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.

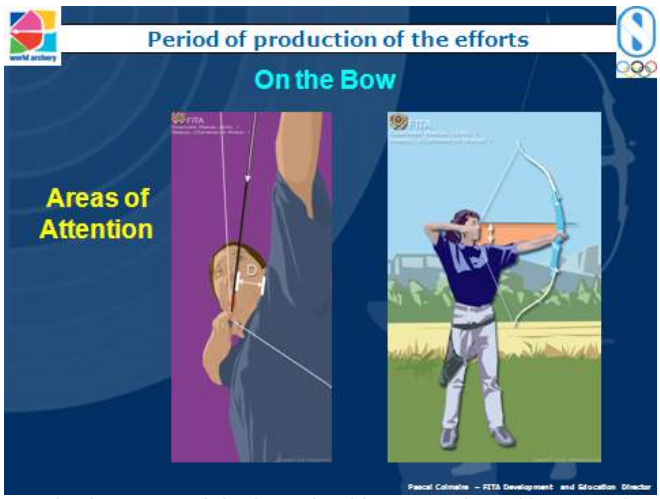
Objective:
- Stability of body and equipment for effective aiming and holding the bow at full draw without creeping or collapsing due to the spring effect of the bow;
- Extending the draw length – for novices using a clicker, or using back tension;
- Produce an efficient release.

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);

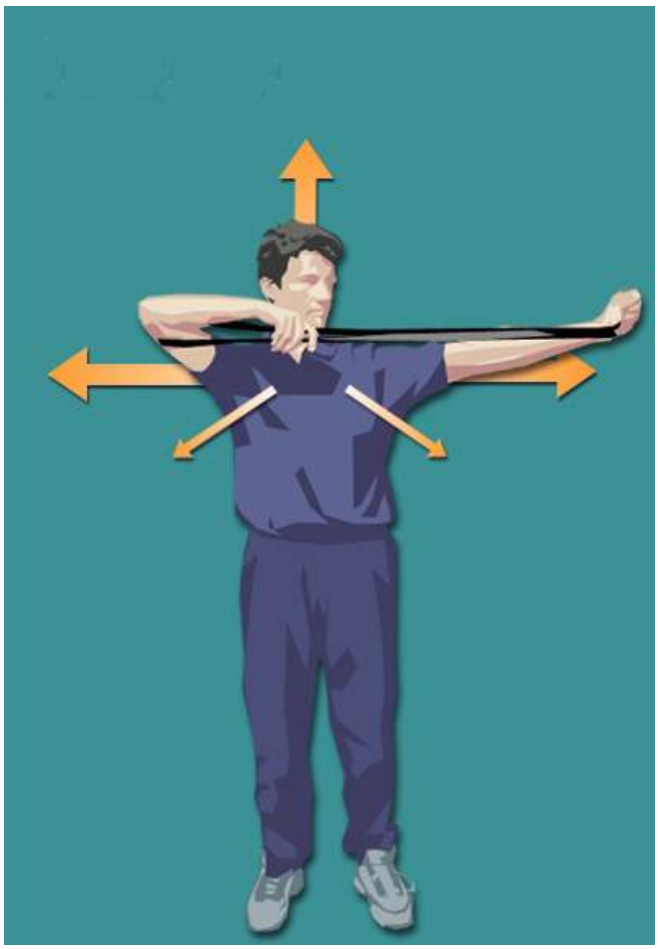
- The body should be upright, with the head centred and vertical when viewed from behind (in the shooting plane) and the bow should be vertically positioned.

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.

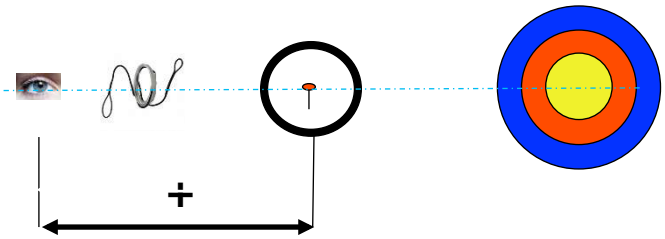
A typical collapse due to the spring effect of the bow.

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.



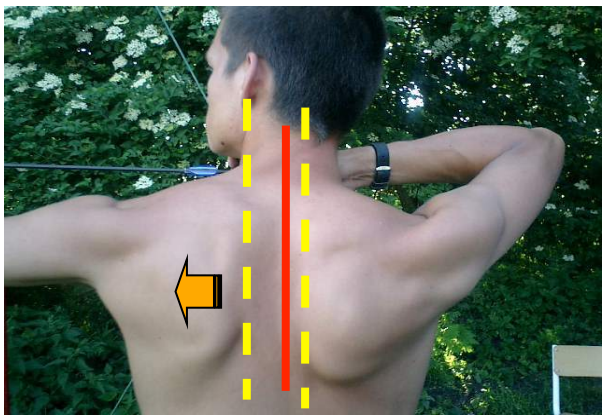
Since several different techniques are used by the world's elite archers to increase the draw length, we will present some of the most popular and/or biomechanically available options.
It is up to the coach to work with each novice individually to find out the most efficient technique for them. By efficient 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.

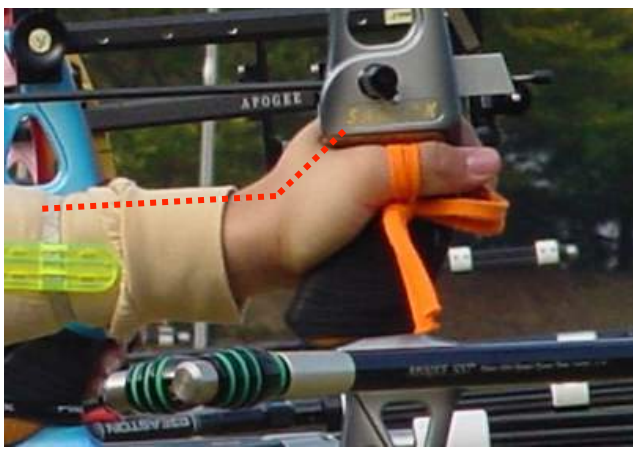


Note: The concept of squeezing the two blades is not relevant, since the novice reduces the draw while squeezing the bow blade towards the spine.

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.

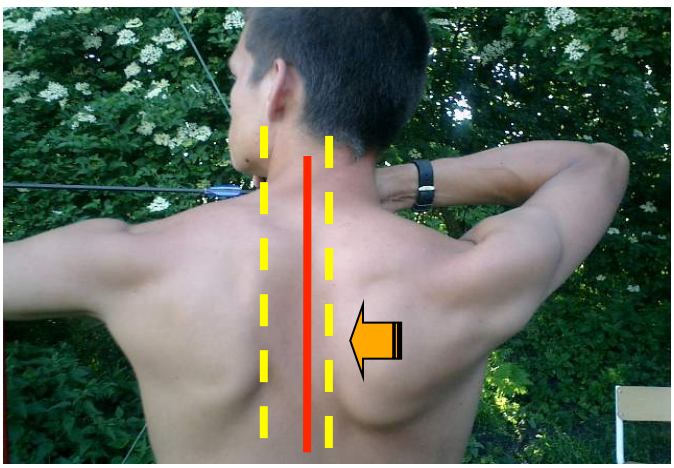
We recommend teaching a horizontal extension to the beginners first. Due to the potential issues for each method, using a technique that has a change in height should only be used in specific cases where it is necessary.

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.



