

Developing Great Shot Technique

Developing Great Shot Technique, Part II

By Gary Anderson, DCM Emeritus



The newest Olympic Rifle event is 10m Air Rifle Mixed Teams. In this photo, two-person male and female athlete teams from Korea, Italy, Russia, India and China are starting the Mixed Team Final in the 2018 Changwon, Korea World Cup. ISSF Mixed Team Rules require the athlete on the left to always fire first followed by the athlete on the right. Time limits for 5-shot series (300 sec.) and single shots (60 sec.) are short so shot technique is more important than ever. The athlete who is waiting to fire must complete his/her Position Preparation while the other athlete is firing.

This article is Part II of a two-part **OTM** series that examines the five phases of shot technique. Part I, which appeared in the Winter 2018 edition, began with a diagram, “Five Phases of Rifle Shot Technique.” This diagram shows how shot technique functions fit together in a dynamic sequence of five phases that are performed while firing shots (for quick reference, the diagram is reprinted in this article).

The diagram shows how the five phases of shot technique flow from one to the other and identifies the basic functions that must be performed in each phase. If everything is done correctly, the result will be an accurate shot.

Part I of this series on “Developing Great Shot Technique” examined the first two phases of shot technique, **Firing**

Position Preparation and **Position Alignment**. Part II examines the remaining three phases, **Shot Start**, **Shot Execution** and **Shot Follow-Up**.

III - SHOT START

The third phase of shot technique, **Shot Start**, occurs as a brief moment when **Position Preparation** and **Alignment** are finished and the sights are aligning on the target to start the shot. This moment only lasts for about a second, but doing **Shot Start** correctly greatly increases the possibilities for firing good shots. In this brief moment, shot technique changes to two functions involved in the actual firing of the shot, breath control and the initial phase of trigger control. Both functions continue through the release of the shot and follow-through.

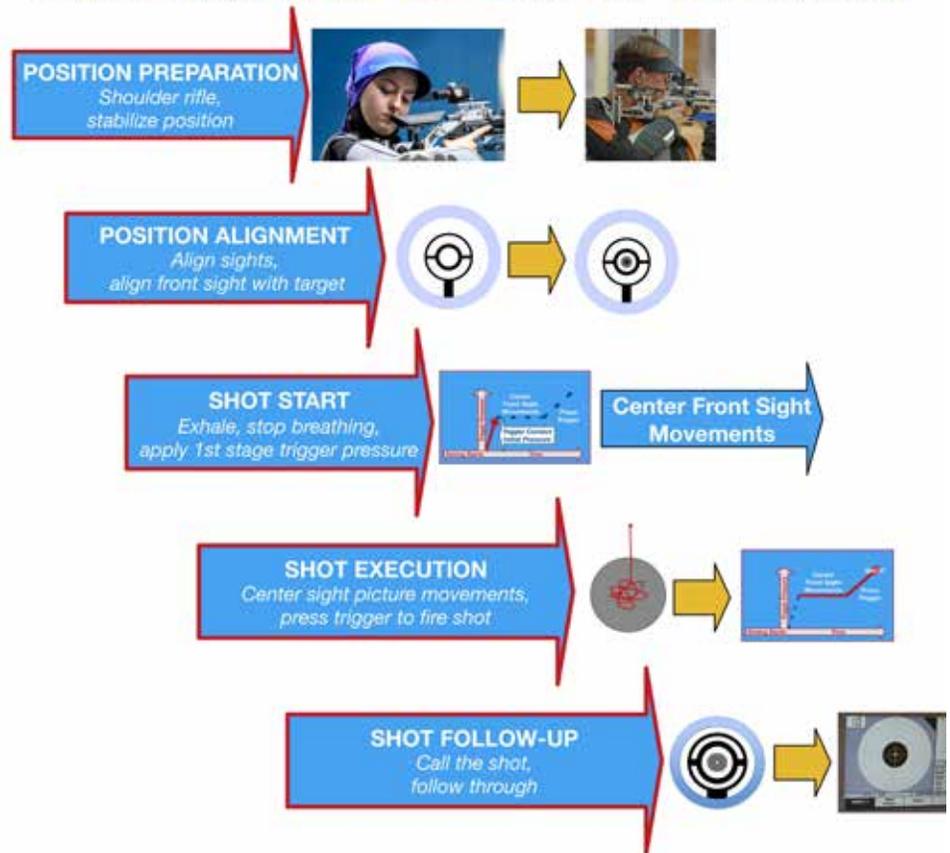
Exhale and Stop Breathing.

