



## Scientific use of “T” Position” in Archery

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### Abstract

The major objective of this paper is to describe the use of “T” position in Archery sport. Scientific and biomechanical implementations are helpful to understand the archers correct position in competitive archery. The basic Principle of biomechanics can be benefited to minimize the efforts and minimum use of muscles evolved in draw and T position setup, as well as bow holding. Pre draw is achieved with the help of learning proper T position under biomechanical conditions, By raising the bow hand and drawing hand above shoulder level into a high Pre draw position this lowers the bow shoulder into the correct position with the “collar bone” sitting onto the ribs and sets up the rest of the body for the draw and shooting process. The basics of biomechanics and scientific analysis help to archer to rectify errors in their shooting form.

**Key words, Archery, Shooting, Stance, Body Position, T Position,**

### Introduction

Archery is a game of bow and arrows. It is an art and science of drawing Bow to hit on the Bulls Eye for specific target. An all time hunting and self defense was the predominant side of keeping bow and arrows with people. Archery's roots stretch back to the days when bows and arrows were used to kill game and enemies. The sport of archery grew from the king-mandated practice to kill game and enemies. Archery historically is far back to the days when bows and arrows were used to hunt and to kill enemies. The sport of archery grew from the king-mandated practices in England of those who fought for their country: tournaments began to spring up in 17th century England. In the United States, the first archery club was formed in Philadelphia in 1826. (Sports law)

Game of competitive archery has been changed drastically and with the use of research and development in its techniques and skin has made this game more resize and complex in terms of skill acquisition. the use of mechanics biomechanics and various advanced tools, make easy to understand and arches about its minor major mistakes and help them to verify it. The main objective of competitive archery is

to score the highest number (10) of points by shooting arrows into a target that is marked with deferent color rings worth various points.



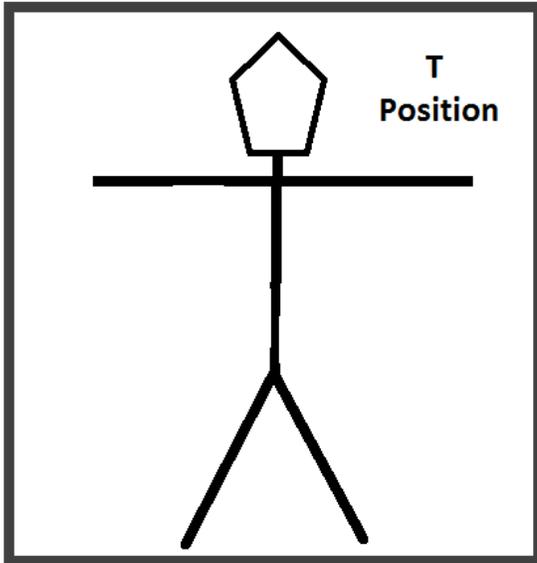
Fig, 1 Archer's Normal Bow Carry position

### Archery and T Position

Archery is the game of skill acquisition and proper reputation the Archer has to start with standing learning he has to learn to stand properly with his shooting star the bigger the beginner Archer has to practice proper Standing and understand the basic muscles of body utilized to make him comfortable stand he has to bear the bow weight along with the body weight while

practice with more than the Archer. The arrow gets heavier compared to normal position called poundage of bow.

The proper standing allows an Archer to make better adjustment with bow and peel the proper utilization of muscle involved during bow pulling and shooting practice in general Archer has to stand minimum 1 to 2 hours for practice to keep his body position tuning and adaptation. He can get more time slowly after the acquisitions of standing habit and his stamina for stand alone.