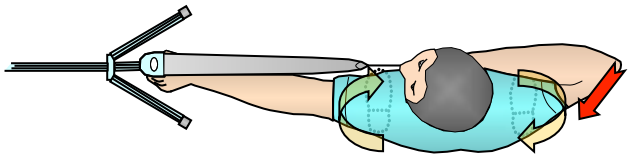
This technique is popularly known as "Back Tension".

Advantage:

- It provides a nice release: lively, dynamic, in-line, and originating from the string shoulder.

Potential issues:

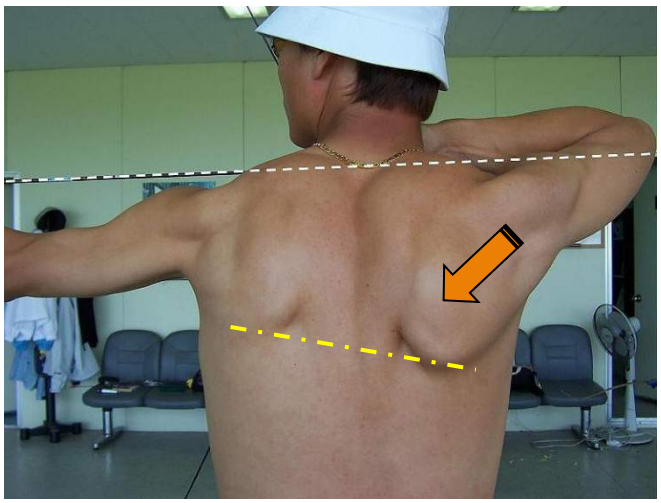
- Requires a strong core to avoid rotating the upper body (horizontal level effect) and keep the release hand from pulling away from the neck;



- 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 <u>diagonally upwards</u>.

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:

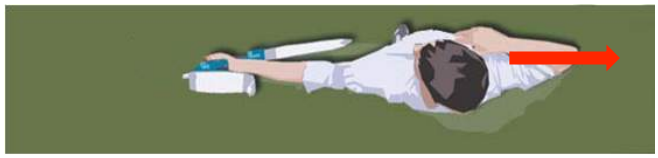
- Improved contact between the string hand and the jaw.

Potential issues:

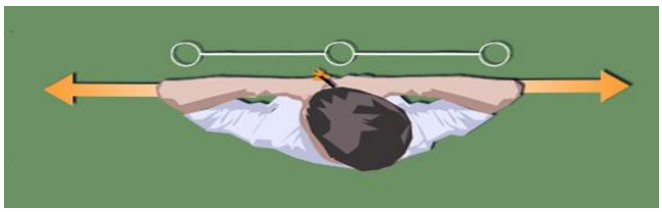
- Ring finger may slip on the string;
- Contact between the forefinger and chin may be lost;
- Head may lean down and forward.

2. <u>The string scapula moves away from the spine</u>

2.1. The string elbow moves <u>horizontally backward</u> (away from the target) along the draw force line.

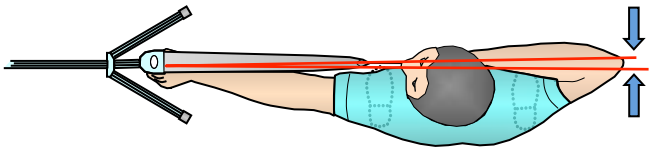


This movement is generated by spreading the blade away from the spine. This is the natural motion done when pulling on our hands as show in the illustration below.



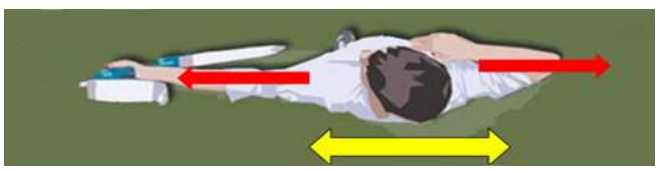
Advantages:

- 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.

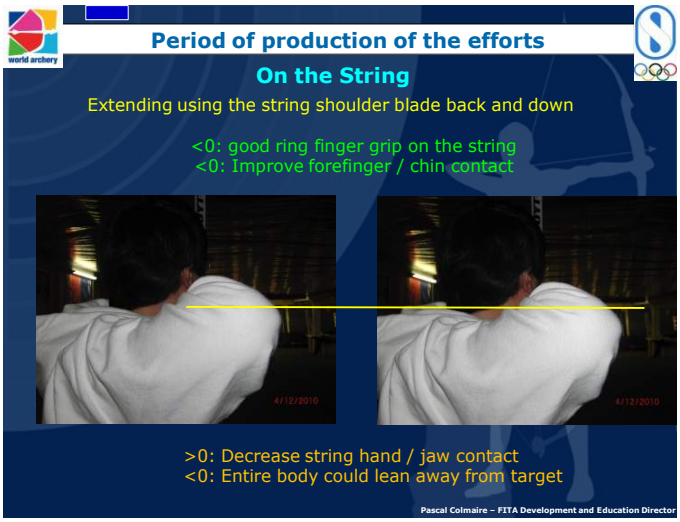


Potential issue:

- Implementation is sometimes found difficult or awkward.

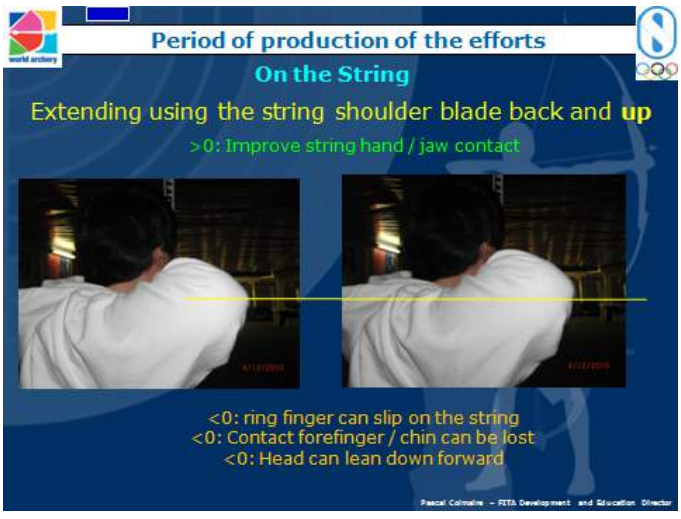
2.2. The string elbow moves backward (away from the target) and a little downward.

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.

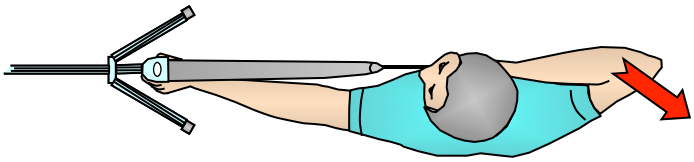


The advantages and potential issues for this method are the same as those in #1.3 above.

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:

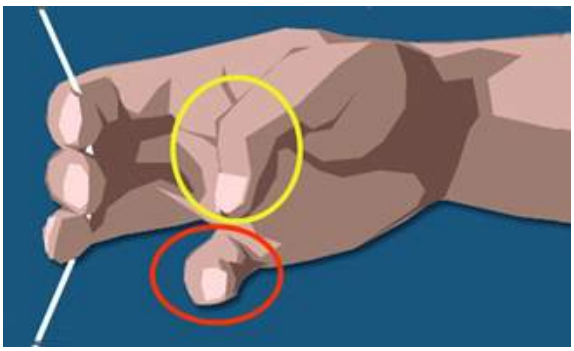
- Fatigue of the posterior bundle of the deltoid.

