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The Editors

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## **COACHING CHILDREN How young is to young?**

*By Grant Fry*



Recently a mother of a team member was leaving practice after picking up her son. She approached me nervously and mentioned that her youngest daughter had expressed an interest in archery.

"How old do they have to be to participate in the program?" she asked.

I explained that her question is somewhat like asking what color is prettiest. My suggestion was to bring the child to the next practice and I would let her know after I had a chance to evaluate the child's development.

My personal feeling is that there are some 16-year old children that are too young and immature to properly handle a bow, while there are six-year olds that are just right and fit in perfectly.

Most of my team members are between the ages of 8 and 12 years old. I have never closed the door on children under 8, but most have too short of an attention span to

really get a lot out of the program.

Young children often exhibit several areas of concern for a coach. First, is physical coordination. Second, is being able to remember more



than **Making shooting fun and achieving success are key factors for youth to stay involved in archery.** three or four verbal directions at a time. With nine steps to a perfect shot to remember as well as safety rules and range commands, some children easily become perplexed and frustrated.

My experience has shown that by working on 2 or 3 steps until they become habit and then working on 2 or 3 more. Within several weeks, most kids are responding to a full set of shooting steps as well as range commands. Naturally, the steps I choose first help them to achieve the quickest success. These steps are usually stance, holding or gripping the bow correctly, nocking the arrow and drawing the bow. The other 5 steps are added as quickly as possible. Most young children have a natural ability to aim and direct the shot. Therefore, I have not felt the need to work on that first.

A liberal dose of safety rules also accompanies the shooting steps. I like to explain the safety rules with an end results approach. For example, "If you go to the target before others finish shooting, what could happen to you?" Or, "If everyone pulls their arrows at the same time, what color mustache or eye patch will you end up with?" Each paints a vivid picture of what could happen and why they should obey the safety rules.

Another technique I have found that reaches children without intimidating them is physiological in nature. Children respond to peers almost better than adults. When an adult is standing or towering over a child, that child accepts the authority figure with a different view than when they can look at someone eye to eye. The eye to eye scenario seems to be a more effective communication tool compared to the authority figure towering over them. When giving instruction, try to kneel down so you can achieve the eye-to-eye level communication. You will find that they respond much better to you.



Another ingredient needed to inspire and motivate children is to have fun. Perhaps that should be stressed as FUN! Nothing is quite as exciting as something you're having fun with. Conversely, nothing is as much of a drag as having no fun doing something that requires a lot of patience and attention like learning a new skill, especially a physical skill.

Feeling a level of success is always an important factor in teaching kids. Moving the child closer to the target is one method of achieving instant success. Another, is finding success with anything they did, even if they

totally missed the target. For example, "Your stance looked real good. How did it feel?" Never dwell on what they didn't do right. Liberal use of sincere praise is absolutely essential for young children. Find something you can sincerely praise them for. Promise them that if they will follow your instructions, they will do even better.

The style I have found to be most successful is what I generously call "Coaching by Cheerleading." It is a form of positive coaching with a liberal dose of enthusiastic and sincere praise. Avoid phrases such as, "Don't do-," or "That's wrong." Approach direction from a positive angle. "Perhaps if you did-, you'd hit the bullseye," or "Move your hand here and see if that improves your shot." These are examples of approaching a child from the positive side rather than the negative. This skill is not easily achieved. It takes practice and patience on your part.

Young children under age 8 have very different needs. Some are physically able to handle the rigors and discipline of archery better than others. Some children are there only because their parents forced them to be while others are there just to have some fun. And every now and then you have someone who is truly gifted with talent. You, as a coach, need to be objective enough to decide who are there for fun and who are there to become the next Olympians.

Success to you in your coaching efforts.

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**Recurve Tech 300**  
**Archery Injuries**  
**How we get them, correction and prevention.**

*By Mike Gerard*

A lot of us have had some archery-related pain at one time or another, some serious and some not so serious. The following article discusses how we managed to get some of those injuries and how they could possibly have been avoided.

The nature of our sport usually produces injuries only in the upper part of the body, that is foot or leg injuries are not common unless you or someone else shot you. By the way, explaining to the police that "gee I didn't know it was loaded" is not a widely accepted excuse in our sport.

Our injuries are all localized to the upper body in relation to fingers, forearms, shoulders (primarily), back, neck and some minor facial damage from bow string or finger tab contact. The only comment I can offer on the lower half of the body is to try not to lock your knees. The legs should be straight, but relaxed. Locking the knees will reduce body stability and hinder circulation, a serious problem in very hot weather conditions.

The following information will review different parts of the body and how injuries result from our normal shooting regiment.

**ASYMMETRY:**

One aspect of our sport that must be considered is the asymmetry of shooting a bow. The two halves of the body are doing different operations. The drawing side is continually drawing large amounts of accumulative weight, while the bow arm side is continually resisting compression. For many, this can lead to upper back pain and skeletal problems. Some archers who have been shooting for many years have even developed mild cases of scoliosis (lateral curvature of the spine).

This imbalance can cause many mid and upper back problems as the drawing side of the back becomes stronger than the bow arm side creating muscular imbalance. One of the things I have found to help reduce and eliminate back problems caused by this imbalance is to pull my bow on the opposite side, or left handed (myself being a right hand archer). Weight training is also very helpful in reducing this imbalance and preventing injuries. For compound arches, I would recommend drawing a lightweight recurve bow that is about 5 to 10 pounds heavier than the holding weight of your compound. Trying to pull a heavy compound from the opposite side without first building into that weight could cause some serious shoulder problems.

The recurve is a lot less stressful on the shoulder in this application as it just gets heavier the further you pull it. If you are not strong enough to draw it to full draw, that is not a problem, it is self-limiting. A compound on the other hand requires that you start at the highest draw weight, which could be very stressful on body parts that are unaccustomed to those types of stresses.

Before shooting I usually draw my bow left handed about 15 to 20 times once I am warmed up and have stretched. After shooting I like to draw the bow 20 to 30 times on the opposite side. Since following this regiment, I have not had any of the old back problems I used to suffer from and the frequent visits to the chiropractor have been eliminated.

### **SORE FINGERS:**

For finger shooters, the drawing fingers can take a lot of punishment, especially if you shoot with the bowstring placed on your finger tips or the string placed in the first joint of the three drawing fingers. This does not mean that you can't shoot good scores with this



technique, it is **Using a deeper hook on the drawing fingers will cause less friction on the finger tips.** only to say that the fingers are likely to take more of a beating.

Archers who shoot more toward the ends of the fingertips are usually the ones wearing lots of "Coban", Band-Aids or other forms of added finger protection. Shooting with the string placed on the ends of the fingers produces a good deal more stress on the forearm to hold the string securely. When you consider how much weight the average (serious) archer pulls on the fingers it is certainly noteworthy that this total can easily be over 6 tons of accumulated weight per day.

For example, if you shoot 300 arrows in one practice session and you shoot 40# at full draw, that is 12,000 pounds or 6 tons of accumulated draw weight. That may not seem like much to a weight lifter, but remember it is done hundreds of times in only one exercise. Sore fingers most often result from friction. Shooting on or near the finger tips produces more friction as it makes it very difficult to relax the draw fingers due to the amount of tension placed on the flexor muscles of the forearm. This is the reason I am such a strong proponent of a deep finger grip, where the string is placed between the first and second joint of the middle finger. The deep hook enables the fingers to relax and will eliminate a lot of forearm tension and produces a much smoother release.

Often the forearm can become very sore from the extreme stress required to hold the string on the ends of the fingers. This condition can be aggravated by another symptom that often occurs when the string is on the fingertips and that is squeezing the draw fingers while at full draw.

Archers who shoot with a deep hook, as do virtually all top Korean archers, will rarely have sore fingers. The only soreness that may develop would be from string pressure due to shooting hundreds of arrows with a thin tab, but not soreness caused by friction. Finger sensitivity can also be caused from callous pressure when the callus becomes too hard and causes additional pressure on the nerves. It is best to keep calluses well manicured and fairly soft. Try applying a good quality hand lotion to the calluses each night before bed. Rubbing the lotion thoroughly into the callus will help keep the callus from becoming hard and it is good therapy for the fingers.

If the calluses become too large and dry, the skin can crack creating an open sore that does not heal quickly. To promote healing if this problem occurs, you need to trim down both side of the crack so the cut is flush. Then use 200 to 300 grit sandpaper to sand it flush by sanding parallel with the split so not to aggravate it more. Otherwise, normal shooting conditions will only add to the irritation and impede the healing process. Next, coat the crack with an antibacterial cream or petroleum jelly and cover with a Band-Aid. If you are shooting and this occurs, try using a little super glue in the crack (as long as it is not bleeding a lot) and press the two sides of the crack together for a few seconds to close the wound. You will find that the pain is immediately reduced as well. Then wrap the area with a few layers of Coban or a Band-Aid and continue shooting.

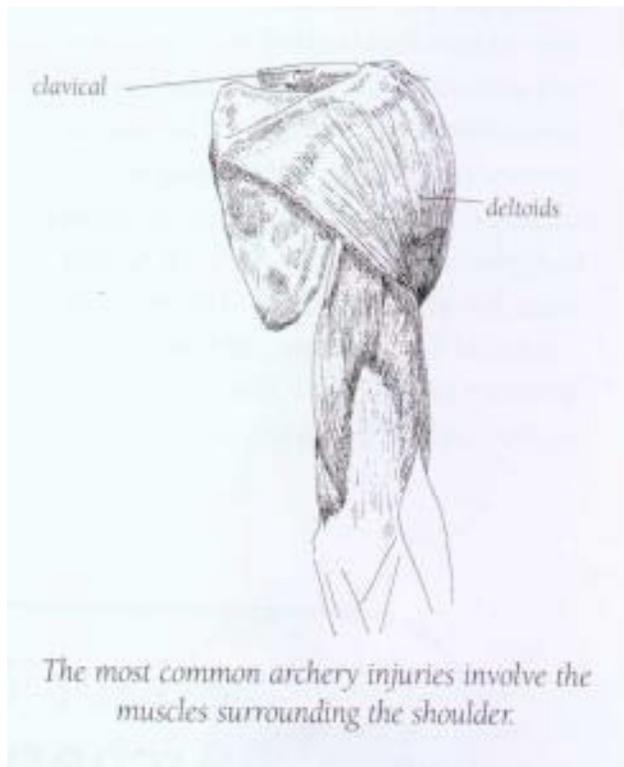
### **DRAWING ARM SHOULDER PAIN:**

The biggest and most severe of the shoulder problems is often created in the rotator cuff of the drawing shoulder. This problem is common for both compound and recurve without discrimination. The common ailment aligned with this injury is Tendinitis and is also the main reason for eliminating many archer's shooting career.

