them. It may be, for example, that a particular condition means that the person will tire very quickly and lessons should be shorter than normal. If the novice's disability includes some difficulty in communicating, there must be someone who can interpret or help with communication. If you are concerned about any medical issues, then you should consult someone in the medical profession. You may find that you have to adjust either the archery technique or equipment to suit the particular person that you are coaching.

People take up archery for many different reasons and it is useful to find out, at an early stage, what the novice wants from the sport. They may just want to have fun and enjoy shooting. However, if they have aspirations to become an elite athlete and be selected to represent their country at international disabled events such as the Paralympic Games, then the coach needs to be aware of the rules which govern these events.

10.2. Types of disability

There are many people with different disabilities in the world and nearly all of them are able to do archery. These disabilities can be broken down into four main categories:

- Physical disabilities
- Sensory disabilities
- Mental disabilities
- Various illnesses

Within each of these categories, there will be a wide range of different limiting factors. The coach will not necessarily have to know about all these disabilities but will find it easier to look at the way an archer shoots. The following categories can be used to help simplify coaching athletes with a disability:

- Archers with limited or no use of arms
- Standing archers with some balance problems
- Archers with a visual impairment
- Archers with mental disabilities
- Archers shooting from a wheelchair
- Archers shooting from an ordinary chair or stool
- Archers with communication difficulties
- Archers with a combination of difficulties

10.3. Archers with limited use of arms

10.3.1. Bow arm

10.3.1.1. Prosthesis

If the bow arm is amputated, the archer can be fitted with a prosthesis that has a device to hold the bow. They may well have one which is used for normal everyday tasks and which can be adapted for this purpose.



A bow arm prosthesis strapped to the bow.

10.3.1.2. Strapping

If the bow arm is very weak or the novice has no grip in their fingers, the bow can be strapped to the hand. This strapping has to be very tight in order to keep the bow in the correct position but should be checked frequently to make sure that it is not cutting off the blood supply to the fingers.



Making use of strapping to hold the bow

10.3.1.3. Elbow Splint

If the bow arm is too weak to hold the weight of a bow with the arm held out towards the target, an elbow splint can be used.



An elbow splint supporting the bow arm

10.3.2. Drawing arm

10.3.2.1. Prosthesis

If the drawing hand, wrist or a part of the forearm is missing, a prosthesis can be fitted as in 10.3.1.1. This can have a hook fitted which hitches to the string. The novice twists the forearm in order to release the hook from the string.

With a Compound bow, the system illustrated below is an option.



Trigger activated by the opening of the angle of the elbow joint

There are two popular alternatives in case of a more severe amputation.

A release aid attached to a body harness and activated either by the rotation of the top body, or by a pressure of the jaw on the trigger.



Trigger activated by the change of the orientation of the top body

Alternatively, the novice can draw the bow with their teeth. A number of archers do this. A piece of leather is attached to the string on either side of the nocking point. The archer holds this with the teeth to draw the string and opens their mouth in order to loose the arrow. This "mouthtab" needs to be checked frequently as the archer will bite through it eventually.



An archer pulling the string with his mouth.

10.3.2.2. Release aid

If the drawing arm is weak and there is no grip in the fingers, the method used for many years and still useful for novices is to strap a hook to the hand. The novice hooks this on the string to draw, releasing with a twisting motion. Many archers prefer to use this kind of release aid as it is quite simple to make and easy to use. If the archer does not have sufficient dexterity in the fingers to release in the usual way, a release aid with a trigger can be adapted so that it activates when the trigger is brought into contact with something, e.g. a particular part of the jaw.



An archer using a release aid with a cheek trigger

10.3.2.3. Dexterity

In determining the shooting side of an athlete with a disability, consideration for the specific limitations of the archer is the first priority. Depending on how an archer's strength and control are affected by their disabilities, they may shoot better with one hand than the other, regardless of which eye is dominant. Therefore in order to help the archer shoot from a position where they have the ability to execute a good shot, eye dominance may have to be disregarded.

10.4. Standing archers with balance problems

Balance problems for a standing archer can have a number of causes such as one leg longer than the other, polio, one artificial leg, etc. There are a number of solutions to this. The archer may well have a shoe which is built up to compensate for a disparity in leg length. If not, the coach can suggest putting a block of wood, for example, under the shorter leg to create a good, upright stance. If the archer's balance is very poor, which could be a safety issue if they were to fall over when it was windy, it is worth suggesting that they shoot from a chair or stool placed on the shooting line.



Archers using a stool or chair for support

10.5. Archers with a visual impairment

As with all the other categories, this covers a wide range of people. Some will have sufficient vision to shoot in the same way as able-bodied archers while others will have no vision at all. This section is primarily concerned with novices closer to the latter end of the spectrum. Talk to them to find out if they were blind from birth or lost their sight at a later date as this will make a difference to the way they perceive the world. Someone who has been visually impaired from birth may not know what "red" is, for example. Allow the novice to feel all the equipment so that they can paint a mental picture of it.

As safety is paramount for everyone on the range, there must always be a coach or helper for each blind athlete who is shooting.

Very often, initial shots can be made using a "hands on" approach, with the permission of the archer. Physically guide them through the steps of shooting an arrow; draw with them, release with them, and guide the bow hand. Let them get the feel of shooting.

It has often been asked what pleasure is gained in archery for a blind person to such a visual sport. In fact, the archer will develop the ability to know how accurate the shot is from the sound of the arrow's impact. The arrow makes a different noise when hitting the gold rather than the white.

10.5.1. Position on line.

In order to have a consistent stance on the shooting line, visually impaired archers need something which they can feel with their feet. A pair of horseshoes attached to the ground (with target pins outdoors or with tape indoors) will enable them to place their feet inside them and be in the same position whenever they return to the shooting line.



A feet location device to help visually impaired archers feel their shooting location

10.5.2. Sighting

The most popular sighting method for beginners to have them use a tactile sight. There are other systems, such as the IRIS system that involves transmitters and an earpiece, but they are generally not appropriate for beginners due to cost, inconvenience and potential interference with the archer's balance.

10.5.2.1. Tactile sights

A very basic tactile sight can be as simple as a camera tripod with the adjustable handle in a position to press on the back of the knuckles. A plastic container filled with water hung from the lower cross strut of the tripod gives it enough stability to resist moving or falling when the archer presses against it. With a little creativity, the precision of this arrangement can be improved, but the contact on the back of the bow hand is the important thing.



Tactile Aiming Aid for a left handed archer

Proper use of a tactile sight controls the elevation of the bow, hence the distance the arrow will travel, as well as the side to side travel. It is important to remember when adjusting the sighting aid that it is moved away from where the arrow has gone, towards the target point, rather than "following the arrow" as with a visual front sight. More sophisticated tactile sights are available and additional advice can be sought from the International Blind Sports Association (IBSA).



A specialised tactile sight that can be finely adjusted using a "click action" adjustment mechanism

10.5.3. Assistance

All visually impaired archers, when using tactile sights, will require an assistant to tell them where their arrows are going so that sight adjustments can be made. After the end is shot, the assistant will guide the archer back to the waiting area before scoring and collecting the arrows.

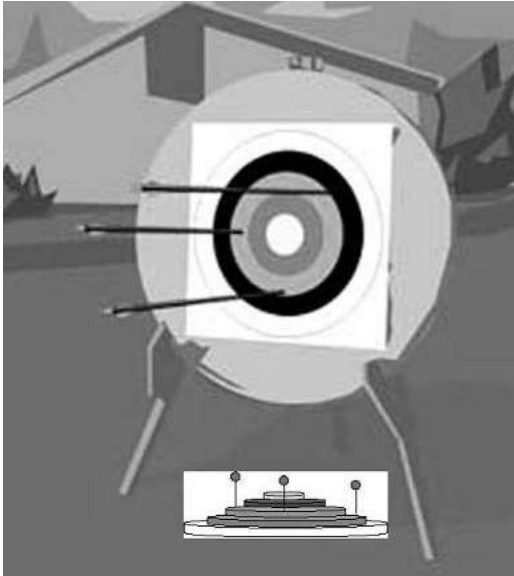
The assistant can only adjust the sight in between shooting ends; if the sight needs adjusting during the shooting end the archers have to change it on their own.



Assistant adjusting a sight in between shooting ends

10.5.4. Scoring

Because the archer still needs to have a sense of where their arrows have gone, he can be accompanied to the target, of course paying attention to the possible dangers that may be found on a shooting range. In the case that the archer cannot walk to the targets, the scorer can push round-head pins into a circular piece of foam to represent the positions where the arrows have struck the butt. The archer can then feel where the arrows have gone.



Pins pushed into a miniature target indicating the arrow locations. The spotting target can be flat or made using pieces of foam built up so it is easy to tell the difference in the rings.

10.6. Archers with mental disabilities

Owing to the diverse nature of mental disabilities, each prospective archer must be assessed individually basis to determine the best course of action. Each mentally challenged archer will most likely require individual attention 100% of the time. If there is only one coach in the club, the archer's parent or another volunteer may be trained as an assistant to look after this individual. Helper or not, the mentally challenged archer must follow directions. If no helper is available, see if the archer can return at another time when they can receive the attention they require. Even if there is no helper, if an archer can behave, they can participate, but safety must always come first. These archers may have physical disabilities as well which can be addressed in the usual way but they are also likely to:

- Have a short attention span
- Become easily frustrated
- Show extreme emotions

Tremendous patience is required as instructions may have to be repeated many times. The archer is also likely to:

- Turn around suddenly at full draw
- Run up to the target before the signal for arrow retrieval has been given

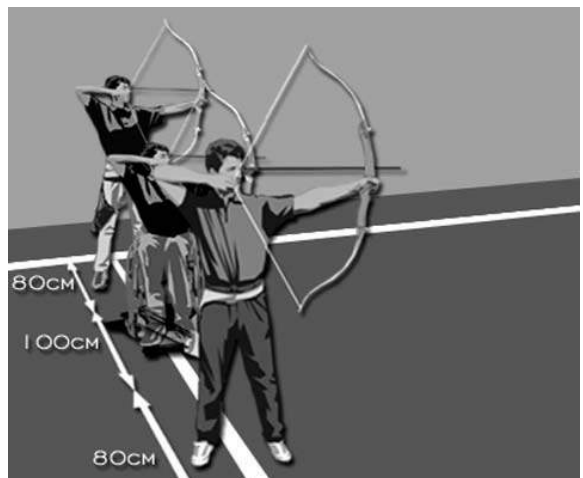
In extreme cases, it may be necessary to decide that safety considerations preclude the person from taking part.

10.7. Archers Using Wheelchairs

10.7.1. Chair position

The wheelchair should be placed so that the archer's shoulders are in the same orientation towards the target as for a standing archer. Just as a standing archer's feet position can be at 90 degrees to the target or angled towards the target, so the chair can be at 90 degrees to the target or be angled towards the target if the coach feels that this is beneficial. Make sure that the archer applies the wheelchair brakes while they are on the shooting line. Outdoors, where the ground may be uneven, try to ensure that the archer has all four wheels in contact with the ground so that the chair is stable.

Extra room must be allocated to a wheelchair archer on the shooting line.



Extra space on the shooting line to accommodate a wheelchair

10.7.2. Archer's sitting position

Sitting balance varies considerably with wheelchair users. Those with very poor balance will benefit from a chest or lap strap to gain the extra support required for drawing the bow. Even those with better balance may wish to use a body strap initially until they have gained sufficient confidence for the coach to remove it.



A wheelchair archer using a body strap.

10.7.3. Equipment

If the archer has no disability in the upper body, the only equipment change that may be necessary is a shorter bow than usual because they are closer to the ground.

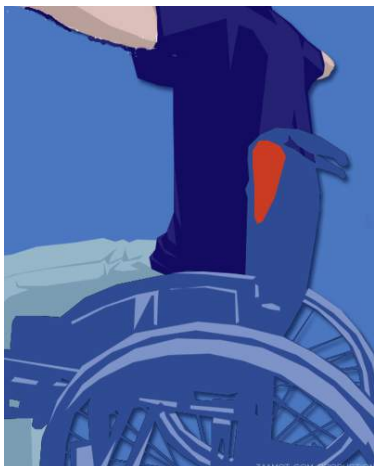
The archer can place a small pad of foam or rubber just in front of the wheel closest to the target so they can set the bottom limb tip down between shots and rest their bow arm.



The chair can be at 90 degrees to the target, like here, or be angled towards the target, like the stance of a standing archer.

Those subject to severe spasms in the legs may wish to have their legs strapped.

The chair back should be below the shoulder blades in order that the muscles used to draw the bow are not restricted. In order to obtain optimal results, the archers must position themselves exactly the same in the chair for each shot. The coach can assist the archers to find some points of reference and teach them to check their position often against those references.



Coaches must assist the archers to find some points of reference on the chair.

The archers will have a tendency to lean back away from the target to compensate for a lack of balance as they draw the bow, particularly as they tire. This form error may also cause problems with string clearance at the chest and the wheelchair. To counter this issue, archer can lean on the chair back for more stability.



Bow rest

With a stabilizer, when the bow tips forwards on release, it will tend to hit the wheel of the chair. Some form of padding added to the wheel will help to prevent damage.



Padded wheel

10.7.4. Stringing the bow

Many archers using wheelchairs string their own bows. This is usually done by putting the stringer on the bow and then looping it round the back of the chair. The archer can then push forward on the bow riser in order to tension it and put on the string.



Bracing a bow from a wheelchair.

10.7.5. Shooting form

In most cases, shooting form is the same as for able-bodied archers but, often, the draw will start higher because of the archer's position. Other form modifications will only be required if the archer has additional difficulties with hands or arms. See section 10.3

10.7.6. String clearance

One of the difficulties experienced by archers using wheelchairs, particularly when shooting at the shorter distances, is clearance of the string against parts of the chair which are nearest to the target, in particular, the wheel. String clearance is an issue for the novice and must be considered to ensure no damage is caused to the bow and the arrow flight is not impeded. If the string is impeded by a part of the wheelchair the arrow goes upwards, which is a serious safety concern.



For beginners, it is important that there is string clearance from the wheelchair or arm-rest.

The following alternatives can be tried to help with this.

- Remove the arm rest of the chair on the target side.



In this case, just remove the arm rest.

- Remove the hand rim from the wheel on the target side or replace the wheel with one without a hand rim. This spare wheel may be kept especially for archery.
- Cant the wheels slightly. Most wheelchair users will know how to do this on their particular chair.



Canting the wheel could solve this issue



Passable pathways on an outdoor archery range

- Place a board under the cushion in the chair, or change to a thicker cushion, to raise the archer slightly.
- Get the archer to sit more towards the target side of the chair. Make sure they move their whole body and rather than just leaning towards the target.

10.7.7. The chair back

The archer with poor balance will need to get some support from the back of the chair. It is better if there is a slight sag in the back of the chair rather than having it very taut. As mentioned above, the height must be sufficient to give the archer support but not so much that it restricts the movement of the shoulder blades. In competition, the archer must not support his or her bow arm on the back or handle of the chair while shooting.

10.7.8. Scoring and collecting

Indoors, wheelchair archers will often choose to score and collect the arrows themselves, although they may have difficulty pulling out arrows in the higher part of the target. Outdoors, it is difficult to push chairs across uneven grassy fields so they will need someone to score and collect arrows unless smooth pathways have been constructed.

At outdoor competitions, often other people on the same target or another volunteer will score and collect for an archer using a wheelchair.

10.7.9. Some points to remember

Try to talk to the archer at their eye level, not always standing above them. Discuss changes you wish to make in the chair position and let the archer make them, if possible. Remember that, even in competition, archers with very little manual dexterity (such as tetraplegics) are allowed to have an assistant to nock their arrows and adjust their sights so it is quite permissible for you to do this, if the archer wishes.

10.8. Archers shooting from an ordinary chair or stool

While most will require a stick or crutch in order to be able to walk, these archers are likely to have more stability than archers using wheelchairs. Since they have their feet on the ground, they will have a much firmer base. Normally, the archer leaves the chair or stool on the shooting line throughout the session so that they do not have to keep repositioning it. The main purpose of a chair or stool is to give the archer the stability which they lack when standing unaided. The archer should be positioned on the seat to emulate, as far as possible, a standing archer. The height of the chair or stool is usually critical and advice may need to be sought from a physiotherapist to find the optimal position. The archer will be unlikely to require support from a chair back (unlike the wheelchair archer) and can be taught in the same way as an able-bodied archer.



A disabled archer using a seat without any back support

have to bring someone with them who can interpret.

10.10. Archers with a combination of disabilities

It is very common for someone to have more than one of the disabilities detailed above. For example, tetraplegics will be confined to a wheelchair and will have impaired use of hands and arms. In these cases, aspects of more than one of the above sections will need to be employed in order for the person to shoot.

10.11. Other medical issues

Although not strictly classed as a disability, there are a number of medical conditions which an archer may have which the coach should be aware of. Conditions such as asthma, epilepsy, haemophilia, rheumatism etc. may affect one of your novices. Talk with beginners before the first session to make yourself aware of any such conditions. Consult someone in the medical profession to become aware of the appropriate course of action to take in should something happen, for example, if one of your archers had an epileptic seizure.

10.9. Archers with communication difficulties

While athletes in this category may be able to shoot in exactly the same way as able-bodied archers, the coach will have to modify their methods of teaching in order to be able to communicate effectively.

10.9.1. Archers with hearing impairment

Depending on the severity of this condition, various steps can be taken. For example, an archer that can lip read may only need to see the coach's lips for the majority of the instruction. Alternatively, it may be necessary to write down specific words or instructions, backed up by gestures. It is very important, from the safety point of view, that the archer is able to know when it is safe to shoot and/or collect the arrows. A visual signal may be necessary if the audible signal usually given is not appropriate.

10.9.2. Archers with speech impairment

Many of the same principles apply as for the hearing impaired. If the coach has too much difficulty understanding the archer, they may

10.12. Conclusion

Embrace the opportunity, should it arise, to coach archers with a disability. It can be very rewarding for a coach to see the enjoyment that a disabled archer can have in their shooting, particularly if there were some difficult challenges in adapting archery to suit the novice.

CHAPTER 11: PHYSICAL DEVELOPMENT

REGARDING THE VOCABULARY:

This chapter uses several specific terms and phrases in describing the physical actions, processes and consequences of the exercises below. As these terms are not specific to archery, nor are they necessarily relevant to the other chapters in this manual, a glossary has been provided at the end of this chapter as a reference for these particular terms.

INTRODUCTION:

In this chapter warm-up techniques and exercises to develop an archer's physical capacities - cardio-vascular, body control, body balance and strength - are discussed.

Archers are athletes and, as such, they must train much as any other athlete does. To reach the highest levels of performance, this training must be functionally specific and directly related to their own sport discipline, to its technical aspects, and in particular the biomechanical and metabolic needs which are required by the discipline itself.

The objectives determined by the physical preparation must also correspond to the real needs of the novice, taking into consideration factors such as their current fitness level and ability to train.

As a general statement, the archer's requirements can be described as follows:

- Good cardiovascular fitness so the archer can train or compete for extended periods without tiring.
- Accurate control of the vertical posture from the head to the feet.
- Control of the horizontal musculoskeletal components used in the execution of the shot process.
- The ability to maintain the proper body alignment: shoulders directly above the hips and feet. (*)
- Good flexibility and mobility.
- Excellent conditioning of all receptors (sensory perceivers) which allow a high degree of precision and for long periods of time.

(*) See section entitled "The importance of keeping the shoulders and hips directly above the feet" in chapter "6.11.1 Aiming Complementary Knowledge"

A fundamental part of the physical preparation in archery is represented by the three "psychomotor" spheres: motor, emotional and intellectual. Research shows that it is crucial to use a balanced combination of physical and coordination-based training exercises for optimal skill development.

The so called conditional physical qualities (strength, resistance and stamina) must support and improve the archer's efficiency in terms of duration or precision with respect to the technical action.

Enormous strength and stamina are not necessarily the main goals in improving the athlete's conditioning, but this does not mean that general physical fitness should be neglected. In fact, the athlete's base fitness forms the foundation for the development (sooner or later depending on the methodology) of specific archery skills.

Therefore we can define the archer as an organism that self-regulates with continuous adaptation controls. In other words, the archer can modify his or her actions to adapt to any internal or external changes occurring during the shot process. Archery is an activity requiring the ability to perceive and interpret incoming information from multiple sources (physical, emotional, intellectual, meteorological, etc.) and react in a coordinated, considered and timely fashion. The incorporation of the bow complicates the reactions required as the archers must take into account the interactions between themselves and the bow as well as the bow/archer unit as a whole.

The ability to react to situations and sensations (sensory or physical) increases as the athlete's skill level improves.

A variety of physical skills and strengths are needed for archery, especially if the training is targeted at young people with

growing bodies and a still-developing neuromotor system.

In addition, varying and alternating training exercises is important to allow continuous and measurable improvements in conditioning and coordination without the risk of developing one muscular pattern while neglecting others.

Equilibrium or balance, another key element in archery, is directly linked to:

- The degree of postural control, coming through the whole proprioceptive system (internal stimuli);
- The quick and effective (postural) adaptations of the oto-vestibular system (*organ in the middle ear that controls body position according to its spatial movements*). This organ senses and then signals the changes needed in order to find the proper posture and muscle engagement required to function well in response to varying external situations;
- The strength to readjust, in a very short period of time, the body's status through proper and specific muscular contractions.

The exercises that develop the ability to maintain or recover good balance need a high level of focus on the part of the novice while the exercise is in progress. This attention has to be mainly directed to the signals coming from the body itself. Developing good balance is a crucial factor in the general evolution of a novice in a sport requiring precision while executing both physical and technical movements through an action.

The proposed exercises for developing, refining and consolidating the ability to maintain and/or recover the equilibrium normally involve all three of the previously listed factors. This means that they are all engaged, simultaneously, to re-create the starting conditions or to achieve the objective of recovering the proper body axis.

These exercises are not an exhaustive list, but a selection suggested as a starting point for a good and balanced training program.

Also the knowledgeable coach should feel free to adapt and change the exercises to best suit the athletes they're working with.

To the lecturer or reader:

If, or when, you have some new and interesting exercises, please send them to the WORLD ARCHERY office for inclusion in these documents.

11.1. WARM-UP

The physical activities shown below are presented under two main groups.

- General physical exercises using common processes and tools as in other sports;
- Specific physical training which involves shooting a bow and arrow.

Although entry level archers use light weight bows, it is a good idea for coaches to include a warm-up routine at the beginning of the session. Aside from creating a good habit; the exercises will also prevent injuries. The following is a suggestion of how the level 1 coach can organize a warm-up session, one of many that could be presented.

This particular example involves several common warm-up components:

- Cardio-vascular exercises;
- Movements of general warm-up;
- Stretching;
- Warm-up through effort producing movements – an introduction to strengthening;
- Oriented warm-up, i.e. simulations such as using an elastic resistance band;
- Specific warm-up, i.e. shooting arrows.

Archers should not put on any part of their equipment, especially their quiver and chest guard (if any), while preparing for warm-up.

11.1.1. Cardio-Vascular exercises

It is suggested that the warm-up start with the athletes participating in light cardiovascular exercise, such as jogging, jumping jacks or even a brisk walk.



After a few minutes of light cardio, the warm-up progresses to other exercises, for example:

Leg Crossing



Alternate passing one leg below the other one

In addition to being an excellent general warm-up exercise, leg crossing (pictured above) strengthens the core and the pushing muscles.

11.1.2. Movements of general warm-up

Warm-up exercises must to be done prior to stretching exercises in order to loosen up the muscles and ensure good blood flow.

11.1.2.1. Torso warm-up

Torso Twisting

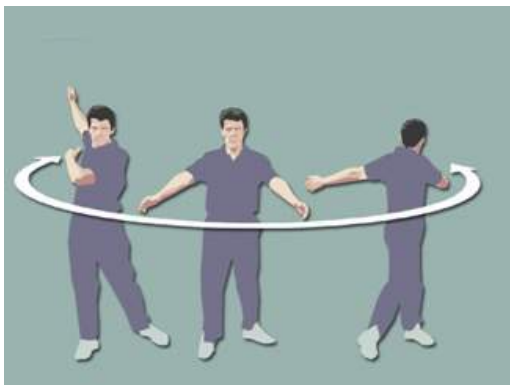
First step:

Let the archer stand on both feet with arms spread to the sides. The torso, pelvis and legs are kept still. The extended arms are balanced from left to right in the horizontal plane at different heights. Hands are kept relaxed and heavy.



Second step:

Pivot the torso and hips in a turning movement. Hands and arms stay balanced at different heights, relaxed and heavy, merely following along with the motion.



Torso rotation

Third step:

Keep the torso rotated for several seconds on one side, while turning the head from side to side three times. The head must be in an up-right position. Repeat on the other side.

Bent Over Trunk Twist

Instead of twisting the torso upright, this exercise can be done bent over.

Have the novice stand with their arms horizontally extended to the side, and their knees straight but not locked. Start the exercise by bending the trunk forward. With a horizontal torso (bent at the hips) twist so that the left hand reaches for the right foot (and touches it if possible) and then reverse for the right hand to the left foot. The arms stay straight throughout and the hands travel through a long arc from roughly straight up to reaching for the opposite foot.



This exercise is done alternately to complete a set of 6 to 10 repetitions with smooth transitions with no pause between sides.



Alternatively, one hand to the opposite foot

Hip Rotation

Instructions:

Have the novice stand with their hands placed on their hips and then rotate the hips in clockwise and counter clockwise direction. Complete 6 to 10 rotations in one direction first before doing the opposite direction.



Torso circles

Instead of rotating the hips, the novices can rotate the upper body as the Mexican women's team is demonstrating below.



In this variation, the shoulders make a circle above the hips and feet, first clockwise, then anti-clockwise. Some movement of the hips to maintain balance is natural.

11.1.2.2. Leg warm-up

Knee Rotations



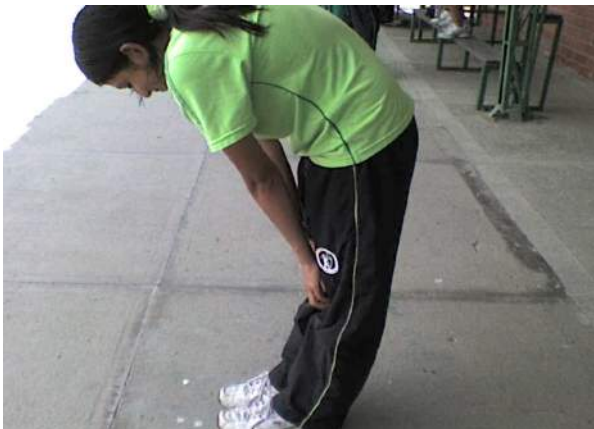
The athlete bends their knees slightly, then makes circles with them in the air above their feet, 6 to 10 repetitions going clockwise, then 6 to 10 anticlockwise.

Tiptoe Squats

The novice places their feet side by side, then rises to a tiptoe position (up on the toes). From this position they slowly squat down as low as possible while maintaining balance.



From the squat position, the novice slowly rises to a standing position again, then presses the knees lightly backward, letting their heels touch the ground.



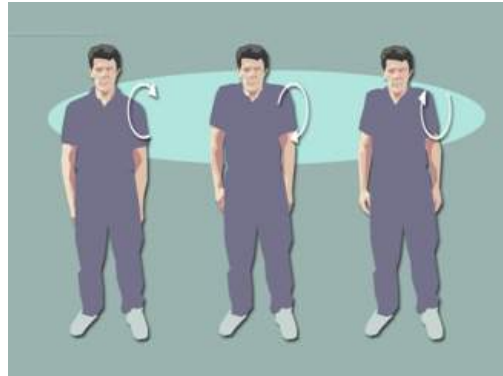
The novice should perform a set of 6 to 10 slow, controlled squats.

11.1.2.3. Shoulder warm-up

Shoulder Rotations

Instructions:

From a standing position, with their arms down at their side, have the novice move their shoulders in the biggest circle possible, clockwise for ten rotations, then counter clockwise for ten.



Shoulder rotation

The goal here is steady-paced, large shoulder circles rather than quick, small circles.

From this point on, associating breathing with the warm-up exercises will help regulate pace and focus. In this case:

- inhale while rotating the shoulders up;
- exhale on the rotation down.

Pivoting Arms

Instructions:

Have the novice position the upper arms horizontally at shoulder level with the forearms square to the arms: one up and the other one down. Rotate the forearms up and down, as shown in the illustration below.



Pivoting arms

11.1.2.4. Elbow, wrist and finger warm-up

Rotations of the Elbows & Wrists, and Fingers

Instructions:

Have the novice start this exercise by putting their palms together with their arms straight out in front of them. (Position #1)



Position #1



Position #2

In a continuous sequence, curve the fingers, bend the wrists, flex the elbow, and bring the hands inward to the chest while rotating the elbows at the same time (position #2).

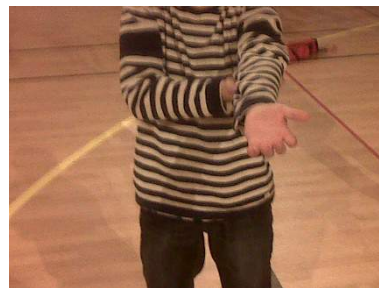


Side views

Then have the novice reverse the motion to finish with their hands back in the starting position.

Elbows, wrists and fingers can also be warmed-up through separate exercises. Some examples are listed below.

Forearm Circles Around the Elbows



Instructions:

Stretch the left arm horizontally out in front of the body. Place the palm of the right hand below the left elbow. Bend the left arm and rotate the left hand toward the body. Pass the left hand inside the enlaced arm, then straighten the arm out again. Reverse the process to return to the starting position. Complete a set of 10 repetitions and then perform the exercise from the start with the other arm.

Wrist Rotations with Hands Clasped

Instructions:

Start with hands clasped, upper arms parallel to the ground and lower arms in a vertical position.

Let the novice rotate the wrist in clockwise and counter clockwise directions. Complete a set of 10 rotations in one direction before switching to the other direction.



Wrist rotations

Finger Warm-ups

"Finger Flicks:" Warm-up the fingers by rapidly opening and closing the hands.



Rapid hands opening and closing

"Piano Playing:" moving the fingers quickly in the air as if playing an invisible piano.



Piano playing

Perform either exercise continuously for 30 seconds before moving on.

11.1.2.5. Neck warm-up

Note: Be aware that rotating the head in a circular motion is not always recommended; hence we have not included it here.

Neck Extension and Flexion

Instructions:

For this exercise, have the novice start with their head upright, looking straight ahead and with their shoulders relaxed (Position #1). They then let their head tilt forward into neck extension, where they are looking at the ground (Position #2). Returning slowly to Position #1, they pause briefly before tilting their head backwards so they are looking at the sky or ceiling in neck flexion (Position #3).



Position #1



Position #2

Position #3

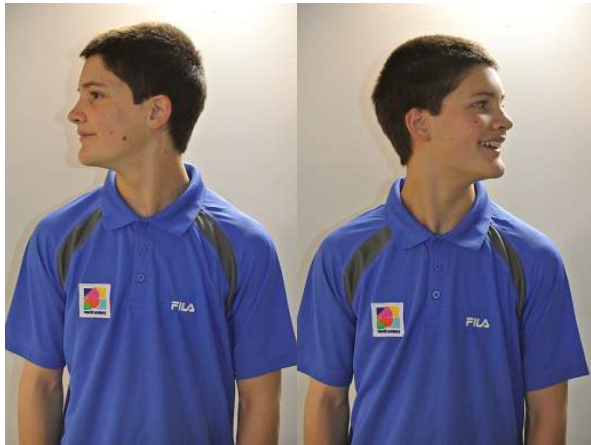


For this exercise, the novice should breathe in while moving the chin upward and breathe out while lowering the head down towards the chest. Complete 10 cycles before moving on to the next exercise.

Turning the Head Right, Centre and Left

Instructions:

Have the novice start with their head facing forward. They then turn their head to the direction of the shoulders, alternating between left shoulder and right, with a brief pause at the starting position.



Head turn

The novice should inhale while turning to one side as far as possible and exhale while turning to the other side.