Proper breath control is an indispensable part of shot technique. An athlete must stop breathing while centering sight picture movements and attempting to fire the shot so that chest and diaphragm movements during inhaling and exhaling do not move the rifle. In proper breath control, the athlete inhales and exhales normally while shouldering the rifle, preparing the position and aligning the sights on the target. When the aligned sights settle on the target and the athlete is ready to start the actual firing of the shot, he/she inhales and exhales one more time and then stops breathing until after the shot is fired.

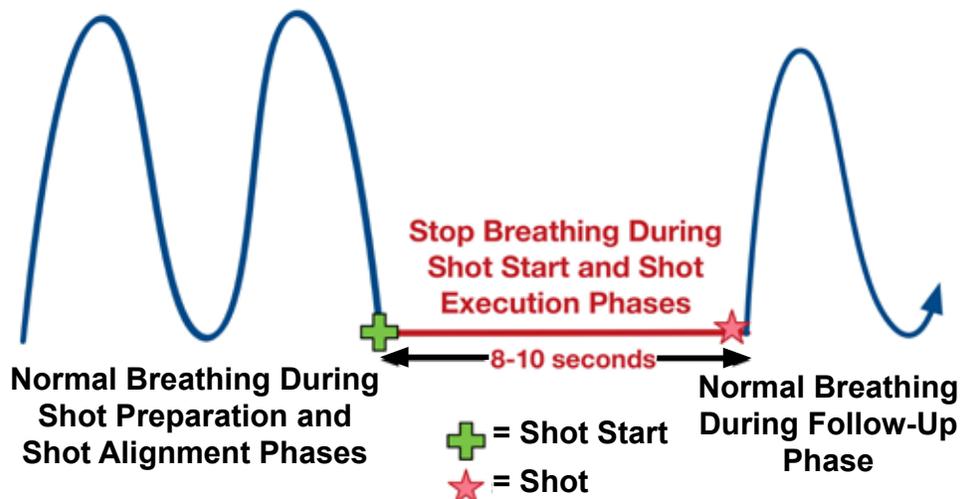
There have been many discussions about when the best point to stop breathing is. Some coaches advocate stopping on partially filled lungs as a means of adjusting the NPA or ensuring an adequate oxygen supply. The consensus best advice, nevertheless, is to stop breathing at the end of the exhale cycle when there is a natural respiratory pause and the lungs and diaphragm are most relaxed. Be assured, there is enough residual oxygen in the lungs to sustain all essential body functions for the 8-12 seconds needed to fire the shot.

Target Number Check. In 10-meter rifle shooting, the angles between the targets are great enough that cross-firing, that is shooting on the wrong target, is nearly impossible. However, a crossfire is a rare possibility at 50 feet and a definite possibility at 50 yards or 50 meters. For shooting at those longer distances, an essential aspect of shot technique is making sure every shot is fired on the correct target. Cross-fires are scored as misses so they must be prevented. That is not difficult, but a specific technique is required. During the last breath cycle before the **Shot Start**, the movement of the sights to the target must enable a visual check of the target number. This must be done before every shot (See the “most famous shot” for what can happen when a check is not made.).

FIVE PHASES OF RIFLE SHOT TECHNIQUE



BREATH CONTROL DIAGRAM



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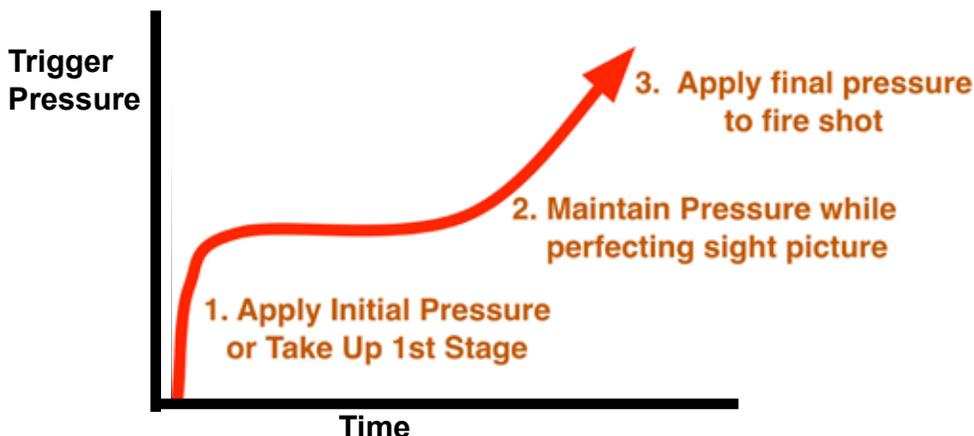
THE MOST FAMOUS SHOT IN SHOOTING HISTORY?