The main cause of this problem is due to incorrectly drawing the bow. As noted in my other articles on shooting technique, this archer is an "arm shooter", meaning they use the biceps of the drawing arm to draw the bow rather than the muscles of the drawing side scapula. Remember, there is really only two ways to draw the bow (referring to the non physically challenged archer), one is to draw with the muscles of the drawing arm using the biceps (not recommended) and the other is to draw with the muscles attached to the drawing side scapula while keeping the biceps relaxed (highly recommended).

What causes the problem? When drawing using the biceps of the drawing arm this all but eliminates the use of the scapula. When approaching anchor the arm is very tight and motion is restricted. As the archer continues to try and draw through the clicker it is difficult due to the shoulder being kept forward in a static position and the arm runs out of room to draw.

The arm must hinge around the shoulder. Since the shoulder is held static, the arm's range of motion is basically maximized at the full draw position. The act of forcing the arm to draw past its natural range of motion results in stretching the ligaments that hold the tendons (such as the bicipital tendon) in place. Once the ligaments are elongated the trouble begins as they allow the tendons to migrate out of position and become irritated. To correct this problem, learn to draw the bow while keeping the biceps relaxed (The Scapula Trainer \* is a very good device for learning this technique). Also, it is necessary to keep the drawing scapula down along with the bow arm scapula. Keeping the scapula down will reduce shoulder tension and provide for a full range of motion.



## **SORE SHOULDERS:**

If you are experiencing shoulder pain in the upper part of the shoulder between the neck and shoulder joint, this is usually caused by fatigue and trauma of the upper trapezius muscles.

The pain can be located in one or both shoulders. The common cause of this ailment is usually the position

**The most common archery injuries involve the muscles surrounding the shoulder.** of the scapula. It is common for archers to raise the shoulders (scapula) as they raise the bow arm and drawing arm. This action activates the upper trapezius creating tension in the shoulders and neck. It is vitally important to learn to raise only the arms while keeping the scapula down and relaxed. Learning to raise only the arms when preparing for the shot will keep the upper trapezius much more relaxed and eliminate fatigue. Raising the shoulders improperly positions the scapula requiring the bow to be drawn and held using multiple muscle groups rather than the body's skeletal structure. Practice raising only the arms (in front of a mirror is best so you can observe the shoulder positions), first without the bow then with the bow to achieve the same feeling.

Raising the shoulders causes another common effect of what I call "clavicle crunch". This is where the collar bone (clavicle) "pops" in the joint, somewhat like amplifying knuckle cracking 10 fold. When the draw shoulder is raised to draw the bow, this places the clavicle in an unnatural and unstable position. This position places additional pressure on the clavicle joint at the sternum and shoulder connections. Raising the shoulder or starting the draw with the drawing arm at a high stress position often causes popping. In every case where archers have come to me with this problem, it has been caused by a high drawing shoulder and or a drawing elbow position that is not compatible with that individual's physiology.

If you are suffering from any of the above conditions I sincerely hope that some of the above information will help you cure those ailments and allow for pain free practice and participation in our sport. There are certainly more aches and pains from archery than those noted here. If you are experiencing something other than the problems noted above from your archery practice, please feel free to write me through AF and I will try to help you figure out the reason for the trouble.

Oh yea, the disclaimer. Please know that I am not a medical doctor and therefore the above information is gathered from my personal experience but is not in anyway a medical recommendation.

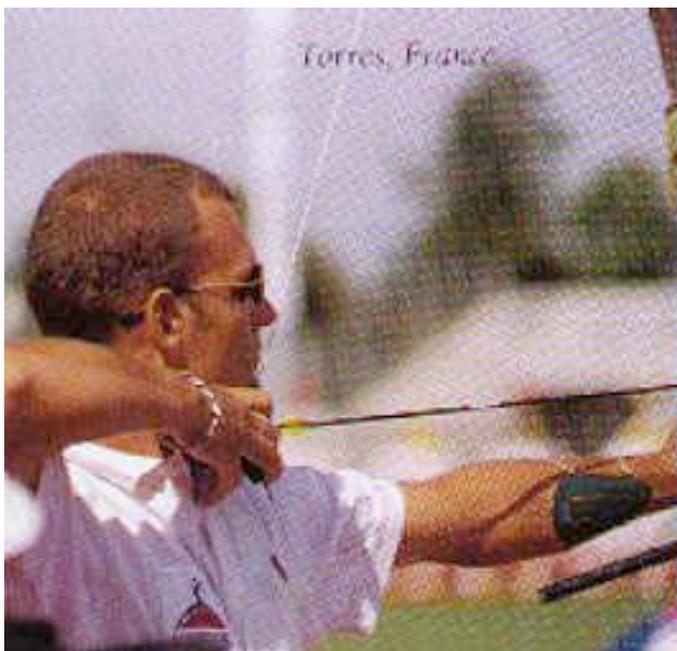
Until Next Time, Good Shooting!

\*Scapula Trainer PO. Box 11117 Marina Del Rey, CA 90295



## **Recurve Tech 100 Controlling Your Clicker**

*By Mike Gerard*



The proper use of a clicker has always been a source of controversy amongst coaches and top archers. Should I push more or pull more? Should I set up on the point and move gently, or pay no attention and pull through with enthusiasm? If you ask a number of different archers and coaches, you will get a wide variety of answers. Each person will back up their beliefs with sound reasoning and success stories. So who are you going to believe?

Shig Honda wrote a book called Winner or Loser" where he suggests that the correct method is to push through the clicker with your bow arm. I knew an archer that used this method very successfully. Anyone that ever saw Mr. Ray Burk shoot, would agree that he definitely fit into the category of a push shooter.

Many top coaches preach the use of strong back tension requiring that a strong motion of the drawing side be used to come through the clicker.

A number Of top coaches teach to be dynamic and push and pull to some degree of equality.

A slow steady continuous motion is preferred by a number of top archers and coaches world wide and is probably the most widely taught method today. My goal in writing this article is not to persuade you one way or another (even though I have a method that I prefer) but to present the pros and cons of the different methods and to help you to decide where you fit in. Then you can create your own testimony I firmly believe that there is no right or wrong method. I believe that an archer's muscle make up and body composition have a huge effect on the method that will be the most effective for them. Let's explore the pros and cons of each method and build some thoughts on what works for you.

Let's start with the push, pull or both controversy

### **Push Pros**

- \* Pushing through your shot gives great motion and follow through of your bow arm side directly toward the target.
- \* You are less likely to build tension on your drawing side as you come through the clicker.
- \* You are able to keep an even controlled tension of the drawing side of your body. This includes the tension in your neck and anchor.

- \* Pushing has greater strength/leverage than pulling.
- \* Pushing does not require as much muscle and joint flexibility as pulling.

### **Push Cons**

- \* When you load up your back tension or drawing side during the shot, if the bow arm is soft, it is difficult to have the exact same tension in your bow arm from shot to shot when the clicker goes off. Said another way, it is easy to have different amounts of extension in your bow arm from shot to shot. This can cause left and right arrows.
- \* It is easy to lose tension on the drawing side as you increase tension on the bow arm side, especially because pushing is stronger than pulling. Collapsing on the right side is bound to cause poor shots.

### **Pull Pros**

- \* Keeping a solid bow arm and pulling through the shot enhances the correct follow through motion.
- \* Keeping the bow arm tension constant offers good sighting and holding control.
- \* Strong consistent bow arm control reduces left and right shots. By setting the bow arm in the beginning and not changing it during the shot, it is easier to be consistent.
- \* When executed well, the follow through and motion in the shot is classic.

### **Pull Cons**

- \* Pulling through the clicker is far and above one of the most difficult methods to master. It is hard to pull and not build tension at the same time.
- \* Pulling requires good shoulder and neck flexibility.
- \* It is difficult to pull and not increase tension in your drawing hand and drawing arm. You must use your back.
- \* It is easy to go in and out of using your back and using your arms. Especially for the stronger less flexible types of people.
- \* You must learn to relax your neck and let your head move with the expansion so your anchor does not increase in tension or pressure.
- \* When increasing tension on the drawing side, it is important not to lose tension on the bow arm side.

### **Push/ Pull Pros**

- \* As you expand through the shot, the ability to lose tension on one side while increasing the other is diminished. You build tension on both sides at the same time.
- \* When done properly, the flow of the shot is exceptional because the follow through is the same motion just sped up from the release of the string.
- \* By moving both drawing and bow arm sides, you cover a great deal of ground and the shot timing is faster.
- \* You are less likely to move your body out of good line because the motion is moving both sides in the correct direction at the same time.
- \* Shots are quick and strong requiring less energy to be expended.

### **Push / Pull Cons**

- \* Getting used to shooting on the move is difficult. Your sight picture has more movement in it.
- \* Learning to load both sides smoothly and evenly takes great patience and practice.
- \* Control of all the movement is not easy to be consistent.



After examining the push pull issues, you have also to consider the different methods of set up. Set up on the point or move like a madman? Both methods have been, and are being used today, to great degrees of success. Which is better or how do you choose which method is best for you? This issue has archers and coaches well divided. In my experience, the answer lies in your body build and make up. If you have a high level of flexibility, you will be effective at moving more. If you have great control and strength but less flexibility you may have great success setting up on the point. Let's explore some more pros and cons.

### **Not Setting Up on the Point Pros**

- \* My favorite pro is you can keep your eye on the target at all times.
- \* By not knowing your body is in the same position, it is difficult to develop consistent timing other than fast, fast, fast.