Neck Bending Sideways

Instructions:

Starting with the novice's head upright and facing forward, have the archer bend his neck sideways alternating between left and right sides. The idea of the exercise is to bring the ear towards the shoulder on each side.



Lateral neck bending

Lowering the shoulder opposite to the direction of head canting introduces a stretch to the movement, which is the subject of the next exercise.

All of the previous three neck exercises help loosen tight muscles around the neck and shoulders.

11.1.3. Stretching

In addition to aerobic and strength capabilities, it is important to consider and to continuously develop the flexibility and the articular ability of the archer.

A definition of flexibility and articular ability is: *"The absolute range of movement in one articulation or series of articulations achievable during a specific action with the assistance of a partner or a gymnastic apparatus"* (Gunnarson 2001).

This definition states that flexibility is not something generic but is specific to a defined articulation or series of articulations. In general, people are not naturally flexible to the same degree in all areas of their body. Flexibility or good articulation in a specific area of the body does not necessarily guarantee flexibility elsewhere.

Good articulation in the upper body does not always mean good articulation in the lower body

There are many quantitative variables that produce some general conclusions about a novice's likely overall articulation and flexibility.

Gender: women are generally 10%-15% more flexible than men.

Age: young people have a superior degree of plasticity due to the characteristics of the skeleton and of the tendinous-ligamentous apparatus, along with the internal temperature and the viscosity of the interstitial liquids of the body. For this reason, an adequate warm-up is very useful to obtain the maximum degree of articular mobility by the novices.

Obviously, the development of the articular ability must be mainly orientated to the muscular zones that need it to better perform specific sport actions. For instance in archers, it is the pectoral muscle that allows, or limits depending on the stretching capability, the alignment of the shoulders following the extension of the back muscles.

This does not mean that the "non-primary" zones for specific sport actions should be neglected, but, obviously, the ability to obtain high level performances involves a rather emphatic specificity.

In almost all situations it is necessary to identify the antagonist muscle to the operative motor action. In opposition to a muscle operating a traction, or producing a stretch, there is one that must (for obvious reasons of equilibrium) release and comply with the mechanical processes occurring in that specific muscular zone. This muscle is called the antagonist and it must be the target of primary focus during the training to increase articular freedom in the area.

During an archery practice, the areas where it is necessary to operate with particular care to obtain the maximum of mobility, are:

- The neck;
- The shoulders;
- The entire spine;
- The hands and the fingers.

And to a lesser degree the hips (for disciplines that encounter uneven footing).

Stretching should be done only when well warmed-up, because it is safer to stretch warm muscles than cold muscles.

The stretch itself should take place during each exhale in smooth motions, with no jerking or bouncing. The novice should stay relaxed and not force the stretches more than 70 - 80% of what they can do.

Have the novice hold the stretch on each exhale for at least 10 seconds for small muscles, 15 seconds for average muscles and 20 seconds for large muscles.

An isometric effort (muscular contraction without any movement) before stretching is another good idea.

The following is a good group of stretching exercises for novices.

11.1.3.1. Torso stretch

Back Stretch with Enlaced Elbows

Place the left elbow inside the right one. The left forearm wraps around the right one to allow the hands to enlace together.



Enlaced elbows

Push the elbows forward, and then lean the top of the body forward. The novice moves the elbows as far as he/she can in any direction and feels the stretch associated with each elbow position.

General Body Stretch in Pairs

Facing each other, the novices place one hand on each shoulder of the other. Then they step backward until their torsos are parallel to the ground.



Spreading their feet a little wider than shoulder width, the novices twist in alternating directions.



Vertical Overall Upward Stretch

Extend the arms up with enlaced fingers and hands positioned palm-up. The novice pushes up as high as they can. Hold for 15 seconds.



Side Bending in Pairs

The novices stand side-by-side facing the same direction and clasp hands or grab each other's wrists. Bracing their inner feet against each other, they lean away from one another as shown below.



Side Bending / Side Stretching

Instructions:

The novice stands with feet shoulder width apart. Bend the torso sideways with one arm stretched upward (position #1). Reverse for the opposite side (position #2).



11.1.3.2. Shoulders

Posterior Shoulder Stretch

Instructions:

- a) Push an elbow against the opposite hand for 15 seconds.



Isometric push forward of the right arm

- b) Stop the isometric effort and cross the legs with the opposite leg to the stretched side in front.



Posture for a better stretch of the back shoulder

- c) Pull on the elbow while twisting the body by turning the hips in the opposite direction to the stretch. Hold for 15 seconds per arm. The novice should feel the stretch in the upper arm and the posterior shoulder.

Back-of-Shoulder Stretch in Pairs

The novices stand side-by-side with their right feet together toe-to-heel and legs overlapping (see image below). Taking each other's left hand, they lean away from one another to stretch the left shoulder. Reverse and repeat for the right shoulder.



High Elbow Stretch

Instructions:

As shown in the picture below, have the novice place a hand on the opposite elbow behind their head.

- a) Have them push the elbow upward against the opposite hand for 15 seconds.



Isometric push upward of the right elbow

- b) Stop the push and cross the legs with the leg from the stretched side in front.



Shoulders and sides stretching

- c) Pull the elbow for 15 seconds. For a better stretch, push the hips toward the stretched side. The stretch should be felt in the shoulder and the body side. Do the same for the opposite arm and side.

Medial Deltoid Stretch

Have the novice clasp their hands behind the back. The Yoga name of this posture is "Cow Head."



Medium deltoid stretching

If the novice cannot grasp the fingers, have them pull the elbow that is pointing downward with the opposite hand, as shown in the picture on the right hand side.

Hands Clapsed Behind the Back, Fingertips Toward the Neck.

Have the novice join their hands (palm against palm) behind the back, with their fingers pointing down. Ask them to flip their hands upward as illustrated below.



Joined hands behind the back

Front-of-Shoulder Stretch in Pairs

One novice stands in front of the other, looking away with their hands together behind their back. The second novice gently raises the hands up. The novices must communicate well to avoid injury from overextending the lift.



11.1.3.3. Chest stretching

In Pairs

One novice stands in front of the other with their hands on their hips. The second novice takes the other's elbows and gently squeezes them together.



11.1.3.4. Neck stretching

Nape and Trapezius

The "Pigeon Neck" consists of an upward stretching of the neck while flattening it out at the back, bringing the chin in and lowering the shoulders. This is a good warm-up exercise for the thorax expansion of the archer.



The "Pigeon neck" an upward nape stretching

Trapezius

Similar to the previous exercise, "Pigeon Neck", except the neck is stretched obliquely.

- Push the head against the hand for 15 seconds.
- Stop the effort and lower the opposite shoulder.
- Only one or two fingers should be used for stretching, as a vigorous pull could hurt the muscular fibers and/or tendons. Maintain the stretch for 15 seconds on each side.



Trapezius stretching

Nape and Upper Back

- 1) Push the head into the hands for about 15 seconds while breathing naturally.
- 2) Stop the effort and bring the elbows together.
- 3) Let the back curl under the weight of the arms and hold the stretch for 15 seconds. Accompany this bending and stretching with a long and deep exhale.



Nape and back stretching

11.1.3.5. Some legs stretching

Hamstring and Calf Stretch (Rear part of the legs)

With one foot planted on the ground and the other a short distance in front, have the novice grab the toe of the forward foot, bending at the knee as necessary. Alternate between pulling up on the toe for a calf stretch and straightening the leg for a hamstring stretch.



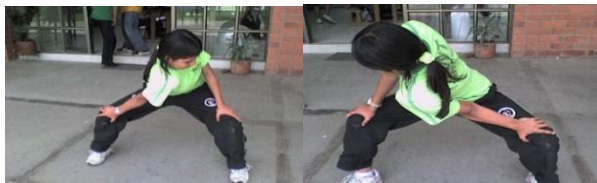
Quadriceps Stretch (Front thighs)

The novice grips one ankle with their hand and pulls or holds the lower leg off the ground. Bringing the heel towards the buttocks and pushing the hip forward and knee back will deepen the stretch.



Elbow presses in between the legs

With a straight elbow press the knee gently to the side, while at the same time turning the trunk to the opposite side.



At the conclusion of every shooting session, the above stretching exercises are also good as the cool-down activity.

11.1.4. Warm-up through effort production

Introduction to Strengthening

Because archery is based on effort production from a stable and strong foundation, it is essential for the coach to make time to suggest ways in which the novices can develop their strength. Due to the limited number of weekly entry level classes available to most archery clubs, the best time is often after the warm-up and before shooting.

This section on strengthening contains exercises that can be conveniently integrated into a shooting session. In particular, those that do not require any apparatus, or only require a stretching band - an essential item in archery education. Many entry level coaches also use an elastic resistance band to show novices strengthening exercises they can do between archery classes.

11.1.5. Directed warm-up with rubber band

As noted in the introduction, many exercises with a rubber band or tube can be undertaken during warm-up. Nevertheless in this section, only “directed” exercises are outlined; i.e. situations in which the novices have to implement physical efforts and activities that are similar to the act of shooting, but without a bow. Most archery coaches conduct some shooting simulations with an elastic band or tube before shooting with the bow and arrows.

Draw simulation with the Rubber Band around the String Elbow and the Bow Hand

Have the novice start with a high pre-draw, and then, letting the elastic band slide through the fingers of the string hand as needed, cycle through the following:

- a) a draw from the above shoulder level while inhaling;
- b) a let-down below shoulder level while exhaling;
- c) a draw from below shoulder level while inhaling;
- d) a let-down above shoulder level while exhaling;
- e) Repeat starting at a) for 15 cycles.



Elastic band around the string elbow



Oriented warm-up of the string shoulder

Shooting simulation with an elastic band

Instructions:

Have the novice carry out the shooting process using an elastic band in place of a bow. Ensure that the working muscles maintain their tone after the release of the elastic band.



Shooting simulation with a rubber band



The coach should check and assist each novice with their shooting form. Have the novice perform the task with their eyes closed in order to have them focus on the feeling of the shot.



Shooting simulation eyes closed with a rubber band

11.1.6. Shooting warm-up

This is the final warm-up phase and is often implemented using a blank buttress.

During this phase review what was taught during the previous practice session. After this review, the coach will either choose to either teach a new skill or to reinforce the previous one.

If the decision is made to continue working on a previously learned skill, it is a good idea to incorporate the circuit of cut-out target faces from the Standard Teaching Process in the shooting warm-up.

11.2. CARDIO-VASCULAR DEVELOPMENT

Although archery is known as anaerobic a-lactic activity (i.e. one that does not produce lactic acid), good cardiovascular efficiency provides an excellent foundation to the archer.

During competitions and training sessions (except in the case of very specific training situations) the heart rate should never reach particularly high values. If the heart rate does rise significantly, it is most likely due to emotional factors and not the required metabolic effort.

An efficient cardiovascular system allows a faster and more effective recovery through the faster elimination of the residues of energy production generated by continuous and repetitive efforts; therefore it delays fatigue. In addition, good circulation enables faster heart rate stabilisation, creating a more consistent and optimal shooting state for the archer.

Aerobic activity is anything that elevates the heart rate in a free-breathing environment as for instance running, cycling, fast walking, rowing and sport games such as basketball, football, handball, etc. Furthermore, such an activity is only considered aerobic when the heart rate is between 50 and 80 percent of the participant's maximum heart rate.

Through a simple formula (called the Karvonen formula) it is possible to determine, simply and precisely, the proper heart rate required to attain a specific degree of aerobic benefit.

$$\mathbf{((HR\ max - HR\ at\ rest) \times\ percent\ intensity) + HR\ at\ rest}$$

In the above formula, "HR max" is the participant's maximal Heart Rate, and "hr at rest" is their heart rate at rest.

For example, for a healthy novice who has a maximum heart rate of 180 bpm (beats per minute) and a resting rate of 70 bpm, if he has to work at 60% of his maximal cardiac efficiency the formula becomes:

$$((180-70) \times 0.60) + 70 = 136\ \text{bpm}$$

In this example, the heart rate derived from the Karvonen formula should allow the novice to easily and with minimal risk proceed with the selected physical activity at a consistent and bearable rhythm for a long enough period of time to provide positive effects and increase his aerobic fitness.

Exercising with too high a heart rate risks injury, delayed recovery and wastes too much energy for the individual's objectives. Conversely, working in a range that is at too low a level does not produce any kind of cardiovascular adaptation.

Ideally the activity selected for the aerobic training portion will be varied regularly, i.e. alternating running sessions with cycling sessions and with other sports. This is especially true if young novices are involved as the variety will help them improve their level of motor coordination.

Aerobic training can be done before or after a shooting session. For instance 15 to 20 minutes of running at a pace defined by the Karvonen formula would not cause any trouble to the novices at the beginning of a training session. Better still, a prolonged warm-up benefits all levels of performance by improving flexibility and increasing the body temperature (making muscular contraction easier as well as other positive impacts) in concert with improving cardiac fitness. Alternatively, a physical training session performed at the end of a shooting session yields many advantages with respect to organic and muscular recovery.

If the novice already has a good level of physical efficiency, it is possible to start with 10 minutes of running and then increasing the duration to 30-40 minutes over a few sessions. If the novice is not receptive to this increase, or the novice is not trained in the exercise, it is better to start with a fast walking session and progress from there.

The novice should not consciously increase their speed; any increase will occur automatically as the cardiovascular system becomes more efficient. As the novice's fitness improves, their heart rate for the same level of physical exertion and the engagement will drop. Consequently to maintain the pulse at the preselected rate,

the novice will automatically increase their pace.

The objective is to maintain a constant heart rate at the preselected target during the physical training session.

Periodically, have the beginners take their pulse during the exercise session to gauge their intensity level. Typically, the easiest location for taking a pulse is the carotid artery on the side of the neck. Take care not to press too hard on the carotid artery to avoid an inaccurate reading. Count the number of beats for 6 seconds and multiply that number by 10, or count for 10 seconds and multiply by the number of beats by 6 to get the number of times the heart is beating per minute. If the pulses of the beginners are within their target heart rate zone, they are right on track. If not, adjust the exercise workload until they get into their selected range.

As soon as clear improvements appear, the novice should increase their intensity level, for example from 60% to 65%. Continue increasing the challenge as appropriate until the novice reaches 80% of their maximum heart rate.

Keep in mind that aerobic activities can be performed in "circuits" in alternation with more specific shooting exercises. This kind of training is normally utilized to increase the novice's overall fitness. An example of a circuit would be 6-arrow ends alternated with 2 or 3 minutes of running for a number of repetitions to challenge the level of the novice. Aerobic activities can be also utilized, again as a circuit, in alternation with strength exercises, and strength training circuits can also be intermixed with shooting.

11.3. BODY BALANCE

The ability of a novice to maintain a controlled, stable equilibrium for a long time on the shooting line is often a condition that can make the difference, either positive or negative, in the final result. This is especially true in situations that involve rain, wind, unstable ground surface, etc.

Even without any wind, if the novice's body sways, the visual alignments used for aiming are disturbed. The novice usually reacts to this by moving the bow arm in order to bring the sight (or arrow point depending on the aiming system) back to the centre of the target. In the meantime, the body sways back, making the visual alignment wrong again. So the novice moves to regain their alignment and so on, creating a vicious circle in which more and more tension builds in the novice's body. By the end of this scenario, even if the novice releases properly, the arrow impact in the target will be away from the centre because the arrow has been propelled from a different "launch pad".

Also, an unstable body generates only a few, very brief, coordination opportunities between the visual references and the novice's feelings (see Chapter 1). This generally results in a conscious and deliberate release by the novice instead of the smooth, serene release brought about by a perfect follow-through.

In archery, a strong body balance is required in order to keep the aiming eye in a stable special position during the shooting sequence, particularly during the force production period at full draw.

In this section, two aspects of body balance are covered:

- General Body Balance
- Shooting Body Balance

11.3.1. General Body Balance:

11.3.1.1. Body balance exercises on feet without any device:

The following generic exercises have to be implemented at least 3 times per week for a minimum of 4 weeks to be effective. The sessions will typically progress as follows: 30 seconds per exercise in the 1st session - 35 seconds in the 2nd session - 40 seconds in the 3rd session - 45 seconds in the 4th session - 50 seconds in the 5th session - 55 seconds in the 6th session - 1 minute for the following sessions.

Standing on level ground with feet in a line heel-to-toe:



Static posture, feet in line, eyes closed

Start with one foot forward, then repeat the exercise with the other foot forward. Closing the eyes makes the exercise more challenging.

Standing on level ground on one foot:



Static posture on one foot, eyes closed

Perform the exercise once for each foot. Closing the eyes increases the challenge of the exercise.

"The Plane"



The plane, eyes closed

Balanced on one foot, lean forward at the waist with arms stretched out to the sides and the second leg straight out behind. Repeat the exercise, switching which leg is on the ground. Closing the eyes increases the challenge of the exercise.

"Reverse Plane"



Reverse plane, eyes closed

Balanced on one foot, lean backwards with arms stretched out to the sides and the second leg straight out in front. Repeat the exercise, switching which leg is on the ground. Closing the eyes increases the challenge of the exercise.

Static lunge



Static lunge, eyes closed

Take a large step forward, keeping the feet no more than shoulder width apart in the left-to-right direction, and push the trailing knee towards the ground. Repeat with the other foot forward. Closing the eyes increases the challenge of the exercise.

Static equilibrium on the edge of a step

The following set of exercises can be implemented on the edge of a pavement or step. If on a stair, for safety purposes, chose the lowest step. All of these exercises are static; hence the beginners should not walk. The equilibrium on one or two heels exercises could be done with the eyes closed.

a)



Same exercise in both directions with the right foot front, eyes closed



Same exercise in both directions on each foot, eyes closed



On two heels, eyes closed or open



And one heel (do both)



On two points of feet or the point of one foot (do both), eyes closed

Slow continuous walk



Slow and continuous walk

Walk continuously for one minute, travelling only 2 meters.

Slow and continuous rotations



Continuous slow rotation on 1 foot, eyes closed

Standing on one foot, twist at the torso, first to the right, then the left and finishing centred, in one minute. Repeat for the second foot. Closing the eyes increases the challenge of the exercise.

Slow tiptoe squats



Slow and continuous squats on toes, eyes closed

Standing with feet together, rise to a tiptoe position (up on the toes). From this position slowly squat down as low as possible then slowly rise to a standing position again. Closing the eyes increases the challenge of the exercise.

One leg squats



Slow squats on one foot, eyes closed

Standing on one foot, slowly squat as low as possible and then slowly return to the standing position. Repeat the exercise with the second leg. Closing the eyes increases the challenge of the exercise.

Two foot twist-walk



Twist on two feet

Standing on two feet, “walk” laterally by twisting the feet. Only the ankle moves, the hips must be kept in line directly below the shoulders. Move 4 meters back and forth.

One foot twist-walk



Twist on one foot

Standing on one foot, “walk” laterally by twisting the foot. Only the ankle moves, the hips must be kept in line directly below the shoulders. Move 4 meters back and forth. Repeat the exercise with the second foot.

11.3.1.2. Proprioceptive or wobbling boards:

Improve body balance and control by maintaining balance while standing on differently configured wobble boards. A suggested progression is:

- Start with 40 seconds minimum
- Increase progressively to 1 minute
- Have the novice simulate 3 shots without equipment
- Have the novice simulate 3 shots with an elastic band

- Forward-backward
- Left-right



- or, 360°



All of these exercises can be executed with one foot or two feet on a single board, or using two boards.

Also mixed boards can be used, for example one foot on a forward-backward wobble board and the other foot on a left-right wobble board.



The 360° exercise can also be done with a board laid down over an inner tube that is not fully inflated.



11.3.1.3. Body balance exercises with light overloads:

In the standing position the human being is constantly re-centring the body from any direction of swing. To refine this re-centring process, here are some exercises in which the novices tilt in various directions to reach the limit of their balance and hold that position. Make sure that the novices keep the bodyline straight at all times, taking special care not to break at the waist.

Start by doing the exercise with body weight only, then add a light weight held over the head to increase the challenge. The amount of weight held overhead varies according to the ability of the novice. A general target is about 5-8 kg for experienced novices.



11.3.2. Shooting Body Balance

The concept here is to create some instability while the novice is shooting in order to improve their balance and stability on solid ground. This can be accomplished simply by having the novice shoot from an unstable platform.



11.3.2.1. Wobbling in one direction

- a. From the left to the right foot
Demonstrated in the picture above by the athlete on the right. Below is a view of the underside of the board.



- Board size = 40 x 70 cm;
- Fix two partial wooden disks of 83 cm (33") diameter 25 cm apart from each other on the underside;
- Use a non-slip board;

b. From heels to toes
Shown in the image below.



- Board size = 40 x 70 cm;
- Fix two partial wooden disks of a 52cm (21") diameter 50 cm apart from each other on the underside;
- Use a non-slip board;

Some suggestions:

- Keep the partial disks quite short (maximum 12 centimetres high) to reduce the risk of injury in case the novice slips off the board;
- fix the partial wooden disks with screws;
- Prepare partial wooden disks in various sizes (diameters) in order to suit the balance skill of the novices and to create a progression in the level of instability;
- When shooting from natural ground, put a flat board on the ground first as a solid surface for the wobble board to sit on.

11.3.2.2. Wobbling in all directions

This can be achieved by lying a board on an inner tube that is partially inflated.



500-10, or more challenging 480/400-8", are popular sizes of tubes for novices

Some suggestions:

- The inner pressure has to be modified depending on:
 - The balance skill of the novice;
 - The body weight of the novice.
- Choose a large enough tube to avoid the board touching the floor;
- Ideally use a round board, so the corners will not hit the floor;
- Prepare tubes from various diameters (e.g. some 8" and a few 12") in order to fit the balance skill of the novices and to create a progression in the level of instability.

11.4. STRENGTHENING

The development of the archer's strength is a fundamental step of the preparation, both to improve the technical skills, and to guard against injuries caused by the repetitive nature of shooting a bow.

Archery is a sport discipline with a very high need of precision and fine motor control (including the ability to use only the muscle groups required for the specific actions, at the moment required, and with the necessary intensity and duration). Additionally, different parts of the shot sequence require distinct types of muscular contraction or release. Therefore, it is important to have a strength program that incorporates a high degree of archery-specific muscular activity.

On the other hand, a generic strength program involving the whole body must be pursued as well, tailored to the novice's ability level, in order to develop the strength required to support the shooting technique. In fact, many technical actions can only be carried out, or improved, if there is a sufficiently high level of other physical qualities relating to the strength of the student.

Normally strength is defined as the ability to lift or to move a certain weight. This is called a "concentric contraction" and it is, for example, the strength exerted by the string side during the drawing of the bow. The reverse action, an "eccentric contraction" is identified as the opposition of a force in the direction of the action produced by the force itself. For example, letting down from full draw back to the rest position without shooting.

Finally, an "isometric contraction" is identified as the application of a strength action without any kind of resulting movement. For instance, holding the bow out at arm's length is a case where the shoulder muscle is engaged with a muscular contraction without any perceived or intended movement.

There are other aspects of strength training, such as explosive-reactive movements, that are not important to proper archery physical preparation and, therefore, they will not be described or discussed.

From the time the novice lifts the bow up until after the follow-through, many muscle groups are activated simultaneously or in a rapid sequence using the three types of contractions described above.

Performance improvement will come faster using carefully chosen and specific programs comprised of targeted exercises. Bear in mind that, in the majority of situations, muscular intervention is not due to a single muscle, but to a "chain" (a synergistic or consequent action of multiple muscles) often activated with different contraction methodologies.

The strength of a muscular chain is limited by its weakest link. A deficit in a single muscle within a particular muscle group will affect the performance of the routine, and consequently reduce the effect of the whole motoric action.

Controlled strength is an essential component in executing a successful shooting sequence. However, the use of indiscriminate overloads without following the basic rules of strength development can create unpleasant side effects. For instance, if the load and the number of repetitions are not properly suited to the training objectives, not only will the performed action not get the desired results, but it may cause undesired and sometimes serious damage. A common occurrence is when the athlete performs an excessive number of sets or repetitions. Instead of developing resistance or strength, this produces a muscular hypotrophy (muscle loss or weakening) and/or a loss of articular mobility (flexibility or range of motion).

The following are some simple tips to minimize the risk of injuries, aches, inflammation, etc. due to poor handling of the movements or of the load.

- The load used must always allow a "clean" execution, i.e. without any loss of control. In short, the novice must be able to demonstrate complete control of the exercise during the whole routine.
- The pause between each routine/series must allow sufficient recovery to ensure the next routine/series is not jeopardized.
- The working sessions dedicated to strength development must have enough rest time in between for the body to

repair, rebuild and be ready for the next training session.

- Priority must be given to “how” over “how many”. It is better to have fewer repetitions that are technically well done than many repetitions with poor form.
- The correct position of the backbone (posture) is the most crucial of the necessary requirements to produce an efficient movement and, therefore, to obtain the desired results. Correct posture creates the optimal conditions for the entire body to work in.
- Perform stretching exercises that involve the muscle group being worked before, during, and after the session.
- Use a training program where the number of repetitions and the loading intensity are a function of the desired result and the ability level of the novice.

It is very difficult, at this level, to describe fully the difference between the development of maximal strength and the development of resistance strength, otherwise known as stamina or endurance. For the purposes of this manual, maximal strength is generally developed with fewer repetitions (reps) of higher relative loads, while resistance strength comes from more repetitions with lighter loads.

When starting a strength-training regimen, the aim is primarily to develop coordination in load bearing movements by using light weights or resistance that can be easily handled by the novice. Once that has been achieved, the threshold of the physical exertion can be pushed forward using higher loading resistances or weights.

A simple formula is generally used to select the appropriate resistance or load for a student based on their unique ability level. First the student must discover their “one repetition maximal” load (RM). This is the amount of load at which the athlete can perform only one repetition of the exercise due to the high load intensity.

Development of resistance strength (stamina or endurance):

Use a load between 40% and 70% of RM in 3-5 sets of 20-25 reps, depending on the training level of the novice.

Development of maximal strength:

Use loads between 70% to 100% of RM. Usually 3 or 4 sets of decreasing numbers of repetitions are implemented with an increasing load such as: 6-8 reps at 70%, 4-5 reps at 85%, 2-3 reps at 90-95%, and one rep at 100%.

The methodologies for the development of maximal strength are, normally, quite intense during both the physical exertion and the recovery phases. Maximal strength development generates stimulations either on the nervous system or on the metabolic system often leaving the novice exhausted. Attempting technical gestures, such as those required to shoot an arrow, while exhausted or not sufficiently recovered often results in modifications in the tensions and the contraction sequences of the muscles normally used. Consequently, loss of fluidity during the various steps of the shooting sequence may occur. Worse than that, the novice may inadvertently use unusual muscles or muscle groups to compensate for any temporary strength deficit resulting from the fatigue of the proper ones. The consequence is generally a sensorial modification of the posture and of the action itself due to a variation of self-perception. Therefore, it is critical that specific archery training occurs only after sufficient recovery time has passed after a strength training session.

Finally, it is important to note that, for an archer, the physical preparation must be in service to the sport-specific actions and not the other way around. If properly implemented and monitored, a strength training program will be a benefit to the archer, providing a better foundation for the shot and its requisite movements.

11.4.1. Postural body control

Ideally, an archer should shoot from a stable, balanced and erect posture.

To achieve this, the novice must have a strong foundation connected through the feet, legs, hips, back and shoulder all the way to the head with no weak links

The muscles of the feet and legs continuously and imperceptibly adapt their tension to maintain and control the archer's balance.

In the same way, the gluteus and quadriceps (mainly the wide medial) muscles provide stability as far as the thigh muscles are concerned.

In this case, the gluteus muscles have the distinction of being very near to the novice's core and, therefore, are able (even with very small contractions) to balance or unbalance the bow/archer unit.

The back muscles give crucial stability to the novice and generate the required stiffness. "Stiffness" is the level of rigidity and compactness that the muscular-tendinous system generates during loading situations. These muscles dynamically control, easily and without a high level of wasted energy, the posture of the upper section of the body as a whole. The back muscles must be precisely employed, not only to allow correct and efficient operations, but also to avoid risk of injury.

Postural considerations generally take up much of the focus during a novice's first steps, either for obvious technical reasons related to stability and balance or for constructive reasons concerning the development of the novice and of the practice process.

A strong trunk muscular system, in particular the back, is essential to maintaining an ergonomic and effectual posture during the act of shooting. The stable and solid positioning of the other body segments is directly related to the efficiency of the trunk muscular districts. If we imagine the backbone and its muscles as the mainmast of a ship, we see that failures or tension deficit are unfavourable to the correct execution of technical actions.

In addition, an inadequate core strongly increases the risk of injury or pain caused by incorrect postural behaviour resulting from the lack of strength required to support the positions assumed by the novice while shooting.

The positioning of the different body segments (the scapula, the neck, the pelvis and so on) depends on the archer's capacity to generate stiffness.

When possible, it is advisable to introduce some asymmetric exercises using an unstable platform in order for the novice to experience and learn to control destabilising influences.

11.4.1.1. Core exercises on stable support

Static or semi-static postures are the first step in a series of physical exercises designed to build up a solid posture with a high level of proprioception. Proprioception is the capacity to perceive and to recognize the body's position in space and the degree of muscle contraction, even without visual cues. As such, good proprioception is essential in archery.

The object of the following exercises must always be to get the alignment of the ankle-knee-hip-shoulder-head axis as precise as possible (*). These elements must be kept in a straight line as a result of the continuous muscular contractions happening throughout the body.

() One of the basic archery skills that the novice must develop – See Chapter 1 "Activity Description and Archer's Skills" and also section 6.11.1 "The importance of keeping the shoulders and hips directly above the feet."*

As is the case for strengthening, these exercises can be grouped based on the part of the body they target. It is up to the coach to select some of them when preparing sessions. Do not try to do all of them in the same session because it would take too long, leaving no time for shooting. For the first sessions, one or two exercise(s) per targeted body part is enough.

These exercises can be performed in any order. Start with 1 set, then progress to 2 then 3 sets of each exercise with variable

timing (depending on the ability level of the novices). 15 seconds to 1 minute is appropriate for the prone or supine positions whereas the lateral and the three support prone positions should have timing varying between 15 and 40 seconds. Careful monitoring and familiarity with the novices on the coach's part are usually a sufficiently precise method for determining the correct volumes to be used.

These exercises can be performed at the beginning or the end of the training session as part of the warm-up or warm-down. Alternately, they may be used as the central part and main objective of the session.

Prone plank



Prone plank (low and high variations)

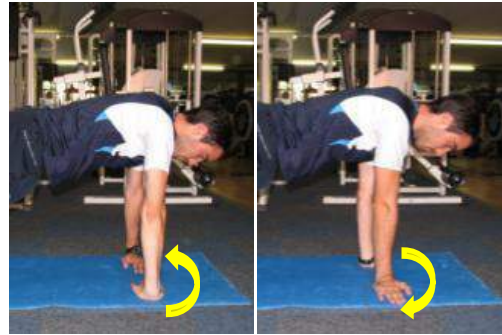
Low prone plank

With toes curled under, elbows under the shoulders, hands touching, raise the body to be a straight line from heels through hips and shoulders to the top of the head. If anything, the hips should be above this line. Hold this posture for the duration of the exercise. See the above illustration on the left hand side.

High prone plank

Similar to the low prone plank, but with hands below shoulders and arms extended. See the above illustration on the right hand side.

Hands turning variation:



High plank, hands turning variation

From the high prone plank position, lift the hands in turn and rotate them from neutral position to pointing inwards, then outwards and repeat for the duration of the exercise.

Tripod prone plank (one hand)

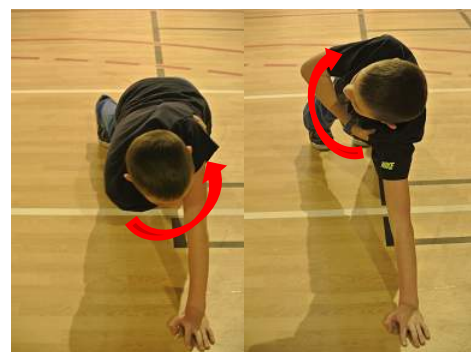
The same position as the high prone plank, but with one hand lifted from the ground. Repeat the exercise once for each hand.