During the 2004 Olympic Games 50m rifle final, USA shooter Matt Emmons had a 5-point lead with one shot to go. He needed only a 6.0 or better to win his second gold medal of the Games, at least \$50,000 in prize money and a place in shooting history as only the second shooter in Olympic history to win two gold medals in one Olympics. When Emmons fired his last shot, his target did not register a shot. In the pandemonium that ensued, it was discovered the Emmons had done the unthinkable; he cross-fired his last shot.

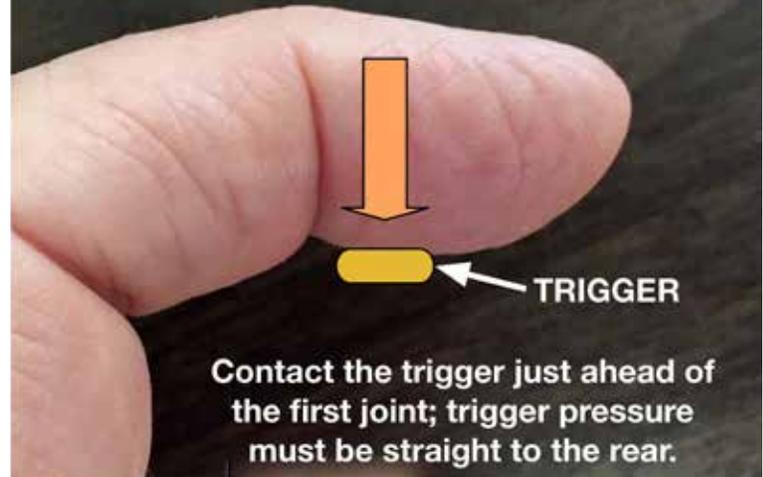
EVERY SHOOTER MUST CHECK HIS/HER TARGET NUMBER BEFORE EVERY SHOT!

Triggers and Trigger Control. To understand the second part of the **Shot Start**, applying initial pressure on the trigger, it is necessary to understand triggers and basic trigger control. There are two types of triggers, two-stage and single stage or direct triggers. When the first stage on a two-stage trigger is pressed, the trigger moves several millimeters until it comes to a stop or second stage. Additional pressure is then applied to the second stage, which releases with little or no perceptible movement. Precision air rifle and smallbore two-stage triggers can be adjusted to provide for optimal first stage pressure and movement distance.

BASIC TRIGGER CONTROL



FINGER POSITION ON TRIGGER



A single-stage trigger is designed to require little or no perceptible movement from the first application of pressure until the trigger releases the shot. There have been many debates concerning which trigger is best and what the ideal trigger pull weight is. Approximately 70 to 75 percent the world's best rifle precision air and smallbore rifle athletes prefer two-stage triggers while 25 to 30 percent use direct triggers. Trigger pull weights used by these athletes vary from 30 grams (1 ounce) to a maximum of 80 to 120 grams (3 to 4 ounces). Less experienced athletes are definitely encouraged to use heavier 80 to 120 gram trigger pull weights.

Triggers on Sporter Class air rifles must have a minimum one and one-half pound trigger pull. The popular Sporter Class air rifle, the Crosman Challenger, has a two-stage trigger so trigger control technique with it and similar Sporter Class air rifles must also start with taking up the first stage and applying initial pressure on the trigger.

Basic trigger control technique involves three steps (see diagram). The first step, which must be done at the beginning of the shot sequence, is to apply initial pressure on the trigger or take up the first stage on a two-stage trigger. The second step is to maintain that pressure on the trigger while centering and perfecting the sight picture. The third step is to apply additional pressure on the trigger to fire the shot while the sight picture is centered.