### **Setting Up on the Point Pros**

- \* It is easier to ensure that your body is in the same position from shot to shot.
- \* Aiming is steady with less movement to the sight.
- \* Shot timing is under your control to a greater extent when done properly.
- \* You can load the bow arm side and control left and right shots.
- \* By moving less, the ability to build tension in the drawing hand is reduced.

### **Setting Up on the Point Cons**

- \* It is easy to freeze or stop pulling.
- \* You must take your eye off the target to watch the clicker at setup. This can add time to the shot.

- \* You can have tension in your neck and get away with it. Not good!
- \* Shot timing is slower and less fluid from the break up of your sight picture to watch the clicker.
- \* You can think you are on the point, but creep forward after you take your eye off to aim.
- \* It is easier to over aim.

A method that is being taught to a high degree of success is to have one very slow controlled continuous motion. You see this in the Koreans, as well as a number of top Europeans. If you ever get the opportunity to watch Lionel Torres from France or Elif AlLinkaynak from Turkey, they will provide a great example of this effective method. Whichever method you prefer, it is most important to be able to perform your increase in draw length without building muscle tension. The method you choose needs to be consistent with that goal. Your body composition will also have an effect on your method of choice. Less flexible people will do better setting up on the point and pushing to a higher degree. People with greater flexibility have the ability to move through the clicker without building tension. Remember, tension is your enemy.

I prefer to leave the words push and pull out of my conversation of coming through the clicker, because to push or to pull insinuates that some tension is increased somewhere! I prefer to use the phrase, "move through the clicker" instead. When I was a younger (more flexible) archer, I used to describe doing nothing more than moving my shoulder blades together. No push or pull, just move your shoulder blades towards each other, and the clicker will go off. Give yourself a picture that is without tension and visualize the clicker going off by itself.

Well I hope this article moves you to go out and practice, because the only way to cure bad habits, is to practice good ones! See you on the range.

A blue rectangular button with the word "PRINT" in white capital letters.A rectangular button with a double border (inner grey, outer red) and the word "BACK" in black capital letters.

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## Recurve Tech 100 Upper Body Positioning

*By Rick Mckinney*



The strength of the shot comes from body positioning. You have read many articles about the correct stance and how it affects the shot. Once you have the correct stance, you need to make sure that your upper body is positioned correctly in order to consistently execute an accurate shot time after time.

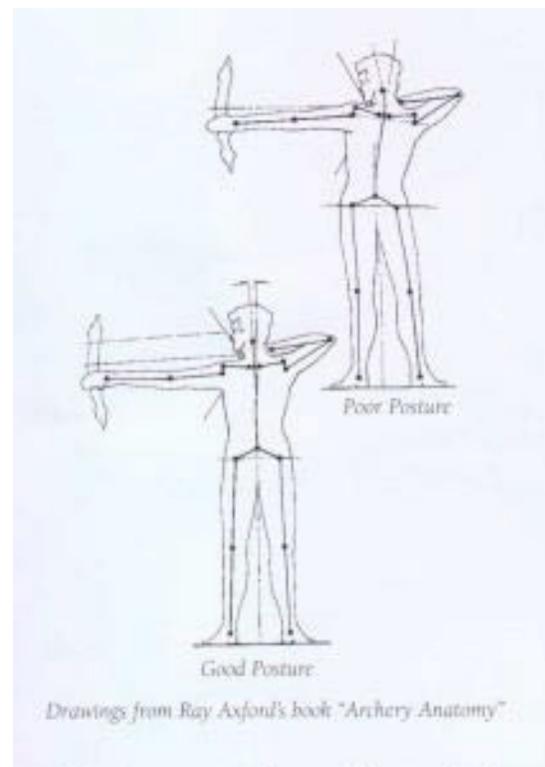
The best way to begin is to learn that it is easier to understand bone movement instead of muscle movement. When lifting your arm or moving your foot, you do not think about which muscle you need to do this action. What you think about is what body part you want to move. Why is it that in archery everyone wants to tell you to use your back muscles or even better is when they tell you to use those

Rhomboids! The Koreans learned early that you want to position certain bones in order to prepare for executing a good and consistent shot.

Let's start with standing up straight. In order to achieve this you want to think of keeping your head up. if your head centers itself above the body your upper body will stay more in line. Most people will tend to lean backward due to the mass weight of the bow and pulling weight. Both of these will cause your bone structure to be out of line and this will force you to use more muscle than you should. One of the more important bones that will be out of position is your scapula or shoulder blade. The scapula needs to be in a position to handle the bow forces that come into play at full draw. if the scapula is too high, your front shoulder which will rise continuously while at full draw. This creates a serious problem if you use a clicker.

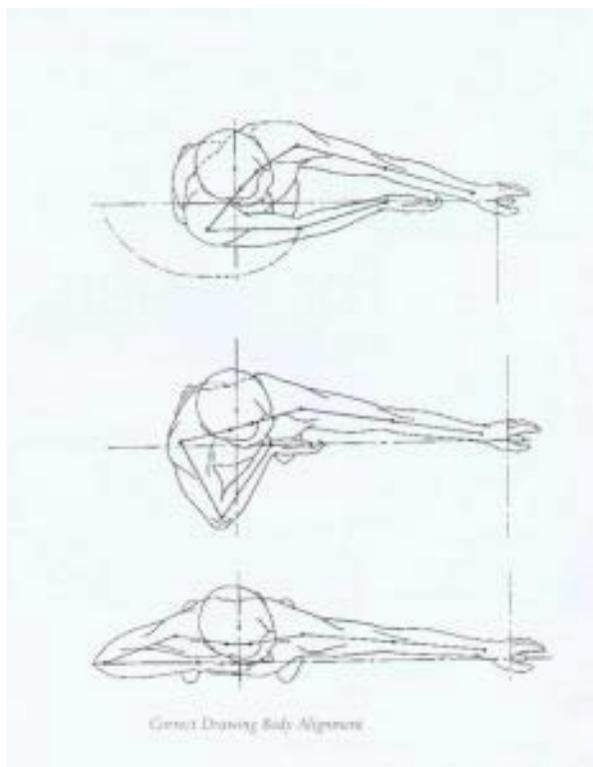
While you are pulling with your back half or release hand, your front half or your bow hand is moving backward, thus canceling all your draw. That is why it looks like your clicker is not moving. Keeping the shoulder blade down in a good locked position helps you get through the clicker a lot easier.

Your goal is to look like a "T" at full draw. Now this is not absolute. It is where you should try to get to and still be comfortable. Not everyone has the perfect physic (actually I have never seen anyone have the perfect physic, you just try to get close to it). How you start your draw can determine whether or not your shoulder blade will be in the proper place. When you start to draw at a low position and raise your bow arm, you are forcing the shoulder blade out of position immediately and it is doubtful that you will be able to get it back into place. If you start with your draw with the arm level to the target, you are in a 50/50 zone. This means that the shoulder blade could be put into position or it could lift out of position. If you start your draw with your bow raised slightly, you have the best chance of getting the shoulder blade into the proper position.



Drawings from Ray Axford's book "Archery Anatomy".

Let's focus on how we should appear when someone is looking over the top of us. The shoulder blades should be in line and that the drawing elbow should be in line with the front of the bow shoulder and bow hand. This gives you great leverage and will enable you to use less muscle thus giving you better control. When your elbow is out of line, it will force you to use more muscle unless you use constant motion to execute the shot. This can be discussed in another article in the future.



**Correct Drawing Body Alignment**

There are two ways of getting into line during the draw. The first method is common with most archers, but is considered wrong and inefficient. The archer keeps their drawing elbow level with the arrow, thus forcing the arm to be out of line and causing the archer to pre-load their arm muscles. Not good for execution, because they will not use the shoulder and shoulder blades for execution. Now, if you start with a high drawing elbow and keep it close to your body when drawing you will notice that your line will stay very close and you will use less muscle and be more stable at full draw. Also you will notice that when you start with a high drawing elbow, you will be able to position your front shoulder blade properly.

Just remember to think in moderation. Most people may tend to be too excessive when trying new things and they over exceed what they are trying to accomplish, like setting the shoulder blade too low! Or they start their drawing elbow and bow hand as high as they can reach! Do not over react, just do it naturally and you will be pleased with the results.

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## Product News

### New and exciting archery products

#### Tru-Flite Introduces New Space-Saving Arrow Pack



Tru-Flite Arrow Company, Inc. has introduced a new space-saving arrow pack for the 1999 season. The new dozen pack is 25% smaller, due to a highly innovative design that reduces space within the carton while protecting the arrows inside. The new reduced carton size will allow dealers to display more product within the same shelf space creating greater retail efficiency and increased revenue per square foot.

Available in both clear polycarbonate and corrugated packs, the new space-saving design protects arrows while displaying them in an easy-to-see format that appeals to customers. The exterior of the new package delivers the eye-catching graphics and detailed product information that keeps arrows moving off the shelves and customers coming back season after season.

Tru-Flite offers a full line of high quality arrows and accessories designed for today's serious archers. For more information contact: John Gooding, President, Tru-Flite Arrow Company, Inc., PO Box 746, Monticello, IN 57960. Phone (800) 348-2224, Fax: (219) 583-9271. [www.tru-flite.com](http://www.tru-flite.com),

Email: [arrows@pwrtc.com](mailto:arrows@pwrtc.com)

#### Carbon Tech Introduces the new CT McKinney Arrow Shaft.



Open your mind to a new way of thinking and you'll quickly realize the CT McKinney arrow shaft with the new MAC System is one of the most innovative designs in arrow technology. This shaft is designed specifically for the recurve competitor who demands the ultimate performance in arrow flight accuracy. The MAC System included with each CT McKinney shaft allows you to adjust spine stiffness in minutes.

The CT McKinney comes in 7 different sizes, ranging from a static spine of 900 up to 450 and 410 when using the New MAC system. Although other arrow companies offer a lot more sizes, it is not necessary when using the new MAC system. "When using the MAC

system, it is like having one arrow that can adjust to at least two sizes, " says Rick McKinney, four-time Olympian. Carbon Tech is based out of Sacramento, California and has been in the arrow business since January of 1997. Although very young in the arrow industry, they have become a fast growing and popular dealer only company.