Tripod prone plank (one hand)

Torso rotation variation:

From the tripod plank position, slowly rotate the torso from parallel to the floor to a perpendicular orientation and back.



Torso rotations upward and downward

Tripod prone plank (one foot)

Similar to the low or high prone plank, but with one foot lifted from the floor. Repeat the exercise once for each foot.



Three supports prone posture

Two support prone plank

Similar to the high prone plank, but with opposing hand and foot lifted from the ground. Repeat the exercise once for each foot/hand pair raised.



Two supports prone posture

Low Lateral plank

Brace on one elbow, with the feet stacked one on top of the other, the edge of the lower on the ground. Keeping the shoulder low and pushing the elbow into the ground, raise the hips from the floor to form a straight line from heels to head.



Low lateral plank (regular and elevated feet variations)

To add difficulty, raise the feet onto a support. Three sets on each hand.

High lateral plank

As with the low lateral plank, but braced with a hand on the ground and the arm straight. Raise the free hand or mime the shot process to increase difficulty level. Three sets on each hand.



High Lateral plank with leg raise

Same as high lateral plank, but raising the upper leg to roughly shoulder width from the lower.



Lateral plank with leg raise

Intermediate supine plank on two elevated feet

Brace on both elbows, facing upwards with the feet on an elevated support. Raise the pelvis from the ground to form a straight line from the feet to the head.



Supine plank

High tripod supine plank (one foot)

As with the supine plank but with extended arms and one foot on floor or elevated support, lift the other foot from the support.



High tripod supine plank

Low tripod supine plank on one elevated foot

With shoulders or elbows on the ground, facing up and the feet on a support, lift the body to form a straight line from heels to head, then lift one foot from the support.



Three supports supine posture

Dynamic supine plank

Start the hands under the shoulders, feet below knees. Lift one foot off the ground and slowly extend the leg while raising the hips to the supine plank posture. Repeat for three sets with either foot as the support.



Abdominal exercises

Abdominal exercises are usually classified as core exercises, since they involve the muscle group that allows the archer to maintain the proper ankle-knee-hip-shoulder-head alignment.



Abdominal shoulder lift

Abdominal shoulder lift: starting with the back flat on the ground, and with the hips, knees and ankles all at a 90° angle. Raise the shoulders roughly 8 cm from the floor while keeping the chin away from the chest and eyes looking at the ceiling. Exhale on the lift, inhale to lower. 3 sets of 10 reps.



Abdominal hip raise

Abdominal hip raise: starting in the same position as above, keeping the shoulders on the floor, raise the hips roughly 8 cm from the floor. Exhale on the lift, inhale while lowering. 3 sets of 10 reps.

There are many other popular exercises to strengthen the abdominals readily available on the internet or published in magazines and books. Thus, no more shall be discussed in this manual.

11.4.1.2. Core exercises on unstable support

The concept is to have the novice learn to control their balance while moving one part of the body or holding an unstable posture. These exercises are necessary when the classic postures are not efficient enough for the demands of the activity. In this case, when the novice is no longer being challenged by the exercises above, it is necessary to introduce some more difficult elements in order to create situations where the novice is obliged to reset his motor scheme.

The use of one or more "Medicine balls" or "Stability balls" can be very useful. For the following exercises, use the low range of the implementation recommendations as for the "Core exercises on stable support" in 11.4.1.1. as a guide for duration.

1. Unstable plank postures

It is possible to increase the efficacy of the basic plank exercises by creating a source of instability in either the hand supports, the foot supports or both. The three following images depict possible variations for increasing the difficulty of a plank posture.



Low plank on a ball



High plank on an unstable base



High plank on three balls

2. Balancing on a stability ball

By removing direct contact with the ground and supporting the entire weight on a stability ball, the novice is required to engage their core to maintain balance.



Seated

Sitting on the ball with arms and legs extended requires that the appendages be manipulated from the core to maintain balance.



Prone plane

Lying with the belly on the ball and arms and legs extended and maintaining a straight body position from heels to head requires good core engagement, especially from the back muscles, for balance as well as maintaining full extension.



Supine plane

Lying supine on the ball with arms and legs extended and body in a straight line engages the front core muscles for balance and strength.

Here again the abdominals must be engaged as part of the core muscles.



Abdominal shoulder raise on a ball

Abdominal shoulder raise on a ball: From a "table" position (lower back on the ball, feet at shoulder width or less, knees and ankles at 90° flexion) and keeping a flat back, raise the shoulders towards the ceiling, keeping the chin away from the chest and eyes looking up. 3 sets of 10 lifts.

11.4.1.3. Body control with load in suspension

These exercises voluntarily introduce a loss of equilibrium, (and recovery!), of the entire erect and aligned posture through the contraction of the tibia and fibula muscles. This will enable the novice to recover from a greater unbalancing angle, be it backward, forward, lateral, or a mixture.

One of the strongest advantages of the following exercises comes from their involvement of almost every supporting muscle, working the feet to the neck and everything in between. Every muscular element is engaged in order to maintain a stable posture. Additionally these exercises present a low risk of injury or overloading the backbone with an excess of weight or activity.

The exercises are normally performed with the added weight being proportional to the novice's level of conditioning. For example, young novices generally work with a bar plus round weights varying from 5 to 15 kg.

The degree of load must challenge the novice to work moderately to maintain balance, but be sufficiently light that correct execution and body control can be sustained.

a) Walking

In the early stages, the novice simply walks with a weight held overhead. The primary goal is to maintain an erect posture and stable equilibrium. Three types of walk are proposed below:



Walk on heels only, keeping toes lifted off the ground.



Walk with the weight rolling smoothly over the entire foot from heel to toe



Walk only on the toes of the feet, heels lifted.

These simple walks are done for about 2 or 3 sets of 20 metre "reps." Performing these walks on an incline generates better efficacy in the gluteus region. Alternately if the walks take place in sand, there is better engagement of the foot-leg district (gastrocnemius, fibular, tibial and foot muscles).

Once the novice is able to control these easier walks, more complicated walks can be considered, such as skipping, running with a back kick, running with a front kick, jumps and skips of any kinds and in any directions, with one or both feet. The level

of difficulty increases proportionally to the adaptation. Maintaining posture with an overhead load during a simple movement is relatively easy, while maintaining the same overhead weight at higher speed and/or with large swings of various body segments is much more complicated with respect to coordination and requisite strength.



b) Challenge of balance

This exercise starts from an erect position supporting a weight. The weight must always be at a level commensurate to the ability of the novice, usually between 5 and 10 Kg.

The exercises are normally performed through a voluntary challenge to the equilibrium in the front-back plane or in the lateral plane. The subsequent recovery occurs through a sequence of muscular contractions without losing the alignment of the posture. Imagine a straight line passing through a projection of the novice's centre of gravity on the ground, their core and their head. This line must never be broken. When the novice reaches a high level of skill these exercises can be done on a wobble board or a balance beam.

These exercises can be performed at any time during training sessions, either during shooting sessions or the physical conditioning sessions. The number of repetitions is varies depending on the novice's ability level. Generally 15 to 20 seconds of exercises repeated 2 to 3 times

are enough to produce positive results for a novice.



Challenge to the front-back equilibrium



Challenge to the lateral equilibrium

11.4.2. Strengthening with body weight

In most cases the novice can use a part or all of their body weight for their strengthening routine.

In addition, free-standing exercises, without the use of machines, generally produce better results when proper form is used.

The following exercises are good general exercises and also strengthen the ankle-knee-hip-shoulder-head alignment.

Leg crossing

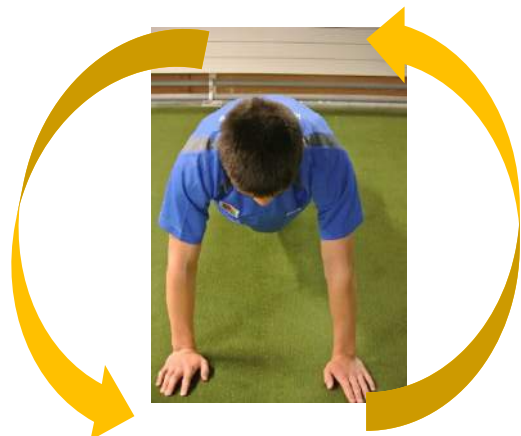


Alternately pass one leg under the other one

In addition to being an excellent general warm-up exercise, leg crossing (pictured above) strengthens the core and the muscles used to draw the bow.

The dial

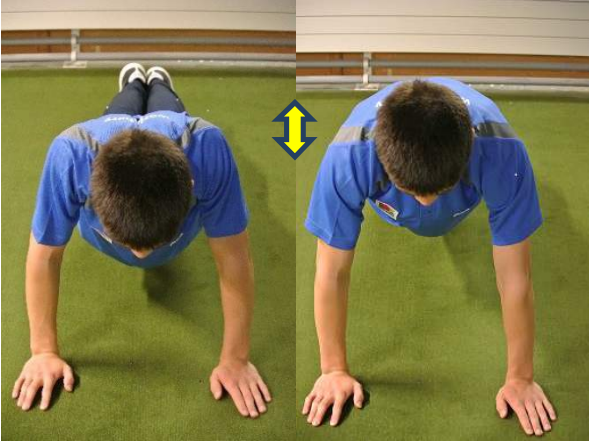
In the position below, ask the beginner to accomplish a tour of dial clockwise on the floor, by moving the hands across the body and keeping the feet still.



Follow it with another tour of the dial, counter clockwise.

Straight arm – Shoulder blade spreading

Starting from a high plank position, alternate between letting the shoulders sag with the shoulder blades squeezing towards the spine, and extending by spreading the shoulder blades away from the spine.



Facilitated push-ups on knees



Starting in a hands-and-knees position with the hands directly below the shoulders, the knees together and a straight line being made from the knees to the head. Tighten the shoulder blades and bend the arms, lowering the upper body until the elbows form a 90° angle, then return to the starting position. Repeat for 3 sets of 10 reps.

Facilitated push-ups on an elevated support



Starting with the body in a high prone plank position and the hands on an elevated support, bend the elbows to 90° and return to the plank position. Repeat for 3 sets of 10 reps.

Push-ups



Starting from the high prone plank position, with hands directly below the shoulders, lower the body so that the elbows are at 90° and then return to the high plank. Hold each position for five seconds. Repeat for 3 sets of 4 reps.

As a variation, widen the hand position as depicted below.



Push-ups on a ball against a wall



Starting with the body in a plank position and the hands on a ball, bend the elbows to 90° and return to the plank position. Repeat for 3 sets of 10 reps.

Arm extension in a bent over posture



Preliminary posture 1:

With the knees on the floor, place the forearms flat on the floor with the elbows directly below the shoulders and the hands directed forward. The thighs and arms should be at right angles with the floor.

Preliminary posture 2:

Without moving the toes, stretch out the legs. The body should be in a position like the one illustrated above on the left hand side.

Exercise:

Move the entire body forward as far as possible until the nose gets close to the floor (the right hand side of the pictures above), then return back to the original posture (left hand side). Repeat for 3 sets of 10 reps.

Triceps extension in a prone plank posture



Start from a high prone plank position with the hands a short distance forwards of the shoulders (left illustration). Bend the elbows to lower the body until the forearms are flat on the floor (right illustration), then return to the starting posture. Repeat for 3 sets of 10 reps.

Triceps wall/floor presses



Position the feet about 30 cm from a wall, lean the back against the wall and place the hands away from the body against the wall. Press the hands against the wall to move the shoulders and upper body away from the wall. Repeat for 3 sets holding one minute per set.

Triceps dips on an elevated support



Supporting the feet and hands on a bench or other support, lower the body with the arms until the elbows are at 90° and then raise to full arm extension again. Repeat for 3 sets of 15 dips.

Shoulder Shrugs



Sitting on the floor with the legs straight out in front, arms straight and hands placed beside the hips, extend from the shoulders to lift the buttocks from the floor. Repeat for 3 sets of 10 reps.

Exercises to improve foot articulation

The following exercises work on the foot articulation, developing the muscular-tendinous apparatus, making them stronger and more toned as well as more mobile. Therefore, in addition to being able to support the archer's weight more easily and for longer periods, the muscles will be able to adapt better to the ground and changing conditions without losing precision in the feedback. The exercises include:

- A series of intra and extra rotations of the tibia-tarsus section (ankle articulation) with controlled moves.
- Pronations and supinations with a stop at the maximum point of articulation.
- Plantar bending.

Below are two example of possible exercises.

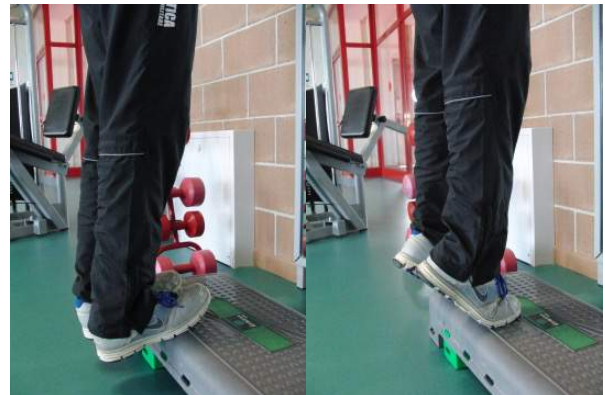


The efficacy of the described exercises is increased if they are done barefoot, or better, in the sand.

Exercises loading the gastrocnemius (calf)

Often called a "calf-raise," this is a simple exercise of maximal extension performed using a simple step. Standing on the step, the athlete allows their heels to drop down as low as possible and then rises onto their toes to maximal height. This exercise is intended to be done "at maximum" repetitions, meaning that the novice ends the series when the burning sensation, during the lift does not allow a full raise. Generally, the exercise is done in 3-4 sets of 20-30 reps.

When the novice reaches the above working volumes with no difficulties, they should increase the challenge by using only one leg at a time. Later they can add either some overload (ballasted jacket, dumbbells or a barbell), or a balance component to the exercise.



Calf-raise starting and finishing position

Exercises loading the leg muscles

Proper methodology suggests starting with exercises using a natural load (i.e. the novice uses only their own body weight). This is due not only to the obvious reasons of safety and protection, but also to allow the novice to learn the posture and body sensations of the unusual working situations. A high degree of postural control is necessary to avoid osteo-articular problems.

As is often the case, the exercises have dual functions: firstly the development of a conditional parameter (in this case the strength) is pursued, and secondly proprioception-postural awareness and improvement (control of the body during exercises engaging medium to high intensities).

All of the following exercises can be executed using additional weights (i.e. ballasted jacket, suspended load or barbell), after the novice demonstrates complete control of the physical gesture and good strength development. The use of unstable platform as shown below is strongly recommended.



Example of use of an unstable platform for Front Lunge

Squat using the body weight only

From a standing position with the feet about shoulder width apart, lower the hips behind the feet until the thighs are parallel to the ground. Note that the back stays straight and the knees do not go forwards of the toes. Perform 3 to 4 sets of 10 to 12 controlled repetitions with 3 to 4 minutes of recovery time between sets. In the image below, the heels are raised on a flat disc.



Squat

Half squat using the body weight only

Squat half-way, using only the body weight, for 4 to 6 sets of 12 to 15 controlled reps with 3 to 4 minutes of recovery time between sets. Notice the heels are raised on a flat disc.



Half squat

Front Lunge

Take a large step forward, keeping the feet no more than shoulder width apart in the left-to-right direction, and push the trailing knee towards the ground. This can be performed as a walking motion or in place. 2 to 3 sets of 12 to 16 steps or reps with 3 to 4 minutes of recovery time in between.



Front lunge

Lateral Lunge

Have the legs wide apart laterally, move the body left and right, or simply up and down in place for 2 to 3 sets of 10 steps or reps with 3 to 4 minutes of recovery time in between.



Lateral lunge

Isometric Wall Squat – two feet

Wall squat in an isometric two-foot stand, holding for 20 to 30 seconds and 2 to 3 minutes of recovery for 2 to 3 sets. As the strength develops, increase the time proportionally to 60 or 90 seconds.



Isometric wall squat on 2 feet

Isometric Wall Squat – one foot

Wall squat in an isometric one-foot stand, similar to the exercise above but with reduced time - starting with 15 to 20 seconds and moving up to 60 seconds.



Isometric wall squat on 1 foot

During strengthening exercises, it is important to control the breathing rhythms. As a general rule, inhale during the less intensive moves i.e. while lowering in a squat, and exhale during force production, i.e. when switching from lowering to raising or during the rise of a squat.

In an isometric exercise, there are no alternating situations of muscular contraction, as the muscles maintain tension throughout the duration. Nevertheless, it is still important to control the breathing rhythm during each exercise. Novices have a tendency to hold their breath during isometric exercises, resulting in an anaerobic effort that produces excess lactic acid, which spoils the exercise.

Since control of the breath is a key aspect in archery technique, implementing a breathing sequence for strength training sessions is natural and reinforces the sport-specific application.

It is also useful to remember that the described exercises must be distributed throughout the week or overall training cycle and not practiced all together in the same session.

Ideally the coach will set priorities for the training sessions (either metabolic, or according to targeted body part/region) in order to plan the novice's adaptations to achieve a primary objective for the single session or for the whole training period. This must be planned according to the competition calendar and specific technical targets.

Exercise loading gluteus from a quadruped position – out-stretched limb

Start in a hands-and-knees position with the arms and thighs at right angles to the ground. Slowly lift one leg, straighten it, and then raise it as high as possible in the air before returning to the start position. Repeat for 3 sets of 10 reps per leg.

The exercise is demonstrated in the following 2 pictures.



Gluteus from quadruped position out-stretched limb

11.4.3. Strengthening with an elastic resistance

Not all novices have access to high-tech workout machines. Fortunately, a rubber strengthening band is sufficient for the novice to get a good workout. For those athletes who do have access to machines, it is still advisable, especially in the initial stages of the physical training, to use free-standing exercises. Specific machines often "drive" the execution of the exercise, reducing its effectiveness.

Using various elastic resistances, or the same elastic held at different distances, the required effort from the novice can be reduced or increased to suit their needs and ability level.

When using an elastic resistance band, 2 to 3 sets of 10 repetitions, or 20 seconds of isometric hold, or any combination of these two alternatives are appropriate.

Exercises for the legs

Exercises loading the leg abductors

Start from a standing position, sideways to a solid support with an elastic resistance band affixed and looped around the ankle of the leg furthest from the support. Pull the outer leg away from the centre line of the body, stretching the elastic band. Repeat for each leg.



Loading the leg abductors

Exercises loading the leg adductors

Start in a similar position to the previous exercise, but with the resistance band looped around the ankle closest to the support. Draw the inner leg towards the centre line of the body, stretching the band. Repeat for each leg.



Loading the leg adductors

As an alternative, each of the previous two exercises can be performed from a seated position.

Exercises loading the tibia and fibula muscles

The following exercise should be performed using a number of repetitions and sets appropriate to the skill level of the novice. The 5 to 10 minutes before starting a shooting session is a good opportunity to work the lower leg muscles to feel the adaptations and become sensitized to the activations required while shooting.

Start from a seated position with an elastic resistance band affixed to a solid support and looped around the toe of one foot. Pull the toe of the foot towards the body, stretching the band, and then relax.



Repeat the exercise for each foot.

Leg extension

Start in a seated position with a resistance band looped around the ankle of one leg and affixed to a solid support or held in one hand as shown below.



Slowly extend the leg forwards using the quadriceps muscle and then return to the starting position.



Repeat the exercise for each leg.

Leg curl

The starting position has the athlete lying face-down on a bench with the resistance band looped around the back of the ankle of one leg with the other end of the band held in a hand as shown below.



The novice bends the leg at the knee using the hamstring muscle and then returns to the starting position.



Repeat the exercise for each leg.

Exercises for the upper body and arms

Most of the following exercises can be done with either both arms (as a symmetric effort, depicted in the first image below) or one arm (an asymmetric effort, shown in the second and third pictures). In the latter situation the entire body control and balance is involved in producing a controlled and smooth movement.

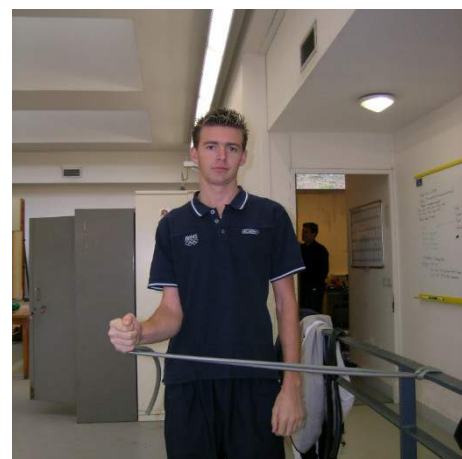
Rotator cuff

Start with the elbows at a 90° angle, close to the body, hands straight out in front, and holding a resistance band in each hand. With a controlled pull, move the hands away from each other as far as possible while keeping the elbows at a right angle and close to the body and then slowly return to the starting position.



External rotation with both arms (symmetric)

This exercise can also be done asymmetrically with an elastic resistance band affixed to a solid support.



External rotation with one arm (asymmetric)

In order to maintain good muscular balance, the exercise should be reversed to challenge the internal rotation as well.



Opposite direction: inner rotation

As an additional challenge, the one-handed variations can be done with the leg furthest from the support holding the resistance band lifted off the ground.

Posterior part of the shoulder and back

Start with the arms straight out in front of the body, shoulder width apart and holding the resistance band in each hand. There should be a small amount of tension on the resistance band in this position. Pull the arms away from each other until they are straight to the left and right of the body. As shown below, the band can be either simply held by the athlete or it can be looped around a support or a partner.



Horizontal opening

This exercise can be done with the hands at various heights, to target different muscle groups, and with either both arms (symmetric as shown above) or one arm (asymmetric). In this latter situation body control and balance is involved to complete a smooth and controlled movement.

Pectoral fly

Loop a resistance band around a solid support and hold one end in each hand facing away from the support and some tension in the band. Starting with the arms straight out to the side, move the hands in forwards an arc until they are straight out from the shoulders and then return to the starting position.



Standing row

Start with the resistance band looped around a partner or affixed to a solid support and one end held in each hand. Stand far enough from the support so that there is a slight tension in the band with the arms extended straight out from the shoulders. Draw the hands back in a line to the shoulders, keeping the elbows at or above shoulder level, and return to the starting position.



Lateral arm raises

Stand on one end of a resistance band and hold the other end in one hand with some slight tension when the hand is level with the hips. Raise the arm laterally until it forms an angle of about 30° above the shoulder and then lower it to the hip level again.



Single arm raise (asymmetric)

If the band is long enough, the exercise can be done with both arms at once by standing on the middle of the band and holding one end in each hand.



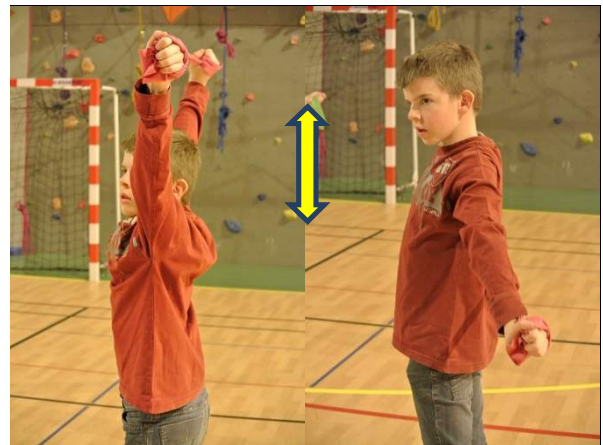
Double arms raise (symmetric)



If the exercise is too difficult to do while standing, it can be implemented from a kneeling position, as shown above.

Lateral arm extensions

Start with an elastic resistance band held in both hands, with the band either slightly in front or slightly behind the body. Extend the arms at hip level so there is a small amount of tension in the band. Raise the arms laterally until they are above the head, keeping the band 2-3cm from the body, and return to the starting position, maintaining tension in the band throughout.



Forward arm raises

Similar to the lateral arm raises, stand on the resistance band, either in the middle or at one end and hold the free ends in one or both hands. Start with the arms straight, slightly in front of the body at hip level and some tension in the band. Raise the arms to shoulder level and return to the starting position. This exercise can be performed with either one hand or both.



Forward arm raise with both arms

Overhead Triceps extensions

Hold the resistance band in both hands and position the arms behind the back, with one arm at the waist and the other near the head. Starting with the elbow at 90° and some tension in the band, extend the upper arm above the head and return to the starting position.



Elastic held by both hands

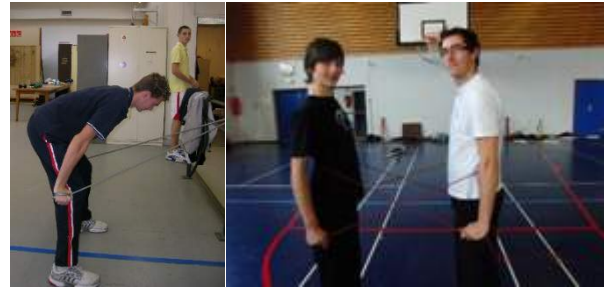
This exercise can also be done with both arms simultaneously if the athlete stands on the band as shown below. In this case, the starting position is with the upper arms at shoulder level and the elbows at 90°.



One end of the elastic locked under a foot

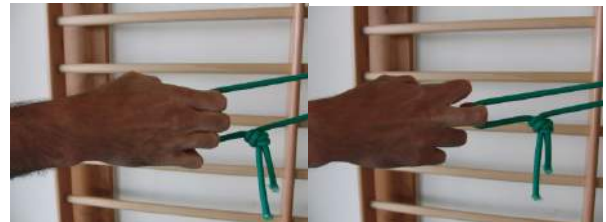
Straight arm pulldowns

Start with a band affixed to a support or looped around a partner at about shoulder level. Stand so there is some tension in the band with the arms straight and extended at shoulder level. Pull the arms down until they are beside the body and then return to the starting position. This exercise can be done with either both or one arm at a time.



Finger flexor muscles

Hold a loop of resistance band with the fingers in a similar grip to what would be used on a bow string. Curl the fingers towards the palm of the hand and then return to the starting position. The loop of elastic can be either fixed to a support or held in both hands.



This exercise can be done with one or more fingers at a time.

11.4.4. Isometric strengthening with a partner*

* *These exercises can also be done using a solid support: Table, Door frame, etc.*

These exercises are designed so that one member of the pair provides an effort and the other counteracts this effort. Only a few of the many possible exercises are illustrated below. Hold the effort 10 seconds during the first session, and smoothly progress up to 20 seconds.

Vertical hand presses

Position the upper arms vertically beside the body and the lower arms horizontally out in front of the body. As shown in the pictures below, the hands of one partner are on top of the other's hands pressing down, while the partner resists the push. Repeat the exercise with the pair switching roles, holding the effort for 10 seconds in each direction.



One partner presses down and the other presses up

Arms rotation / Rotator cuff



The starting position is similar to the previous exercise, but in this case the palms are facing inwards and one partner has their hands inside the others. In the image above, the novice on the left-hand side is striving to move his hands apart while keeping his elbows against his body in an external rotation effort. His partner strives to block any movement through an internal rotation effort. Repeat the exercise with the pair switching roles, holding the effort for 10 seconds.

This exercise can also be done one arm at a time, which requires more body and balance control.

Lateral arm raising/lowering

One partner stands in front of the other with his arms at his sides, straight and slightly away from the hips. The partner behind holds the forearms or the wrists in his hands with his arms straight.



The novice in front strives to elevate his arms using his deltoid muscles while his partner strives to block any movement using his pectoral muscles. Repeat the exercise with the pair switching roles, holding the effort for 10 seconds.

This exercise can also be done one arm at a time, which requires more body and balance control.

Forward arm elevation

In this exercise the partners stand facing each other. One partner holds his arms straight and slightly in front of his body. The partner holds his wrists or forearms in his hands, also with straight arms. In the images below, the novice on the left-hand side is striving to raise his arms in front of himself, while the novice on the right-hand side blocks any movement.



This exercise can also be done one arm at a time, which requires more body and balance control. Repeat the exercise with the pair switching roles, holding the effort for 10 seconds.

Backward arm elevation

For this exercise, one partner stands in front of the other and extends their arms backwards from their body. The second partner holds the forearms or wrists of the first.



In the picture above, the novice on the right-hand side is striving to elevate his arms behind himself while the novice who is on the left-hand side blocks any movement. This exercise can also be done one arm at a time, which requires more body and balance control. Repeat the exercise with the pair switching roles, holding the effort for 10 seconds.

Horizontal backward push

The partners stand an arm's length to one side of each other and place one hand on the back of the other's shoulder or upper arm as shown below.



Both novices push their extended arm backward, working the muscles from the posterior part of the shoulder and the back as well as body control and balance. Repeat the exercise changing the extended arm, holding the effort for 10 seconds for each arm.

Horizontal forward push

The starting position is similar to the previous exercise, but with the hands placed on the front of the shoulder or upper arm in this case.



Both novices push their extended arm forward, working the muscles of the anterior part of the shoulder and the pectorals as well as engaging body control and balance. Repeat the exercise with the pair switching extended arms, holding the effort for 10 seconds for each arm.

Standing Rowing

As depicted below, one of the pair stands in front of the other with their upper arms extended at shoulder level and their elbows bent. Their partner braces the elbows in their hands with straight arms and a solid stance.



The novice in front strives to push his elbows backward, while the novice who is behind blocks any movement.

This exercise works the muscles from the posterior part of the shoulders and the back as well as body control and balance. Repeat the exercise with the pair switching roles, holding the effort for 10 seconds in each direction.

This exercise can also be done one arm at a time, which requires more body and balance control.

Many other exercises can be implemented by a group of novices with little or no equipment. Below is another valid example. The partners are standing back to back and twisting the trunk to pass a stone or weight from one to the other. Many other exercises are available on the Internet and innovative and effective variations are often invented during training sessions.



The exercises contained in this chapter are intended to help the novice precisely “feel” their own body (proprioception), either at a segmentation level, or at postural level. The specific workout machines normally used in gyms have the advantage of isolating, with some precision, specific muscular areas. However, they also quite often prevent the user from adapting other muscle groups to the movement. As a consequence, the creation of more complex kinetic chains and adaptive motor schemes is blocked.

For this reason, these exercise machines produce better results with more advanced archers, who need only specific “corrections” in particular muscle groups. In such a case, the machine helps them to achieve more than they would using of the normal exercises.

11.4.5 Effects of the various strengthening methods

Load as % of the maximal (RM)	Maximum possible repetitions (slow)	Few repetitions at fast rhythm	Many repetitions at slow rhythm	Many repetitions at Fast rhythm	Few repetitions at slow rhythm
85% -100%	95% - 100% = 1 90% = 3 85% = 4 - 5	Not possible at 90% of RM	Not possible at 90% of RM	Not possible at 90% of RM From 80% to 90% strength and speed	Strength
70% - 80%	80% = 6 – 7 70% = 8 - 10	At 80% Power At 70% Speed	At 80% Hypertrophy	At 80% Resistance	Reduced improvement or reduction of strength
50% - 60%	60% = 14 – 16 50% = 18 - 20	Hypertrophy and strength	Little effect on strength, high hypertrophy, resistance	Strength, speed and resistance	Strength and Hypertrophy
30% - 40%	>20	Speed	Resistance	Muscular endurance	No effect

11.4.6. Specific or shooting strength

The development of strength on the archery range uses the same progression criteria as in general strength training (start with body weight, then progress to overloads such as barbells, dumbbells, etc.), i.e.:

General strength	Specific Strength
More weight	More mass (kg) More tension (drawing effort)
More repetitions	More arrows or shots
Less rest	Burst of arrows and/or short rests
More time under the load	Long hold (time at full draw)

11.4.6.1. More mass weight

Shoot with a heavier mass-weight bow for at least 40 minutes to improve the specific strength required to hold the bow up at full draw. To increase the mass weight: wear a weight-band on both wrists or on the string wrist and attach one wrist weight to the bottom part of the riser.

Recommended additional weight on each wrist:

- Girls: ½ pound
- Women & boys: ¾ pound
- Men: 1 pound

Shoot at a regular pace, without rushing or taking breaks. When doing this exercise, all archers must shoot in a single line at the same time for it to be most effective.