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:

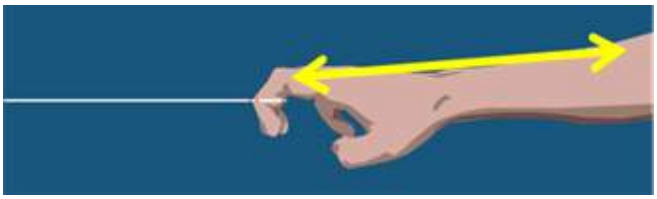
- Tension in the unused fingers often increases during the learning phase. This should be avoided to enable better use of the muscles in the back and posterior part of the string shoulder.



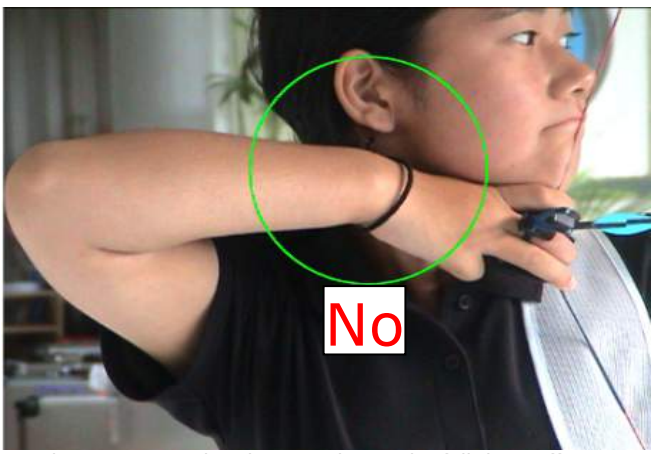
The coach can check by touch how relaxed the unused fingers are, as shown below.

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.



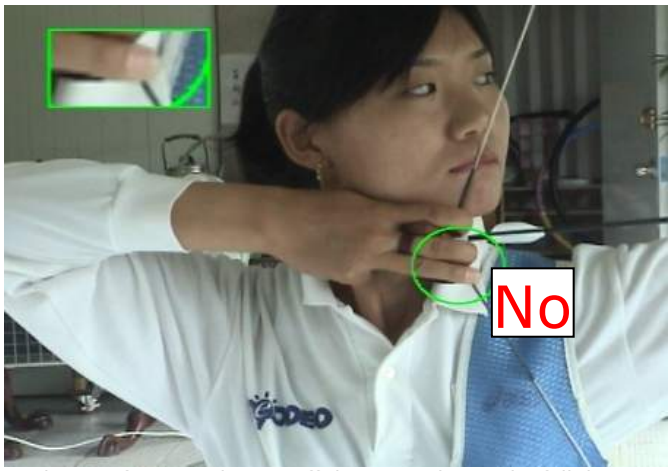
During this period, beginners often have the wrist bending out. This should be avoided to enable better use of the muscles in the back and posterior part of the string shoulder.



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:

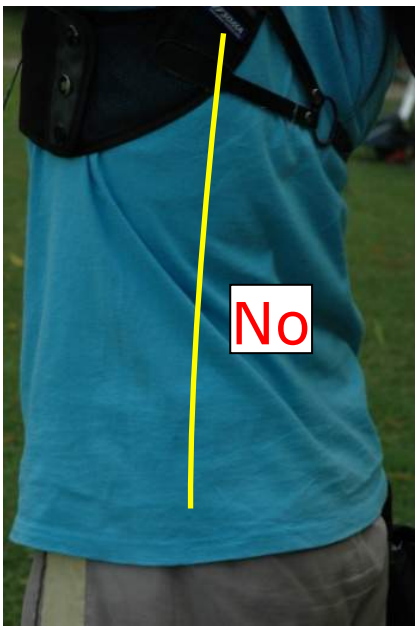
- The string should move very little on the chest or chest guard. Some coaches even believe that it should not move at all.

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

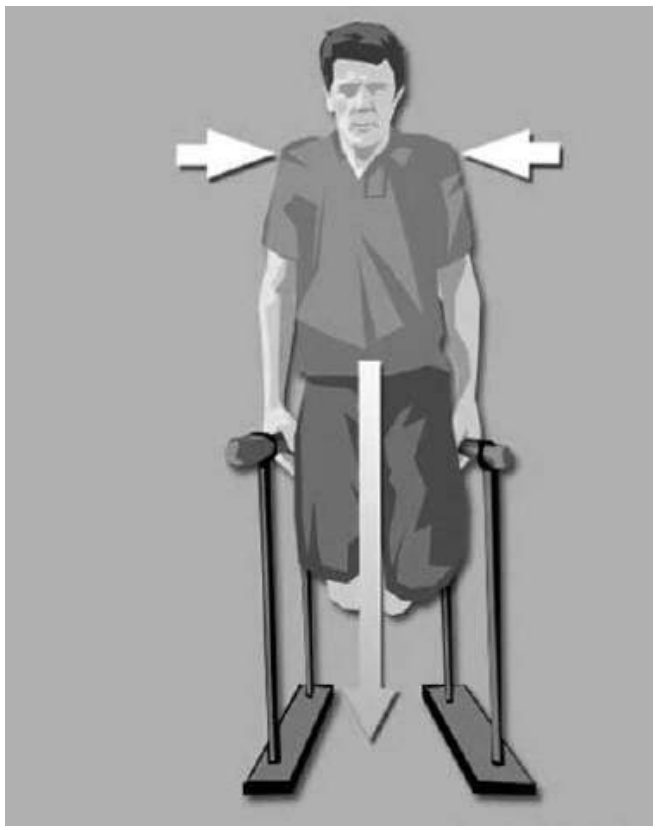
Note: Several of the following exercises employ the same process, but are focused on a different aspect of the Draw Expansion effort. We have chosen to repeat the entire process each time, allowing the coach to bring only the pages related to a single exercise to the range, and avoiding referring back 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.

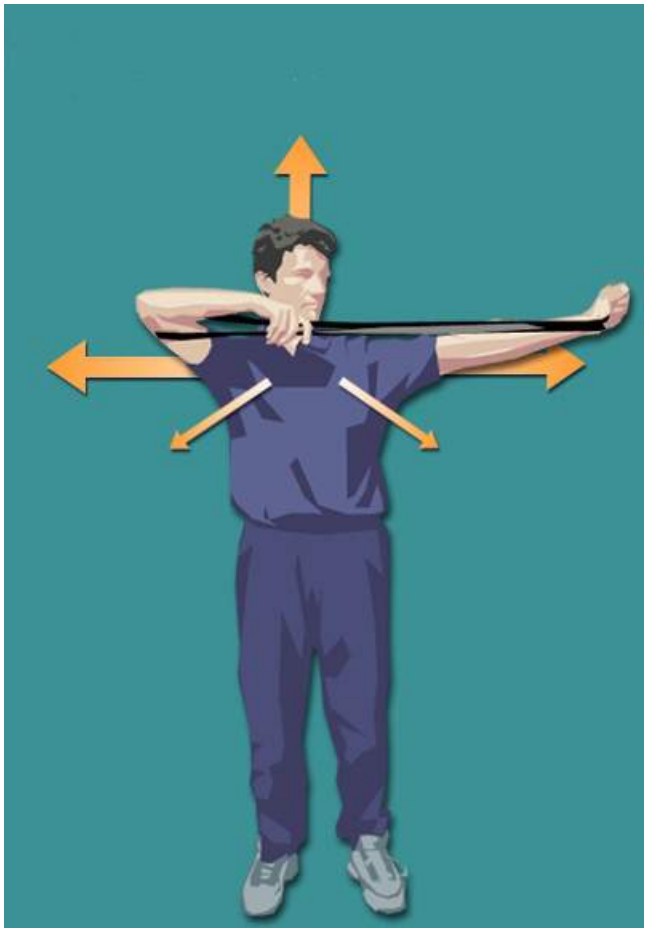
This position can be compared to that of a novice collapsing under the spring effect of the bow as shown below:

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.