Fig, 2 Archer's Normal "T" position

### Basic skills in Archery

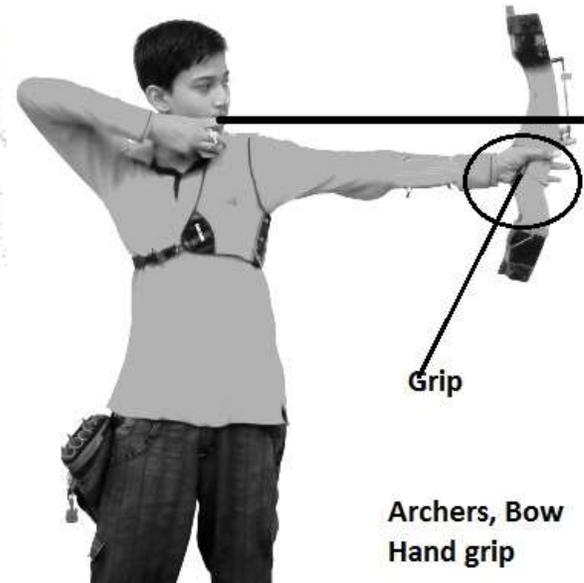
Body position extension of Arm in a parallel position and the body remain look like "T" shaped which include the both arms and leg which holds the bow and upper body bearing while training, shooting, and practice either right or left depend upon the person's habit pulling arm which hold the pull string of a bow toward the anchor point and remain constant until the full draw of bow. Archer can take a rubber pipe or elastic to perform that dummy practice at beginning. (Fig-3)



Fig, 3 Archer's Normal "T" position and Rubber Pulling Drills.

### Steps of T- Position

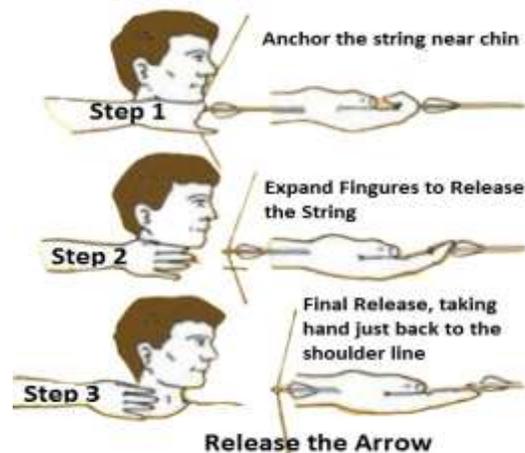
- Step 1** Archer should stand with proper posture.
- Step 2** Archer spread wide his both arm in the shoulder line like "T" (Fig-2).
- Step 3** Make stop sign as traffic police do to stop the vehicle right or left hand depend upon the habit of Archer holding the bow hand.
- Step 4** Make grip on the bow hand fingers using your thumb as we hold the bow handle (Riser) during practice.(Fig-4)



Fig, 4 Archer's Bow Hand Grip

- Step 5** To bring the pulling arm near the chin mark to feel the anchor.(Fig-4)
- Step 6** Hold for a while minimum 5 to 10 second as per the coach guideline.

**Step 7** Check the back muscle, feel the both back and shoulder muscles involved during the full draw position in step 6 to get the body more white to perform well (Fig-5)



Fig, 5 Archer's Steps of Release

**Step 8** Release the pulling arm should come back near the shoulder line of pulling hand smoothly after the fingers get relaxed to lose the string or rubber from the anchor point.

**Step 9 Follow through.** The after shooting position is an important part of pre position to remain in a perfect position of shooting arrows. Archer has to check the follow through after every time of his performance. He can also take a minimum pause to keep understanding of his skill learning just after the release (Fig-5) step 3.

**Step 10** Relax and re-energize to perform again to repeat the same step until finished.

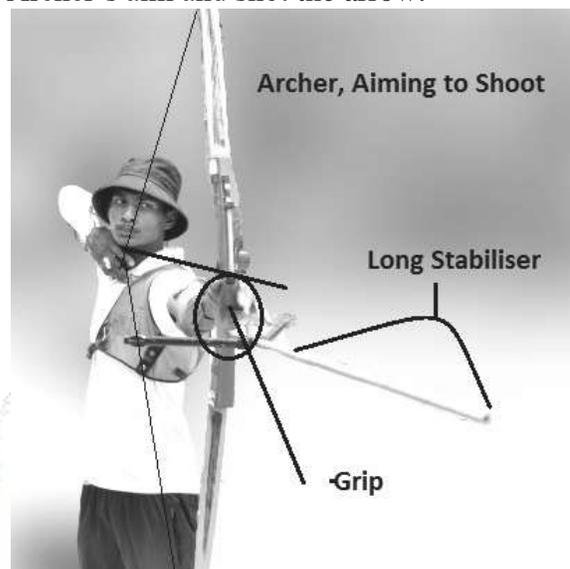
### Procedures

Archery can be contested individually or in team of three. A competition consists of an agreed-upon number of rounds, or (12) ends. An end is a series of either three or six shots. The shots are taken at a target with five concentric color zones. An arrow landing in the target can score anywhere from 1 to 10 points. For an end consisting of three arrows, an archer has two minutes to complete shooting. For an end of six, a maximum of four minutes are allowed. The rules for this sport are adopted from (FITA) the International archery Federation.