At the conclusion of the exercise, keep the weight-bands on the wrists while collecting the arrows. Once back to the shooting line, remove the weight-bands immediately before shooting the next end and continue the session for at least 10 more minutes.

This exercise is recommended before changing to a heavier mass bow, for instance when the archer will be adding some stabilizers, or changing from a wooden riser to a metal riser.



An inexpensive alternative is to use a light elastic resistance band looped around the bow wrist and secured under one foot as shown below:



The addition of "mass" can be regulated by changing the length of the elastic.

Another alternative is to hang a weight from the riser as shown below.



Using water or sand in a plastic bottle has the advantage of allowing regulation of the weight by increasing or reducing the contents of the bottle.

This last variation exercise has the further advantage of helping prepare the archer for shooting in windy conditions.

11.4.6.2. More bow tension (drawing weight)

The easiest way to increase the bow tension is to have the novice shoot with limbs that are about 10% heavier (roughly 2 pounds) than the normal ones.

If heavier limbs are not available, loop an elastic resistance band around the string elbow and the bow, passing through the bow fingers of the novice. Use the extra bow weight for a minimum of 40 minutes, or even up to 80% of the session. Conclude the exercise by immediately shooting 3 additional ends without the extra weight.

Always shoot at least 3 arrows per end and as in the previous exercise, all archers must shoot at the same time in a single shooting line. Shoot without rushing but also with no breaks during the exercise.

When using an elastic band (highly suggested), it should be 2 meters long:

- Girls: ½" wide
- Women & boys: ¾" wide
- Men: 1" wide

Choose a good quality elastic band from a sewing supply store. Make a loop or harness for the string elbow and knot, or better sew, it at a length that provides the resistance needed by the novice.



Naturally, there are many other ways to generate a higher bow weight or drawing tension with an elastic aid; three possible options are shown below.



With two (light) elastics



Or with one (light) elastic

Another way to use an elastic band, is to loop it around the bow and hold it at the position that the arrow would be nocked with the string fingers as shown below. In this case no arrow is used and the bow is drawn and let-down rather than shooting an arrow.



11.4.6.3. More arrows / shots

Two options can be considered to accomplish this:

- More arrows during each practice session;
- More shots as a consequence of more practice sessions.

More arrows during a single practice session

This alternative is generally used for entry-level archers, since usually they can only practice during scheduled classes. The coach has several alternatives to allow the novices to more shots per session:

- Extend the duration of the classes;
- Reduce, as much as possible, the non-shooting time during the classes;
- Have the novice shoot more arrows per end;
- Combine any of the above alternatives.

More shots as a consequence of more practice sessions

This solution is used more by archers who have more access to their equipment, the coach and an available range. Keep in mind that there is a safety concern in allowing a very new beginner to take equipment home, since they may shoot arrows unsafely.

A safe solution, allowing the novice to shoot a bow without an arrow, is shown below.



In this system, the elastic band stops the string just before it returns to rest and is less violent for the bow than the shot of an arrow.

For most of the entry level bow weights, a good quality elastic band from a sewing supply store will suffice to catch the string and be durable enough for prolonged use. Make a loop or harness for the string elbow and knot, or better sew, the elastic at a length that provides the proper slowing-down of the bow string. The sound upon release will be a good indicator; it should be low and smooth. Depending on the draw length and arm size of the novice, an elastic band about 1.75 m long and 3 cm wide should do.

Some of the other advantages of this simple and inexpensive device are:

- Upon release, the novice does not attempt to watch the arrow flight; hence they stay focused on the follow-through of his/her shooting form;
- It strengthens the release, eliminating any tendency to collapse upon release;
- It allows practice when there is not enough time to go back and forth to the archery venue. Because there are no arrows to collect, plenty of shots can be made in only half an hour;
- It also allows the novice to shoot in front of a mirror, which provides valuable visual feedback.

After a while, the same exercise can be done with a non-elastic device connecting the string elbow and the bow string. In this case, the movement of the string upon release should be quite small, no more than 10 cm at most, as a rigid connection is harder on the string shoulder than an elastic one.



11.4.6.4. Burst of arrows – Short rests

The exercise immediately above works well for this purpose since it allows the novice to shoot many shots within a short period of time because no time is spent loading or collecting the arrows.

Running for arrow collection is another way to reduce the rest between ends, even over the short shooting distances used by novices. Please be aware, however, that due to safety precautions the archers should not run whilst holding the arrows in their hand. They should be safely contained in a substantial quiver.

Finally, resting less between arrows while on the shooting line is another alternative. In this situation the coach must be sure that the novices do not shoot faster than their usual time for the shot execution. The time is saved between arrows, not during the shot process itself.

11.4.6.5. Holding for a long time at full draw

This is an old, popular and efficient way to develop the specific strength of the archer. The coach should start by asking the novices to stay three times longer than usual at full draw (approximately 8 seconds) for three consecutive draws. When the novice can maintain their form for a 8-second hold (no creeping, form deformation or shaking, etc.), the coach increases the difficulty by

- a) Extending the time at full draw up to 11 seconds;
- b) Extending the time at full draw up to 14 seconds;
- c) Adding one more set - i.e. four attempts of 14 seconds each;
- d) Extending the time at full draw up to 17 seconds;
- e) Extending the time at full draw up to 20 seconds;
- f) Adding one more set - i.e. five attempts of 20 seconds each.

Between each long hold, allow the novices to rest for 150% of the holding time - i.e. 15 seconds of rest when holding for 10 seconds, or 30 seconds of rest when holding for 20 seconds.

11.4.6.6. Combinations

When the novice is experienced with the above exercises, they can start using them in various combinations. Two suggestions for combinations are depicted below.



Long hold with heavier bow weight (drawing tension)



Reduced rests with heavier bow (more mass)

11.5. CONCLUSION

FINAL REMARKS:

The objective of this chapter has been to provide the level 1 archery coach with a consistent “package” of simple and effective exercises. Implementing the movements described above in a planned training environment will help the novice become a skilled archer or even an elite athlete competing around the world.

It is impossible in a manual such as this to be completely comprehensive and therefore there are many omissions. Even the concepts that are included have only been very briefly covered. The main goal of this chapter, however, was to give short operational and methodological indications and to perhaps “open some doors” about concepts that may have been unknown, or even worse, underestimated.

If some readers get the desire to increase their knowledge through additional study, the most important purpose of this work will be achieved.

In this case, the archers will be grateful as will the whole archery movement.

THANK YOU:

The World Archery Coaches Committee thanks all contributors to this chapter on physical training that has been developed from a document submitted by Roberto FINARDI. Since 2007 Roberto FINARDI has been the Physical trainer of the Italian National Archery Team (Recurve Bow).

11.6 GLOSSARY

Abduct (to):

To move away from the centre line of the body.

Adduct (to):

To move towards the centre line of the body.

Aerobic system:

System of the reactivation of the energy necessary to the body (ATP) occurring thanks to oxygen through the use of glucides, lipids and proteins. This system refers to prolonged efforts even for long periods of time, but at low intensity.

Agonist:

The muscle directly responsible for a specific action. For instance, the biceps is the agonist muscle during the flexion of the forearm.

Antagonist:

Is the relaxing muscle which allows an agonist muscle to perform its task. For instance, during the flexion of forearm, the triceps relaxes and, therefore, is the antagonist of the biceps. During the extension of the arm the roles of the biceps and triceps invert.

Articular ability:

Ability to perform movement up to the maximum of the possible physiologic limitations of a joint.

Catabolites:

Residual substances created by the body through the break-down of proteins and amino acids during exercise. They are discarded by the body and eliminated via the kidneys.

Conditional quality:

The fundamental motor qualities possessed by all people. Strength Speed, Resistance, Flexibility.

Contraction (concentric):

Contraction where the muscle shortens during strength development, producing mechanical work (i.e. lifting an object).

Contraction (eccentric):

Contraction where the muscle lengthens during strength development, producing mechanical work (i.e. the controlled lowering of a weight)

Contraction (isometric):

Contraction generating tension without variation in the muscle's length.

Coordination:

A collection of functions organizing, controlling and transferring a movement. The coordinative functions are strictly correlated to the perceptive system.

Endogenous:

Phenomena, activities, situations, or events generated within an organism.

Ergonomics:

The search for performance improvement through better interaction among the different elements of a system.

Exogenous:

Phenomena, activities, situations, or events generated by an external source.

Feedback:

Returned information.

Forearm:

The part of the upper limb located between the elbow and the wrist.

Heteroception:

Information coming from the perceptive channels (sight, hearing, touch) and giving information regarding the external environment.

Homeostasis:

The process of regulation by which an organism (the body) maintains a state of balance and resists external or internal disturbances through self-regulating mechanisms.

Hypertrophy:

Increase of muscle volume due to the growth of the component elements (fibres, myofibrils, connective tissue).

Hypotrophy:

Process of muscle regression, due to the volume decrease of its constitutive components.

Kinetic connection:

The interaction of different body portions that activate specific moves in synergy.

Lower Leg:

The part of the lower limb located between the knee and the foot.

Metabolism (basal):

Energy consumption of a resting organism, including the necessary energy for the vital metabolic functions.

Multilateralism:

Training strategy including a large variety of means and objectives.

Posture:

The position of the body in space and the consequent relationship with the body parts

Proprioception:

Ability to feel the body position in space and the tension status of the muscles.

Stiffness:

Degree of compactness and rigidity (in a positive sense) by the muscular-tendinous systems allowing rapid and efficient motor actions.

Thigh:

Part of the lower limb located between the hip and the knee.

Timing:

Choice of the proper moment to perform an action.

Upper Arm:

The part of the upper limb located between the shoulder joint and the corresponding elbow.

CHAPTER 12: GAMES

Games are a great way to focus on various aspects of shooting form without the traditional concentric-circle target. Working in a fun and dynamic way on things such as time pressure or aiming off among other important aspects of shooting without the normal stress of competition is beneficial to archers at every level.

This chapter **suggests** some games which can be **adapted** depending on available time, numbers of archers/teams, equipment, etc. When setting up the distances keep in mind the ability levels and the bow classes of the archers you are working with. Quite often, the "scoring" system can be modified. Have fun trying out your own variations tailored to the specific group of participating archers. For most of these events, bows, arrows and target butts will be needed, but not always. These games are a great way to end classes or keep long-term archers engaged and improving their form and competitive ability.

60 Seconds Rowdy

- **Equipment:** Butts, bows, arrows, 80cm, 60cm or 40cm target face, stopwatch or clock.
- **Game objectives:** Ignore distractions while shooting, distract others while they shoot.
- **Shooting distance:** Variable, depends on archers' ability levels and bow class(es).
- **Number of archers:** Two or more individuals.
- **Number of arrows:** Depends on the archers' abilities, the number of ends is equal to the number of archers so everyone can be "The Rowdy" for an end.
- **Rules:** Each end lasts exactly 60 seconds. One archer is designated to be "The Rowdy" for each end. The other archers shoot as many arrows as they can. The Rowdy has to try to disturb the archers by making loud noises, telling jokes or stories, whistling, singing, etc. The Rowdy must stay a safe distance from the archers and may not touch them in any way. The points the archers score go to that end's designated Rowdy. Each end another archer is designated to be the Rowdy until everyone has had a turn. The winner is the one who has the lowest score.
- **Skill emphasized:** Maximal accuracy during stress.
- **Variation:** If there is only one archer and one Rowdy per end, the Rowdy may touch or pinch the shooting archer softly only around the torso and legs, but not the arms. The Rowdy

should not push the shooting archer but is however allowed to blow at the archer.

300

- **Equipment:** Butts, bows, arrows, target face drawn like a dartboard.
- **Game objective:** Score as many points as possible per end and reach zero first.
- **Shooting distance:** Variable, depends on archers' ability levels and bow class(es).
- **Number of archers:** individual, teams of two, teams of three.
- **Number of arrows per end:** Individual, six arrows; teams of two, three arrows per archer; teams of three, two arrows each.
- **Rules:** Each team or individual starts with 300 points. The score shot per end is subtracted. The winner is the first archer to reduce their score exactly to zero. If the score is under zero the end doesn't count.
- **Skill emphasized:** Maximal accuracy and aiming off.



Athletic

- **Equipment:** Butts, bows, arrows, 80cm, 60cm or 40cm target face.
- **Game objective:** Shooting with variable stance, try to reach the highest score.
- **Shooting distance:** Variable, depends on archers' ability levels and bow class(es).
- **Number of archers:** Two or more individuals.
- **Number of arrows:** Four arrows per archer each end.
- **Rules:**
First arrow: Archer's usual stance, but on tiptoe
Second arrow: Feet together on the line
Third arrow: Standing on one foot (archer's choice or group choice of which foot)
Fourth arrow: Kneeling. Variation: on one knee.
The winner is the archer with the highest score after a predetermined number of ends (often 5).
- **Skill emphasized:** Maximal accuracy under stress, body balance, self-evaluation and tactics.

Basketball

- **Equipment:** Butts, bows, arrows, basketball target face (easily made by the coach or by the archers themselves).
- **Game objective:** Hit the basket and the balls and score as many points as possible.
- **Shooting distance:** Variable, depends on archers' ability levels and bow class(es). Rather than varying the distances, different sizes of balls and baskets on target faces can be used to even out skill level and equipment advantages.
- **Number of archers:** Any number of individuals, up to four per target (have two lines if four archers are sharing a target).
- **Number of arrows:** Four arrows per archer.
- **Rules:** With the first three arrows of the end try to hit the balls. With the fourth arrow, try to hit the basket. Only if the archer hits the basket with the fourth arrow can they count the points of the balls. The winner is the archer with the highest number of points after a predetermined number of ends.
- **Skill emphasized:** Maximal accuracy and tactics.



Better Letter

- **Equipment:** Butts, bows, arrows, 80cm, 60cm or 40cm target face, small sheets of paper with an archery term (see the game "Word Hunting") written on it, a box, pencil.
- **Game objective:** To complete as many archery terms as possible in a given time or amount of ends. Luck is needed because some words are longer than others.
- **Shooting distance:** Variable, depends on archers' ability levels and bow class(es).
- **Number of archers:** Any number of individuals, grouped on targets by ability.
Number of arrows: Three arrows per end, the number of ends depends on available time.
- **Rules:** Fold the sheets of paper with the archery terms on them and put them into the box. Each archer takes one word and shoots the numbers corresponding to the letters using the key below. The archer pulls their next word only after finishing the one before. The archer who finishes the most words wins.

Letter key:

A-10 B-9 C-8 D-7 E-6 F-5 G-4 H-3 I-2 J-1 K-10 L-9 M-8 N-7 O-6 P-5 Q-4 R-3 S-2 T-1 U-10 V-9 W-8 X-7 Y-6 Z-5

- **Skill emphasized:** Maximal accuracy, aiming off and tactics.

Billiards

- **Equipment:** Butts, bows, arrows, billiard target face.
- **Game objective:** First hit the white ball, then a valid ball in play and finally the "hole". Cross out your billiard balls first.
- **Shooting distance:** Variable, depends on archers' ability levels and bow class(es).
- **Number of archers:** two individuals, two teams of three.
- **Number of arrows:** Individuals shoot three arrows per end; teams of three shoot one arrow each per end.
- **Rules:** The individuals/teams decide if they shoot the half or the full billiard balls ("solids" or "stripes").
Full: 1, 2, 3, 4, 5, 6, 7
Half: 9, 10, 11, 12, 13, 14, 15
Special ball: 8
Individuals: With the first arrow hit the white ball; with the second arrow hit a correct billiard ball, with the third arrow hit the "hole".
Team: the team decides who shoots first (at the white ball), second (at the billiard balls) and third (at the "hole").

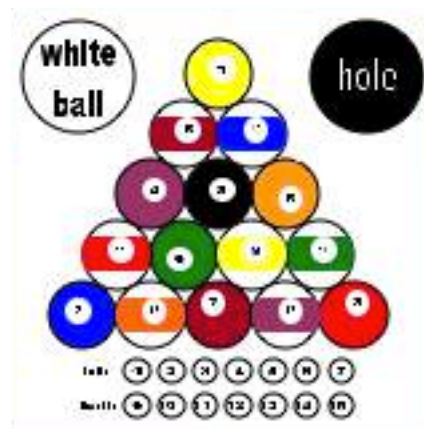
The archer/team can only cross out the billiard ball if the first arrow hits the white ball, the second hits a correct yet not already "sunk" billiard ball and the third arrow hits the "hole".

The winner is the archer or team that crosses out all its billiard balls first.

An archer/ team who hits the eight loses at once.

Variations: The archer or team must "call their shot," i.e. identify the target ball they are trying to hit prior to shooting. Sink the balls in numerical order. Sink the eight ball after sinking all the correct balls to win. Hit an opponent's ball or the eight ball during play and lose a turn. Hit a ball from the opponent's set and the opponent may count it as sunk.

- **Skill emphasized:** Maximal accuracy and tactics.
- **Variation:** The second arrow can hit the billiard balls from the other archer/ team, this ball can then be crossed out by them.

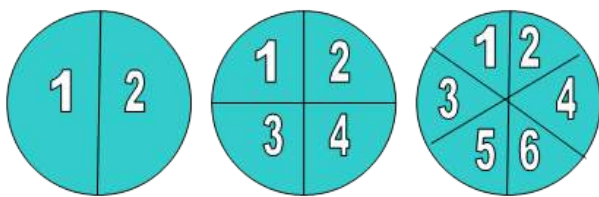


Blind Arrows

- **Equipment:** Butts, bows, arrows, 80cm, 60cm or 40cm target face.
- **Game objective:** Combine blind shooting with aiming, make the highest score.
- **Shooting distance:** First end: 3-5m; second end: variable, depends on archers' ability levels and bow class(es).
- **Number of archers:** Individuals or teams of two.
- **Number of arrows:** Individuals shoot six arrows per end; teams of two shoot three arrow each per end.
- **Rules:** Odd-numbered ends are shot blind (i.e. the eyes are closed after reaching anchor) and even-numbered ends are shot normally.
The highest score after a predetermined even number of ends wins.
- **Skill emphasized:** Maximal accuracy, attention to the overall shot, feeling the shot.

Cake

- **Equipment:** Butts, bows, arrows, 80cm, 60cm or 40cm target face.
- **Game objective:** Keep your arrows in your "piece of cake."
- **Shooting distance:** Variable, depends on archers' ability levels and bow class(es).
- **Number of archers:** Individuals, two to six archers per target.
- **Number of arrows:** Three arrows per end. The number of ends depends on the number of archers per target (or a multiple thereof).
- **Rules:** Divide the target face into sections, usually corresponding to the number of archers per target. Number the segments, i.e.:



Two archers Four archers Six archers

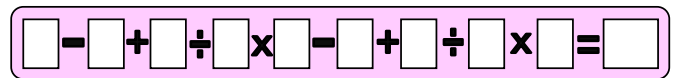
Each archer gets assigned a number to start with. In the first end, they shoot into the section corresponding to their number. For each subsequent end, the archers have to shoot into the next "piece" in order. Only the arrows in the correct piece are counted.

- **Skill emphasized:** Maximal accuracy and aiming off.
- **Variations:** The arrows hitting the wrong segment are subtracted. Archers score all the points in their section, regardless of whose arrow it is.



Calculator

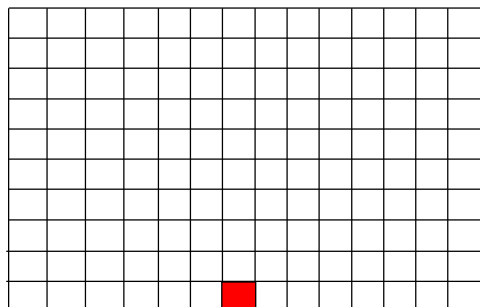
- **Equipment:** Butts, bows, arrows, 80cm, 60cm or 40cm target face, sheet of paper with the calculation matrix for each archer, pencil, and, if needed, a calculator.
- Calculation matrix:



- **Game objective:** To reach the highest final result.
- **Shooting distance:** Variable, depends on archers' ability levels and bow class(es).
- **Number of archers:** Any number of individuals, grouped on a target by ability.
- **Number of arrows:** One arrow per end; nine ends.
- **Rules:** Enter the score after each end into the relevant square. After nine ends, calculate the total working in order from left to right, ignoring the usual rules of math. The winner is the archer with the highest final result. When entered in a square after "+" or "x," an arrow that misses the scoring rings is a zero. In a box following "-" or "÷", a miss scores as a ten.
- **Skill emphasized:** Maximal accuracy, stress management, tactics and self-evaluation.
- **Variation:** The archer can decide where to fill in the score after each end.

Car Racing

- **Equipment:** Butts, bows, arrows, 80cm, 60cm or 40cm target face, Car Racing sheet, one for each or up to four per sheet by using different coloured pencils or pieces.



- **Game objective:** To reach the finish square (shaded) first.
- **Shooting distance:** Variable, depends on archers' ability levels and bow class(es).
- **Number of archers:** Any number of individuals.
- **Number of arrows:** Three arrows per archer per end.
- **Rules:** Move your "racing car" over the squared sheet according to the location of your arrows in the target.
 Ten -> 2 squares up
 Nine -> 1 square up
 Eight -> 1 square to the left
 Seven -> 1 square to the right
 Six -> 1 square down
 Five -> 2 squares down
 Four -> back to start
 Three -> back to start
 Two -> back to start
 One -> back to start
 If the movement would have your car leave the grid, no movement is made for that end.
- **Variations:** All archers start out in the same square. All archers' start positions are the same distance from the finish, but in any direction. Archers of different ability levels start out in different places on the grid.
- **Skill emphasized:** Maximal accuracy and attention to the overall shot.

Darned Prime

- **Equipment:** Butts, bows, arrows, 80cm, 60cm or 40cm target face, and, if needed, a calculator.
- **Game objective:** To avoid the total score of an end being a prime number.
- **Shooting distance:** Variable, depends on archers' ability levels or bow class(es).
- **Number of archers:** Any number of individuals.
- **Number of arrows:** Three arrows per archer per end. Number of ends depends on available time.
- **Rules:** Each archer shoots three arrows per end.

Scoring per end:

If the Score:

- is a multiple of two; score counts normal
- is a multiple of three -> add 1/3
- is a multiple of four -> add 1/2
- is a multiple of five -> subtract 1/5
- is a prime -> doesn't count

Start counting with the lowest multiple, i.e.:

- Score = 24
 Multiple of two -> 24
 Multiple of three -> + 8 = 32
 Multiple of four -> + 12 = 44
- Score = 28
 Multiple of two -> 28
 Multiple of four -> + 14 = 42
- Score = 25
 Multiple of five -> 25 - 5 = 20
- Score = 15
 Multiple of three -> 15 + 5 = 20
 Multiple of five -> - 3 = 17
- Score = 11
 Prime number -> = 0

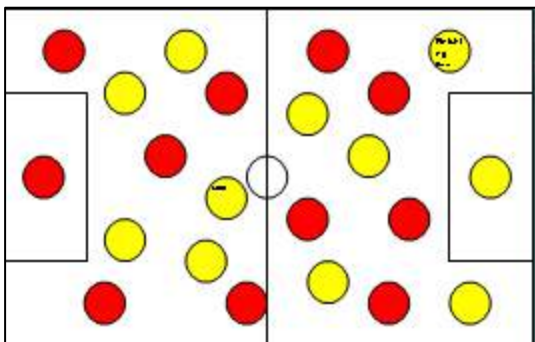
The prime numbers between 1 and 30 are: 2, 3, 4, 7, 11, 13, 17, 19, 23 & 29.

The winner is the archer with the highest total score at the end of shooting.

- **Skill emphasized:** Maximum accuracy and aiming off.

Football

- **Equipment:** Butts, bows, arrows, football target face.
- **Game objective:** To shoot as many goals as possible.
- **Shooting distance:** Variable, depends on archers' ability levels and bow class(es).
- **Number of archers:** Two individuals, two teams of two.
- **Number of arrows:** Individuals shoot two arrow each per end; teams of two shoot one arrow per archer per end.
- **Rules:** The individual or team has to decide if they belong to team RED (red spots) or team YELLOW (yellow spots).
Individuals: The archer belonging, for example, to team RED has to hit a red spot in the field. Then he is allowed to shoot in the goal with the yellow spot (the "goalkeeper" of team YELLOW). If he hits the goal without hitting the goalkeeper he receives a point. If the archer hits the yellow spot, the goalkeeper caught the ball and team RED receives no point.
Teams of two: One archer tries to hit the spot of the team in the field and the other team mate tries to hit the goal.
The winner is the archer or team with the most goals after a predetermined number of ends.
- **Skill emphasized:** Maximal accuracy and team shooting.



Give Away

- **Equipment:** Butts, bows, arrows, 80cm, 60cm or 40cm target face.
- **Game objective:** Shoot at least two out of three arrows perfectly.
- **Shooting distance:** Variable, depends on archers' ability levels and bow class(es). Far enough to challenge the archers.
- **Number of archers:** Teams of two, teams of three, teams of four.
- **Number of arrows:** Three arrows each, number of ends depends on available time.
- **Rules:** Each archer shoots three arrows. The best counting arrow is given to the team score; the second best counting arrow counts for the archer, the worst counting arrow doesn't count at all. The two winners are the team and the individual with the highest scores.
- **Skill emphasized:** Maximal accuracy, self-evaluation and team shooting.

Kick the Blue

- **Equipment:** Butts, bows, arrows, 80cm, 60cm or 40cm target face.
- **Game objective:** Keep all arrows in the red and gold.
- **Shooting distance:** Variable, depends on archers' ability levels and bow class(es).
- **Number of archers:** Individuals, teams of two, teams of three.
- **Number of arrows:** Individuals shoot six arrows per end; archers in teams of two shoot three arrows each; in teams of three, the archers shoot two arrows each. Number of ends depends of available time.
- **Rules:** Each archer shoots their arrows. Arrows hitting the gold or the red are counted normally, arrows hitting the blue are not counted, and arrows hitting the white or black are subtracted. The archer/team with the highest score at the end wins.
- **Skill emphasized:** Maximal accuracy.
- **Variation:** time limit: 90 seconds per end.

Knight Flight

- **Equipment:** Butts, bows, arrows, target face drawn like a dartboard.
- **Game objective:** Hit the even or uneven numbers, depending on the team.
- **Shooting distance:** Variable, depends on archers' ability levels and bow class(es).
- **Number of archers:** Individuals, teams of two, teams of three.
- **Number of arrows:** Individuals shoot six arrows per end; archers in teams of two shoot three arrows each; in teams of three, the archers shoot two arrows each.
- **Rules:** Two teams. Team A has to hit the even numbers, team B has to hit the uneven numbers.
 - > Hit in the single Zone: 1 point
 - > Hit in the doubles Zone: 2 points
 - > Hit in the triples Zone: 3 points
 - > Hit in single centre (outer bull's eye): 4 points
 - > Hit in the double centre (inner bull's eye): 5 pointsPoints are only scored if they are in the team's correct number. The bull's eye is open to both teams. The winner is the archer/team with the highest score at the end of shooting.
- **Skill emphasized:** Maximal accuracy and aiming off.
- **Variation:** Scores of the arrows hitting the wrong fields are subtracted.

Leonardo Da Vinci

- **Equipment:** Butts, bows, arrows, 80cm, 60cm or 40cm target face.
- **Game objective:** Keep the arrows in the even numbers.
- **Shooting distance:** Variable, depends on archers' ability levels and bow class(es).
- **Number of archers:** Individuals, teams of two, teams of three.
- **Number of arrows:** Individuals shoot six arrows per end; archers in teams of two shoot three arrows each; in teams of three, the archers shoot two arrows each. Number of ends depends on available time.
- **Rules:** Arrows hitting even numbers are scored normally; arrows hitting odd numbers are subtracted. Winner is the archer/team with the highest score.
- **Skill emphasized:** Maximal accuracy and tactics.

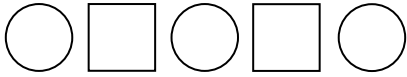


Lucky Dice

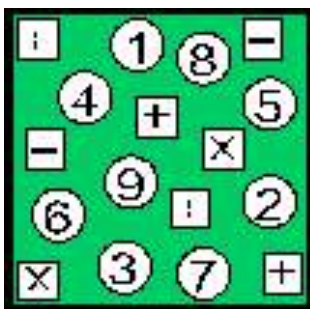
- **Equipment:** Butts, bows, arrows, 80cm, 60cm or 40cm target face and two dice.
- **Game objective:** Score as many points as possible.
- **Shooting distance:** Variable, depends on archers' ability levels and bow class(es).
- **Number of archers:** Individuals, teams of two, teams of three.
- **Number of arrows:** Individuals shoot three arrows per end; archers in teams of two shoot two arrows each; in teams of three, the archers shoot one arrow each. Number of ends depends on the time available.
- **Rules:** Each team throws the dice and shoots their arrows. The score for the end is the total of the arrow values plus the points on the dice.
- **Skill emphasized:** Maximal accuracy.

Mathematic Game

- **Equipment:** Butts, bows, arrows, Mathematic Game target face (easily made by yourself), pencil, sheet of paper with empty circles and squares for each end, and, if needed, a calculator.

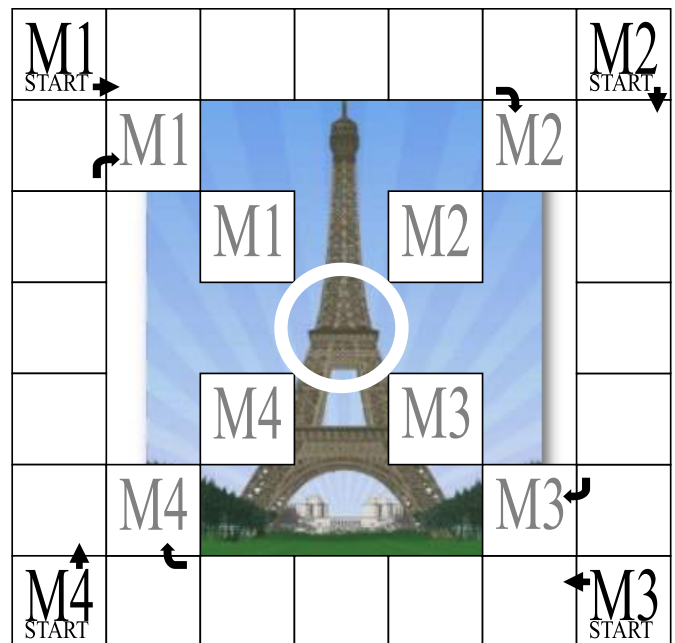


- **Game objective:** Count and reach the highest final result.
 - **Shooting distance:** Variable, depends on archers' ability levels and bow class(es).
 - **Number of archers:** Any number of individuals, up to four per target (have two shooting lines if four archers are sharing a target).
 - **Number of arrows:** Five arrows per archer each end.
 - **Rules:** The goal is to reach the highest final result. Count the results of the ends together, ignoring the usual mathematical order of operations. If there is a miss, the other archer or archers on the target have to decide which number or which sign the archer has to put in. Each number or symbol may only be shot once per archer per end (although multiple archers may each shoot the same symbol in a single end).
- Variations:** Depending on skill level, use numbered or marked arrows and shoot alternating numbers and symbols. Use marked arrows and compute the score based on the order the numbers and symbols were shot.
- **Skill emphasized:** Maximal accuracy and tactics.



Metro

- **Equipment:** Butts, bows, arrows, Metro target face (easily made by yourself).
- **Game objective:** Be the first to reach the destination after 26 stations (squares).
- **Shooting distance:** Variable, depends on archers' ability levels and bow class(es).
- **Number of archers:** Individuals, up to four per target.
- **Number of arrows:** Six arrows per archer per end.
- **Rules:** Each archer decides which Metro to represent, M1 through M4, and starts shooting on the corresponding start field. They then work their way clockwise around the board, through the 26 "station" squares, shooting each square in order. If an archer does not shoot the squares in the correct order, they have to go back to the previous corner and continue from there. Once an archer has completed the circuit, they move along the diagonal squares towards the Eiffel Tower (the centre circle). If an archer on the diagonal misses the next square, they only go back one square, towards their start corner. Once all the squares have been shot in order, the archer shoots for the Eiffel Tower. The archer reaching the Eiffel Tower first wins.
- **Skill emphasized:** Maximal accuracy and aiming off.