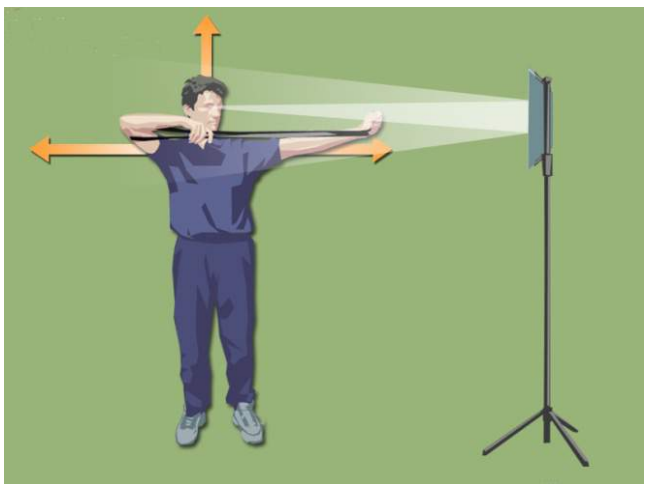
While shooting, and if produced gently, continuously and slowly, this increase will be enough to counteract the compression of the shoulders by the action of the bow, and will generate good muscle tone in the form.

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

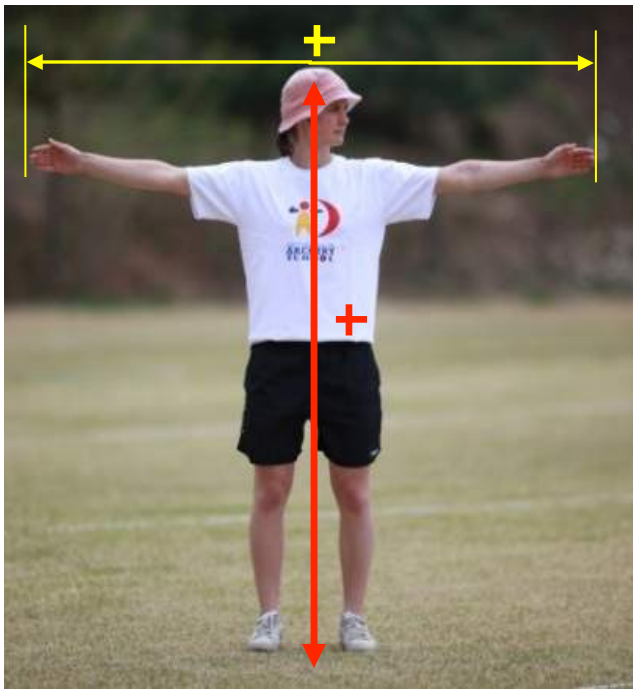
This exercise should be introduced only after the novice has tried the two previous ones as it includes elements from each of them.

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.

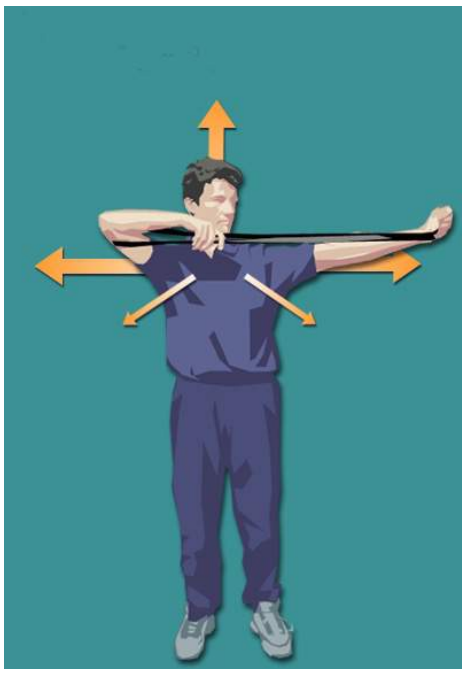
It consists in spreading both shoulders down and apart, at the same time flatting the chest, stretching the head up and lowering the belly down.

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.

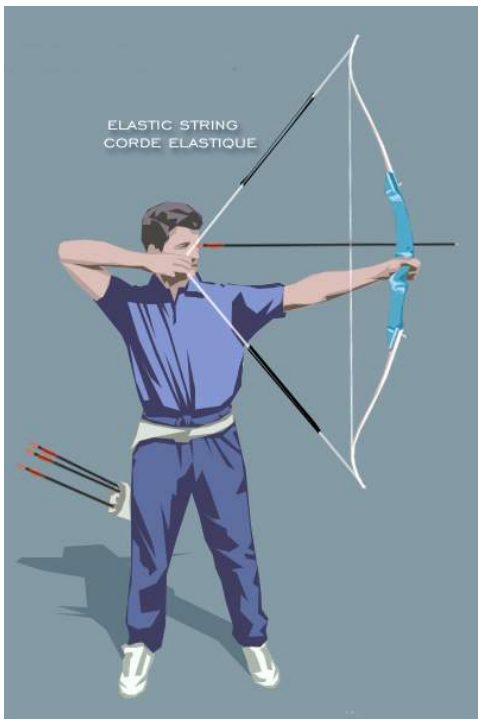
2. The novice simulates the upper body expansion with an elastic band attached to the string elbow and held in the bow hand.



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

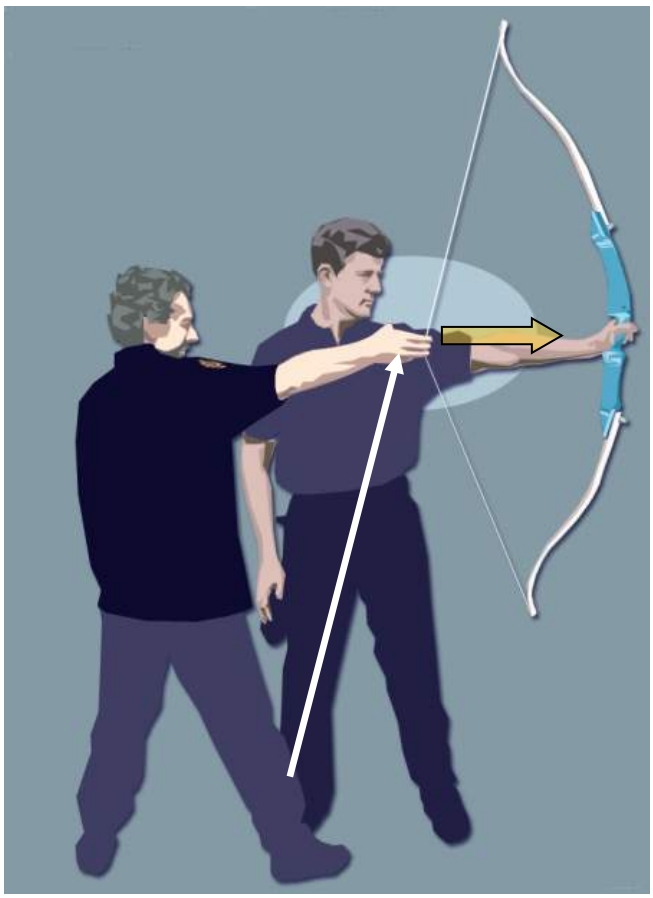
Objective:
Help the novice discover the effort to be generated on the bow side and the muscles and body parts involved.