In case of equipment adjustment, such as changing bow string, additional time may be granted. Archers shoot in rotation, and can shoot from either the longest to the shortest target, or vice versa. Scores are entered for each arrow, with the score being called out by the archer and checked by competitors. The number of arrows short and the distance depend on the archer's classification:

### Shooting

Archers shoot from a standing position, without support, with their feet either straddling the shooting line (one foot over, one foot behind the line), or both feet on the line. When a signal is given to begin the time limit, archers can raise their bows and shoot. If archers shoot either before the signal to start or after the signal to stop, they forfeit their highest scoring arrow for that particular end. Fig-6 showing the Archer's aim and shot the arrow.



Fig, 6 Archer's Steps of Release

In team competition, the highest scoring arrow for any member of the team-regardless of who committed the foul-is forfeited. A spent arrow is not counted as shot if the competitor can touch it with her bow without moving her feet from shooting position, or if the target face or buttress blows over.

### The Shooting range

The shooting range is divided into lanes and is laid out so that shooting is done from south to north. Each lane has lines at right angles between the shooting line and the target; a lane can contain up to three targets. Males and females are separated by a clear lane of at least five meters.

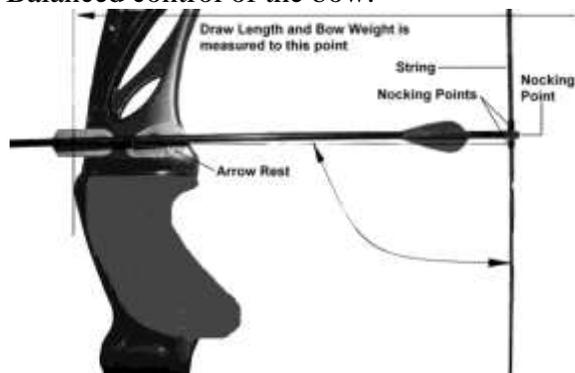
A waiting line is set at least five meters behind the shooting line. No more than four competitors may shoot at one target. Each buttress is numbered and set at an angle of about 15 degrees from vertical. The distance is measured from the ground directly below the gold of each target to the shooting line. The centre of the gold is about 130 centimeters above ground.

### Techniques of Archery practice

Following techniques are essentials of the perfect archery practice can be summarized as:  
Constant length of draw. Proper draw length of the equipment (bow)

Constant line of force. Suitable bow poundage or line of force of the bow.

Balanced control of the bow.



Fig, 7 Grip and the Draw weight measures

Economy of effort, handling should be smooth.

On the basis of these four essentials, the ideal position at full draw will be, Stance - upright, balanced and comfortable standing position of an Archer. (Fig-4)

The bow draw length as per the archers need or consistency, proper handling of the bow with balance forces from the forward pressure of the bow arm and the equal traction (pull) through the pulling arm.

The drawing shoulder should be low, not rotated in a natural position. A few guiding principles to biomechanics of standing "T" position. We have to use the same technique on recurve bow or compound bow. There should be no difference in technique practice and also in shooting with proper use of the bone instead of muscles to make the body stable as muscles can get fatigue fast, but bones don't get tired.

Archer must consider how to structure a shooting technique to maximize the use of bones and minimize the use of muscles, all forces along bones and through joints, if we do this we won't need to use muscles. We can use large muscles to complete the process of pulling techniques. We cannot relax or transfer tension from one muscle to another when they are under tension.

We must use the muscle from start to end the process. as the work of bone and muscles are different, but correlated we should understand the complex structure of muscles using the shooting stance. (*Archery Australia "Shooting Techniques in Biomechanics 2007"*)

Archer needs technique that eliminates or minimizes risk of injury.