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Hand and Finger Placement. Performing good trigger control also requires paying attention to hand placement on the pistol grip and finger placement on the trigger. Start by fixing the finger location on the trigger. The index finger should contact the trigger just ahead of the first joint. The finger contact point and movement must be worked out so that the contact point presses directly to the rear, never to the side, when the finger is flexed. The right hand must approach the pistol grip so that it enables index finger movement directly to the rear. The wrist must be straight as the hand grasps the pistol grip and the index finger must not press against the pistol grip.

Applying Initial Pressure on Trigger. After checking the placement of the index finger on the trigger and the hand position on the pistol grip, the athlete can turn his/her attention to the second **Shot Start** function, applying initial pressure on the trigger. During the last breath cycle before the **Shot Start**, the index finger must move from outside the trigger guard to the trigger and apply initial pressure on the trigger. For newer shooters, the amount of initial pressure on the trigger should be about half of the total pressure required to fire the shot. A lot of practice is required to develop a precise feel for how much initial pressure to apply, but a highly trained rifle athlete should be able to apply as much as two-thirds of the necessary trigger release pressure.

The two functions that must be done in the **Shot Start** phase are both critical to firing accurate shots. You cannot hold the rifle steady if you do not stop breathing. By applying initial pressure on the trigger you engage the muscles that flex the trigger finger so they are ready to apply final trigger pressure when the sight picture is perfected. Applying initial pressure also significantly reduces the amount of pressure that must be applied to fire the shot when the sight picture is correct. Beginners must consciously remind themselves that when they begin to aim at the target, they must exhale, stop breathing and take up the trigger's first stage. Advanced shooters will automate these functions so conscious thought is not necessary to do these two functions.

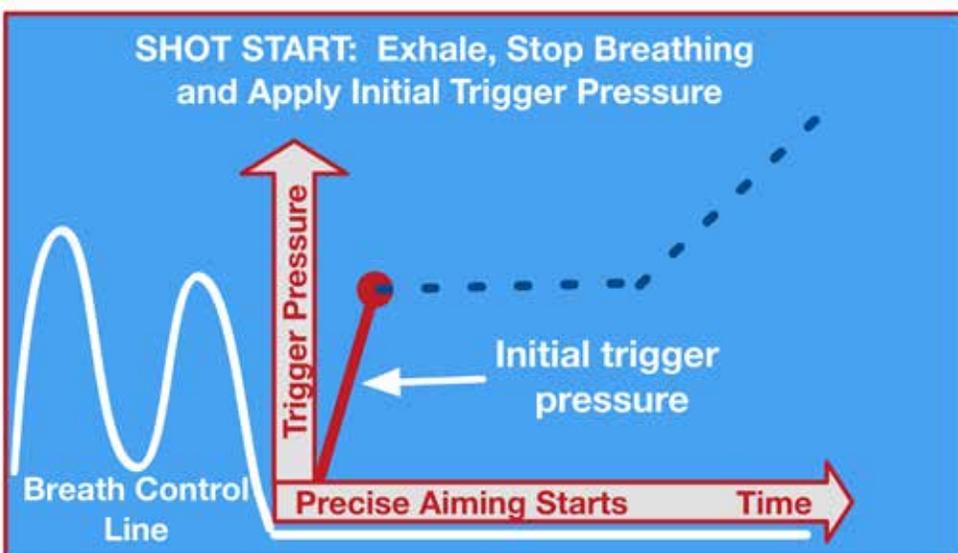
SHOT EXECUTION

The fourth phase of shot technique, **Shot Execution**, is when the shot is actually fired. This phase involves 1) continuing to hold the breath, 2) conscious focus on the sight picture (visual focus) to center sight picture movements and



This photo illustrates an ideal hand and wrist position to facilitate good trigger control. The wrist must be straight, not bent.

3) when sight picture movements are centered, smoothly pressing the trigger to fire the shot.