To find out more about the new CT McKinney shaft and MAC system contact Carbon Tech at 4751 Pell Dr., Suite #3, Sacramento, California 95838. Phone (916) 641-8088 or fax (916) 641-8087 or visit their website [www.carbon-tech.com](http://www.carbon-tech.com).



### Easton's New Cosmic Eclipse

Easton Technical Products, the worlds leading manufacturer of arrow shafts and precision components, announces the X7 Cosmic Eclipse - with a new out-of-this-world gold graphic. Easton integrated the toughest, straightest aluminum target shaft on the market, the X7 Eclipse , with a sleek new black and gold design, and the result is

Cosmic. Now X7 Eclipse shooters have two choices.

From hours of practice, straight into competition - the X7's super-tough 7178-T9 alloy is proven to maintain its integrity and perform with unequalled accuracy The Cosmic Eclipse comes in the new 2412 size, the perfect size for speed and target punching diameter. The Cosmic is also available in 2112, 2212, 2312, 2512, 2213 and 2413, with Easton's exclusive Super UNI Bushings factory installed for perfect nock alignment every time.

Call (801) 539-1400, or write Easton Technical Products, 5040 West Harold Gatty Drive, Salt Lake City, UT 84116. You may also want to visit Easton's web site at [www.eastonarchery.com](http://www.eastonarchery.com) for updates on Easton archery products, the latest Outfitters gear and attire, and information about the Easton Select Archers Club.

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## NAA News

### **Joad summer camp archery program on target.**

*By Jackie Fiala, Joad National Coordinator*



This summer, the National Archery Association will introduce a new archery camp program designed to keep campers coming back for more. The program is easy to run and flexible enough to adjust to any kind of camp program. What's more, campers can actually advance to higher levels based on their performance!

The camps will be provided with scoresheets, award certificates and charts to post for the campers to see their progress. There will also be simple instructions and guidelines for the camps to use based on the campers' abilities

and the distances available at the camp. Pins are also available for the five achievement scores at each distance. The five pins represent the colors of the target face, graduating from white to gold.

Scoring qualifications vary from distances of seven yards for campers 8 years of age or younger, to 10, 15 and 20 yards for older archers at camps with stationary targets. There are also qualifications for camps with more than one distance, up to 30 and 50 yards.

On each award certificate there is a place for the camp name and the archery director's signature. Along with the camper's name, the certificate also shows at what distance and target size the camper achieved the award and what qualification was attained. On the bottom of the certificate, the NAA phone number and website are listed so the campers can seek additional, year-round JOAD club information.

For the \$50 JOAD Summer Camp Membership Fee, camps will receive:

- Bi-Monthly issues of Archery Focus Magazine and eight annual issues of the NAA member newsletter Nock-Nock.
- Guidelines to run the archery camp program Scoresheets.
- Master Camp Chart to record camper achievements.
- 100 Achievement certificates (more available for purchase).
- Pins available for purchase at \$1.50 each.
- NAA membership applications for campers to take home.



- General liability coverage through the National Archery Association.

JOAD Summer Camp Program brochures will be available at the American Camping Association conferences, at all scheduled NAA Level 1 Basic Camp Instructor certification courses, and by calling the NAA office at (719) 578-4576.

For information on how to schedule an NAA Level I Basic Camp Instructor Course in your area, contact Lloyd Brown at (619) 2750865. The Level 1 Course is designed to train and certify archery instructors for short-term camp and youth recreational programs.

A blue rectangular button with the word "PRINT" in white capital letters.A rectangular button with a double border (inner grey, outer red) and the word "BACK" in black capital letters.

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## **FAILURE is our TEACHER**

***By Lisa Franseen, Ph.D.***



**Lisa Franseen received her Ph.D. degree from the University of Montana and is a sport psychology consultant in Denver, Colorado. She has provided applied mental skills training to Olympic archers during training camps, national and international competitions and the 1996 Olympic Games in Atlanta. Lisa also teaches sport psychology for Level 3 and 4 Archery Coaching Certification Courses. While working with the United States Olympic Committee, she specialized in the development of mental skills programs and performance enhancement with elite individual athletes and teams which included the U.S. Archery, Swimming, judo and Taekwondo resident teams.**

*The greatest athletes have failed at times and so will you. Failing is a natural part of life. But how we deal with failure determines the kind of archer we will become and how quickly we will make gains.*

In many societies, "failing" immediately conjures up something negative and bad, sometimes something horrible, and certainly something to be avoided whenever possible. Failing in sports is associated with losing (according to the scoreboard), and not meeting your own or other's expectations. Something very curious tends to happen when we think we "failed". We not only perceive our performance as being below a certain standard, which is considered to be a negative thing indeed, but we also perceive ourselves as being the "one who failed" or "the loser," which makes who we are a negative thing. These labels we attach to ourselves are messages that we are bad; they work to corrode our self-esteem. Thus, to uphold our sense of worth and esteem, we become dependent on winning.

At times, this dependency on winning to feel okay about ourselves even causes us to deny that we've lost or "failed!" Have you ever caught yourself thinking "I would have won if or "I would have gotten a new personal best if or "I should have done better"? These self-statements are really a way of avoiding reality (the reality being that you didn't win, didn't get a personal best, didn't do better, etc.) and attempting to "save face." However, they prevent us from looking failure square in the face and potentially learning something valuable that will help us to succeed next time.

**Just as the tumultuous chaos of a thunderstorm brings a nurturing rain that allows life to flourish, so too in human affairs times of advancement are preceded by times of disorder. Success comes to those who can weather the storm.  
I Ching, no. 3**

Failure does not have to be negative. It does not have to tear down our self-esteem. It is important to know that it is a choice to see failure in this way And it's also important to know you have other choices.

Failure can be our teacher. In *Thinking Body, Dancing Mind* the authors talk about failure as an inevitable, natural, and positive process. Failure is as much a part of life as breathing and cannot be avoided. Thus, the only alternative is to embrace failure. See it as an opportunity to teach you the needed lessons for later success. In this way, failure works for you and not against you. If you fight failure you become restricted in your ability to see what there is to learn. if you embrace failure, you can "relax and figure out how to go beyond your present level of performance. You perfect your game through adversity and failure. Look at failure as a lesson from which you can learn."

You may be wondering why I have written an entire article on this subject. In my experience, it is more the norm when one "loses" to feel like a loser than to feel confident that we will continue to improve. When we haven't met our expectations, it is more common to beat oneself up than to look for the lesson to be learned. I think it is important here to ask why it is so difficult to see failure as an inevitable, natural, and positive process.

In large part, it may be due to the high value of winning in our society As they say, "Winning isn't everything .... it's the only thing!" I saw a T-shirt the other day with the words, "Second place is the first place loser." The media focuses on and consistently reports win-loss records for professional teams. Athletes have quit or have been "cut" from their team because they've lost, coaches have been fired for having a losing team, and parents have rejected their children as human beings because they can't "win." In most cases following a tournament, when others ask "How did you do?" they want to know if you won, or how far you were from winning. Rarely does "How did you do?" mean "How close to your own potential did you shoot today?"

Despite the prevailing attitude in society, winning is NOT everything. Studies have shown that children would rather play on a losing team than sit on the bench of a winning team. Most archers would say that shooting in the zone and achieving a personal best while losing to an opponent who is exceptional can be more satisfying than beating an inferior opponent while you are shooting poorly I'm not saying that winning isn't important it's a significant part of sport. Winning - or striving to win - is what makes competition fun and exciting. But competition is neither good nor bad. It's merely a comparison of ourselves against others. Whether it's healthy or not depends on the extent to which winning is emphasized over other goals. When we lose perspective on winning, our performance declines.

This focus on, and attitude about winning in our society has developed a "fear of failure." it's not really a fear of failure, it's a fear of the shame and loss of pride (i.e., a bruised ego) that is associated with failure. There are even theories that have been developed about this concept. According to the Need Achievement Theory (Atkinson, 1974; McClelland, 196 1)' each of us has two underlying motives when it comes to achievement. One is to achieve success and the other is to avoid failure. The theory predicts that those who are highly motivated to achieve success are more apt to seek out challenges and take risks than those who are highly motivated to avoid failure. Only in seeking challenges and taking risks do we set the stage for improvement and enhanced performance. When we retreat from challenges and only engage in 'safe' situations where we can be assured of avoiding failure, improving skills is difficult.

**One requirement for improving your shot is to see "Failure" as positive and to learn from setbacks**

It seems there are at least two reasons that a fear of failure leads to poor performances.

- One, we are drawn closer to whatever we focus on. Thus, we will be drawn toward failing if we focus on avoiding failure and we will be drawn toward success if we focus on our performance abilities.
- Two, someone who fears failure cannot always avoid situations in which failure is a possibility. They tend to favor competitive situations where they are certain to win or certain to lose (for example, competing against and losing to a gold medalist wouldn't create much shame because of the skill differential). Where there is not the certainty of losing or winning, the person who fears failure will feel maximum uncertainty, worry, anxiety, and muscle tension. Under these 'internal' conditions the person who fears failure will be more likely to fail.

It is important to be aware of the myths that surround failure. Many of us grew up learning that if we work hard enough, we can avoid failure. Unfortunately, this is not true. Believing that it is, however, only denies us reality; denies that failure is an inevitable part of life. It only sets us up for disappointment when we do fail. Many of us also grew up learning that failure is horrible and intolerable. Failure is disappointing but not intolerable; we do live through it. The 'horrible' feelings that accompany failure are usually in reaction to the shame and loss of pride.

**Real failure is the unwillingness to take the chance to improve life.  
Huang and Lynch**

Now that you understand how a fear of failure can interfere with performance and how adopting an attitude of failure-as-opportunity can enhance performance, try the following suggestions to help you to be successful, regardless of who wins the competition.