Number Plate

- **Equipment:** Butts, bows, arrows, 80cm, 60cm or 40cm target face, sheet of paper with empty number plates for each archer, pencil.

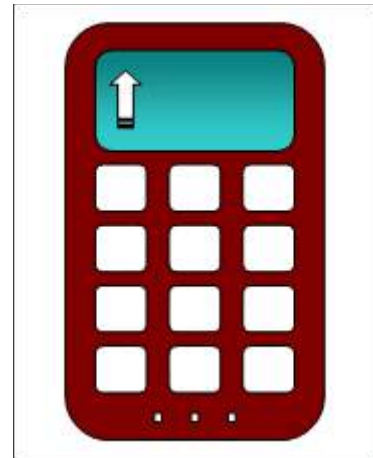
Number plate:

M	M	M	M	M
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- **Game objective:** Reach the highest number plate.
- **Shooting distance:** Variable, depends on archers' ability levels and bow class(es).
- **Number of archers:** Any number of individuals, grouped on targets by ability.
- **Number of arrows:** One arrow per archer per end for five ends.
- **Rules:** Each archer shoots an arrow. While scoring, each archer decides in which field of the plate they will write the score. A ten counts as a nine and so does a nine, the other rings score as usual and a miss counts zero. The goal is to have the highest number plate after five ends.
- **Skill emphasized:** Maximal accuracy, tactics management and self-evaluation.
- **Variation:** Strive for the lowest number plate. A miss counts nine.

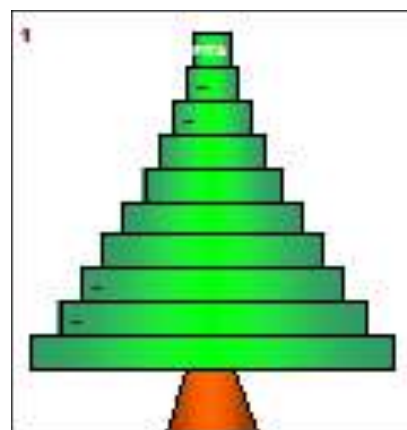
Phone Number

- **Equipment:** Butts, bows, arrows, Phone target face, sheet of paper, pencil.
- **Game objective:** Be the first to "dial" your own or a fictive phone number by hitting the number pads in the correct order.
- **Shooting distance:** Variable, depends on archers' ability levels and bow class(es).
- **Number of archers:** Any number of individuals, grouped on targets by ability.
- **Number of arrows:** Three arrows per end.
- **Rules:** Every player writes down their (or another) phone number on the paper, then goes through the number in correct order, not shooting at the next number until the preceding one is hit.
Variation: If a wrong key is hit, the archer must start again from the beginning.
- **Skill emphasized:** Maximal accuracy and aiming off.
- **Variation:** instead of using the phone target, use a 80cm, 60cm or 40cm target face, using the ten ring zero.



Pine Tree

- **Equipment:** Butts, bows, arrows, target face drawn like a pine tree out of crossbeams.
- **Game objective:** Be the first to go consecutively through the crossbeams.
- **Shooting distance:** Variable, depends on archers' ability levels and bow class(es).
- **Number of archers:** Individuals or teams of two.
- **Number of arrows:** Individuals shoot three arrows per end; for teams of two each archer shoots three arrows per end.
- **Rules:** Each archer goes through the crossbeams from longest to shortest, excluding the "trunk". Shorter crossbeams may not be counted as hit unless all the preceding ones have been hit previously. The winner is the first who manages to hit all ten zones of the tree.
- **Skill emphasized:** Maximal accuracy and aiming off.



Robin Hood

- **Equipment:** Butts, bows, arrows, 120cm or 80cm target face.
- **Game objective:** Keep the arrows in the gold.
- **Shooting distance:** Starts at 5 m, then 10m, 15m and so on in 5m increments.
- **Number of archers:** Any number of individuals.
- **Number of arrows:** Maximum three per archer each end.
- **Rules:** Each archer shoots a maximum of three arrows per end at each distance. As soon as an archer hits the gold, he/she can stop and is allowed to shoot the next end at the next distance. Any archer that doesn't hit the gold with at least one arrow is eliminated. The winner is the archer that stays in the competition the longest. That archer is declared the "Robin Hood" of this round.
- **Skill emphasized:** Accuracy and self-evaluation.
- **Variation:** Only one arrow per end and distance.



Rollercoaster

- **Equipment:** Butts, bows, arrows, 80cm, 60cm or 40cm target face
- **Game objective:** Finish the "Rollercoaster" round first by completing the steps in order.
- **Shooting distance:** Variable, depends on archers' ability levels and bow class(es).
- **Number of archers:** Any number of individuals.
- **Number of arrows:** Three arrows per end.

- **Rules:** Each archer has to shoot in the following order:
 1. Buy a ticket -> shoot a ten.
 2. Take your seat -> shoot an eight.
 3. Fasten seat belt -> shoot a nine.
 4. Left bend -> shoot a six or a seven on the left side of the face.
 5. Right bend -> shoot a four or a five on the right side of the face.
 6. Steep uphill -> shoot a three into the upper part of the face.
 7. Steep downhill -> shoot a one or a two into the lower part of the face.
 8. Finishing straight -> shoot an eight or a nine.
 9. Stand up totally dizzy -> shoot a seven.
 10. Be happy! -> shoot a ten.Only when one task is done can the archer proceed to the next one. The first archer who manages to "be happy" wins.
- **Skill emphasized:** Maximal accuracy and aiming off.



Silly Seven

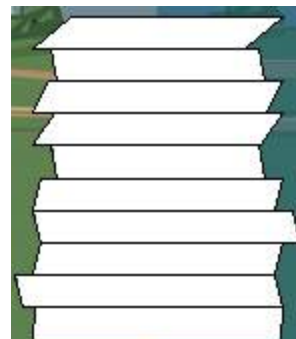
- **Equipment:** Butts, bows, arrows, 80cm, 60cm or 40cm target face.
- **Game objective:** Avoid shooting sevens.
- **Shooting distance:** Variable, depends on archers' ability levels and bow class(es).
- **Number of archers:** Individuals, teams of two, teams of three.
- **Number of arrows:** individuals shoot six arrows per end; archers in teams of two shoot three arrows each per end; for teams of three, the archers shoot two arrows each.
- **Rules:** Shoot all arrows. If you hit the seven ring one or more times, the score is halved.
i.e.: 1st end: 10/9/8/8/8/6 = 49 points
2nd end: 10/9/7/7/7/5 = 22.5 points (45÷2)
- **Skill emphasized:** Maximal accuracy and attention to the overall shot.

Six-Pack

- **Equipment:** Butts, bows, arrows, 80cm, 60cm or 40cm target face.
- **Game objective:** Shoot until all arrows are in the gold.
- **Shooting distance:** Variable, depends on archers' ability levels and bow class(es). Far enough for it to be a challenge for the archer to hit the gold.
- **Number of archers:** Any number of individuals.
- **Number of arrows:** Six arrows per end, one or two archers per target face.
- **Rules:** The archer shoots all six arrows. The arrows hitting the gold remain in the face. The others are shot in the next end again. Repeat it until all six arrows are in the gold.
Variation: Continue until all arrows are in the ten ring.
- **Skill emphasized:** Maximal accuracy and mental training to learn how it looks and feels like when all six arrows are in the gold. This is a special game to finish a practice lesson.

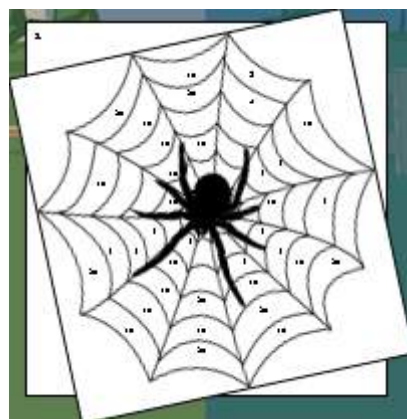
Skyscraper

- **Equipment:** Butts, bows, arrows, 80cm, 60cm or 40cm target face, sheet of paper, pencil.
- **Game objective:** Build a skyscraper with the most floors.
- **Shooting distance:** Variable, depends on archers' ability levels and bow class(es).
- **Number of archers:** teams of two, teams of three, teams of four.
- **Number of arrows:** One arrow per archer each end. The number of ends depends on available time.
- **Rules:** Each member of the team has to shoot at the same ring as their team mates. If the entire team shoots their arrows into the same scoring ring, they can add a floor to their skyscraper. If not, they try again on the next end. The team, building the skyscraper with the most floors, wins.
Variations: Arrows touching the line score the higher ring value. Archer decides value for arrows touching the line.
- **Skill emphasized:** Maximal accuracy, team shooting, self-evaluation and tactics.



Spider in the Net

- **Equipment:** Butts, bows, arrows, Spider in the Net target face (made by yourself).
- **Game objective:** Score maximal points while keeping away from the spider.
- **Shooting distance:** Variable, depends on archers' ability levels and bow class(es).
- **Number of archers:** Individuals or teams of two.
- **Number of arrows:** Individuals shoot six arrows per end; for team of two, the archers three arrows each.
- **Rules:** Shoot all six arrows and score the points of the fields in the net. For each arrow hitting the spider subtract 20 points. The winner is the archer/team with the highest total score after a predetermined number of ends, depending on time.
- **Skill emphasized:** Maximal accuracy and tactics.



Spin-the-Bottle

- **Equipment:** Butts, bows, arrows, 80cm, 60cm or 40cm target face, one bottle.
- **Game objective:** Shoot while being watched; watch the technique of other archers.
- **Shooting distance:** Variable, depends on archers' ability levels and bow class(es).
- **Number of archers:** Individuals.
- **Number of arrows:** 3 arrows each.
- **Rules:** All archers stand in a circle, the bottle is placed on the floor in the middle and spun around. The archer that the bottle's neck points to shoots three arrows. All the other archers stand behind or to the side and watch the technique of the archer. Then the circle is re-formed, without any archers who have already shot, and the bottle is spun again until everyone has taken a turn shooting.
- **Skill emphasized:** Shooting while watched and attention to the overall shot.



Surfing

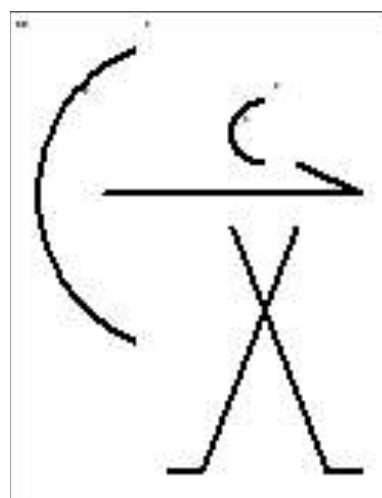
- **Equipment:** Butts, bows, arrows, 80cm, 60cm or 40cm target face.
- **Game objective:** Hit the ten.
- **Shooting distance:** Variable, depends on archers' ability levels and bow class(es). For the archer it should be possible to hit the ten with one out of four arrows on average.
- **Number of archers:** Any number of individuals.
- **Number of arrows:** Changes for each end; eleven ends.
First end: one arrow
Second end: two arrows
Third end: three arrows
Fourth end: four arrows
Fifth end: five arrows

Sixth end: six arrows
Seventh end: five arrows
Eighth end: four arrows
Ninth end: three arrows
Tenth end: two arrows
Eleventh end: one arrow

- **Rules:** Shoot the number of arrows for the end and score them. If an archer hits a ten within the end, he is allowed to shoot in the next end. Otherwise he has to sit out for one end. Only the ten counts. Winner is the archer with the highest score.
- **Skill emphasized:** Maximal accuracy and self-evaluation.

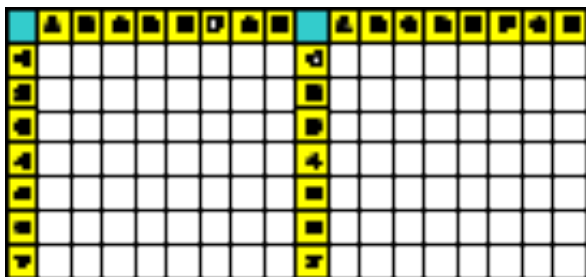
Toxophilus

- **Equipment:** Butts, bows, arrows, 80cm, 60cm or 40cm target face, sheet of paper, pencil.
- **Game objective:** Complete Toxophilus first.
- **Shooting distance:** Variable, depends on archers' ability levels and bow class(es).
- **Number of archers:** Two individuals, two teams of two, or two teams of three.
- **Number of arrows:** Individuals shoot three arrows per end; in teams of two, each archer shoots two arrows; archers in teams of three shoot one arrow each.
- **Rules:** Shoot one end. The archer/ team with the highest score is allowed to make a line in its drawing. There are five lines to draw. The winner is the archer/team completing its Toxophilus first.
Variations: In the case of a tie for high score, both archers/teams draw a line. In the case of a tie for high score, either archer or team draws a line. In the case of a tie to finish, the archers/teams involved have a one-arrow shoot off.
- **Skill emphasized:** Head to head competition, stress and accuracy management.

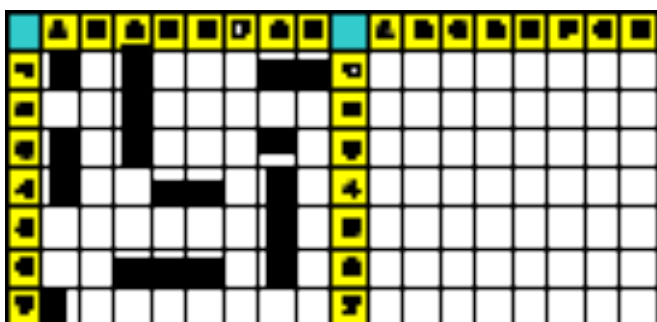


Treasure Hunting

- **Equipment:** Butts, bows, arrows, Treasure Hunting target face (easily made by you), sheets of squared paper (at least two times 8x9 squares, numbered 1-7 vertically and lettered a-h horizontally), and pencil.



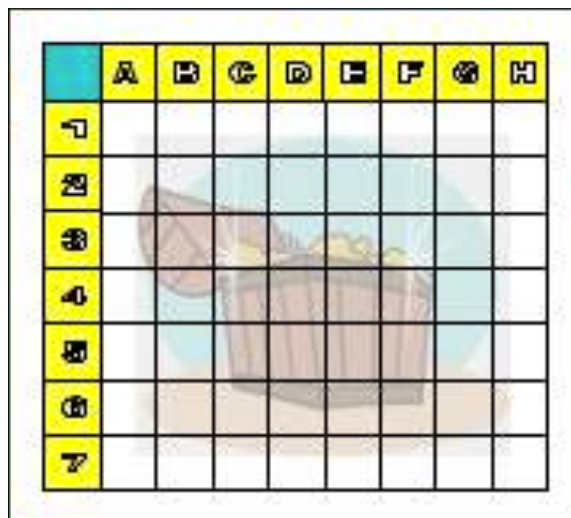
- **Game objective:** Find the nine treasure chests hidden in your opponent's turf, before he finds yours.
- **Shooting distance:** Variable, depends on archers' ability levels and bow class(es).
- **Number of archers:** Individuals, two per target.
- **Number of arrows:** Three arrows per archer per end.
- **Rules:** Each archer has a sheet of grid paper with two fields of at least the size of the Treasure Hunting target face being used. In the left field on the sheet of paper the archer makes lines unseen by the other archer to mark where their own chests are buried. Each archer has to "hide" nine chests. (3 of each of 3x1 squares, 2x1 squares, 1x1 square), i.e.:



Once each archer has "hidden" their chests, each archer shoots three arrows on the treasure hunting face. The opponent has to say when a chest is found and when it is completely dug up.

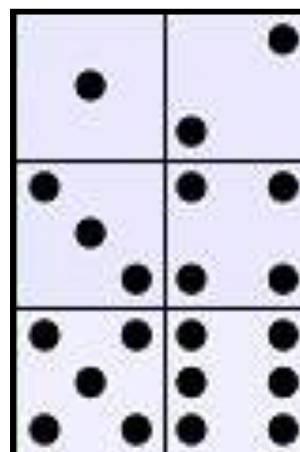
In the right field the archers mark which squares they have already hit and if there was a chest or not. The winner is the first one to dig up all their opponent's treasure chests.

- **Skill emphasized:** Maximal accuracy and concentration.



Triple

- **Equipment:** Butts, bows, arrows, target face with six equal-sized fields (easily made by you), 1 six-sided die.
 - **Game objective:** Shoot all arrows per end into the same field.
 - **Shooting distance:** Variable, depends on archers' ability levels and bow class(es).
 - **Number of archers:** Individuals, teams of three.
 - **Number of arrows:** Individuals shoot three arrows per end; archers in teams of three shoot one arrow each per end. Number of ends depends on available time.
 - **Rules:** First each archer/team rolls the die. They then try to shoot all three arrows into the field corresponding to the number they rolled.
- Score: 3 arrows in the field = 4 points
 2 arrows in the field = 2 points
 1 arrow in the field = 1 point
- **Skill emphasized:** Maximal accuracy and aiming off.



NON-SHOOTING GAMES

Jumping Jack

- **Equipment:** One six-sided die, chairs (one for each archer). Alternative: sitting on the ground. Optional: a list of the movements for the players to refer to.
- **Game objective:** React quickly and correctly.
- **Number of archers:** Up to eight individuals.
- **Number of arrows:** Three arrows each (or other counters).
- **Rules:** The archers sit on chairs in a circle. One archer or the coach is the game leader. The leader throws the die so that everyone can see it. The players have to react according to the number rolled:
 - 1 - Stand up
 - 2 - Clap one's hands
 - 3 - Silently raise one's arms in the air.
 - 4 - Shout: "bow"
 - 5 - Touch the floor with both hands
 - 6 - "Freeze", don't make any movement.

The game leader is allowed to confuse the players by doing things not required by the number on the die. Each archer has three arrows. Archers doing wrong movements have to give away one arrow. The winner is the archer that stays in the play the longest or still has at least one arrow left.

- **Skill emphasized:** Eye-movement coordination, reaction, concentration.

Figure Hunting

- **Equipment:** Figure Hunting sheet, one for each.

12	91	59	38	87	46	22	37	28	56
33	45	63	2	16	74	42	82	15	49
51	94	79	70	85	67	95	23	88	64
86	11	75	19	98	1	52	9	76	27
20	80	3	41	25	60	89	55	100	32
50	57	78	73	31	66	97	48	7	39
24	8	17	90	68	99	4	72	10	53
36	65	34	69	13	40	26	61	18	96
83	58	5	29	43	77	54	93	81	21
30	14	92	71	47	84	35	6	62	44

- **Game objective:** Finding the numbers in order as quickly as possible.
- **Number of archers:** Any number of individuals.
- **Rules:** Find the numbers 1-100 consecutively as quickly as possible. Tap on the number with your index finger when you find it. Start from number 1.
- **Skill emphasized:** Concentration and activation.
- **Variation:** start from number 100.

Word Hunting

- **Equipment:** Word Hunting sheet, one per archer, pencil.
- **Game objective:** Find all hidden words or as many words as possible within a time limit.
- **Number of archers:** Any number of individuals.

- **Rules:** Find the hidden words from the list and circle them. They can be written in any direction (up, down, forward, backward, diagonal). The winner is the archer that finds all the terms first or the most within a time limit.
- **Skill emphasized:** Concentration, dealing with archery terms.



 3D
 JIG
 TIP
 PIN
 HIT
 TAB
 FOC
 CAM
 END
 PEG
 GRIP
 REST
 SPOT
 FACE
 GOLD
 NOCK
 SPINE
 SLING
 RISER
 FIELD
 PIVOT
 GLOVE
 SETUP
 SHAFT
 VANES
 TILLER
 SCOPE
 SHOOT
 COACH
 QUIVER
 STRING
 KISSER
 ARROW
 TUNING
 FLUFLU
 INDOOR
 TARGET
 BUTTON
 ANCHOR
 ARCHER
 CLICKER
 RELEASE
 TRIGGER
 WINDOW
 RELEASE
 FEATHER
 ARCHERY
 ADDRESS
 SERVING
 LEANOUT
 DRAWING
 OUTDOOR
 BAREBOW
 LONGBOW
 STABILIZER
 EXTENDING
 PEEPSIGHT
 ARMGUARD
 ALIGNMENT
 TECHNIQUE
 COMPOUND
 TRAJECTORY
 TOXOPHILITE
 POINT OF AIM
 BACKTENSION
 FOLLOWTHROUGH
 OLYMPIC RECURVE
 FITA

X O L Y M P I C R E C U R V E T
 M U T R R J P R O H C N A G A N
 I T P E G O I H E O D N Q R R E
 A D S H O O T G A L E K G I C M
 F O C C O R G C T S E E I P H N
 O O S R O U H R E S T A E M E G
 T R P A H P I N S J X C S Y R I
 N N O I S N E T K C A B V E N L
 I O T R F Y S H A F T R U S D A
 O C E T I L I H P O X O T 3 B Q
 P K U V E S R E Z I L I B A T S
 D W A H L C E G N I N U T R X B
 N D E G D K H R B C M A D M E A
 U L F U L F O N T T R I G G E R
 O O E O A O C I I H S E T U P E
 P G A R S X V L L Q T X J A E B
 M S D H U B Y E L U U T E R E O
 O C S T O V I P E I O E N D P W
 C L S W F I T A R V N N I R S O
 Y I E O I K G I W E A D P A I B
 S C R L V N M N U R E I S W G G
 T K D L O A D D I R L N P I H N
 R E D O C Z Q O A L T G W N T O
 I R A F A R R O W T S E O G X L
 N F E A T H E R E S S I K Y P Z
 G B U T T O N Y G N I V R E S M

CHAPTER 13: THE WORLD ARCHERY BEGINNERS' AWARDS PROGRAM

13.1. Introduction:

This World Archery Beginners' Award Program Manual is a guide for beginner archers and their Level 1 archery coaches.

13.1.1. To the Level 1 Archery Coaches:

Thank you for promoting archery!

This guide will help coaches in properly educating novices in archery and in evaluating their progress.

We encourage you to make regular use of the World Archery Level 1 Coaching Manual and/or audio-visual document in your coaching activities.

13.1.2. To the Beginner Archers:

Congratulations on taking up Archery!

This chapter presents the curriculum of each of the 7 levels of the World Archery Beginners' Awards Program. It will help you to develop your general shooting skills, knowledge of archery and performance. Your progress will be encouraged and rewarded by the earning of World Archery Beginners' Award pins.

After completion of the Entry level program, you will be encouraged to take part in some World Archery tournaments, through which you can win other World Archery awards specific to each archery discipline.

World Archery wishes you a life of enjoyment within the World Archery family.

13.1.3. The World Archery Beginners' Awards Program at a glance:

The World Archery Beginners' Awards Program has been designed to be implemented in all countries of the world at any time; incorporating Indoor and Outdoor disciplines. Up to seven awards lead the novice:

- from a very short shooting distance - 6 to 10 meters, depending on the archer's age;
- to the shortest Indoor distance - 18 meters, but on a bigger target face than the World Archery official one for this distance;
- and even further - to 26 meters on an 80 cm target face, which is close to the first World Archery Outdoor distance, 30 meters.

This process is not only based on score, since skills, knowledge and know-how are also

assessed; hence the main goal of the World Archery Beginners' Awards Program (BAP) is the archer's education as a whole.

13.2. Overall presentation

13.2.1. Goals:

World Archery has produced this manual to guide beginners in assessing their progress during the long period covering the entry-level program before they compete in official tournaments.

13.2.2. Evaluation principle

To earn any of the World Archery Beginners' Awards, you have to reach a minimum level of:

- score;
- skill development;
- Knowledge and/or know-how.

13.2.2.1. SCORE

Your performance is evaluated at reduced shooting distances and number of shots. At each stage, 15 arrows are shot at an 80cm target face

See the evaluation form for the shooting distance for each award level.

13.2.2.2. SKILLS DEVELOPMENT

The achievement of a good score is only a consequence of well-implemented skills, as described in the World Archery level 1 Coaching Manual.

Thus, for each development level, some skills are expected to be acquired. Their assessment is based on some key elements described in the World Archery Entry Level 1 Coaching Manual. If you need help in evaluating these skills, do not hesitate to consult this reference manual. To help with your training, collaborating with an archery coach is also strongly recommended

13.2.2.3. Knowledge and/or know-how

Learning archery is not restricted to learning the steps of the shooting sequence. The novices have also to:

- play safe, and know the safety rules;
- know the specific terminology;

- look after their equipment - to brace the bow, maintain and repair the equipment (i.e. arrows, string, arrow-rest), etc.;
- learn the competition rules.

13.2.3. Delivery of the World Archery Beginners' Awards

The following organizations are entitled to order the World Archery Beginners' Awards from the World Archery office:

- Member Associations (the National Archery Federations) in good standing with World Archery;
- Clubs and Regional Archery Associations, as long as they can prove their membership in World Archery Member Association is in good standing with World Archery.

Note: In some countries, only the National Archery Federation is entitled to sell or distribute the World Archery Beginners' Awards to its Clubs and Regional Archery Associations.

In most cases, clubs maintain a stock of World Archery Beginners' Awards, which they have ordered either through their National Archery Federation, or directly from the World Archery office.

13.2.4. Types of Awards

Two sets of beginners Awards are available:

- One set for the youngest beginners (under 12 years old) and for some disabled novices. It is up to the coach (or person in charge of the entry level programme) to decide the archer's eligibility to challenge for these awards. World Archery does not ask for any proof of age or disability. This group of awards is entitled "FEATHERS".
- One set for pre-teens, teenagers and adults: This group of awards is entitled "ARROWS".

The awards are pins and can be displayed, on the quiver for instance.

13.2.5. Recommended examination guidelines for awards

Develop a schedule of specific sessions for challenging the World Archery Beginners' Awards and require a minimum attendance in entry-level practice sessions to be eligible to take part in an evaluation session.

For instance:

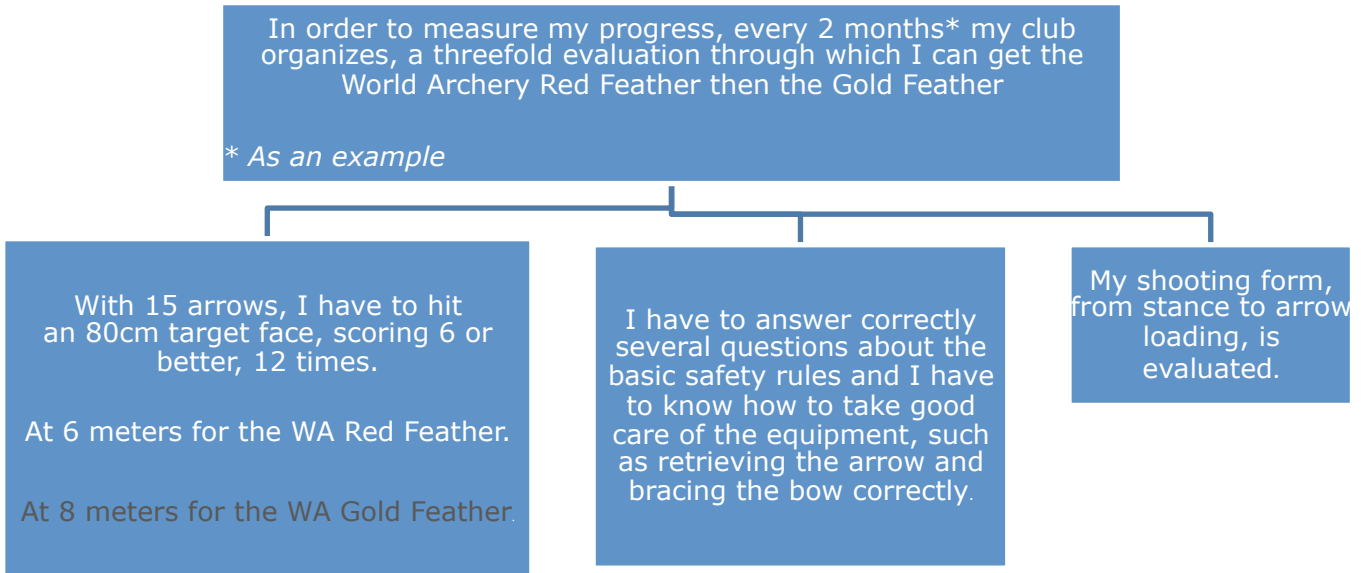
Schedule a specific session for challenging the World Archery Beginners' Awards every 2 months; open only to those who have attended at least 7 practice sessions during the two preceding months.

To challenge for a World Archery Beginners' Award, those who have attended less than 7 practice sessions will have to wait until the next specific challenge session and complete at least 7 practice sessions before then.

Beginners who fail some components of the evaluation may re-challenge these items only, but they must retrain on all the modules failed and the reassessment/evaluation cannot be retaken until the full program is completed.

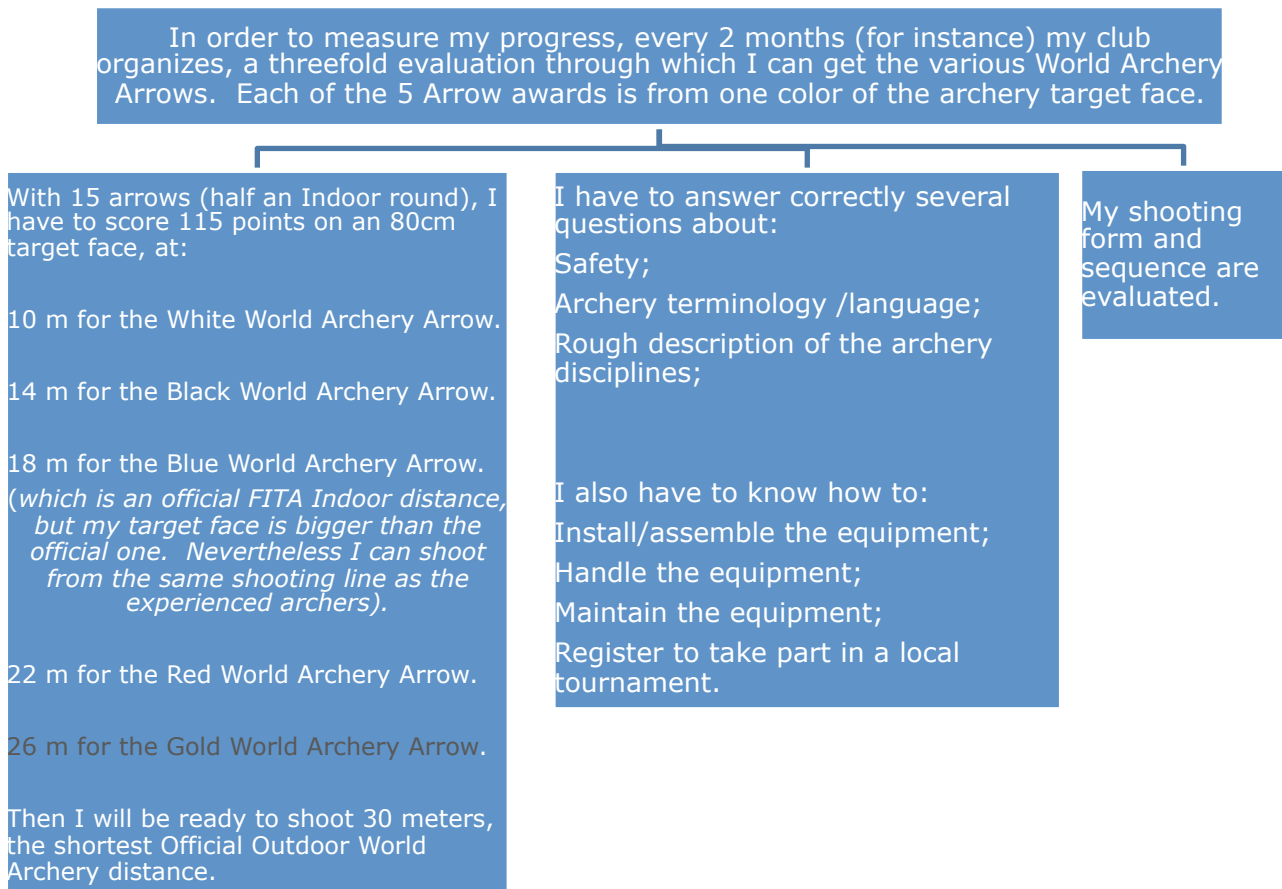
All novices must start by challenging the Red Feather or the White Arrow. Starting at any other level would make it difficult to evaluate the skills, knowledge and know-how that were supposed to have been learned previously.