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.

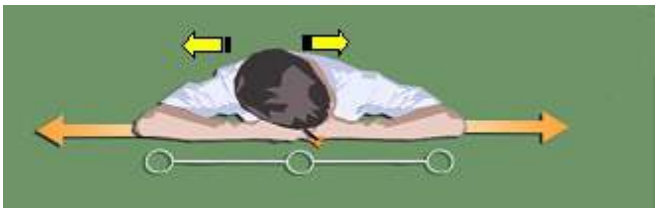
1. The novice stands upright, raises their arms to the side in a cross shape, and then strives to increase their wingspan.

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.



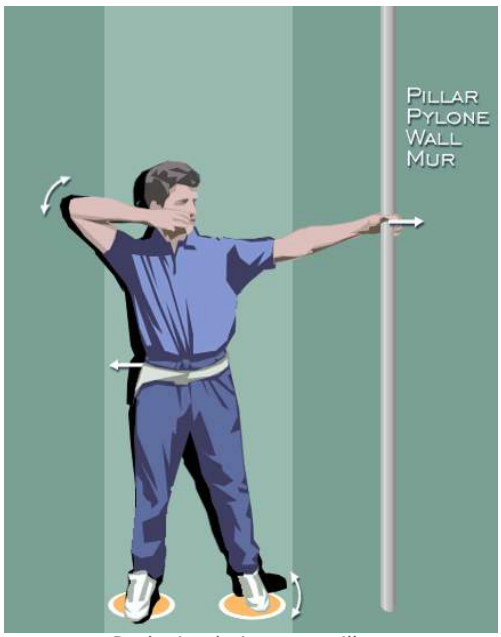
3. Alternate steps #1 and #2.

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.

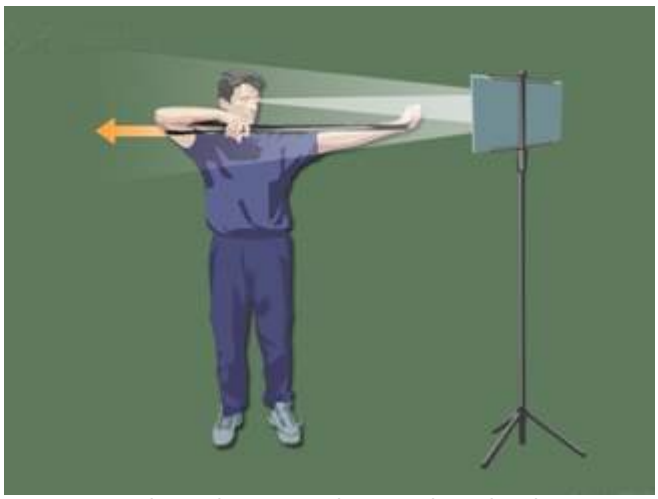


Push simulation on a pillar.

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.

Align the elastic string on the bowstring.

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.

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 <u>above</u> 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 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.

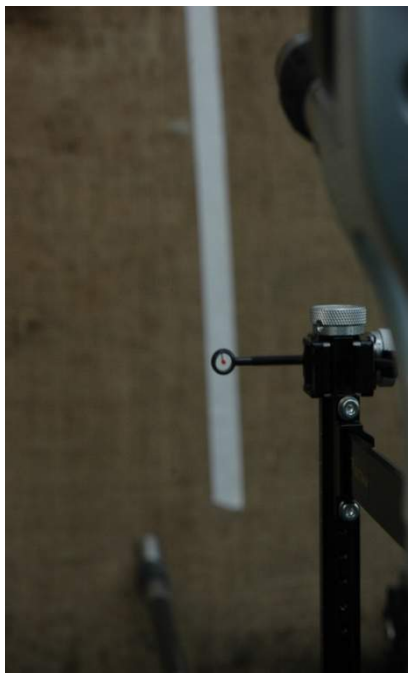
11. Same exercise as in step #10 but concentrating on the feeling with closed eyes and no mirror.

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.

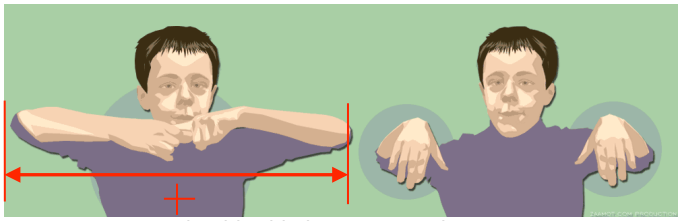
Situation:
Various.

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.

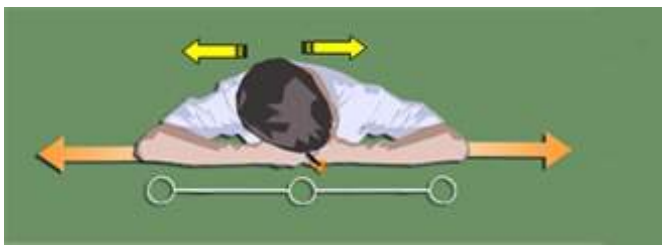
Simulation:

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.

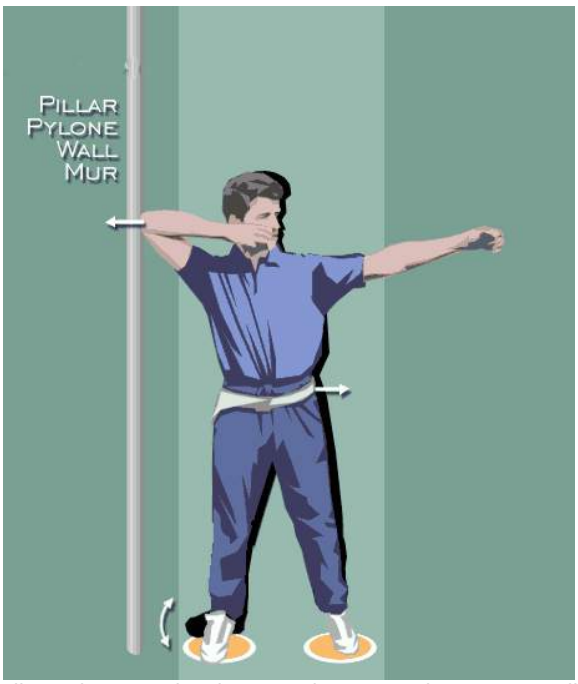


String shoulder blade extension discovery.