1. Commit to having fun, even when you're "losing".
2. Never sacrifice sportsmanship for a "win-at-all-costs" attitude.
3. Ask yourself after every tournament, "What did I learn? What can I do differently next time?"
4. Succeed, regardless of who "wins," by emphasizing skill development in the goals that you set.
5. Focus on personal performance goals, goals that are in your control. For example, your stance your rhythm, having a relaxed bow hand, etc.
- 6 Set small, realistic yet challenging goals (keeping #4 & 5 in mind) that you are likely to achieve frequently This builds confidence and increases motivation.
7. Give yourself sincere credit for effort.
8. Give yourself sincere credit for not quitting when you aren't meeting your expectations.
9. Commit to accepting yourself as a worthy human being, regardless of your performance.
10. Make archery a part of your life - not all of it.
11. Develop affirmations that remind you to see failure as your teacher, such as "STOP, LISTEN and LEARN", "Learning from failure is a sign of success", or "Success does not guarantee happiness; failure need not guarantee misery".

**The pressure to win can be what makes you lose. You must let go of the idea of winning in order to win!**

Bibliography and Footnotes: 1 SportParent. Human Kinetics: American Sport Education Program (1994).  
2 Weinberg & Gould (1995), Foundations of Sport and Exercise Psychology. Human Kinetics: Champaign, IL.  
3 Chungliang Ai Huang and Jerry Lynch (1992), Thinking Body, Dancing Mind (pp. 93-100).

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## Hunting

### Effective Camouflage for Archers

*By Chuck Adams*



In my experience, most bowhunters rely too heavily on camouflage gear and too lightly on smart concealment tactics.

Camo clothes and camo equipment are certainly essential in hunting. An animal's eyes are quick to pick up solid, off-color objects in the woods - particularly when these objects move. If you do not wear a broken pattern of contrasting, woody colors, a deer, elk or bear will instantly see your telltale human shape.

If you fail to conceal your face with a headnet or camouflage makeup, you might also tip off game. And, if you carry a bow, arrows, quiver, backpack or any other item with very light, very dark or mirror-like surfaces, you will surely frighten animals.

Nonetheless, all such precautions are fruitless without sensible hunting tactics. Only when you combine the right camouflage with the right moves can you artfully compromise game.

Let's look at camo gear and camo moves in details.

#### Clothes and Equipment That Work.

Modern hunters have access to a wealth of commercial camouflage. Two or three decades ago, we were limited to a few patterns like Vietnam jungle and World War 11 Leaf. Such military camo was generally too dark for average autumn hunting and sold in noisy, hard-weave fabrics like 60/40 blend and ripstop nylon.

Today, sporting goods stores are packed with practical camo duds. Top patterns break up the human outline with sharply contrasting, fairly large patches of color. Ideally, such contrast works well up close and equally well beyond 20 or 30 yards.

Realtree's new Hardwoods 20-200 pattern is typical. Its very name implies effectiveness at 20 yards and 200 yards, and the name certainly fits the product.

When selecting any camouflage garment, be sure to back away and view it from as far away as store aisles allow. If it blends into one solid-seeming blob beyond 15 or 20 yards, it won't hide you from animals.

Today, fabrics like fleece, wool, worsterlon and saddle cloth ensure quiet movement in the field. When you combine concealment with silence, you can be an effective predator.



For average autumn big game habitats, nothing can beat patterns like Advantage, Realtree X-tra Brown, Mossy Oak BreakUp, Skyline Apparition or Predator Fall Grey. In very lightcolored habitats like the desert Southwest and northern tundra valleys, better choices include ASAT Brown, U.S. Military "Desert Storm" Camo, Realtree Wetlands and Realtree X-tra Grey. In the snow, a pattern of mixed white-and-brown or white-and-grey makes you virtually disappear. Top patterns include Snow Shadow and 3-D Snow.

**Wary, keened-eyed animals like mule deer require full bowhunting camouflage plus time tested concealment tactics. Otherwise, critters win almost every time.**

Desert and snow patterns also perform well in tree stands without heavy surrounding foliage. Tans, greys and whites blend well against a webwork of thin limbs, leaves and a blue or cloudy sky. Such light colors are much better than darker traditional bowhunting patterns.

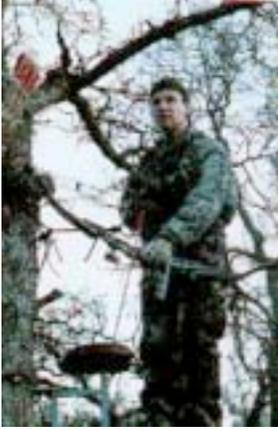
Desert and snow patterns also perform well in tree stands without heavy surrounding foliage. Tans, greys and whites blend well against a webwork of thin limbs, leaves and a blue or cloudy sky. Such light colors are much better than darker traditional bowhunting patterns.

The newest craze among bowhunters is so-called 3-D camo, which consists of thin fabric overlaid by loose, protruding leafy shapes of cloth. Modern offerings like the "Leafy-Lite" suit from Robinson Labs and the Camo-Tex suit from Cabelas are thinner, less bulky versions of "ghillie suits" used by the U.S. Military for many years.

In a coloration like Realtree X-tra Brown or Mossy Oak BreakUp, I have found that 3-D camo yields the best-ever concealment from wary game. The reason? Your human outline is physically destroyed by ragged rows of leaves as well as contrasting colors. If you stay still, game absolutely cannot recognize you for what you really are.

Here's one cautionary tip about 3-D camouflage. If the bowstring even lightly snags leafy fabric on your chest or forearm, your shot will certainly go wild. To prevent this, wear an archery chest protector and large armguard to flatten clothes along these crucial bowstring travel paths.

Complimenting your camo garments with other gear is easy. Most modern hunting bows come standard with non-glare camouflage finishes. For example, my favorite Reflex hunting compound bows all blend well in Realtree X-tra Grey. Similarly, my Super Slam XX78 hunting shafts from Easton are finished with a dull, pleasingly woody pattern of browns, blacks and tans. Most hunting packs, fanny packs and similar day-use soft goods are offered in camo fleece. Even boots, binoculars, mechanical bowstring release aids and other small hunting items are often sold with camouflage finishes. Smallish pieces of gear need not be camo, provided these do not reflect light, but complete camouflage certainly never hurts.



### **Essential Camouflage Tactics**

How you hunt can make or break your other camouflage efforts. The best clothes and most artfully finished gear will not work unless you carefully and deliberately hide from the prying eyes of animals.

First and foremost, a bowhunter must use terrain and foliage to their best advantage. When hunting by foot, you should slip behind ridges and rocks, along ravine bottoms and hollows and against treelines and edges of brush. In elevated stands, you should choose platform sites with the heaviest possible cover behind and to the sides.

If you stroll across ridgetops or open fields, every animal in the neighborhood will flee. If you perch like a buzzard beside naked, limbless tree trunks, it will not matter how high your stand happens to be. Deer will see you from a distance and run.

Using sunlight and shadow is key to hiding from spooky modern game. Wise bowhunters lurk in the deep shade whenever possible and move as slow as a turtle when they find themselves in the sun. If the situation allows, canny archers walk or sit where most animals are forced to look towards a low morning or evening sun. Sunlight dazzles animals' eyes the same as it dazzles yours, so keep the sun behind you whenever you can.

Finally, never forget that movement alerts wary animals above all else. Camouflage clothes and dull-surfaced hardware let you move slowly in many close-range hunting situations. But nothing hides quick movement from the razor-sharp eyeballs of deer, elk, antelope and other wary targets.

### **Final Thoughts**

If you combine camouflage gear with camouflage tactics, you maximize your edge on animals. Without both forms of concealment, critters will beat you most of the time.

## Equipment Review - Recurve **SILENCE is Beautiful**

*By George Tekmitchov*



**George is a senior development engineer for Easton Technical Products and a member of the Hoyt international staff. He has been known to shoot a bow, occasionally. Any agreement between this article and the views of his employer is pure coincidence.**

You know I'm in trouble when I have to rip off a song title from Juliana Hatfield to make my point. Anyhow, last issue I regaled you with tales of what top shooters want from their bows vis a vis "feel". I didn't even make any of it up! Remember what almost all of them wanted? That's right, they want a quiet bow. Now I know some of you out there don't believe you need a quiet bow I was once like you. For instance, back in 1986, my buddy,

The Weasel, and I had a contest going to see who could have the loudest, gnarliest sounding bow and still shoot a 1250. Of course The Weasel thought glass-pack mufflers were cool then too. Really being older and somewhat wiser now, I'd like to discuss what it takes to get that bow to Quiet Down!!

First though, why do you really want a quieter bow?

### **Good reasons:**

- The bow will last longer. All that acoustical energy and vibration means sooner or later something will loosen/crack/fail.
- It will be more pleasant to shoot in the long run.
- It can promote a more harmonious relationship with people you shoot with.
- They won't ginch as much when you release while they're at full draw.
- Attractive women will come up to you and say, "Ooh, your bow is really quiet." Unlikely but it has happened to me.

Now let's look at what makes for loud bows:

- Too high or low a brace height. Numero Uno in the pantheon of loudness factors.
- The limb poundage setting.
- Loose stuff. 'nuff said.
- Light arrows.
- Light strings.

- Too few string twists.
- Nock tightness.
- Undamped stabilizers. The number two offender.
- Bad release.
- Bow design (some are just naturally noisy or 'clanky')

Now, there are some obvious and some not-so-obvious steps to deal with each of these issues.

### **Brace Height.**

All recurves shoot quietest in at least one and often two brace height positions. Shockingly, many times this is actually within the manufacturers recommended specification! A clue as to why this happens can be gleaned from a quick look at the recurve limb tip. See that string groove? If your string isn't lying along the entire groove when the bow is at rest (not drawn) it may have too high a brace height.

Then when you shoot, the string whacks the limb and it is noisy. Often the place where the bow is quietest is also where it shoots best, so play with this adjustment by twisting the string up or down as needed (you did make your string a bit long didn't you?). This also has a big effect on the overall feel of the bow. For instance, too much brace height can make the limbs oscillate unpleasantly after the shot. You can't hear this oscillation as much as feel it, but it is a big factor.

### **Limb poundage setting.**

Yamaha bows, and to a somewhat lesser degree Hoyt bows, are quietest when shot at the low side of the poundage adjustment. This is the opposite of most compound bows which often get louder as limbs are "backed off".