World Archery Feather Awards at a glance.



After the World Archery Gold Feather I will challenge the World Archery Arrow Awards, starting with the White one at 10 meters

World Archery Arrow Awards at a glance.



When I have achieved the Gold FITA Arrow, I am able to attend some local tournaments shot at short distances

13.3 The FEATHERS



The beginner who successfully completes the three evaluations for a Feather level earns one of the pins shown above.

Note: *The next set of awards will be made with "World Archery" replacing "FITA".*

13.3.1. Recommended guidelines for the Feathers

13.3.1.1. Score evaluation (for Feather awards)

Where: Indoor or Outdoor.

Warm-up: Not limited. Up to the coach.

Target face: 80cm spot target face, only the 6 to 10 rings count.

Alternately a full 40cm target face can be used although it is tougher to aim at.

Target height: the centre of the target face should be 80 cm to 1 meter from the ground/floor.

Arrows per end: 3

Number of ends: 5

Time per end: Not limited (some kids and disabled people need a lot of time to load the arrow on the bow).

Total number of arrows: 15 (half the number of arrows shot at one of the 2 Indoor distances).

Scoring: A simplified scoring system is proposed in order to allow the youngest to score by themselves. An arrow inside or touching the outermost line (of the "6" zone) is worth one hit. See the sample of scorecard below.

Alternately a 40cm target face can be used where the scoring zone covers the 1 to 10 ring and scores 1 point.

12 hits are required.

Example of a completed scorecard:

15 Arrows				
1 Hit	2 Hit	3 Hit	End	Total
●	○	●	2	
○	●	●	2	4
●	●	●	3	7
●	●	○	2	9
●	●	●	3	12

13.3.1.2. Skills Evaluation (for Feather awards)

A coach should practically evaluate each candidate on the respective skills for the Red and the Gold Feather awards. Sections 13.3.2.2. and 13.3.3.2. detail the skills for each of these 2 Feather Awards.

13.3.1.3. Knowledge and Know-How Evaluation (for Feather awards)

Sections 13.3.2.3. and 13.3.3.3. detail the knowledge and know-how that are required for the Red and the Gold Feather awards. For the knowledge, an online multiple-choice questionnaire can be posted. The novices could download it, complete it and submit it by a deadline. The know-how has to be evaluated during a practical session.

15 Arrows				
1 Hit	2 Hit	3 Hit	End	Total
○	○	○		
○	○	○		
○	○	○		
○	○	○		
○	○	○		

13.3.2. Red Feather



13.3.2.1. Performance:

From a shooting distance of 6 meters, you must achieve a minimum of 12 hits scoring six or better out of 15 arrows shot in 5 consecutive ends of 3 arrows at an 80cm target face.

13.3.2.2. Skills

FEET POSITION (Stance)

Objective:

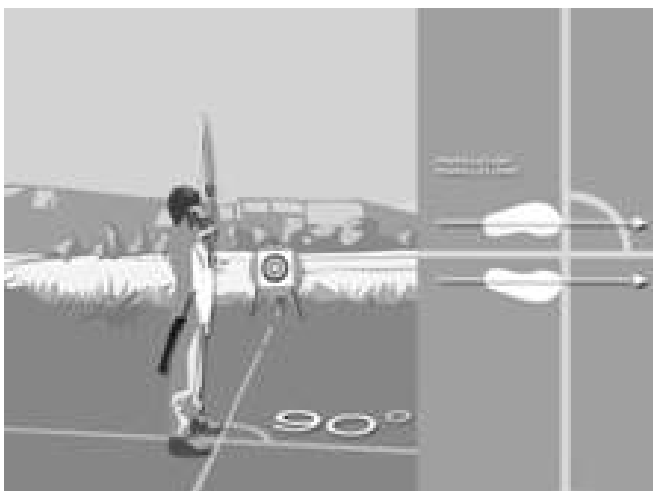
Consistency in positioning and spacing relative to the archer, the shooting line and the target, achieving optimal stability.

Form:

Feet parallel on the shooting axis, set at approximately shoulder width.

Rationale:

This stance gives the archers the opportunity to repeat actions easily and accurately, and provides sound support to the pull and push efforts in the shooting plane. It gives consistent direction to the body in the shooting plane and avoids back problems.



Proper stance on the shooting line

Safe and proper arrow loading

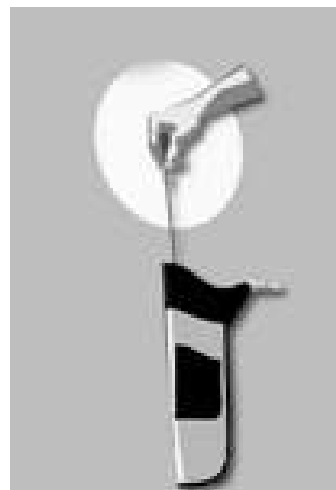
Objective:

Identical placement of the arrow on the bow. The action must be performed in a safe manner to protect the archer, the other archers, and the equipment.

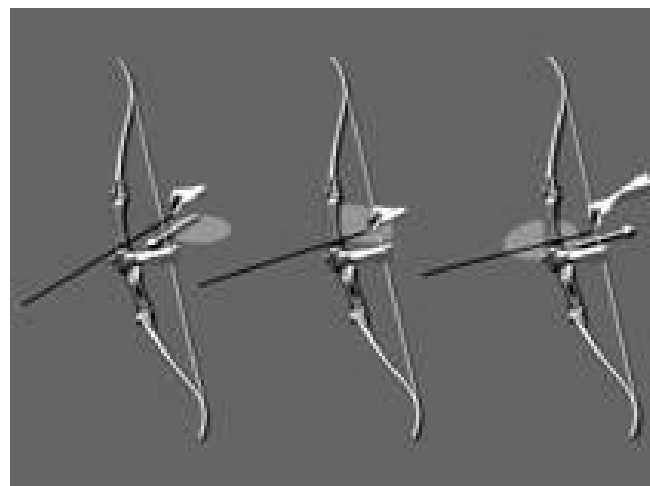
Form:

Hold the arrow by the nock, place the arrow on the rest, correctly orient the arrow*, and nock it on the string.

(*) Arrows with four vanes do not require orientation and more quickly stabilize the arrow on its trajectory.



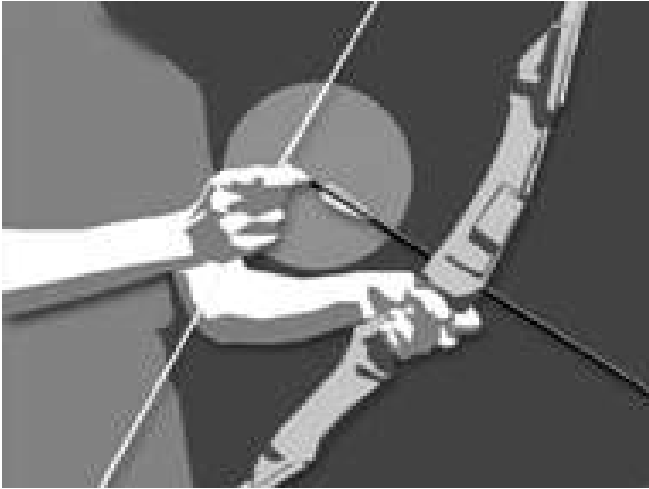
Taking an arrow out of the quiver



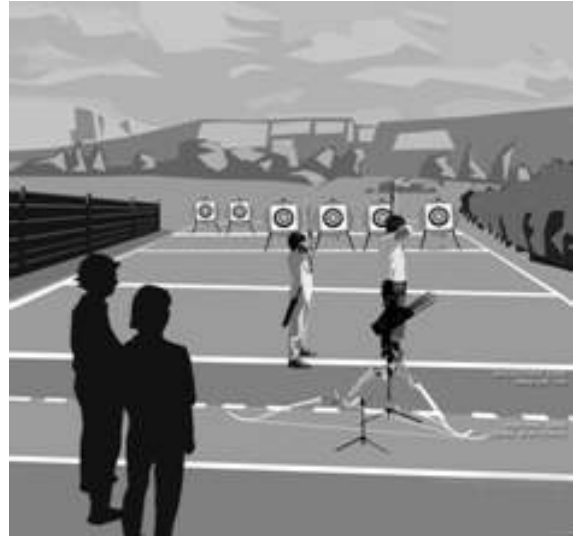
Arrow loading

Rationale:

Taking hold of the arrow in front of the vanes makes nocking more difficult and risks damaging the fletching if the hand slips during the nocking process. A finger must not be used to hold the arrow on the arrow rest since the rest does not endure strong vertical pressure and could be damaged.



Nocking the arrow



Equipment stored in the equipment lane



Finger pressure damaging the arrow rest

When shooting arrows at a shorter distance than usual (for a specific drill, for instance), you can lay your bow on the floor or ground 3 m behind the archers. When you return to the regular shooting distance, store your bow on a rack behind the waiting line or on the floor.



Movable bow-stand holding multiple bows

12.3.2.3. Knowledge and/or Know-How

You must know the following subjects:

BOW SAFETY

- Releasing the string from full draw without an arrow on the string could cause damage and/or injury.
- When the end is over put the bow on a bow stand or rack located in the equipment lane.
- Bow stands located behind the waiting line are ideal for storing bows when they are not being used during training sessions.

ARROW LOADING SAFETY:

The arrow should be placed on the string only while you are standing on the shooting line and a clear signal has been given (meaning that everyone is behind or on the shooting line).

You must straddle the line or have both feet on the line before loading the arrow.

SAFE ARROW RETRIEVAL/COLLECTION

When approaching the targets, care must be taken to avoid walking into arrows sticking into the ground or target. Nocks are very sharp. Pick up all arrows that have fallen short of the target, regardless of who their owner may be.

Make sure that no one is directly behind the person pulling the arrows. Arrows can come out of a target suddenly and the nock may hurt anyone who is too close. Bending over in front of the target is dangerous, as you may hit an arrow either while bending or straightening up. You should wait beside the target to collect arrows.

To pull an arrow out of the target, press one palm hand flat around the arrow sticking in the target. With the other hand, grab the arrow shaft close to the target face and pull out the arrow in line with the shaft and without bending the arrow shaft.

When pulling an arrow out of the grass, do not pull the arrow straight up; you could bend or break the arrow shaft. Instead, move the grass away from the fletchings, especially if you are using natural feathers and pull the shaft back in line with the shaft and along the grass. When the point is out of the grass you can lift the arrow up.

BOW ASSEMBLY:

You must learn from your coach how to properly mount the limbs onto and remove them from the riser (if you use a takedown bow). An assembled Recurve bow that has not been braced has the tips of the limbs towards the target (not towards you) when your hand is properly in the grip. On some older bows, due to a former World Archery rule, the internal part (the side facing you when your hand is properly in the grip) of the top limbs is blank, while the limb specifications (length and weight) are written in the internal part of the bottom limb, as shown on the illustration below.



The technical specifications of the limbs are often written on the internal part of the bottom limb

Evaluation form for Red Feather Candidates

Name of the beginner: _____ Form A

Date: ____ / ____ / 20__

Retake date: ____ / ____ / 20__

PERFORMANCE	Required minimum score	Achieved*	*Not yet achieved	Number of hits (result)
Shooting distance 6 meters	12 hits			
SKILLS	Key elements (What should be done)	Achieved*	*Not yet achieved	References to the World Archery Level 1 Coaching Manual.
Feet position (Stance)	Feet either side of the shooting line			#6.1.1
	Feet at shoulder width apart			#6.1.1
	Line of feet square to the shooting line			#6.1.1
	Feet parallel			#6.1.1
Safe and proper arrow loading	<i>Implemented with bow vertical</i>			#6.2.1
	<i>No finger pressing the arrow on rest</i>			#6.2.1
	<i>Arrow properly rotated cock feather away from bow window</i>			#6.2.1.
KNOWLEDGE and/or KNOW-HOW	Required knowledge or know-how	Achieved*	*Not yet achieved	Comments and/or references
Bow safety	No dry firing (dry loosing)			#2.3
	Set the bow in equipment lane after shooting the end			#2.2.2
Arrow loading safety	<i>Load the arrow on the bow only when everyone is behind the shooting line and the signal is given</i>			#2.2.1 & 2.2.2
	<i>To be done only when the feet are set each side of the shooting line</i>			#2.2.2
Safe arrow retrieval/collection	Walk carefully to target (do not run and watch your step)			#2.3
	Stand to the side of the target (not behind arrows)			#2.2.2
	Properly pull the arrow out of the target (or grass)			#2.4
Bow assembling	<i>Know how to properly mount and remove the limbs on/from the riser</i>			<i>This evaluation can be omitted if there is no takedown bow</i>
TOTAL	16 positive evaluations are required			** Granted ____ not yet granted ____

* Checkmark if the score / skill / knowledge is positively evaluated (Achieved) or not (Not yet achieved). Write in the TOTAL row of these two columns the accumulated number of checkmarks.

** Just checkmark the final result of this evaluation.

Name and signature of the assessor/evaluator: _____

13.3.3. Gold Feather



13.3.3.1. Performance

From a shooting distance of 8 meters, you must achieve a minimum of 12 hits in the six ring or better with 15 arrows shot in 5 ends of 3 arrows at an 80cm target face.

13.3.3.2. Skills

BODY SETTING

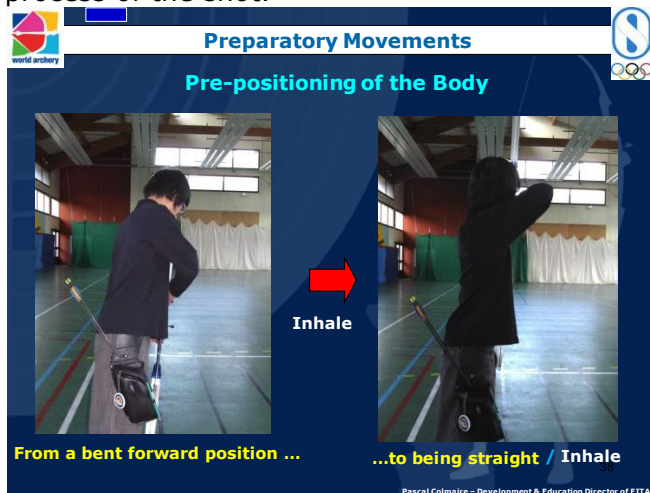
(from before drawing until full draw)

Objective:

Provide an identical, stable foundation that promotes a consistent repetition of upper body actions as well as optimal general balance. It should also allow for positioning the aiming eye at the same stable spot in the space on each shot. Imagine the aiming eye as the top of the "big pyramid" (your coach will instruct you on the pyramid system – refer **to sections** 6.5.1. Complementary Knowledge and 6.10. Complementary Knowledge for details)

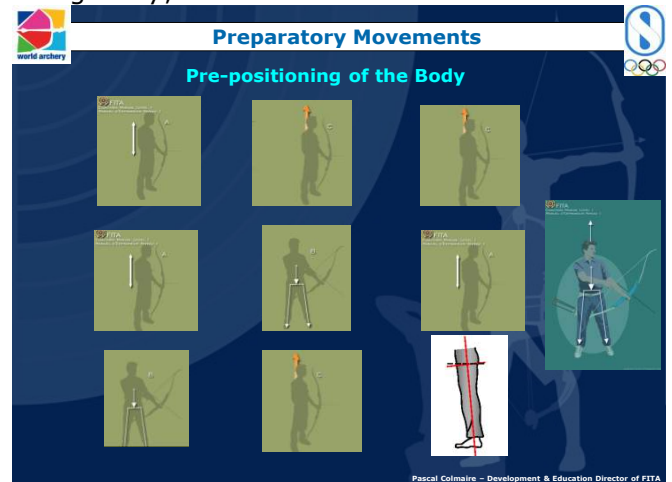
Form:

Most novices are slightly bent over while setting up the string and bow hands. Moving from a bent over position to an upright one creates a good base at the beginning of the execution process of the shot.



The following illustrations present alternative ways to pre-set the body. From Left to Right and Top to bottom:

- Stay upright with flat and straight back;
- Head stretched upwards;
- Flat chest - *Do not move the chest up when stretching the head up;*
- At the same time, keep the shoulders low and down;
- Feel a strong lower body, and feel the body weight spread on both feet;
- Feel a strong belly and a low centre of gravity;



Keep the entire body in the shooting plane with shoulders above hips and feet;

- Turn the head toward the target;
- A little less weight on heels than on the front part of the feet;
- The illustration on the right hand side summarizes the vertical firmness well.

LEGS

Form:

The legs form an upside-down "V" that is symmetrical around the vertical axis going through the head. Weight is placed as equally on both feet as possible.

Rationale:

The body weight is distributed approximately equally on both legs. Swaying in the vertical plane is reduced because the body weight is slightly forward (toward toes).

The string leg participates in the production of the push while the bow leg contributes to the pull. The two efforts strengthen your vertical body axis and generate a downward pressure, providing a solid foundation for upper body work and good stability.



Flat chest, powerful belly and body weight equally shared on both feet



String (right) leg assists the push effort



Bow (left) leg assists the pull effort

THE UPPER BODY

Initially the torso, shoulder, and head are positioned close to their final position.

Form:

Turn or tilt the pelvis backwards (flattening the lower back), and stretch the spine up while keeping the shoulders in the same plane as the hips. Lower your shoulders and flatten your chest - you may feel a slight stretching in the trapezius muscles. Turn your head toward the target (whilst maintaining the stretching up action) until your nose is directed toward the target.

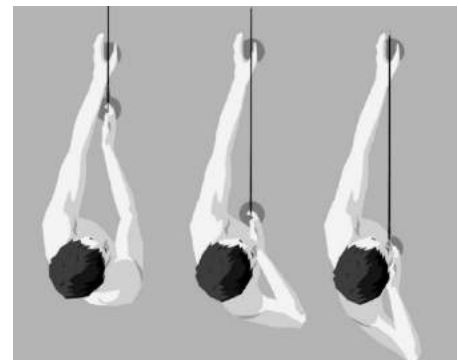
Rationale:

Stretching-up your head and spine assures an erect vertical stance. Tilting your pelvis, flattening your chest and the lowering your shoulders lower the centre of gravity, making your body more stable. Furthermore it transfers energy from the upper body to the lower body, helping you to relax. Shoulders and the head are close to their final position, thus minimizing movement during the draw.

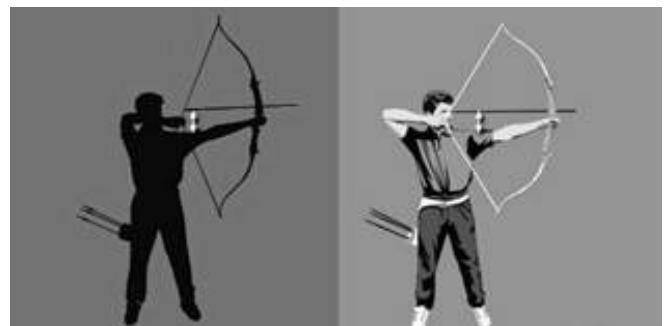
BODY SETTING_(end of draw)

Objective:

Draw the bow without disturbing the pre-set position achieved above. In fact, maintain this body position until after the shot.



Draw made in the shooting plane



The top and bottom body remain well in place during the draw and end of draw

Form:

A balance between the production of traction and repulsion (pull and push) forces must be

created and maintained throughout the draw. As previously noted, these pull and push efforts are supported by the legs.

Always stay in control, keeping momentum movements to a minimal or non-existent level. The drawing motion diminishes in speed as you near the facial reference, but it does not stop. The torso remains almost immobile. If there was no pre-draw, a slight rotation of the chest, aligning the shoulders with the shooting plane may occur.

The body is vertical or leans slightly toward the string leg. The shoulders remain low and the head remains in place and extended up - it should not move toward the string during the draw. The arrow always remains parallel to the ground and the string moves straight to the face in the shooting plane.

Rationale:

This form is easy to duplicate because the foundation stays in place, the movement is simple, and control is easily preserved. Striving for symmetry will maintain balance in the shot. The production of effort is dispersed, which facilitates achieving symmetry, reduces local fatigue effects, and minimizes the risk of injury. The major muscles are used to generate the effort and full drawing effort is attained as soon as the draw approaches the face, which enhances the control of the shot. Because the beginning of the draw is faster, the archer saves energy.

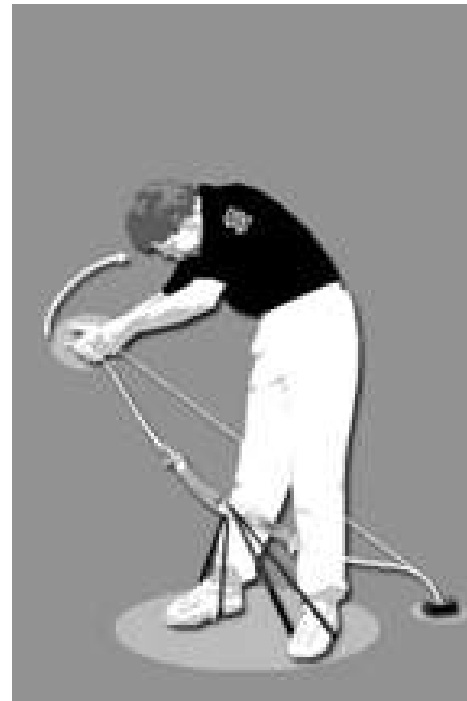
13.3.3.3. KNOWLEDGE AND/OR KNOW-HOW

BOW BRACING:

Your coach will most likely have your bow strung before the start of the first two or three practice sessions. Stringing and unstringing of the bow is usually taught on the third or fourth session when the students are a little more familiar with the equipment. Below we recommend some safe methods for stringing the bow.

A loop stringer is inexpensive, easy to use and makes the task of stringing the bow almost effortless. Like any other stringing methods, it is necessary to check the string positioning before taking the bow stringer pressure off the upper limb tip. Place a small piece of carpet or rubber on hard and rough ground to prevent damage to the lower limb tip. A tip protector on the lower limb would also serve this function

and also help keep the string loop in the proper location.

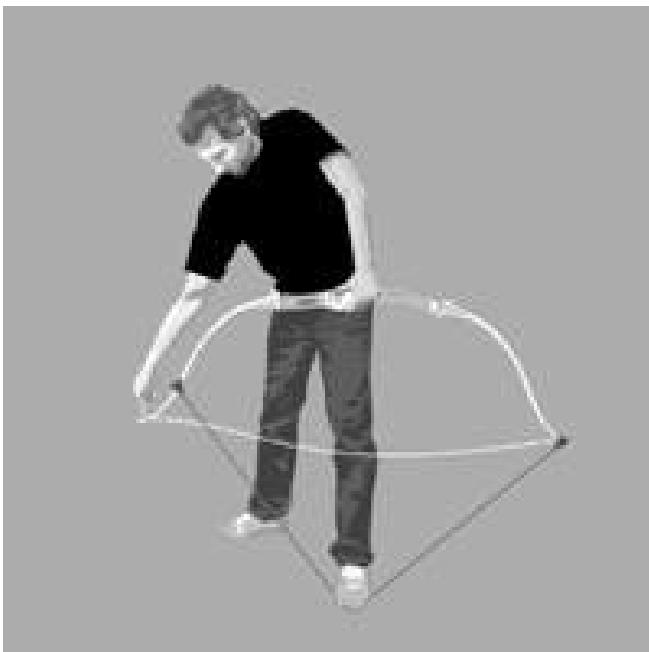


Use of a string loop with 2 feet



Use of a string loop with 1 foot

You also can buy a bow stringer like the one show below from any archery shop. They are a little tricky to use properly at first, but over time and with experience they become simple and reliable tools.



Finally, a wall or pole-mounted bow stringer is another excellent device for setting the string on the bow. It is made of 2 pieces of metal cylinder, wrapped with something to protect the limbs, and affixed to a wall or pole.



RANGE SAFETY:

Under no circumstances should anyone shoot if someone is downrange on the field. Arrows may glance off the targets or depart from their intended path.

The shooting line should be straight, not staggered.

When in a group where archers are not shooting at the same distance, it is safest to have the targets at the desired distances and all the archers on the same shooting line.



SAFETY and ETIQUETTE on the SHOOTING LINE:

Only draw your bow back if you are on the shooting line. Never draw the bow with your bow hand higher than your drawing hand, and you should not shoot "cross-court" (toward a target that is not straight ahead) unless specifically directed to (for a competition or game, for instance).

Avoid talking on the line or otherwise distracting other archers during the shooting of the end.

Leave it to the coach to critique any archer's technique, but encouraging remarks are welcome at any time.

If your bow or arrow falls in front of the shooting line and you can reach it without leaving the shooting line, ensure that the archers on either side of you have their bows down at their sides before retrieving your equipment. Any arrow which cannot be retrieved without moving your feet on the shooting line should only be retrieved after shooting has stopped.

EVALUATION FORM FOR GOLD FEATHER CANDIDATES

Name of the beginner: _____

Form B

Date: ____ / ____ / 20__

Retake date: ____ / ____ / 20__

PERFORMANCE	Required minimum score	Achieved *	*Not yet achieved	Number of hits (result)
Shooting distance				
8 meters	12 hits			
SKILLS	Key elements (What should be done)	Achieved *	*Not yet achieved	References to the World Archery Level 1 Coaching Manual.
Body setting (before drawing and at full draw)	Vertical body			#6.5.1
	Balance on 2 feet			#6.5.1.
	Spine and shoulders making a cross shape			#6.5.1.
<i>Body setting (end of draw)</i>	<i>Let the string hand land on face (chin and/or lips do not reach forward to the string)</i>			#6.8.1.
KNOWLEDGE and/or KNOW-HOW	Required knowledge or know-how	Achieved *	*Not yet achieved	Comments and/or references
Bow bracing	Able to brace their own bow			#9.3.2
<i>Shooting direction</i>	<i>Only draw towards a clear target butt from the shooting line (not toward anyone or the sky)</i>			#2.2.2
Safety and etiquette on the shooting line	Do not disturb (touch or talk to) other shooting archers			2.5
	How to retrieve an arrow that has been dropped on the floor			#2.2.2
Total	9 positive evaluations are required			** Granted ____ or not yet granted

* Checkmark if the score / skill / knowledge is positively evaluated (Achieved) or not (Not yet achieved). Write in the TOTAL row of these two columns the accumulated number of checkmarks.

** Just checkmark the final result of this evaluation.

Name and signature of the assessor/evaluator: _____

13.4. THE ARROWS



13.4.1. Recommended evaluation guidelines for the "Arrows"

13.4.1.1. Score evaluation (for the Arrow awards)

Where: Indoor or Outdoor.

Warm-up: No more than 4 ends (recommendation only).

Target face: 80cm (a full one)

Target height: centre of the target face 1 meter to 1.3 meter from the ground/floor.

Arrows per end: 3

Number of ends: 5

Time per end: 2 minutes.

Total number of arrows: 15 (half the number of arrows shot at one of the 2 Indoor distances).

Scoring: As per World Archery Indoor and Outdoor scoring rules.

13.4.1.2. SKILLS EVALUATION (for the Arrow awards)

A coach should practically evaluate each candidate on the respective skills for the various Arrow Awards. The sections below detail the skills for each of these five Arrow Awards.

13.4.1.3. KNOWLEDGE and KNOW-HOW EVALUATION (for the Arrow awards)

The sections below detail the knowledge and know-how that are required for the five Arrow Awards. For the knowledge, an online multiple-choice questionnaire can be posted. The novices could download it, complete it and submit it by a deadline. The know-how has to be evaluated during a practical session.

White arrow candidates:

Depending on your current level, three cases are possible:

- a) You have not earned any Feather awards, but your coach wishes you to challenge the White Arrow (suggested for beginners who are 12 years old or older). For this level, you must learn the "Skills" and "Knowledge and Know-How" for all three of the Red Feather, Gold Feather and White arrow levels. Your evaluator will use form C1.
- b) You only have the Red Feather award. You should complete the Feather awards program by earning the Gold Feather (this applies to most of the youngest beginners; i.e. under 12 years old). Only after getting the Gold Feather will you be allowed to challenge the White Arrow.
- c) You already have the Gold Feather award. You are ready to challenge the White Arrow level. Your evaluator will use form C2.

13.4.2 White Arrow



13.4.2.1. Performance

Shooting distance: 10 meters

Minimum required score: 115 points

13.4.2.2. Skills – Your shooting sequence should include the following

FEET POSITION:

For candidates having earned no World Archery Feather awards, see the "Skills" section of the Red Feather curriculum.

ARROW LOADING:

For candidates having earned no World Archery Feather awards, see the "Skills" section of the Red Feather curriculum.

BODY SETTING (before drawing and full draw):
For candidates having earned no World Archery Feather awards, see the "Skills" section of the Gold Feather curriculum.

BODY SETTING (end of draw): For candidates having earned no World Archery Feather awards, see the "Skills" section of the Gold Feather curriculum.

RAISING THE BOW:

Objective:

Perform the preliminary movements with as little unnecessary motion and disruption to initial positioning as possible. This initial positioning must allow for an effective draw.

Form:

Synchronized raising of the two hands towards the target until both hands are level with the nose.

Throughout the process:

- the bow shoulder must stay as low as possible;
- the upper body (shoulders, chest and centre of gravity) stays in its lowest position;
- the arrow must stay within the shooting plane as it is moved up;
- the head and spine stay extended;
- the pelvis remains tilted (if this position is chosen).

Toward the end of the raising:

- both hands are moved up to the same level;
- the arrow is parallel to the ground;

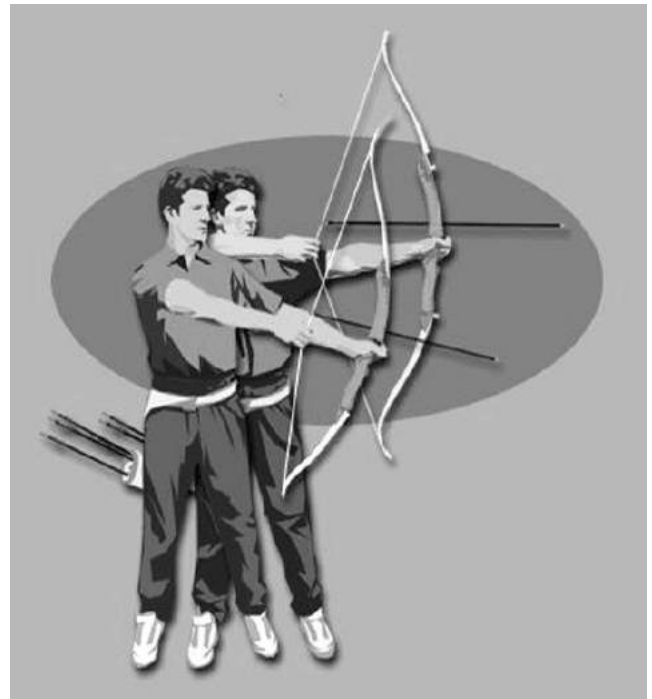
At the end of the raising:

- the arrow is at the nose/eyes level;
- the string shoulder is lower than the arrow shaft;
- the string wrist is in line with the string forearm;
- a slight backward inclination of the torso toward the string foot is acceptable, but a straight body is recommended.

Rationale:

The simplicity of the movement makes it easy to repeat. It is a safe starting position for the draw, even if an arrow is inadvertently released. Raising the arms in this manner only slightly changes the body elements already in position, if at all. . The forces exerted on the

upper body facilitate the low positioning of the shoulders. The body's inclination toward the string foot counter balances the weight of the bow and moves the archer's centre of gravity away from the target (the use of bows with light mass weight will reduce this inclination).



13.4.2.3. Knowledge and/or Know-how – You must know the following

BOW SAFETY:

For candidates having earned no World Archery Feather awards, see the "Knowledge and/or Know-how" section of the Red Feather curriculum.