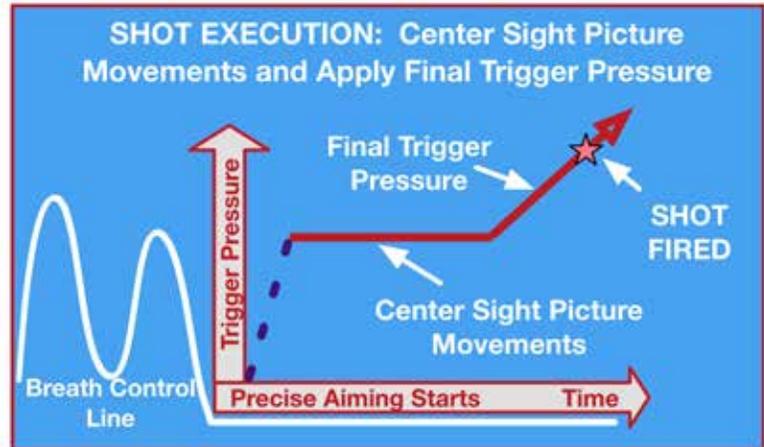


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Holding the Breath. Holding the breath is a passive function that begins when the **Shot Start** occurs and continues until after the shot is fired. The period when the breath is held to fire the shot normally lasts about 8-10 seconds (see Breath Control Diagram). A well-trained athlete can take holds lasting 10-12 seconds without compromising shot quality.

Center Front Sight Movements. In the second phase of **Shot Execution**, sight picture or hold movements are centered and minimized while maintaining pressure on the trigger. New shooters naturally will see a lot of sight picture movement. They should not be alarmed if their sight picture movements are large; this is normal. Regardless of the magnitude of the sight picture movements, the key is to concentrate on centering them over the target. Another way to put this is, “learn to rely on your hold, not on trying to grab tens when they go flying by.”

The “laser trace” diagram illustrates typical standing position hold movement areas for a new shooter, an intermediate shooter and an advanced athlete. In each



case, if the trigger is pressed smoothly while sight picture movements are centered, all shots should fall within that area if the sights are zeroed. The new shooter (top diagram) who fires every shot within that arc of movement will score shots that are well within the scoring rings on the BMC target. An intermediate athlete who has several months of practice (middle diagram) will be able to produce standing holds on the more difficult competition target that will keep all shots in the five or six rings, with a fair share of eights, nines and tens. The third example (lower diagram) shows a typical standing hold for an advanced athlete. In that case, smooth trigger releases should keep all shots within the nine ring, with more than half of the shots scoring tens.

Concentration and Visual Control. For new shooters, it is enough just to concentrate on sight picture movements and keeping them centered on the target. Advanced shooters will find that intense concentration or visual control on centering front sight movements actually stimulates the brain and nervous system to find ways to further control or deactivate muscles that impact stability to make the hold steadier. Intense visual focus on keeping the front sight centered will lead to better holds.

Where concentration is focused depends upon the position. In prone, where hold movements are minimal, the greatest attention should be focused on precisely centering the sight picture. In standing, where hold movements are greater, the athlete's attention should focus on calming and relaxing the body to minimize hold movements. In kneeling, if the position is well-developed with a good hold, the focus can also be on precisely centering the sight picture. Newer rifle athletes whose kneeling holds are not as stable must start by focusing on controlling their bodies to achieve steadier holds.

Final Trigger Pressure. In this phase of **Shot Execution**, final trigger pressure is applied when sight picture movements are centered. A steady hold with

Laser Trace Examples of Standing Position Holds



Laser trace of a typical standing hold of a new shooter on the BMC target



Laser trace of a typical standing hold of a shooter on the competition target after several months of practice



Laser trace of a typical standing hold of an advanced athlete on the competition target

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a centered sight picture will stimulate the trigger finger to apply more pressure on the trigger. Adding pressure to the trigger to fire the shot may be a semi-conscious function or, for many rifle athletes, concentration shifts from sight picture to consciously adding pressure to the trigger. Then, as long as the sight picture movements remain centered, increasing pressure is applied until the shot fires.

Trigger control methods vary according to the athlete's experience, hold stability and the position. There are three basic methods of applying final pressure (see the diagram).