### **Loose stuff.**

Loose stuff. Sight rattle? Loose stabilizer? Clicker rattle? Loose weight adjustment lockdowns? All of these will create lots of noise. Solutions include blue Loctite, teflon thread tape, better designed sights and proper maintenance.

### **Light arrows.**

Light arrows. Obviously a lighter arrow absorbs less energy leaving it in the bow to rattle your sight, and eventually your fillings, loose.

### **Light strings.**

12 strands of Fast Flight is loud compared to 18 or 20.

### **String material**

Dacron, which is elastic, is pretty quiet but slow and stretches like mad. Brownell Fast Flight and BCY Dynaflight are somewhat quiet. Angel Dyneema is thought by many to be the most quiet material.



### **Nock tightness.**

Your mileage may vary, but often, tight nocks are louder on the shot than loose ones.

### **Too few string twists.**

A string with too MANY twists is slower because the string acts like a spring. One with too FEW twists has less "give" and creates more shock.



### **Bow design.**

Some bows are just noisier than others. Hoyt Avalons are quieter than Radians. Yamaha Eollas tend to be quieter than Super Feels. In my opinion, Yarnahas are generally louder at longer draw lengths than most other bows on the market. Bows with limb pockets generally seem quieter than those without. Wood core limbs often seem quieter than foam core limbs (though a lot of this is because they tend to be slower).

### **Bad release.**

Sometimes the bow is loud because it is reacting to what you did.

### **Undamped stabilizers.**

This is a very interesting area. Stabilizers have been forever used as a means of damping and quieting bows. For instance, years ago it was common to see mercury-filled units meant to absorb noise and vibration. Not the most environmentally-friendly solution, but it worked. Later Hoyt developed the "TFC" or Torque Flight Compensator as a means of quieting stabilizers. Originally these were used on the long rod but became popular on side rods.

Today, there are lots of stabilizers and accessory devices meant to help quiet things down. In my view the most useful of these is the "Doinker" made by Bill Leven at Leven Industries in Simi Valley, California. Doinkers and similar products are found on the bows of a very high percentage of top shooters because they simply work. They go between the stabilizer and stabilizer weight to create a disruption of the vibration traveling up and down the stabilizer. Most people who try them like them. Most stabilizers sold today have some damping mechanism built in but even the most advanced stabilizers like the Easton AVRS and Shibuya Titanium-carbon work even better with a Doinker on the stabilizer.

### *Other means:*

Compound shooters have used hydraulic damped stabilizers for a long time. These are generally too heavy for use on the Olympic bow.

There's a new product on the market which I haven't gotten around to trying called a "limb saver". This is a mushroomlooking rubber thing you stick to your limbs. Supposedly it works like a Doinker for your limbs. If this is the case expect to see it in the near future as a successful product.

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## Equipment Review

### BUSHINGS or BEARINGS

(Which is better and why?)

*by Pedro Serratheiro*



Compare the mirror like surface of a car axle and a wheeled axle. Near the compound axle you'll find the miniature ball bearing and the original fiber bushing. Below are (left to right) a needle, phosphor bronze and unshielded ball bearings.

recurve archers. Bushings are one of these problems. In each compound wheel you always find a bushing and an axle. The material and maintenance of these bushings is critical. It is interesting to see that so much is written on compounds in general, but so little is written on compound wheel bushings. Maybe it is because there is no problem perceived, or a lack of knowledge on how to make them any better.

Some years ago, several manufacturers used their quality bushings as a sales tool to differentiate their product. Once again manufacturers are focusing on this part of the wheel. I know of at least two manufacturers which are using ball bearings in their wheels.

In this article I will review the in's and out's of compound bushings and give you some tips on getting your set-up more consistent and possibly even faster.

#### The Problem

Any compound wheel contains an axle and a bushing in order for the system to work. An axle is by definition, a moving piece or a fixed piece with something turning around it. A perfect axle must be very hard, preferably HSS or carbon steel, rectified and with a perfect smooth surface. Some of the best examples are the car axles with their mirror like surfaces.

If we look at the axles used in the modern day compound, their quality and reliability are not the same. This is where the problem starts. Most of the axles on the market aren't very strong, nor are they made of HSS or carbon steel, and some times not even rectified. Have you ever had difficulty with an axle only to find that by turning it to the other side the problem went away? If so, this is a sign that the axles were not rectified. This combined with a rough surface will cut at your bushings quickly.

The bushing is the piece that turns around the axle. It must be softer than the axle but with the same finish characteristics. The tolerance between the axle and bushing is critical in order to achieve minimal friction and maximum duration.

Some of the original compound bushings were made of phosphor bronze and then mechanical plastics like Turcite, Luytex and PTFE. You could also find some bushings made of fiber reinforced with glass bias. Any of these bushings work fine as long as the axles are perfectly concentric and have a nice smooth finish.

I prefer to use bushings made of phosphor bronze, the heaviest and hardest to produce. Plastic bushings do work and are simpler to work with and allow larger tolerances, but I still prefer the phosphor bronze because of its durability.

To get an idea of what kind of bushing wear you are experiencing, put your bow on a press and relieve the cable and string tension. Try to move the wheel from side to side. The movement you feel and actually see reflects wear on the bushings. Even with new bows, some movement is present. This movement is usually from loose axle and bushing tolerances.

Believe it or not, bad bushings affect the bow's fine tuning and its ability to hit the same spot every time. If you are like me and love to have everything perfect (or at least almost) on your bow, find comfort in knowing that the solution isn't difficult.



**Preparing to change bushings. Note the original and the miniature ball bearings (four for each wheel).**



After enlarging the bushing hole to a light fit, notice the sand paper attached to the drill. Take some extra time on this step as it is very critical.

which holds the bushing is small and therefore limits the bearing selection. What we need are the miniature bearings, but they are more expensive and harder to find. But these bearings are the highest quality and you will be happy you chose to invest in them later.

#### The Pros and Cons of Needle and Ball Bearings

##### Needle bearings

###### Pros:

- Supports high linear and axial loads

###### Cons:

- Not encased

#### Solutions

Now you have to decide what to do. If you decide you do not want to change your bushings you can always take care of the problem by replacing the bushings every time they need it; which could run 1-3 times a year. In my case, I have found that a better alternative is to use ball or needle bearings in place of the classic bushing system.

The principle behind this is that the balls or needles roll between the two surfaces almost eliminating friction. The axles and hole

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- Very critical to rough or soft axles (You'll most likely need to change your axles)
- Heavier compared to the plastic bushings

#### Ball bearings

##### Pros:

- Perfectly encased (less maintenance)
- Supports high linear loads
- More sizes to choose from
- Not as critical to rough or soft axles

##### Cons:

- Supports less axial loads than the needle bearings
- Heavier compared to the plastic bushings

If you are able to find and work on carbon steel axles (you'll need a good tool lathe), then your best option is to use the needle bearings. In contrast, if you choose to maintain your axles (recommended) then you're better off to use the ball bearings.

#### Choosing a Ball Bearing

Before starting to talk about all the different types of ball bearings on the market we must stick to the stock sizes for our axles and drilled holes for the bushings. So, with a precision pachymeter measure:

- 1- The axle diameter (often 3/16" or 5 mm)
- 2- The hole for the bushing or the outside bushing diameter (often 5/16" or 8 mm)

With these sizes you'll find high carbon chromium AISI 52100 and stainless steel bar class AISI 440C, shielded or not, ball bearings. The polyamide guards and the ceramic ball bearings are really not needed. I prefer the shielded 52100 ball bearings, unless you want more water resistance, then the shielded 440C will be the best choice.

To help you through the ball bearing choice I've outlined the sizes that will fit your bow:

#### Measurements in inches:

ID	OD	BW
.1562	.3125	.1250
.1875	.3125	.1250
.1875	.3750	.1250
.1875	.4250	.1250
.2500	.3750	.1250

#### Measurements in millimeters:

ID	OD	BW
4	7	2.5
4	8	3
5	8	2.5
5	9	3
6	10	3

ID-inner diameter (axle diameter); OD-outer diameter (outside bushing diameter); BW-Recommended ball bearing width.

If you couldn't find a ball bearing that matches your bow's sizes, stick to the axle size, because it will be simpler to alter the diameter of the hole in the wheel than change everything around new axles. Buy enough ball bearings to completely fill the hole in the wheel (often 3 or 4 for each wheel). This is particularly important since it allows you to dispose of a much higher linear load resistance and, the outer ball bearings support almost zero axial load, due to its reduced bearing width.

#### Installing the Ball Bearings

**WARNING** - Doing the following procedure could void the bow warranty, so proceed accordingly:

- 1- Measure all appropriate bow measurements so you can put everything back to your preferences.
- 2- Put the bow on a press and relieve the cables and string tension.
- 3- Pull out (one at a time) the assembled axle and wheel. 4- Check the ball bearings on the axle. (you'll only need a light fit, grind and polish as needed).
- 5- Pull out the bushing carefully (use a light hammer and a round piece of wood).
- 6- If necessary grind with a rectified drill the hole used for the bushing. If your bearings have an OD of 5/16" use a drill of 5/16". (you'll only need a light fit not a tight fit).
- 7- Only put the necessary ball bearings to fill the drilled hole. (if, for instance, three are not enough and four is too many, put three bearings with a plastic washer between them).
- 8- Insert the axle and make sure everything fits correctly (make sure the movement is smooth and there is no friction).
- 9- Replace all remaining parts.
- 10- Repeat on the other side.



The final product with the ball bearings inserted into the new hole.

In a friction test (fixed axle with a 1Kg-weight wheel suspended) I measured the force needed to start the wheel movement. On the standard wheel, dependent on the bushing material, it needed 150g to 480g more to initiate the movement than the ball bearing. On the chronograph the ball bearings gave 2ft/s to 12ft/s gain depending on the setup. I've used the modified bow for some time now with not a single failure and no wheel bearing maintenance at all. The change to bearings allows you to have a better bow that could be faster, easier to tune but above all maintenance free with no wheel lean.

Good shooting.

PRINT



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## Compound Tech 300 Cams and Speed

*By Larry Wise*



What's the future for speed from a handheld bow? 400 feet per second? Can we get anymore than we're getting now or have we reached the limit of this great invention?