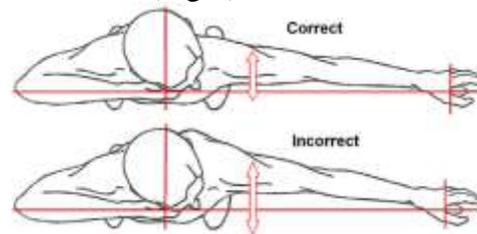
### Use of Biomechanics in Archer's Body position

A good Biomechanical technique will give archers to keep consistency in performance; because archers have to rely on bones to control the shot and not on muscles

which will fatigue, scientific biomechanical technique will help to maximize endurance with consistent results. Archers who rely on muscles to shoot need to put in hours and hours of training to build up strength; while the biomechanical correct archer still must practice but the practice is more constructive and better focused on results and not building brute strength.

### The Bow Arm

The arm of pulling the bow should be in a line of forearm, we would get hurt if we mix the line of I'll go and bow arm. The string would travel down to hit the middle forearm.(Fig-8)



Fig,8 the archer's Bow arm position

The way we do this is to push the bow arm shoulder in toward the arrow as far as it will go. But be aware of a common mistake many people make: that is to roll the bow shoulder joint toward the string. Never do this: the shoulder must be pushed toward the arrow. To roll the arm requires the use of a number of muscles which will cause fatigue. Archer must also use some of the smaller muscles in the shoulder which can lead to long term injury, the most common injury is to the "rotator cuff", which is very painful and requires a long time to repair. The shoulder has a lot of movement left to right so it's easy to push the shoulder toward the arrow, but depending on body shape you may run out of clearance with the forearm and the string. So learn how far you can push the shoulder in and still maintain clearance.

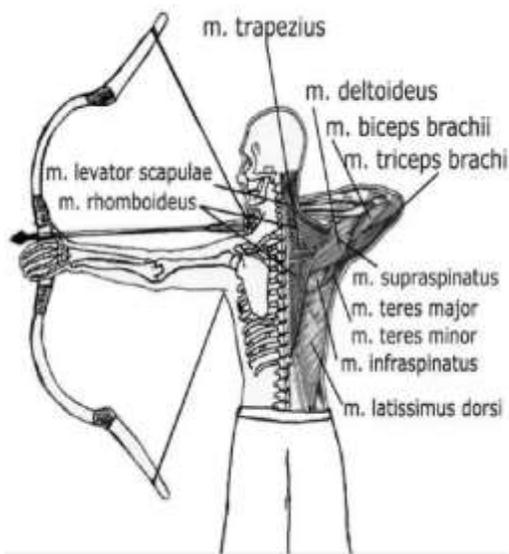
If a person has their shoulder pushed in as far as possible toward the arrow the natural reaction is for the drawing shoulder to move back away from the body, this then gives a straight line between both shoulder joints, the bow arm elbow and bow wrist and requires minimum use of muscles.(Fig-9)

Archer having a relaxed bow shoulder in a natural position makes it much easier to move the shoulder joint in toward the arrow during full draw. Ideally we should have our shoulder joint positioned as close as possible towards the arrow when at full draw without creating clearance problems with our forearm.

Having the bow shoulder joint as close to the arrow as possible is very advantageous from the point of view of minimizing the muscles being used.

## Drawing the Bow

The “High Draw” method is against FITA Shooting Rules. This is not correct as both the drawing hand and bow hand are on the same line. This is because the Arrow gets high aim and if it is shot accidentally the arrow may fly Out of the play would be hazardous to all others.



Fig, 9 the muscles use in Archery “T” stance

- 1) We use the same technique shooting either a recurve bow or compound bow; there should be no difference in technique.
- 2) Use bones, not muscles – bones don’t get tired yet muscles most certainly fatigue, we must consider how to structure a shooting technique to maximize the use of bones and minimizes the use of muscles.
- 3) If we must use muscles, only use muscles at mid extension
- 4) Use only large muscles
- 5) Use only the necessary muscles we have to use
- 6) Use a technique that eliminates or minimizes injury

## Conclusion

In the Game of Archery, an archer has to require a lot of daily practice of bow handling, bow exercise drills, dummy pulling practices and fault correction activities. An archer has to shoot minimum 100 arrows per session of shooting practice to get perfect shoot. The repeatedly perfect body stance will help archer to make perfect shoot. Proper knowledge of Training procedures and the science behind the game, would help to improvise the game and archer would achieve the gold in any pro level competition.

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