ARROW LOADING SAFETY:

For candidates having earned no World Archery Feather awards, see the "Knowledge and/or Know-how" section of the Red Feather curriculum.

SAFE ARROW RECUPERATION:

For the candidates having earned no World Archery Feather awards, see the "Knowledge and/or Know-how" section of the Red Feather curriculum.

BOW PREPARATION:

For candidates having earned no World Archery Feather awards, see the "Knowledge and/or Know-how" section of both the Red Feather and Gold Feather curricula.

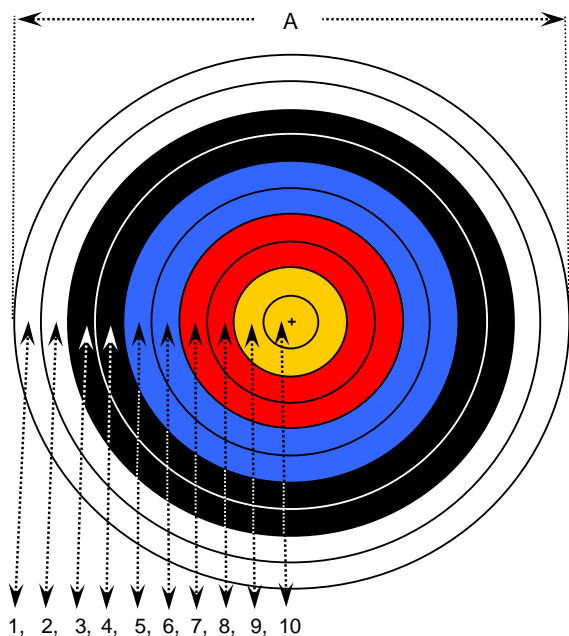
SHOOTING DIRECTION:

For candidates having earned no World Archery Feather awards, see the "Knowledge and/or Know-how" section of the Gold Feather curriculum.

SAFETY AND ETIQUETTE ON THE SHOOTING LINE: For candidates having earned no World Archery Feather awards, see the "Knowledge and/or Know-how" section of the Red Feather curriculum.

SCORING:

You should be able to identify the arrow's value.



You should know how to complete a scorecard for a complete "FITA Arrow round" (Soon to be the "World Archery Arrow round"). The value that each arrow scores must be entered on the scorecards in descending order as called out by the athlete to whom the arrows belong. The other athletes on that target will check the value of each arrow called out and in case of disagreement call the assigned judge who makes the final decision.

Example of a blank scorecard (for BAP Arrow round only):

15 Arrows				
1	2	3	End	Total
10s:		Xs:		

Example of a completed scorecard (for BAP Arrow round only):

15 Arrows				
1	2	3	End	Total
X	8	5	23	
10	10	8	28	51
10	8	7	25	76
8	8	0	16	92
X	7	7	24	116
10s: 5		Xs: 2		116

Evaluation form for **White Arrow** candidates
having earned **no Feather awards**.

Page #1 (start /front page)

Name of the beginner: _____ Form C1

Date: ____ / ____ / 20__ Retake date: ____ / ____ / 20__

PERFORMANCE	Required minimum score	Achieved *	*Not yet achieved	Total score
Shooting distance				
10 meters	115 points			
SKILLS	Key elements (What should be done)	Achieved *	*Not yet achieved	References to the World Archery Level 1 Coaching Manual
Feet position (Stance)	Feet either side of the shooting line			#6.1.1
	Feet at shoulder width apart			#6.1.1
	Line of feet square to the shooting line			#6.1.1
	Feet parallel			#6.1.1
Safe and proper arrow loading	Implemented with bow vertical			#6.2.1
	No finger pressing the arrow on rest			#6.2.1
	Arrow properly oriented (index fletching away from bow window)			#6.2.1.
Body setting (before drawing and at full draw)	Vertical body			#6.5.1
	Balance equal on both feet			#6.5.1.
	Spine and shoulders making a cross shape			#6.5.1.
Raising	Synchronized hands			#6.6.1
	Raise hands while keeping the shoulders down			#6.6.1
	Hands at same height and at nose or eye level once raised			#6.6.1.
	Arrow parallel to the floor once raised			#6.6.1
Body setting (end of draw)	Let the string hand land on face (chin and/or lips do not reach forward to the string)			#6.8.1.

Evaluation form for **White Arrow** candidates
having earned no **Feather awards**.

Page #2 of form C1 (end / Back page)

KNOWLEDGE and/or KNOW-HOW	Required knowledge or know-how	Achieved *	*Not yet achieved	Comments and/or references
Bow safety	No dry firing (dry loosing)			#2.3
	Place the bow in the equipment lane after end			#2.2.2
Arrow loading safety	Load the arrow on the bow only when the Field of play is empty, the shooting signal has been given and			#2.2.1 & 2.2.2
	done only when both feet are set, one on each side of the shooting line			#2.2.2
Safe arrow recuperation	Walk carefully to the target (not running and watching his/her step)			#2.3
	Stand to the side of the target (not behind arrows)			#2.2.2
	Properly pull the arrow out of the target (or grass)			#2.4
Bow preparation	Know how to properly mount and remove the limbs on/from the riser			This evaluation can be skipped if no take down bow is available
	Can brace his or her bow			#9.3.2
Shooting direction	Only draw towards a clear target butt from the shooting line (<i>not toward anyone or the sky</i>)			#2.2.2
Safety and etiquette on the shooting line	Not disturbing (touching or talking to) other shooting archers			2.5
	Properly retrieve an arrow that dropped on the floor			#2.2.2
Scoring	Identify each arrow's value			Chapter 14 Scoring
	Complete a scorecard for a complete round			Chapter 14 Scoring
TOTAL	30 positive evaluations are required			** Awarded ____ or Not awarded yet ____

* Checkmark if the score / skill / knowledge is positively evaluated (Achieved) or not (Not yet achieved). Write in the TOTAL row of these two columns the accumulated number of checkmarks.

** Just checkmark the final result of this evaluation.

Name and signature of the evaluator: _____

Evaluation form for **White Arrow** Candidates
having earned the **Red and Gold Feather** awards **previously**.

Name of the beginner: _____ Form C2

Date: ____ / ____ / 20__ Retake date: ____ / ____ / 20__

PERFORMANCE Shooting distance	Required minimum score	Achieved *	*Not yet achieved	Total score
10 meters	115 points			
SKILLS	Key elements (What should be done)	Achieved *	*Not yet achieved	Comments and/or references to the World Archery Level 1 Coaching Manual
Raising	Synchronized hands			#6.6.1
	Raise hands while keeping the shoulders down			#6.6.1
	Hands at same height and at nose or mouth level once raised			#6.6.1.
	Arrow parallel to the floor once raised			#6.6.1
KNOWLEDGE and/or KNOW-HOW	Required knowledge or know-how	Achieved *	*Not yet achieved	Comments and/or references
Scoring	Identify each arrow's value			Chapter 14 Scoring
	Complete a scorecard for a complete round			Chapter 14 Scoring
TOTAL	7 positive evaluations are required			** Awarded ____ or Not awarded yet ____

* Checkmark if the score / skill / knowledge is positively evaluated (Achieved) or not (Not yet achieved). Write in the TOTAL row of these two columns the accumulated number of checkmarks.

** Just checkmark the final result of this evaluation.

Name and signature of the evaluator: _____

13.4.3 Black Arrow



13.4.3.1. Performance:

Shooting distance: 14 meters
 Minimum required score: 115 points

13.4.3.2. Skills – Your shooting sequence should include the following:

DRAW PROCESS: See the “The Upper Body” section of the “Skills” from the Gold Arrow curriculum.

FULL DRAW (the hold)

Objective:

Body and equipment stability for effective aiming. Holding the bow at full draw without collapsing from the bow's draw weight or mass.

Form:

With the body in an upright position and keeping the torso still, let the chest and shoulders exert a steady downward effort while seeking to spread out the shoulders. Maintain an erect spine and head. Strike a balance between the push and pull forces, supported by an equal use of both legs and an engaged abdominal area. The constants are:

- the distance between the arrow and the bow shoulder in the horizontal plane;
- the distance between the chin and bow shoulder;
- the height difference between the arrow and the bow shoulder in the vertical plane;
- the height of the shoulders;
- the bow's vertical position;
- The positions of the torso and head.

Rationale:

This form strongly opposes the spring effect of the bow, which can cause the archer to collapse, and draws in the chest, facilitating string displacement. The production of effort is dispersed, which facilitates achieving symmetry, reduces local fatigue effects, and minimizes the risk of injury. Moreover, major muscles are used in generating the movement and effort and promote stretching the spine helping the archer stay erect and vertical. Flattening the chest and lowering the shoulders

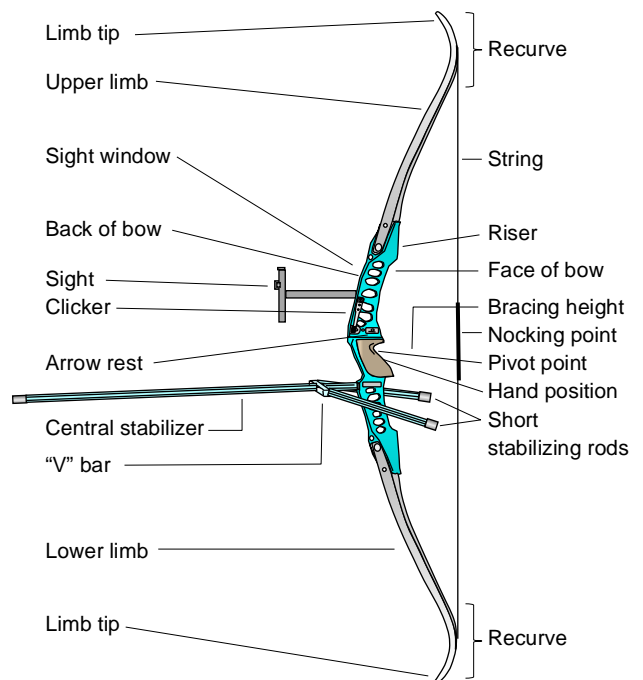
lowers the centre of gravity, making the body more stable. The combination of the above actions contributes to maintaining the draw length and helps to keep the head and the aiming eye at a constant level. Furthermore a certain level of muscle tone is necessary; weak muscles will probably collapse under the spring effect of the bow.

13.4.3.2. Knowledge and/or Know-how

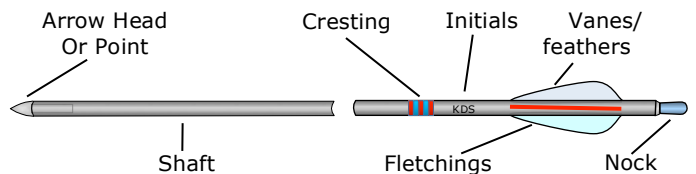
EQUIPMENT TERMINOLOGY

You should know the names designating the various parts of your equipment. During the evaluation you will have to name five parts or components of the bow.

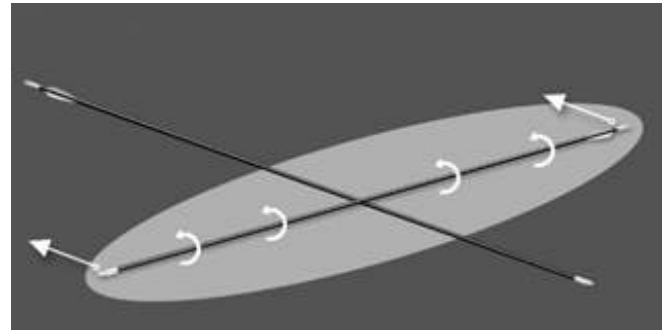
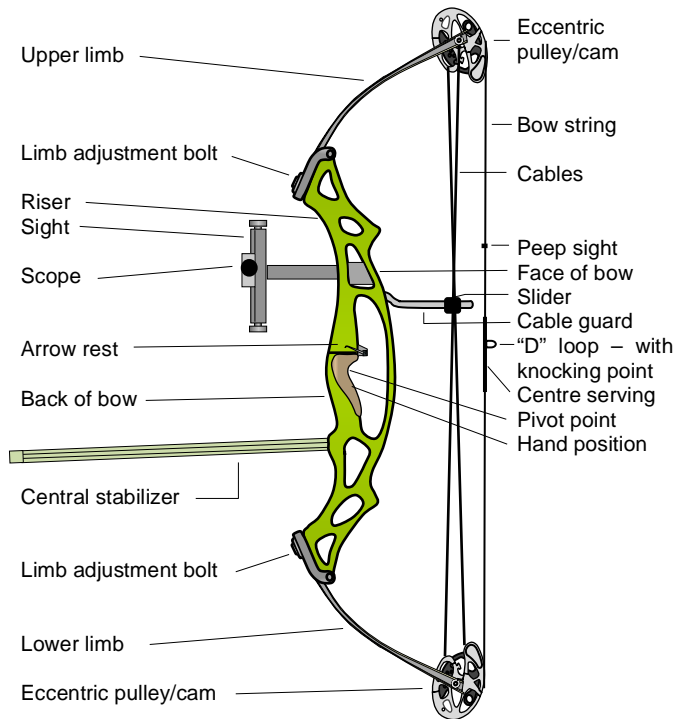
1) Recurve bow:



2) Arrow



3) Compound Bow



Always check shafts for damage such as splits, chips or compression lines as these make the arrows dangerous to use and inaccurate.



Always check shafts for damage such as splits, chips or compression lines as these make the arrows dangerous to use and inaccurate

ARROW SAFETY AND CHECKING

When shot, an arrow may not fully stick into the target. Instead it may hang loose from the point of the arrow and lay down along the target face. If this happens, shooting on that target butt should cease until the arrow is removed. If shooting continues at a target with a dangling arrow, other arrows may hit it causing damage to either the hanging arrow or the one that strikes it. The striking arrow may also ricochet off the hanging arrow.

Arrows should always be straight. Usually small bends in aluminium arrows do not affect a beginner's accuracy. Straightness can be checked by eye, down the shaft, or by spinning the arrow and noting wobble or vibration. Rolling the shaft along a table can also be used to check straightness.

If there are no splits in a wooden or aluminium shaft, but there is a bend in it, a shaft straightening tool can be used. Straightening can be done by hand, but this requires some experience. Be careful because sometimes a shaft can break during the straightening process.



Evaluation form for BLACK Arrow Candidates.

Name of the beginner: _____ Form D

Date: ____ / ____ / 20__ Retake date: ____ / ____ / 20__

Shooting distance for score evaluation	Required minimum score	Achieved *	*Not yet achieved	Total score
14 meters	115 points			
SKILLS	Key elements (What should be done)	Achieved *	*Not yet achieved	References to the World Archery Level 1 Coaching Manual
Draw process	Done with two hands always at the same level (or arrow always parallel to floor)			#6.8
	Draw in shooting plane			#6.8
Main action (What is happening at full draw?)	Stationary arrow point (no draw creeping) - or better - arrow point constantly moving back			#6.10
	Consistent distances between arrow and bow shoulder (vertically and horizontally)			#6.10
Visual attention	Can observe himself (or herself) in a mirror while releasing			6.12 and its exercise "Visual Control of the Release – Exercise"
Subjects 3 evaluations	Required knowledge or know-how	Achieved *	*Not yet achieved	Comments and/or references
Equipment terminology	Can name 5 parts or components of the bow			#9.3.1
Arrow safety and checking	Know what to do in the case of a hanging arrow on the target			#2.4
	Can check the straightness of an aluminium arrow or the integrity of a carbon arrow			#9.4.5.5
TOTAL	9 positive evaluations are required			** Awarded ____ or Not awarded yet ____

* Checkmark if the score / skill / knowledge is positively evaluated (Achieved) or not (Not yet achieved). Write in the TOTAL row of these two columns the accumulated number of checkmarks.

** Just checkmark the final result of this evaluation.

Name and signature of the assessor/evaluator: _____

13.4.4 Blue Arrow



13.4.4.1. Performance:

Shooting distance: 18 meters
Minimum required score: 115 points

13.4.4.2. Skills – Your shooting sequence should include the following:

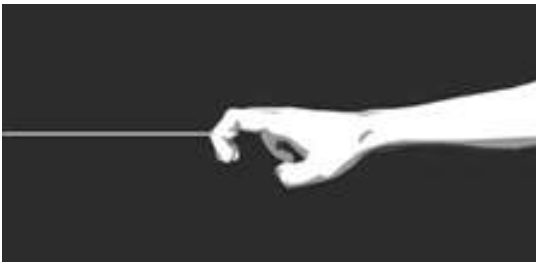
STRING GRIP (String Hook)

Objective:

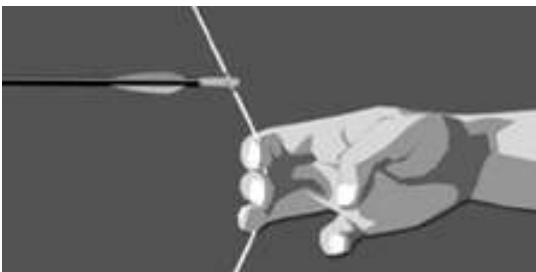
Consistent finger positioning on the string, about the arrow

Form:

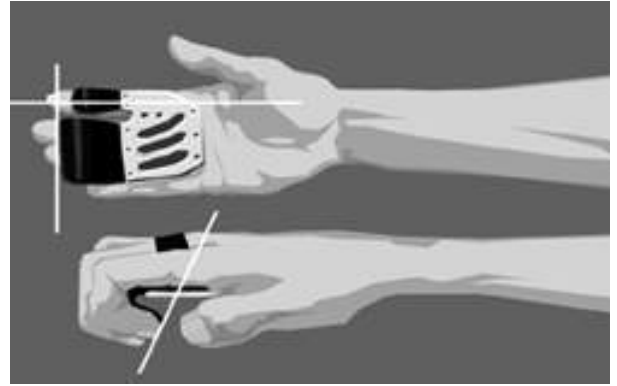
The fingers grip the string between the two upper joints. The palm of the hand is relaxed and the back of the hand is flat.



In most of the unsighted methods, three fingers are used and positioned beneath the arrow. In the shaft aiming method (straight line), the space between the nock and the forefinger is about two to three fingers' width, depending on facial bone structure and size of string fingers.



The three fingers share the workload equally. The back of the hand remains as vertical as possible, not curled-up, with the wrist as flat as possible. The interior of the forearm remains relaxed. Consequently, the hand is in the same axis, or vertical plane, as the forearm and arrow.



With a proper string hook, the back of the hand and the wrist are flat (Example for sight use)

Rationale:

A "deep" string grip in the fingers allows the muscles of the string hand, arm and forearm to relax from the string side. The more relaxed these body parts are, the less they interfere with the string and the cleaner the string releases from the fingers.

FACIAL MARKS:

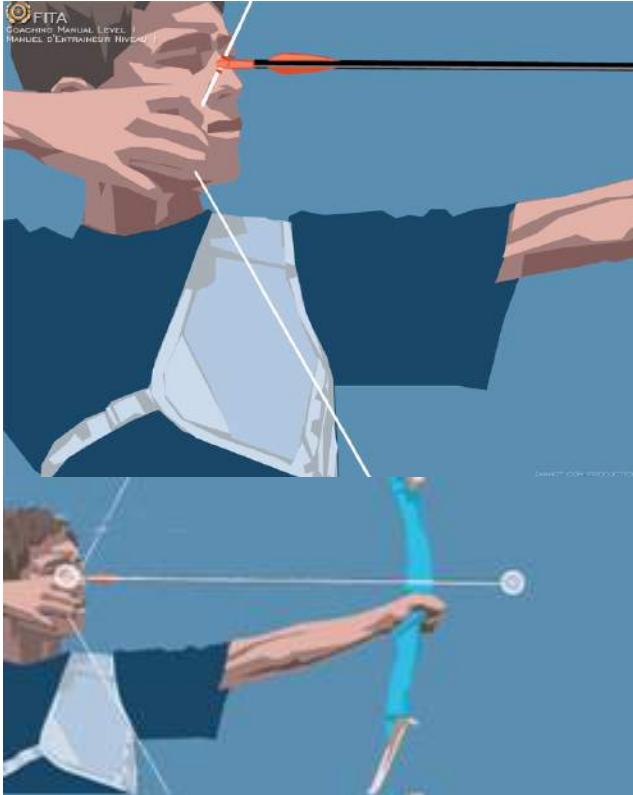
Straight line:

The archer looks straight along the arrow shaft to the point of aim on the target.



This aiming style has its advantages:

- simple visual alignment of the arrow shaft on the centre of the target is enough, no need to repeat the facial marks at full draw (see triangle and quadrilateral methods described further down in this chapter);
- the aiming eye positioning in reference with the shooting plane is automatic (hence no need for string alignment);
- no concern about applying a vertical finger pressure on the arrow (upward or downward) with the string fingers.



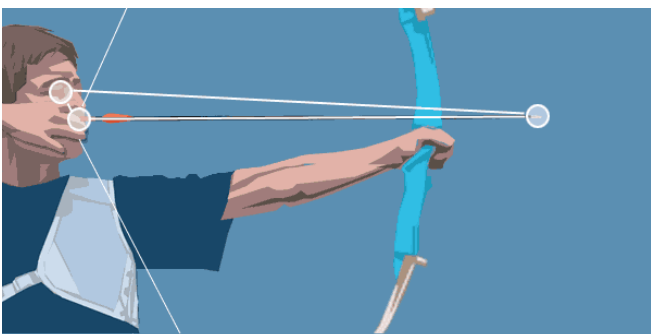
Triangle:

The aiming style positions the arrow using two reference points:

- The arrow point, by visual placement on the target while maintaining a consistent draw length (because the archer is aiming "through" the point);



- The arrow nock, through contact of the string hand on the face.



To ensure the consistent reproduction of the triangle, the archer has to position the aiming eye for string alignment.

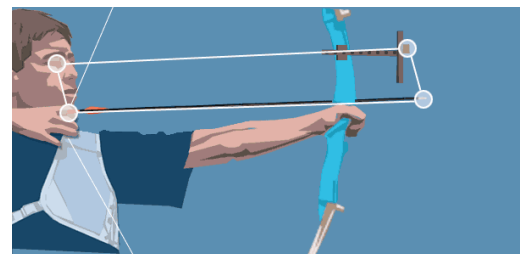


In the triangle method, the aiming eye position (for string alignment) is mandatory

Quadrilateral:

This aiming style requires the introduction of a sight. The arrow is positioned by two reference points:

- The arrow point, by visual placement of a sight on the target;
- The arrow nock, through tactile placement of the string hand on the face.



Furthermore, to ensure consistent repetition of the quadrilateral method, the archer must maintain:

- the bow in the vertical plane or consistently canted the same amount;
- a consistent draw length;
- the position of the aiming eye for string alignment.

ARROW- STRING FOREARM ALIGNMENT:

Objective:

Determine the body position that requires the minimum effort for maximal stability at full draw.

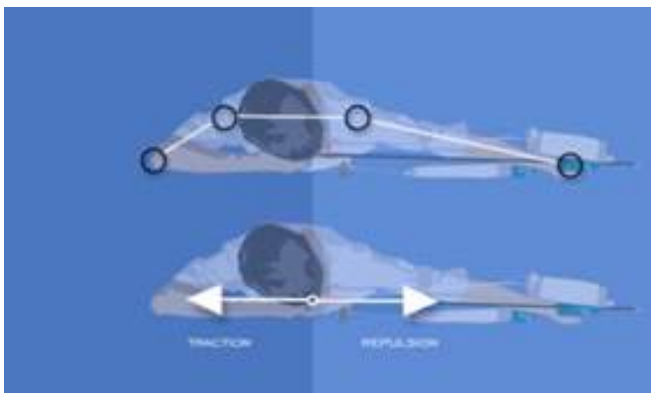
Form:

Your string forearm should be as much as possible in the vertical plane passing through the arrow.

Rationale:

In terms of required effort, this position is the most efficient. Furthermore it allows the muscles in the string arm, forearm and wrist to stay relaxed.

The relaxation of these muscles facilitates the use of the muscles located in the back and behind the string shoulder.



FEELING ATTENTION:

In order to get a better kinaesthetic perception (physical feeling) of the skill and, in this case, the string hand, shoot at a very short distance (about 3 meters) with your eyes closed and focus on the feeling of the shot. Shooting at an empty buttress (nothing to aim at) with your eyes open also makes it easier to sense physical perceptions.

13.4.4.3. Knowledge and/or Know-how

BOW KNOWLEDGE:

You should be able to give the overall description of 3 types of bow.

The following gives a general description of the Recurve, Compound and Bare-bow.

Recurve:

The only type of bow allowed in Olympic competitions. Its limbs curve away from the archer. It is also called Classic Bow.

Compound:

This bow has pulleys and cables to make the holding weight less than half of the draw weight.

Bare-bow:

This is a recurve bow without a mechanical sight or stabilizers.

ARROW MAINTENANCE: NOCK REPLACEMENT

1. Remove the remaining part of the broken nock, if any. For easier removal you can slightly warm the remaining part of the nock with a flame or warm water.
2. If desired, you can use a fine sand paper on the cone of an aluminium shaft. Clean the area where the new nock will fit with 91 % isopropyl alcohol. For an Aluminium/Carbon shaft, clean the area that will receive the new nock, but do not sand it.
3. Put a drop of glue on the area where the new nock will fit, as shown below.



4. Press the nock onto the shaft and rotate it to spread the glue.
5. Orientate the groove of the nock so that it is square to the index vane, as in the picture below.



6. Give the glue time to properly set before shooting the arrow with the new nock.

EVALUATION FORM FOR BLUE ARROW CANDIDATES

Name of the beginner: _____ Form E

Date: ____ / ____ / 20__

Retake date: ____ / ____ / 20__

Shooting distance for score evaluation	Required minimum score	Achieved *	*Not yet achieved	Total score
18 meters	115 points			
SKILLS	Key elements (What should be done)	Achieved *	*Not yet achieved	References to the World Archery Level 1 Coaching Manual
String hand	Flat back of hand (no knuckles pointed out)			#6.3.1
	3 fingers are used for gripping the string			#6.3.1
	Vertical back of hand			#6.3.1
	Consistent grip			#6.3.1
Facial marks	Consistent location			#6.9.1
	Provide "decent" alignment between arrow and string forearm			#6.9.1
	Can align the string			#6.9.2 - String Alignment Discovery Exercise
Feeling attention	Can shoot with eyes closed			#Intro of chapter 6 – Standard Teaching Process
Subjects 3 evaluations	Required knowledge or know-how	Achieved *	*Not yet achieved	Comments and/or references
Bow knowledge	Can give the overall description of 3 types of bow			WA
Arrow maintenance	Knows how to replace a nock			#9.4.5.1
TOTAL	11 positive evaluations are required			** Awarded ____ or Not awarded yet _____

* Checkmark if the score / skill / knowledge is positively evaluated (Achieved) or not (Not yet achieved). Write in the TOTAL row of these two columns the accumulated number of checkmarks.

** Just checkmark the final result of this evaluation.

Name and signature of the evaluator: _____

13.4.5 Red Arrow



13.4.5.1. Performance

Shooting distance: 22 meters
Minimum required score: 115 points

13.4.5.2. Skills – Your shooting sequence should include the following:

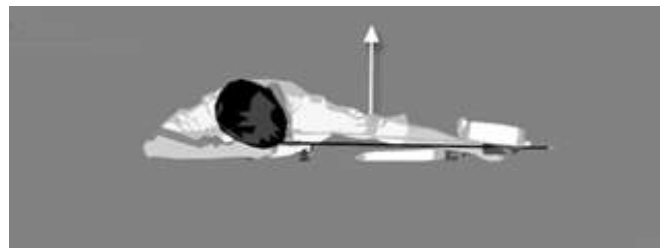
Bow hand and arm:

Objective:

- Consistent bow hand contact with bow grip;
- Apply a minimum degree of influence to the bow grip with your bow hand;
- Sufficient string clearance during the shot (this last objective will be better described in the Gold Arrow curriculum).

Form:

Fingers are relaxed and naturally curled, but not gripping or choking the bow. The wrist is flexed and the "V" between forefinger and thumb is centred on the forearm axis. The bow presses on the centre of the zone made by the thumb axis and the life line. The main pressure zone is about 1 to 2.5 cm from the top of the webbing between the thumb and forefinger. The side of the palm across the life line from this "V" should not press on the centre of the grip.



The bow forearm is straight but not stretched. The bow elbow is fixed and straight. The elbow point must be turned to the left for right hand archers, not toward the ground.

Rationale:

This bow hand grip requires very little muscle contraction and promotes relaxation. The more relaxed the archer is, the better they can perform and the less likely they are to influence the shot with their bow hand.

RELEASE

What happens on the string side of the archer?

Objective:

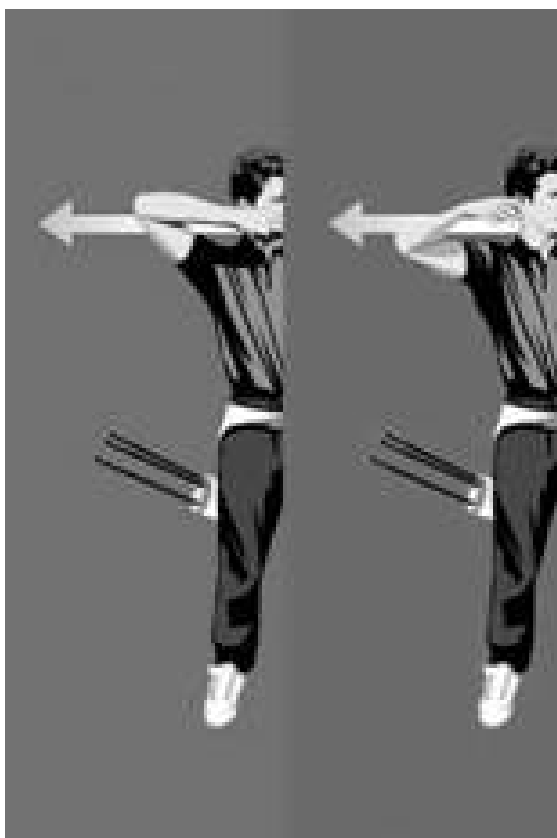
Continue all on-going activities, and further refine the release of the string.

Form:

Upon the string release, the string hand immediately moves backwards, in the shooting plane. It moves along either the jaw (in the "Straight line" and "Triangle" methods) or neck (in the quadrilateral method). The string hand stops at or just beyond the string ear, often touching the ear or neck. The place where the string hand finishes is called the "back end." The upper string arm ends up in the same plane as the shoulders.

Rationale:

Because the muscles of the back are connected to the string shoulder, their contractions affect the entire string arm and the backwards motion that it was implementing during the "full draw" sequence.



RELEASE

What happens on the bow side of the archer?

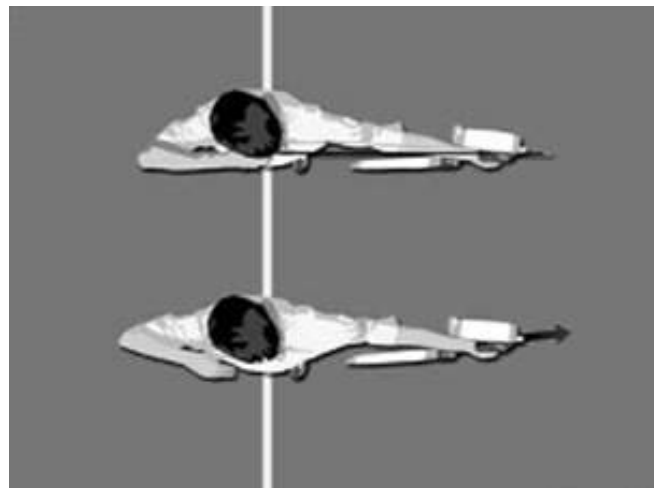
Bow arm:

Objective:

Continue all on-going activities, the bow arm, and even the whole body moves slightly forward.

Form:

Upon the release of the string, the bow arm moves towards the back of the archer.



Rationale:

The deviation of the bow arm towards your back is mainly due to the continuous action of the posterior muscles of the bow shoulder in much the same way as for the string hand. The forward motions toward the target are due to the continuous push effort produced at "full draw" by the whole body from the bow arm to the string leg.