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

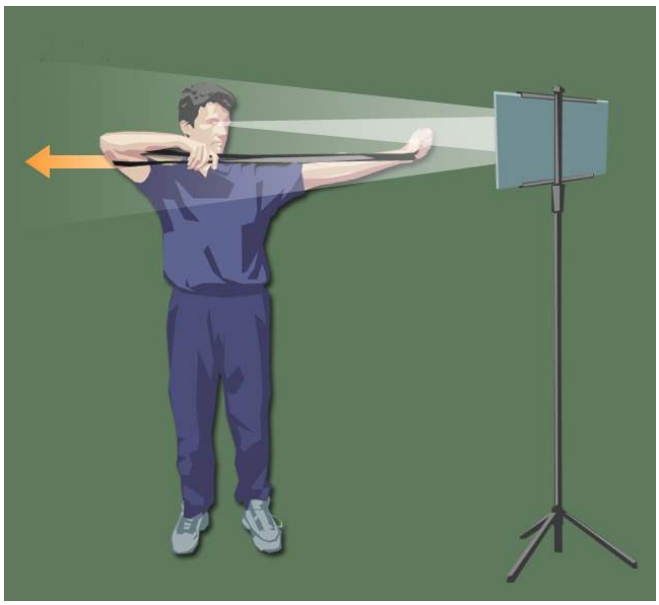


Pull simulation in the shooting plane - simulation on a wall.

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.

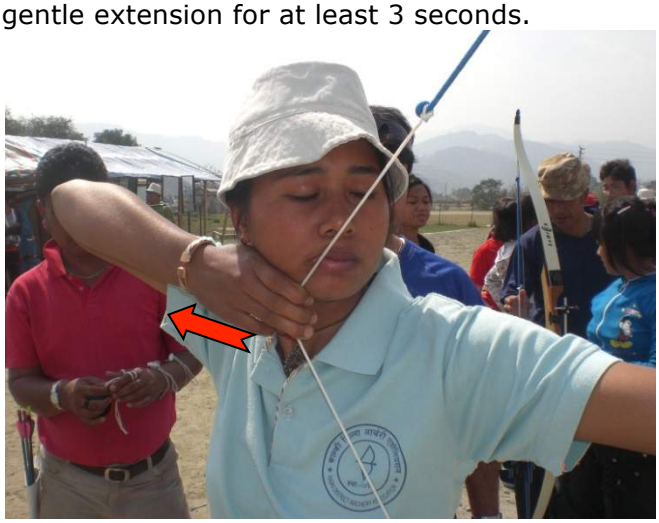
Some extra tension can be applied, as shown in the picture below:

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.

Have them close their eyes and provide a gentle extension for at least 3 seconds.



Then let them open their eyes and check if the two strings are still aligned.

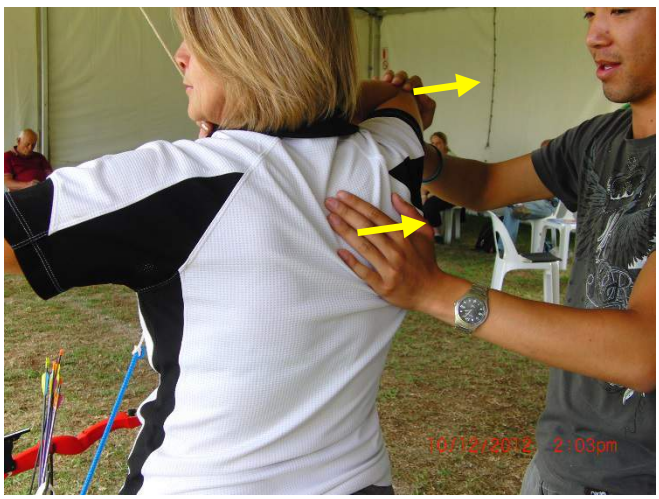
If the strings have stayed aligned, the pull is efficient, since the string shoulder can be extended while keeping the alignment of the aiming eye, string, sight and target. This exercise is not efficient for checking for vertical deviation. If there is some vertical deviation, other exercises will be necessary.

The exercises described below will help teach the beginner how to properly extend the bow shoulder.

- 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.



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 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 unfocussed 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.

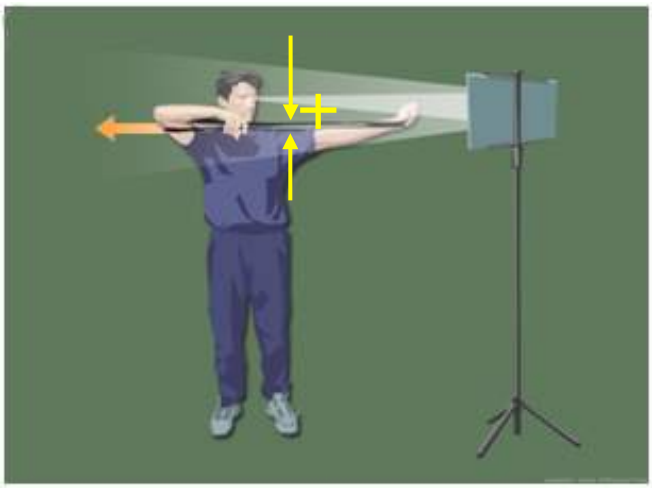
String Shoulder Blade Away and Up – Exercise:

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.

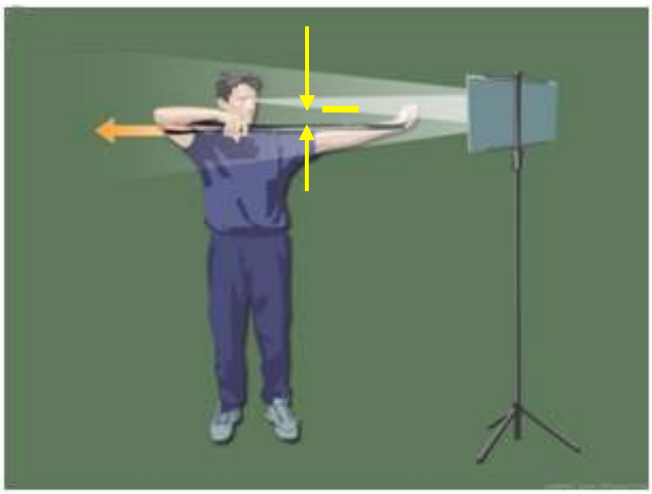
String Shoulder Blade Away and Down – Exercise

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

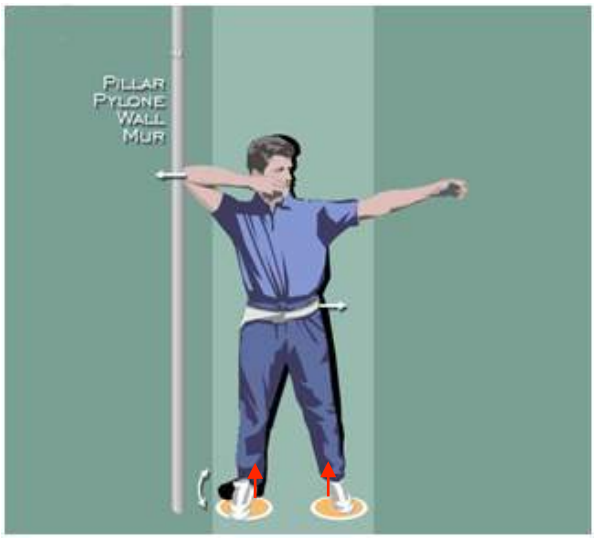

Action

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.