The answers to these questions can be found in the force-draw curve of some of today's big cam and single cam bows. The sharp increase in draw weight at the beginning of the draw stroke, the long dwell at peak weight during the stroke and the quick drop to holding weight at the very end of the stroke indicates that the bow is storing a great amount of energy. That begs the question, How much is it possible to store?

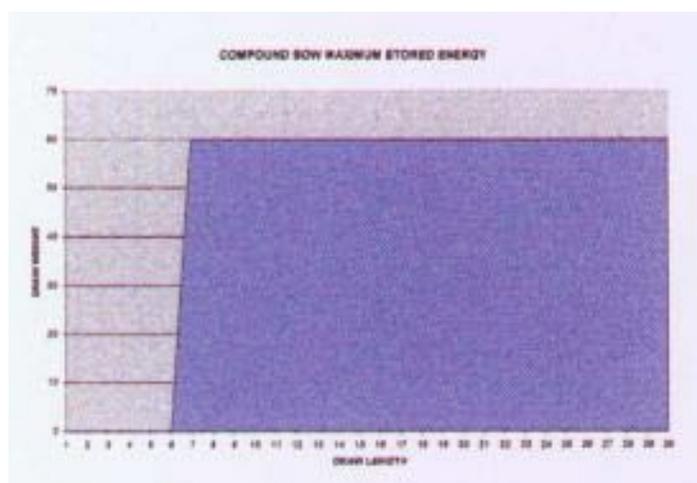
The maximum possible force-draw curve looks like the following, where the draw weight goes straight up from a sixinch brace height, stays at peak weight during the entire draw stroke until it reaches full draw at 30 inches. This curve or right angle creates the most area between it and the horizontal axis. In other words, this curve has

the most stored energy possible over the 24-inch draw stroke of the bow.

This curve is not practical since it does not allow any let off to a valley or holding weight. Include a drop off to a valley just before full draw and less than the maximum energy is stored but the curve is a little more practical for hand-held bows.

Today's super cams, including the newest single cams, come close to the maximum energy curve by creating a forcedraw curve where the weight does not go straight up at the beginning of the draw stroke, but it does go up quickly which requires a high initial amount of energy to be supplied by the archer. The drop into the valley by most super cams takes place over only two to three inches making lots of area between the curve and the horizontal axis below.

The stored energy calculation for this typical cam bow with a six-inch brace height and 30-inch draw is as follows:



S.E.=  $12+28+37+45+53+57+59+59+60+60+60+60+60+60+60+60+60+59+58+54+42+32+18 = 1213$   
inchpounds

S.E. = 1213 inch-pounds

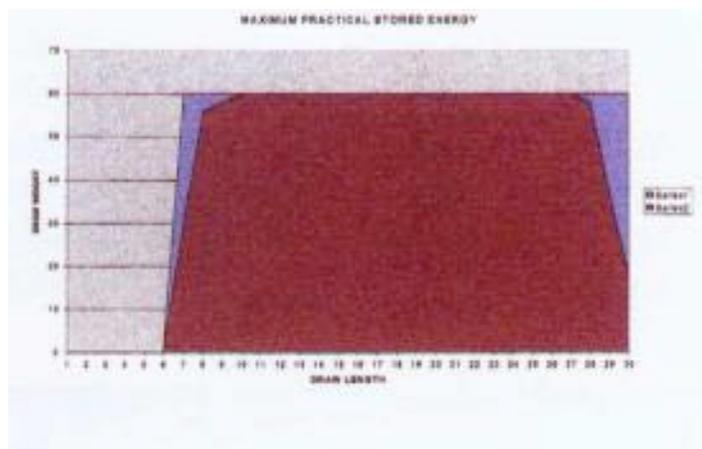
Divide by 12 to find foot-pounds and S.E. = 101.1 ft-lbs.

This is a very high amount of stored energy for 60 pounds of peak weight and is getting close to the maximum possible stored energy.

] The maximum force-draw curve stores the following:

S. E. = 24 inches of draw x 60 pounds 1440 inch-pounds.

S. E. =  $1440/12 = 120$  foot-pounds.



Comparing the two measurements, 101/120, we find that we are currently at 84% of the maximum possible for stored energy. Looking at the numbers I think we're getting close to all we can get from a hand held compound bow. Unless someone invents a new way to store energy in a bow most people aren't going to work any harder at drawing a bow than they already are. In fact, I prefer to work smarter and more consistently so I'm laying off the extreme cams and going with a wheel I can more easily handle.

The next question is, how much of this stored energy does any bow like this give to the arrow? If it's not very efficient then you've spent a lot of energy for little gain. If it's 75 % efficient or better then you're going to get a very fast arrow from the 101.1 ft-lbs. stored by this bow.

If this bow shoots a 400 grain arrow at 280 ft/sec., the arrow will have 69.7 ftlbs. of energy. The arrow's energy of 69.7 ft-lbs divided by the stored energy of 101.1 ft-lbs. yields an efficiency of 69 %. That's fair efficiency for a big cam since you would like it to be above 70 %.

As is the case with most bows, a heavier arrow will receive a higher percent of the stored energy than a light arrow. The difference is substantial but the light arrow still flies at a great enough speed to attract many 3-D archery enthusiasts and bow hunters.

So, back to the original question; are we getting all we're going to get? Probably not but there's not much more to get and the price to be paid may be more than most want to bear.

The down side of getting the speed comes from several aspects. The trademark of the big cam is the sharp drop off into the valley which is disturbing when drawing on a deer or focusing on your shooting form. But, the drop in weight over such a short distance is necessary to get the speed.

Another downer is in the time you spend tuning these big cams which is usually more than for softer cams. And it usually doesn't end with the first or second tuning session; it could be an ongoing process.

Comfort is always a concern for me; just when you reach the point in the drawstroke where your shoulder is losing its leverage, you have to keep drawing peak weight for several more inches. The added stress takes its toll and can stop your archery game in its tracks unless you take proper care of your body. Warming up shoulder and back muscles before shooting should be part of your normal routine just like stretching after shooting.

So, in closing this concept I'd like to think that because we're close to the max on storing energy we ought to be thinking more about consistent performance and choosing a bow for the application. Lots of speed for 3-D, some speed for long range tournament rounds, absolute consistency for shorter target shooting and rugged reliability for bow hunting. It's nice to have that Corvette for touring on Sunday but when you have to haul the freight you better get a truck!

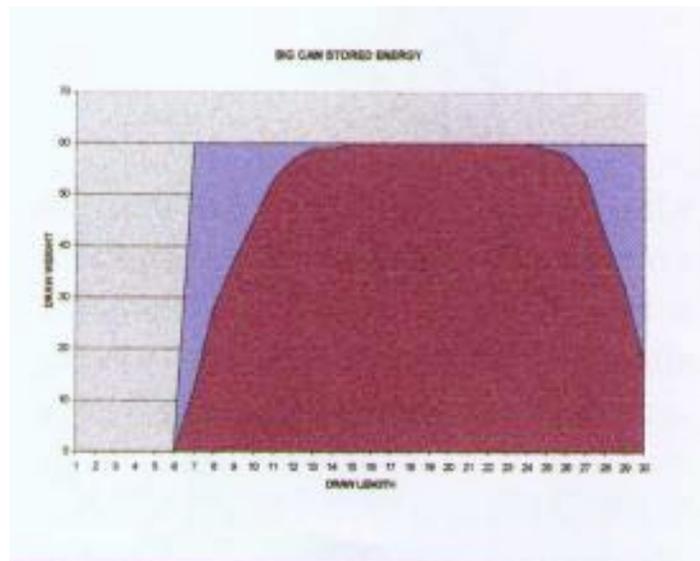
Shoot straight, keep well.

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## **Compound Tech 200 Basic Compound Tuning Method**

### ***From the GNAS Coaching Manual***



Whether you are an advanced shooter or you are just getting-started, a basic level of tuning knowledge is very important. The following is a simple tuning method for the compound bow. Please note that all left handed archers should do the opposite to that which is recommended.

#### **PRE TUNING SET-UP**

##### ***1. Adjust draw length***

You can make fine draw length adjustments by adding twists to the bowstring, or by fitting a new string that is 1/2 inch longer or shorter. If

you have a bow with fastflight cables, you can make fine draw length adjustments by adding twists to increase draw length, or subtracting twists to decrease draw length. But you must remember to leave at least 12 twists in the cables. With steel cables, there is usually an adjuster of some kind for synchronizing the wheels, you may be able to use this to make small draw length adjustments, but this depends on the make of bow if you do use the cables to make fine draw length adjustments, make sure the wheels stay in sync.

##### ***2. Set tiller at zero***

Mark the limb bolts with a felt tip pen or a paint pen. The reason for marking the limb bolts is because it makes it easier to keep track of the amount of turns when making adjustments. Also limb bolts have been known to move while shooting, so if you don't mark them the peak weight of your bow may decrease without you realizing it.

##### ***3. Set bow weight***

Adjust bow peak weight until you feel comfortable with it. Make sure you adjust each limb bolt the same amount in order to not move your tiller.

##### ***4. Arrow rest and alignment***

When you attach an arrow rest, make sure that the arrow will line up with the center of the arrow rest hole or if you are using a launcher type of rest, make sure the prongs are level. Then with a ruler measure from the outside of the top limb to the wheel on the bowstring side. If the limbs are not parallel, then you must find the center of the limb and work from there. Now, with that measurement, use a pencil and mark the limb just above the riser, belly side of the bow. Nock an arrow on the string and line the bowstring up with the mark on the limb. The string should be straight down the arrow, if not adjust the arrow rest until it is.