Bow hand:

Objectives:

Continue all on-going physical activities during the arrow propulsion period (just after release). Develop a passive bow hand and fingers to get a clean arrow launch without any force being applied to the riser that could create torque in the bow at full draw and/or during the arrow propulsion period.

Form:

When the bow is propelled forwards after the release, your wrist gets stretched and pulled by the sling. Then when the bow cants forward and drops down, your wrist flexes down with it.

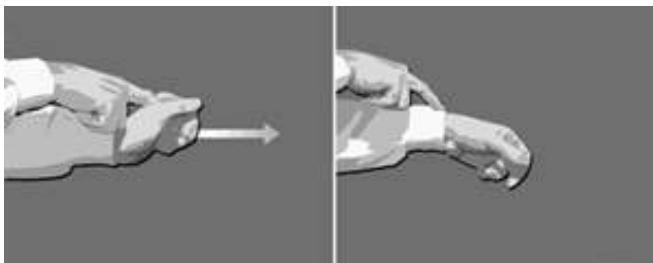


Example of a bow hand that has been kept well relaxed until the end of the shot

Rationale:

The bow presses on your relaxed hand and wrist. When this pressure disappears (when

the bow is propelled forwards at the end of the string's forward movement), the hand remains totally relaxed and follows the motions of the bow.



Simulation of a relaxed bow wrist and hand

13.4.5.3. Knowledge and/or Know-how

ARCHERY DISCIPLINES.

Outdoor Target Archery:

The World Archery Outdoor Target Archery rounds may be shot by both Recurve and Compound archers, in separate divisions. However, only the Recurve division competes in the Olympic Games. The World Archery Standard Round may only be competitively shot by athletes conforming to the World Archery Standard Bow Division.

- a) The 50m Round for Compound consists of 72 arrows on the 80cm target face.
- b) The 60m Round (for Recurve) for Cadets and Masters consists of 72 arrows shot at 60m on the 122cm target face.
- c) The 70m Round (for Recurve) consists of 72 arrows shot at 70m on the 122cm target face.

The World Archery 1440 Outdoor Target Archery Round consists of 36 arrows from each of the following distances shot in this order:

- 60,50,40,30 meters for Cadet Women;
- 70,60,50,30 meters for Women, Cadet Men, Junior Women and Master Women;
- 90,70,50,30 meters for Men, Junior Men and Masters Men.

Or in the order:

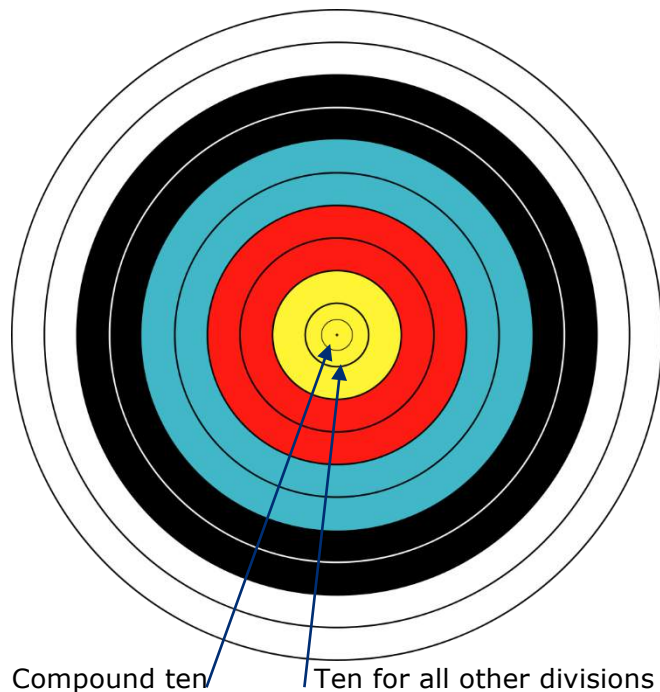
- 30,40,50,60 meters for Cadet Women;
- 30,50,60,70 meters for Women, Cadet Men, Junior Women and Masters Women;
- 30,50,70,90 meters for Men, junior Men and Masters Men.

The 122cm target face is used for the 90, 70, 60m (and 50m for Cadet Women) distances and the 80cm face is used for the 50 (other than Cadet Women), 40 and 30m distances. The 80cm multiple centre set-up may be used at 50, 40 and 30m.

Indoor Target Archery:

World Archery Indoor Target Rounds may be shot by both the Recurve and Compound archers, in separate divisions.

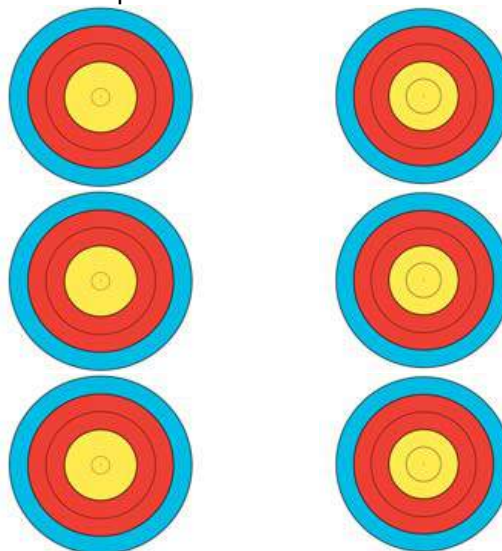
The 25 meter World Archery Indoor Round consists of 60 arrows on a 60cm diameter face or the 60cm triple centre set-up, for all classes. The 18 meter World Archery Indoor Round consists of 60 arrows on a 40cm diameter face or 40cm triple face for all classes.



Vertical triple face:

For Compound

For others



The combined World Archery Indoor Round consists of the above two rounds shot in succession in the order listed above.

Field Archery:

The World Archery Field Archery Rounds may be shot by Bare-bow, Recurve and Compound archers, in separate divisions.

The World Archery Field Round consists of 12, 16, 20 or 24 targets. Three (3) arrows are shot per athlete at each target. The targets are arranged along a course with such difficulties in aiming and shooting as the terrain presents and the spirit and traditions of the discipline require. The target butts are set between 5 meters and 50 meters for Bare-bow and between 10 meters and 60 meters for Recurve and Compound. The course may be marked or unmarked.

The World Archery Arrowhead Round consists of any number of targets totalling between 24 and 48 targets which is divisible by four, or in other words two complete World Archery Field Rounds. The rounds may be shot on marked or unmarked courses or one of each.

ARROW MAINTENANCE

Removing points (and/or inserts)

When removing a metal point, insert and point together, or an insert and point in two pieces, you must:

- 1 - Lightly heat the exposed end of the point or insert for 3-5 seconds over a small gas flame.
CAUTION: Do not overheat the component or the shaft.
- 2 - Grip the point with a pair of pliers.
- 3 - Twist and pull out the point (and/or insert if any).
- 4 - If the point and/or insert cannot be removed, reheat for another 3-5 seconds and try to remove again.
- 5 - Repeat procedure step 4 until the adhesive softens enough to remove the component.

Installing points and/or inserts in the shaft

Material needed for installation:

- 91 % isopropyl alcohol;
- Paper towels;
- Cotton swabs;
- Hot-melt (archery specific);
- Torch or burner.

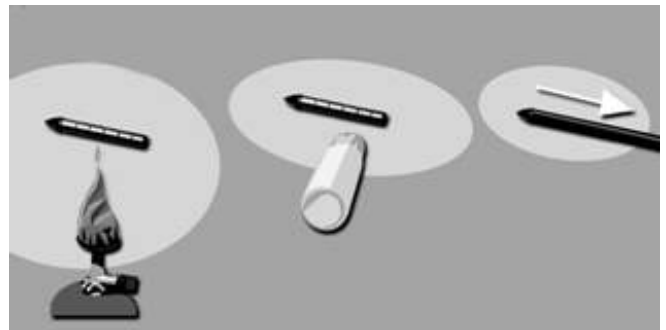
The following instructions can be used for one-piece points or for aluminium inserts with a point already screwed in.

After cutting your shaft to length, follow the point installation procedure carefully to prevent overheating the point. Overheating points can damage the arrow by:

- destroying the shaft's epoxy bond between the carbon and the aluminium tube (in an aluminium/carbon shaft);
- change the endurance of the aluminium in this area if aluminium shafts are being used;
- destroy the epoxy that bonds the carbon fibres (in an all-carbon arrow).

For gluing points and/or inserts, use hot-melt adhesive.

1. Clean approximately two inches inside the point end of the shaft using a cotton swab dipped in 91% isopropyl alcohol. Repeat the process until a fresh cotton swab is free of cutting dust, residue or other contaminants. Let the shaft dry thoroughly before bonding.
2. Carefully heat a stick of hot-melt adhesive over a small gas flame; then apply a ring of hot adhesive to the inside of the point-end of the shaft.



CAUTION: Do not apply heat directly to the arrow shaft.

The melting point of hot-melt adhesive is low enough that the shaft will not be damaged during installation and high enough to keep the point securely bonded despite the frictional heating generated when the arrow penetrates a target mat. Arrow points can come out in the target mat if a lower melting temperature hot-melt adhesive or if not enough is used.

3. Hold the end of the point with your fingers. (Do not hold with pliers because it is then possible to overheat the point.) Heat the insert portion of the point shank or insert until you feel it getting warm. It should be just hot enough to melt the adhesive.

CAUTION: Do not overheat the points. If the point becomes too hot to hold in your fingers, it is too hot to put in the shaft. Set the point on a non-combustible surface until cool.

4. Heat the hot-melt adhesive and apply a generous layer of adhesive to the shank of the point or insert.

FLETCHING A SHAFT

5. While the adhesive is still fluid, push the point and/or insert into the shaft with rotating motion until the point flange seats against the end of the shaft. To assure an even distribution of glue, rotate the point for two complete revolutions after it has seated against the shaft.

NOTE: Do not force a point and/or insert into a shaft. If it does not seat fully, reheat the point immediately for 2-3 seconds and try pushing it in again.

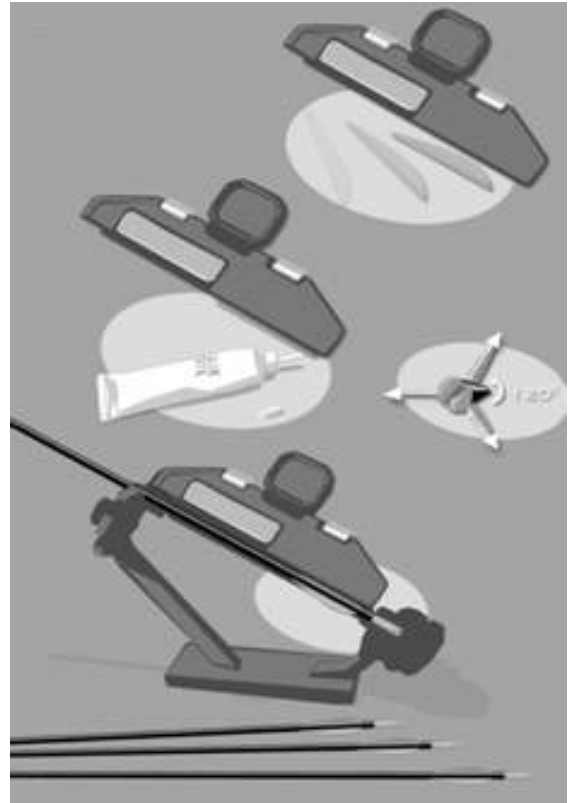
6. Wait for it to cool, then pick the glue ring off towards the point (away from the shaft). This has the added benefit of not wasting the excess glue; simply reheat it and put it on the end of the glue stick.

CAUTION: Do not apply heat directly to an arrow shaft of any type because it could destroy the carbon fibres and/or change the endurance of the aluminium in this area. Take care to not overheat the points, because this could also cause damage in the shaft.

If the head of the shaft is damaged on the point side, you may be able to use this arrow again, if its initial length before the "problem" was long enough. If there is enough shaft to safely do so, this arrow may be cut down a little to remove the damaged area. It is advisable to cut all your arrows down to the new length, for the sake of consistency.

Feathers or vanes can be applied or replaced with a fletching jig. Without this device it is difficult to keep the vane straight on the shaft until the glue is dry. Most archery dealers re-fletch arrows, which is less expensive than buying new ones. Ideally your club should own a fletching jig.

For more information, refer to section 9.4.5.3. "Fletching the arrow" from the WA Level 1 Coaching Manual



Fletching a shaft

EVALUATION FORM FOR RED ARROW CANDIDATES.

Name of the beginner: _____ Form F

Date: ____ / ____ / 20__

Retake date: ____ / ____ / 20__

Shooting distance for score evaluation	Required minimum score	Achieved *	*Not yet achieved	Total score
22 meters	115 points			
SKILLS	Key elements (What should be done)	Achieved *	*Not yet achieved	References to the World Archery Level 1 Coaching Manual
Release	String hand moves along jaw or neck			#6.12.1
	Backwards motion generated by the follow-up contraction of the back and posterior string shoulder muscles			#6.12.1
Bow hand	Consistent bow hand on grip			#6.4.1
	Relaxed bow hand allowing the use of a sling			#6.14.2, many exercises
Bow arm	Elbow properly orientated			#6.4.1
	Stationary upon release or moving a little toward the back due the follow-up contraction of the back and posterior bow shoulder muscles			#6.14.2 - Follow-Through of the Bow Arm - Exercise
Subjects 2 evaluations	Required knowledge or know-how	Achieved *	*Not yet achieved	Comments and/or references
Archery disciplines knowledge	Can give the overall description of 3 archery disciplines			www.worldarchery.org See Disciplines
Arrow maintenance	Know how to fit and glue a point, and fletch an arrow			#9.4.5.2 & 9.4.5.3
TOTAL	9 positive evaluations are required			** Awarded ____ or Not awarded yet ____

* Checkmark if the score / skill / knowledge is positively evaluated (Achieved) or not (Not yet achieved). Write in the TOTAL row of these two columns the accumulated number of checkmarks.

** Just checkmark the final result of this evaluation.

Name and signature of the assessor/evaluator: _____

13.4.6. Gold Arrow



13.4.6.1. Performance:

Shooting distance: 26 meters
Minimum required score: 115 points

13.4.6.2. Skills – your shooting sequence should include the following:

STRING CLEARANCE

Objective:

Allow a free path of the string during the propelling of the arrow.

Form:

See the two tests further down in this section. You will have to successfully pass one of these tests.

Rationale:

Any string interference during the propelling step would:

- make the consistent repetition of the push axis and the propelling intensity difficult;
- reduce the amount of kinetic energy transmitted to the arrow.

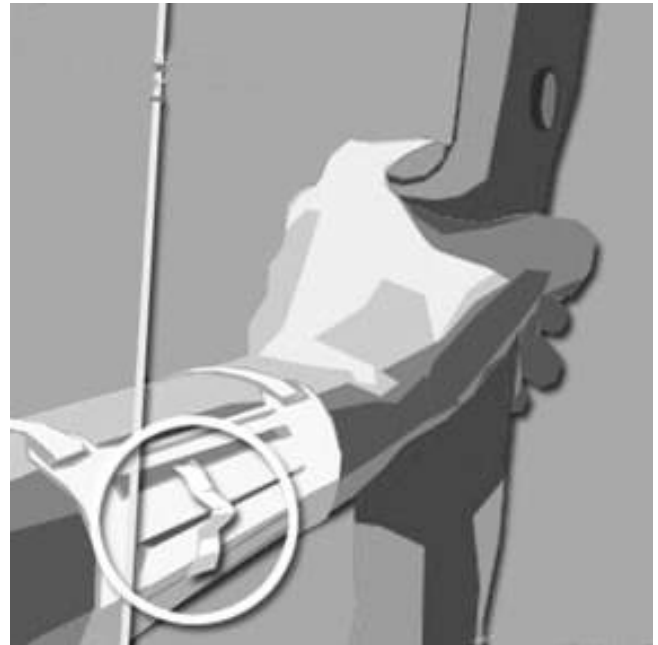
Test at the bow arm:

Make a mark with a pen on one side of a length of adhesive tape. With no hand on the string, raise your bow and note where your string is located on your armguard or forearm. About 1 to 1.5 cm forwards of this spot, affix the marked piece of adhesive tape, raised about 2 mm in the middle (like a bridge), with the mark closer to the string. The bridge of tape should be affixed vertically across your bow forearm/armguard, or if you prefer, parallel to the string.

The mark will help identify if the string hits the tape while it is pushing the arrow or on its way back after the arrow has left the string.

Shoot one arrow with this adhesive tape in place, making sure that you do not flatten out the bridge before the draw. After the shot, look at the tape and analyse the hit (if any).

If you come to the conclusion that the string clearance is too poor because the tape is damaged, ask to your coach to help you improve it.

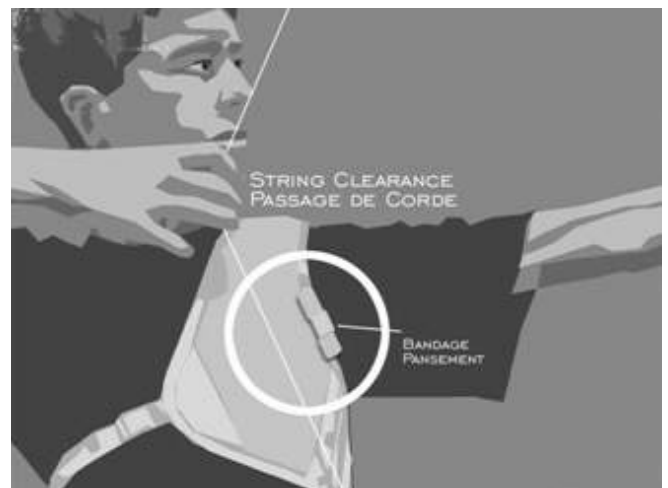


Test at the bow side chest:

Either watch yourself in a mirror, or with the help of an assistant, observe where the string touches your chest at full draw (if at all). About 1 to 1.5 cm forwards of this spot affix a piece of adhesive tape that has a bridge shape – 2 mm raised in the middle. See picture below.

The most critical point is the edge (hem or trim) of the chest-guard surrounding your bow shoulder. The bridge of tape should be affixed parallel to the line of the string at full draw. Shoot one arrow with this tape in place, making sure that you do not flatten out the “bridge” part before the draw. After the shot, look at the tape to analyse the hit (if any).

If you come to the conclusion that the string clearance is too poor because the tape is hit, ask to your coach to help you improve it.



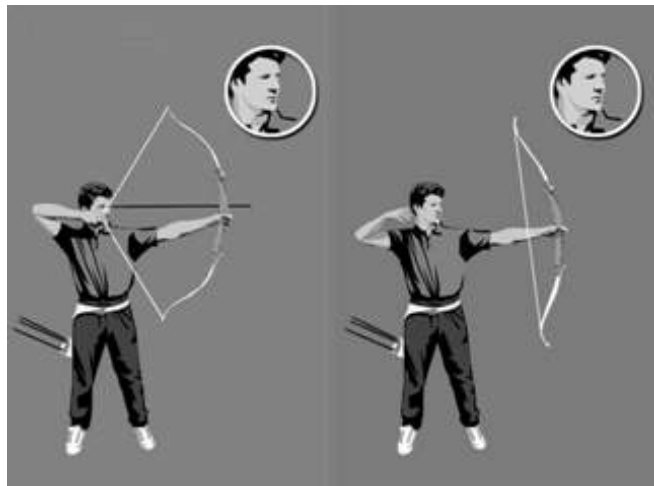
FOLLOW-THROUGH

Objective:

Continue all on-going activities – not only the physical ones, but also the visual and mental ones - and further refine the release of the string.

Form:

The shot must take an observer by surprise; no tell-tale signs of an impending shot may be seen. The body, face and gaze remain impassive before, during, and slightly after the action.



Your face should remain the same, before, during and after the release

Sequence: repeat with consistency the shooting steps (as listed below).



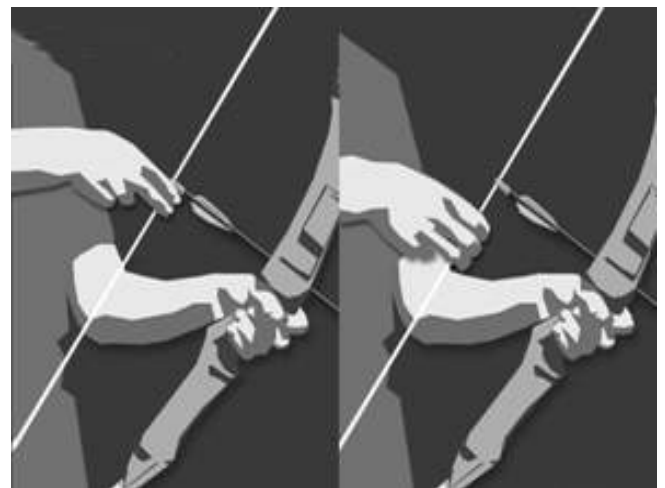
Step 1: Feet



Step 2: Nocking



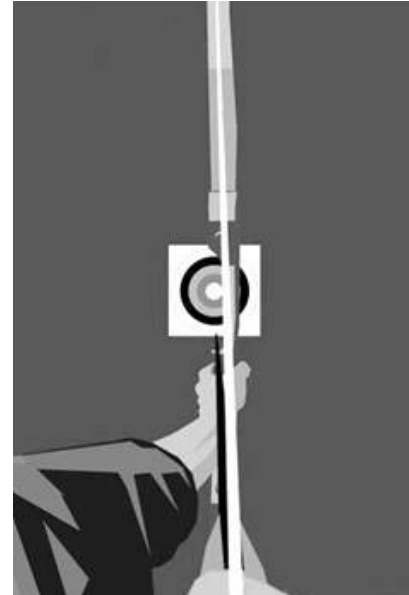
Step 3: Bow Hand



Step 4: String Hand



Step 5: Body Setting



Step 8: Aiming eye positioned and string aligned



Step 6: Raising



Step 9: Aiming



Step 7: Draw



Step 10: Expansion



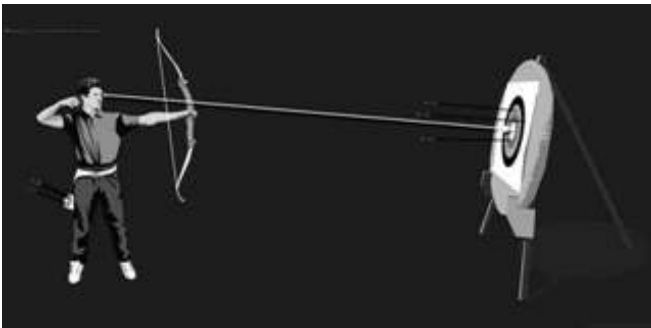
Step 11: Release



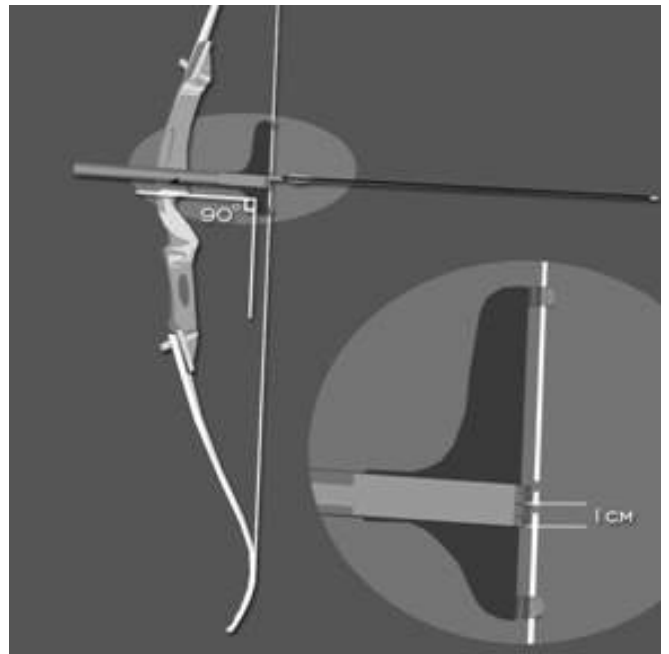
Making the nocking point:

The correct height of the nocking point depends on many things. A suggested starting point is to have the nocking point locate the bottom of the nock at about 1 cm higher above the level of the arrow rest, as measured with a bow square.

This is valid if you start with the straight line method (recommended). 6 mm above the rest is enough if the archer uses a string grip where the arrow is between the fore and middle fingers.



Step 12: Follow through and continued aiming



13.4.6.3. Knowledge and/or Know-how

TOURNAMENT REGISTRATION PROCESS:

You should know the registration process (of your club) in order to participate in a local tournament; hence you have to ask your club, what this process is.

ARROW SETTING:

Affixing arrow rests:

The use of an arrow rest is important as it reduces the area of contact between the bow and the arrow, thus creating less friction when the arrow begins to move upon release. Some arrow rests are made from wire and others are plastic.

The arrow rest should be glued onto the window directly above the pivot point of the handle and should be aligned perpendicular to the string.

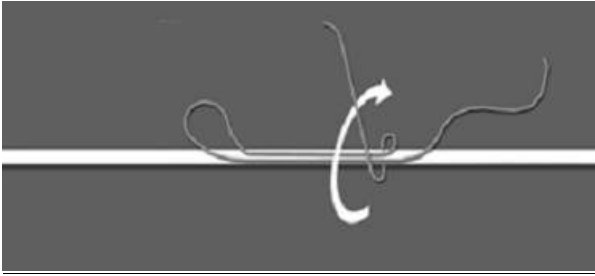
There should be a space of at least 15 mm between the arrow shaft and the window shelf.

Nock locators may be added in two ways.

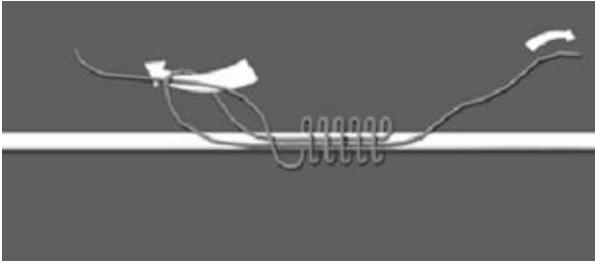
- Manufactured nock-sets are available. Quite often they are made of metal and are clamped on the string with special pliers.
- Another method is to use standard heavy thread with fletching cement to form a small neat ring around the serving. This knot must be firm and uniform. Apply another thin coat of glue over the entire nock locator, and then leave it to dry.

The nock locators may be above and below the nock.

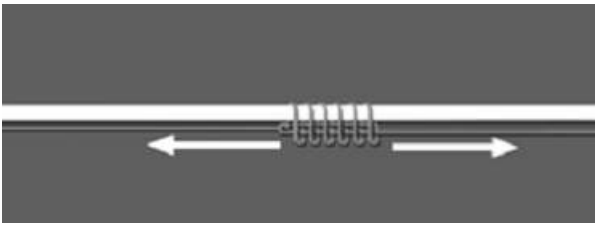
TYING A THREAD NOCK-SET ONTO THE STRING



Roll one end of the thread around the loop (made of the same thread) and the string body



Pass the end of the serving thread into the loop, then pull both ends of the thread

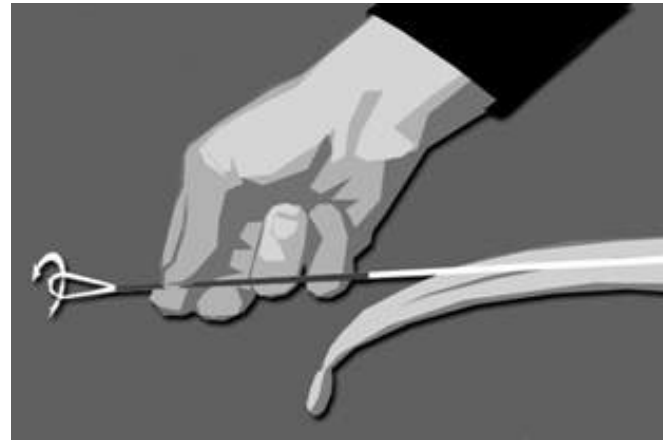


Cut both ends, then add some glue

BRACE HEIGHT

The bracing height of the bow should be within the individual bow manufacturers' recommended tolerances.

If necessary the string can have twists added to it to increase the bracing height, or conversely, have some twists removed to lower the bracing height.



EVALUATION FORM FOR GOLD ARROW CANDIDATES.

Name of the beginner: _____ Form G

Date: ____ / ____ / 20__

Retake date: ____ / ____ / 20__

Shooting distance for score evaluation	Required minimum score	Achieved *	*Not yet achieved	Total score
26 meters	115 points			
SKILLS	Key elements (What should be done)	Achieved *	*Not yet achieved	References to the World Archery Level 1 Coaching Manual
String clearance	Successful string clearance test (bridge of tape for instance)			#6.13
Follow-through	Impassive face upon release			#6.14.1
	Continued aiming upon release			#6.14.1
Sequence	Repeat the shooting steps with consistency			# 4.2.2.2
	Consistent shooting time (+/- 10 seconds per end of 3 arrows)			Use of breathing #6.15
Subjects 2 evaluations	Required knowledge or know-how	Achieved *	*Not yet achieved	Comments and/or references
Tournament registration process	Know the registration process (of the club) for a local tournament			Internal process of the club
Arrow setting	Know how to affix an arrow-rest and make a nocking point			#11.3.4& 11.4.6
TOTAL	8 positive evaluations are required			** Awarded ____ or Not awarded yet ____

* Checkmark if the score / skill / knowledge is positively evaluated (Achieved) or not (Not yet achieved). Write in the TOTAL row of these two columns the accumulated number of checkmarks.

** Just checkmark the final result of this evaluation.

Name and signature of the assessor/evaluator:

CHAPTER 14:

To become a level 1 archery coach

The level 1 coach candidates are usually trained during a clinic organised by a National or Provincial Archery Association.

Eligibility to attend a level 1 archery coaching course:

The course announcement should contain the eligibility criteria to attend the course. They should guarantee the homogeneity of the group, for instance requiring a minimum of 2 years of archery experience. Other details should be provided such as:

- The dates, location, and names of the conductors.
- The list of pre-course readings.
- The materials and clothing to bring.
- The evaluation process and criteria.
- The attributes of level 1 certification.
- If appropriate, recertification process and requirements.

Evaluation:

Note:

WA does NOT certify any coach. The certification process is entirely up to the organizer of the course. This is usually the respective National Archery Federation, and/or its Coaching Committee, or/and one of the National Sport Governing Bodies.

Below are some suggestions to evaluate the level 1 coach candidates.

- a.** Demonstration – The candidates will have to demonstrate proper shooting form according to their physical ability level.
- b.** Lesson - Each candidate will have to prepare and conduct a coaching session during which he/she will teach a shooting skill of his/her choice. The candidate will have to give the preparation plan for the entire session to the Jury. The jury will ask the candidate to conduct the main part of the session in a time of about 20 minutes. 10 minutes of discussion will follow between the jury and the candidate.

- c.** Equipment – The candidates will have to repair or set some equipment
A jury should be designated. The jury should consider the performance of the level 1 candidates in the above three aspects of coaching.

Certification:

The successful candidates can only be certified by their National Archery Federation or/and one of their National Sport Governing Body, not by World Archery. When involved in the coaching course, World Archery can deliver a certificate of attendance; the same applies to the Olympic Solidarity.

Related WA coaching material:

Coaching News:

<http://www.worldarchery.org/HOME/Organisation/Committees/Permanent-Committees/Coaches>

Coaching Overview:

http://www.worldarchery.org/Portals/1/Documents/Development/Documents/WA_Coaching.pdf

Coaching Levels – Description:

http://www.worldarchery.org/Portals/1/Documents/Development/Documents/Coaching_levels-e.pdf

Archery growing in popularity and many people of all ages are coming out to try our great sport. To properly and safely introduce people to archery, level 1 coaches are in high demand at archery organisations, particularly clubs, schools, recreational centres, rehab centres, etc. If you would like to contribute to make our sport bigger and better, please contact your National Archery Federation:

http://www.worldarchery.org/Portals/1/Documents/Organisation/Member_Associations/Directory_MAs.pdf