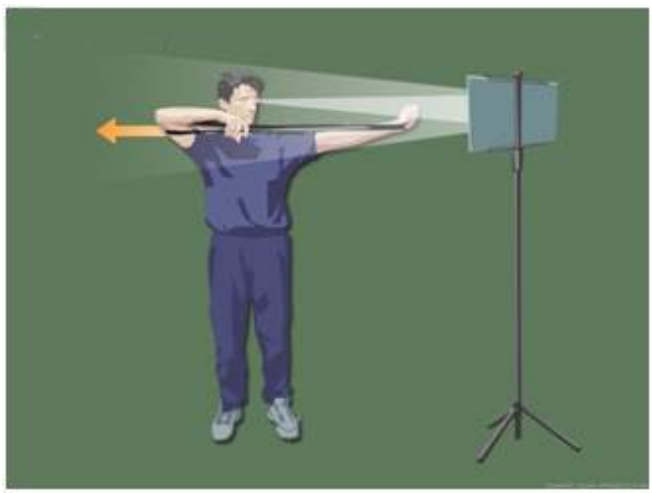
Pull simulation in the shooting plane - simulation on a wall.

The body should move in a plane parallel to the wall, toward the toe.

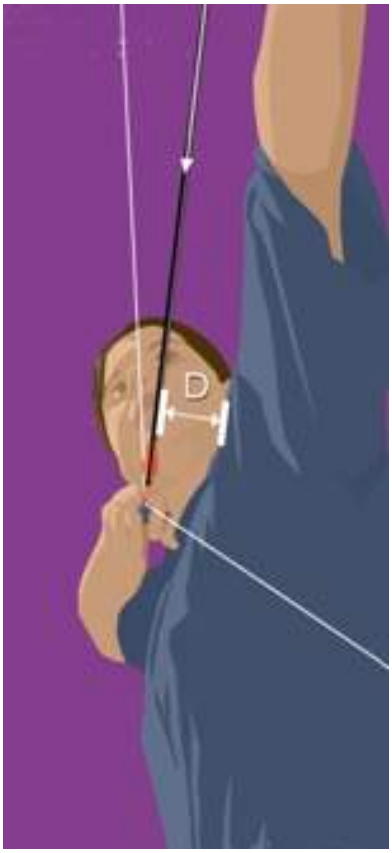
Have the novice repeat this exercise with an elastic band attached to the string elbow and held in the bow hand.

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.

4. Put an elastic string over the braced bow and have the novice come to the full draw position.

Ask the novice to align the elastic string with the bowstring.

Have them close their eyes and gently squeeze the string shoulder blade toward the spine for at least 3 seconds.

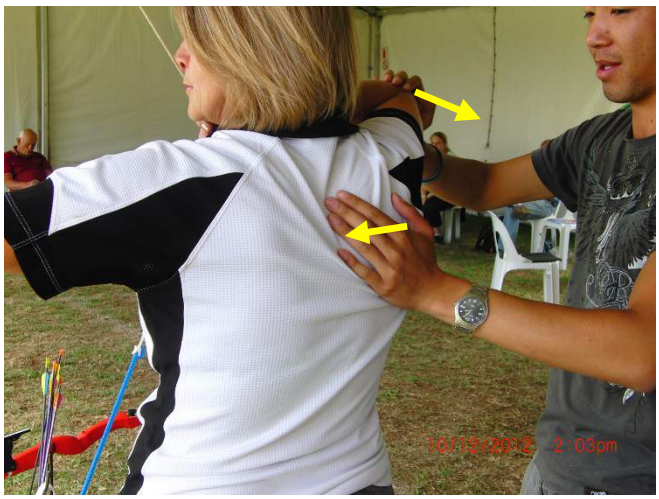
Allow them to open their eyes and check if the two strings are still aligned.

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.

a) 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 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 unfocussed.

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."

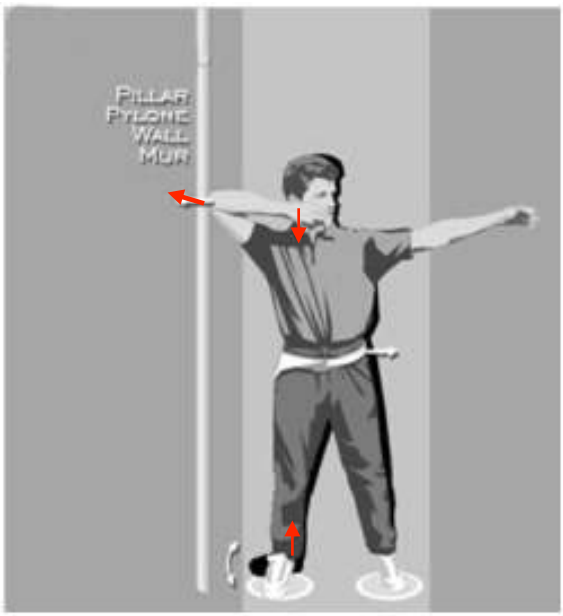
12. Repeat the exercise above, but shooting at a target face or other mark. Have the novice release the arrow at the end of the three-second (minimum) extension period, with their eyes still closed. If the arrows hits the mark, the draw extension is efficient.
For safety reasons, have the novices shooting 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

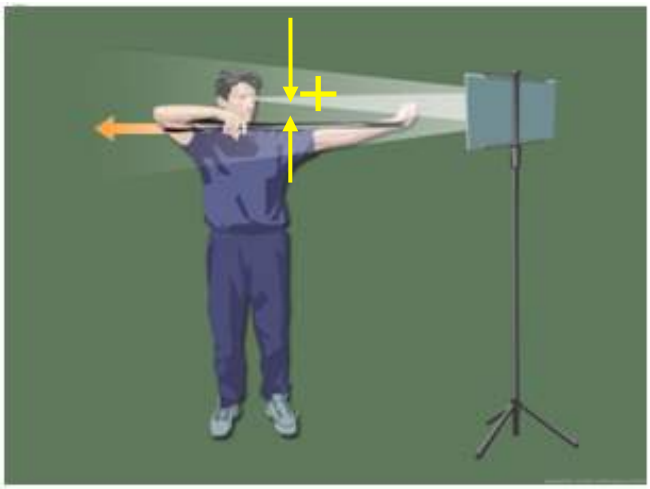
Use the exercises from "Moving the String Shoulder Blade Horizontally Towards the Spine" with the following modifications:

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.

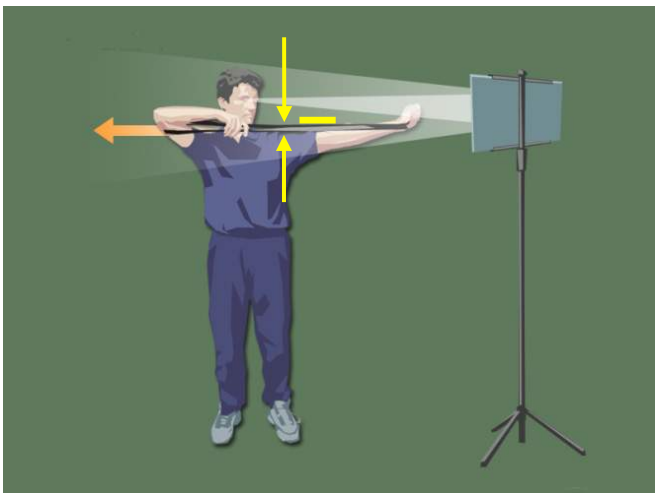
Moving the String Shoulder Blade towards the Spine and Down - Exercise