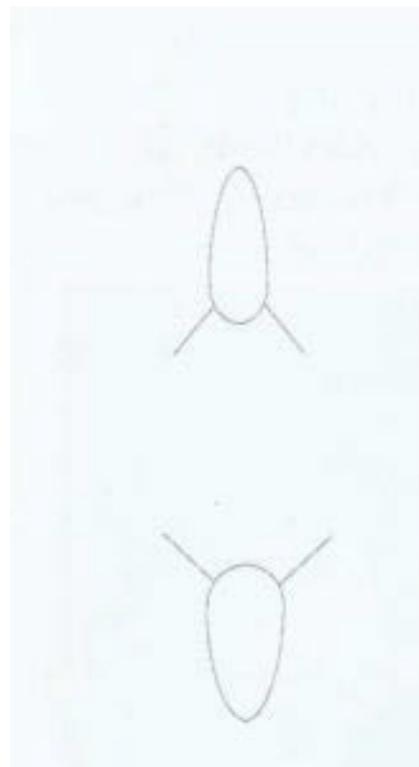
##### ***5. Nocking Point***

Set the nocking point at about 1/8" above even to start with.

## PAPER TUNING METHOD

The idea or goal of the paper tuning test is to get the arrow to leave the bow as cleanly as possible. You will need a picture frame or something similar about two feet square to mount a sheet of paper to. Mount this on a stand so the center of the frame is about shoulder height. Place the frame about six feet in front of a target, leaving plenty of room for removing the arrows. Before shooting at the paper, shoot at a target from a distance of 10 yards and adjust your sight until your arrows hit at your point of aim. Now you are ready to start paper tuning.

I recommend that you shoot at three different distances from the paper frame; 2 yards, 4 yards and 6 yards. Start at two yards, and make all your adjustments from this distance, the other two distances are for confirmation only. One point to remember, always use more than one arrow, and if an arrow makes a different tear pattern than the others you are using, rotate the nock to align with another fletching and try again. Repeat the process and if the problem still exists, discard the arrow.



## CORRECTIONS

If your arrows are making a downward tear, this indicates a low nocking point. To correct:

- Raise the nock slightly
- If you are using a drop away type arrow rest, then it might be dropping away too soon, try increasing the tension.

If your arrows are making an upward tear, this indicates a high nocking point.

To correct:

- Lower the nock slightly
- Do not lower the nocking point below even on the square.

If this doesn't help the problem try:

- A more flexible arrow rest blade or reduce downward spring tension on the arrow rest.
- Decrease or increase bow peak weight.
- Reduce the amount the arrow overhangs the arrow rest.
- Changing arrow point weight
- Using a stiffer arrow shaft



If your arrows are making a right tear this generally indicates that the arrow rest position is too far to the right and that there is possible vane contact on the inside of the launcher/rest.

To correct:

- Move the arrow rest to the left in small increments to correct the clearance problem
- Make sure the arrow had adequate clearance past the cable guard and cables.
- Make sure your bow hand is relaxed to eliminate excessive torque to the bow.

If your arrows are making a left tear this generally indicates a weak arrow or a clearance problem.

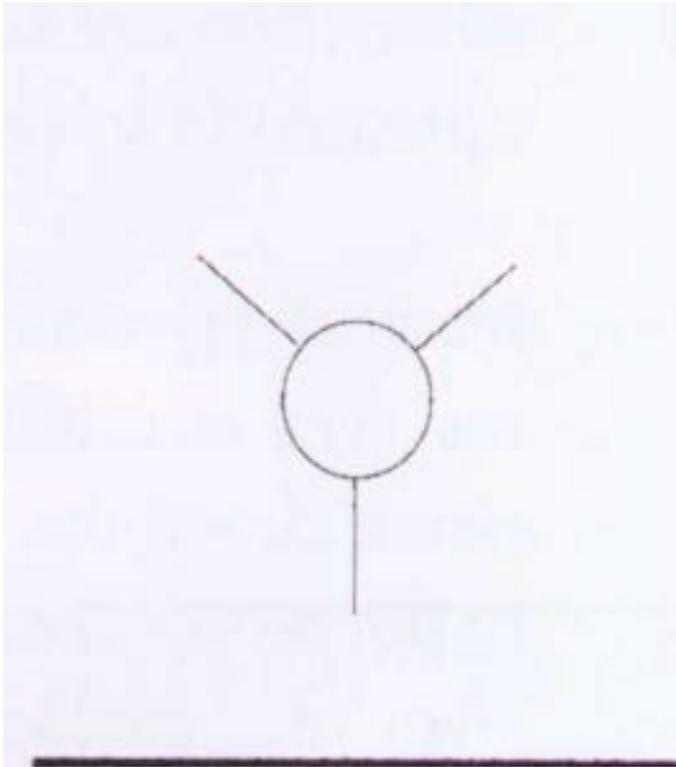
To correct:

- Move the arrow rest to the left in small increments.
- Make sure your bow hand is relaxed, so you don't torque the bow.
- Decrease bow peak weight.
- Use a stiffer arrow.

A high left tear indicates a combination of flight disturbances. To correct:

- Lower the nock slightly it is best to correct the nock high tear first.
- Move the arrow rest to the left for left handed archers.
- Make sure your bow hand is relaxed to eliminate excessive torque of the bow.
- Check the wheel synchronization, a small adjustment to the top wheel may improve the tear pattern.





The optimum tear pattern resembles a bullet hole, but remember that we are all human and that it is not always possible to achieve this. Furthermore, group testing should always follow a rough paper tuning test to finely adjust your set-up to what groups the best for you.

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## Compound Tech 100 Shot Dynamics

*By Drew Wilcox*



Every club or pro shop has at least one shooter that never seems to miss. No matter what the level of pressure or the amount of distractions, these folks just keep drilling the middle shot after shot after shot. Most shooters at this level will tell you that the game is 90% mental. But what about the other 10% In this installment Of compound 100 we are going to take a look at some of the things that go into that 10% of a good shot.

Let's look at this from a students perspective. The two best ways to learn a new skill are by watching and by doing, and since you can't

"do" until you have an understanding of the task, let's start by watching.

Find a couple of these "big gun" shooters and just sit and watch them for a little while. Don't worry, they won't mind. Most shooters at this level are either thrilled to share what they know or anxious to show off. Either way, sitting out of the way quietly watching won't bother them a bit. If you study several different archers you will notice that they have some subtle differences in their styles, but the one thing you will notice that they all have in common is that they all do everything exactly the same, every shot. Notice that from the time they start to draw their bows to the time that the arrow hits the target, all their actions, motions and movements are fluid and smooth. These archers are working hard, but have honed their skills to the point that they appear to the onlooker to be instinctive or second nature.

### STANCE & BODY POSITION

Notice that although the shooters choices of



stance **Dee Wilde is one of the best release shooters in the world, winning more World Champion titles than anyone. His reaction after the arrow shot is classic.**

will vary a small amount from closed to open, each archer is very certain that their foot position is the same every time. Their body positions could be used as examples for a basic geometry class, everything is at right

angles. Legs are straight yet relaxed, the torso rises straight up and their heads sit in the middle of their shoulders without leaning forward, back, left or right. Their shoulders are low, inside the sockets, the drawing arm is straight back making a perfect line with their arrow and the bow arm is straight but relaxed. This is what the coaches refer to as the "T" geometry, a term widely used in association with an archer's form.

### THE BOW HAND

Lots of beginning shooters start out with the basic instruction to keep your bow hand open. This is a good way to defeat the problem of grabbing your bow and to learn to trust your bow sling, but the tension created in your hand muscles by opening it can still effect your bow's reaction and the point of impact of your arrow.

Watch the bow hands of your group of big guns. Notice that they are very relaxed, almost dead in fact, not an inkling of tension to indicate they are opened or closed. It's just there, braced against the bow. Notice that the force of the bow is coming squarely into the hand, there is little or no pressure on either side of the bow's grip. When the shot is released, pay attention to how the bow reacts straight towards the target, almost as if it wants to go with the arrow.



**EXE  
THE  
REL**

When you first start you were probably told that shooting a release was just like shooting a

**If you are using the right muscles to activate the release, you will have an "explosion" factor after the shot is gone.**

aim and squeeze. They didn't lie to you, it is an honest way to get started with these mechanical aides, but now it's time for you to evolve past the basic concept.

Look at your subject of study again, watch their hands as they work their release. Notice that once they have planted their thumb or finger on the trigger you don't really see any additional motion in the hand to activate the release. A lot of archers see this and tend to think that these shooters have set their releases up with a "light" triggers. This is not true. Most of the top shooters are using relatively stiff settings on their triggers to insure security and consistency. The seemingly effortless release performed by these shooters is achieved

through back tension.

Back to your subjects. This time watch the shoulders and upper back areas. You will notice all kinds of activity here. As the archer pulls with his back, the tension generates energy through out their arm and hand causing the compression of the trigger. Notice that as the shot is executed, the archer seems to explode through the shot. The release hand comes straight back and the bow arm jets forward as if they were on the same plane and path as the arrow. This "explosion" is the equivalent to a screaming siren that the archer has made a good shot.

A good rule for archers just starting to use their back tension is to imagine a point right between the shoulder blades that you are trying to pull towards. Archers employing this method know that all they have to do is be patient, continue to aim and pull and the shot will go off flawlessly.

O.K. you've been sitting long enough. It's time to start learning by doing. Emulate what you have seen. Be patient and don't try to force anything. One day soon you'll be on the shooting line enjoying a good day of shooting and then you will realize, there is someone sitting behind you quietly watching.

See 'ya on the shooting line.

A blue rectangular button with the word "PRINT" in white capital letters.A rectangular button with a double border (inner grey, outer red) and the word "BACK" in black capital letters.

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## Close Shots

### The "Meat and Potatoes" of the 12 ring

*By Randy Ulmer*



If you were to ask the top tournament 3-D shooters which targets win tournaments for them, most would say the close ones. These are the "meat and potatoes" of the twelve rings.

Many shooters walk up to a 20-yard target and spend very little time judging it and even less time deciding where they are going to aim. I don't care how good you are, it's tough to hit a twelve ring at 20 yards without a good aiming reference or the exact yardage.

The key to consistency on the close targets is good form. Many shooters will let their form get sloppy because "its only a 20 yarder". After I've taken plenty of time to judge the target and establish an aiming reference, I like to imagine that I'm shooting a Vegas face at an indoor range and focus on relaxation and concentration.

If you take as much time on the close targets as you do the long ones, your scores will improve. More often than not, the difference between the first place shooter and the fifth place shooter is how they fared on the "easy" ones.



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