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

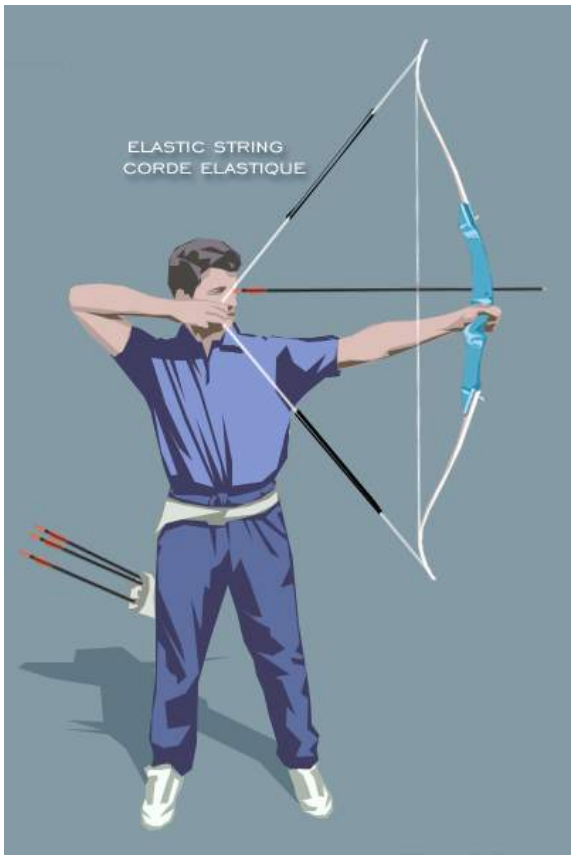
Objective:
Combine the "push action" on the novice's bow side with the "pull action" from the novice's string side.

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.

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).

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.

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 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.

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.

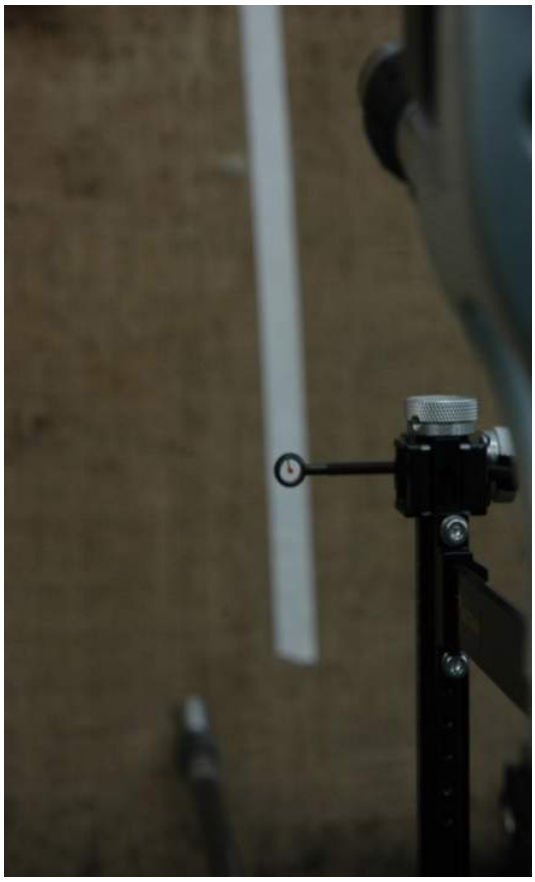
6. Have the novice remove the elastic band and shoot with eyes closed.

7. Similar to the exercise above but with eyes looking up and unfocussed.

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.



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.

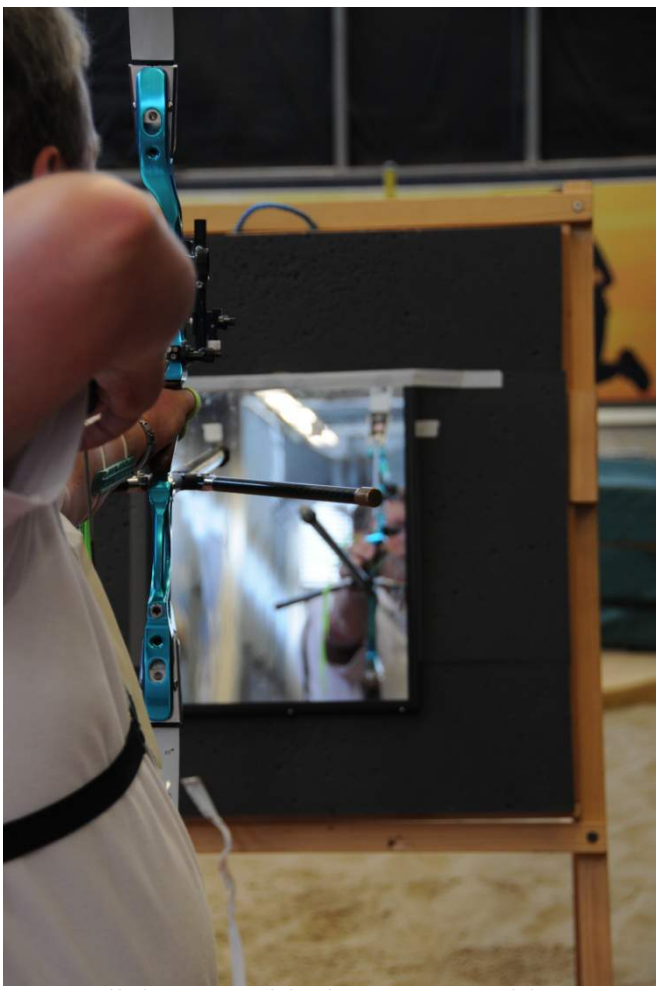
For each step, the number of repetitions has to be predetermined then adjusted by the coach. A dozen is the bare minimum number of repetitions for the exercise to be effective. Several sessions could be required to get a decent implementation by some novices. When coaching a group, a compromise will 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.

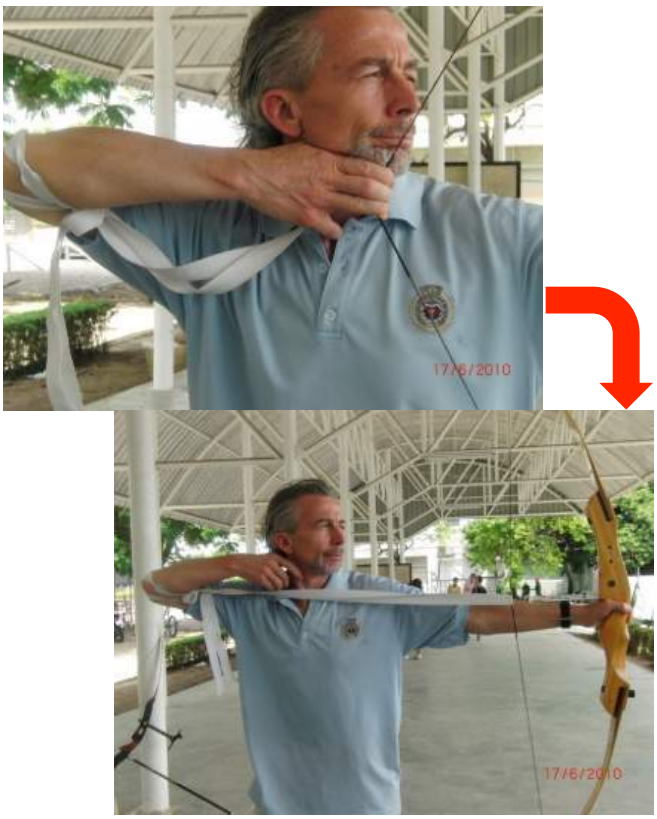


Self-observation of the draw extension stability.

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.