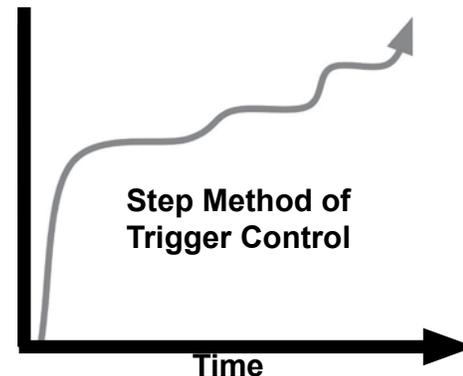
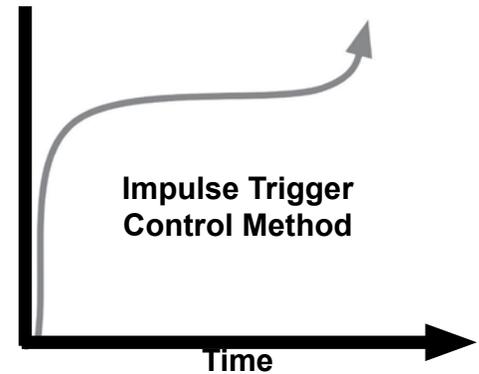
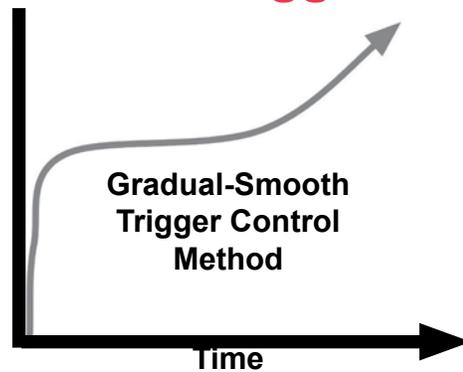
Gradual-Smooth Method. When sight picture movements are centered and perfected, increasing, smooth pressure is applied until the shot breaks. This method is best for new shooters, and for steadier positions like prone and perhaps kneeling.

Step Method. In this method, small steps of increased pressure are applied during times when the sight picture is optimal. Variations of this method are used by many experienced athletes in standing.

Impulse Method. This is also a method for experienced, highly trained athletes. This method starts by applying as much initial pressure as the athlete can reliably sense. Then when the sight picture is optimal, a quick "impulse" of trigger pressure fires the shot. This method can be used with precision rifles where trigger pull weights are relatively light, but it should not be used with sporter air rifles that have heavier trigger pull weights.

Athletes must work out the methods of trigger control that they use. In a steady position like prone, the gradual-smooth method is almost always best. In kneeling and standing, new rifle athletes should also use the gradual-smooth method as they learn to center sight pictures and rely on their holds. More advanced rifle athletes will develop the skills needed to take advantage of the step or impulse methods where shots are fired at precise moments when sight pictures are at their very best.

Trigger Control Methods



Gradual-Smooth Method:

Apply gradually increasing final pressure after sight picture is centered.

Step Method:

Apply trigger pressure in steps when sight picture is centered.

Impulse Method:

Increase initial trigger pressure and quickly apply final pressure when sight picture is perfected.

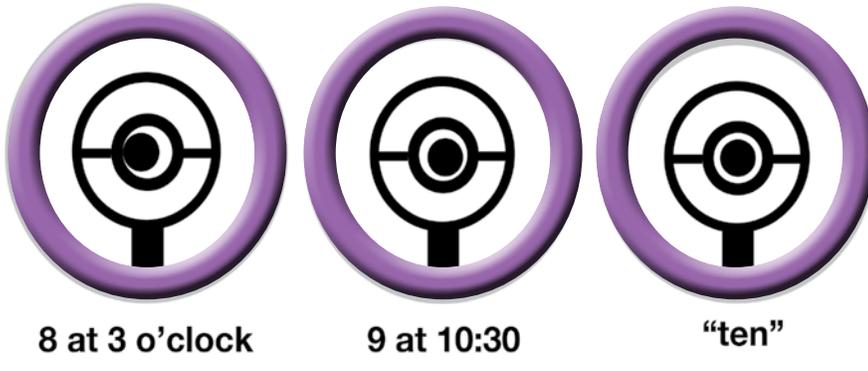
SHOT FOLLOW-UP

The fifth phase of shot technique, **Shot Follow-Up**, occurs during and after the shot. **Shot Follow-Up** comprises calling the shot, recoil control and follow-through. Correct follow-up is necessary to ensure that the precise alignment of the firing position and rifle is not disturbed during the time between when the trigger is released and when the bullet or pellet exits the muzzle. By moving the head away from the stock too quickly or changing the way the rifle recoils it is possible to divert the shot from its point of aim.

Calling the Shot. A rifle athlete "calls" shots by forming mental snapshots or images of sight pictures at the precise moments when the shots fire and recoil starts. To call a shot, he/she must describe where the front sight was when the hammer fell. A new shooter should be able to say whether the front sight ring was high, low, left, right or centered. An advanced athlete will be able to "call" where in a particular scoring ring a shot should be by using a clock system. For example, a shot that was slightly to the left might be called a "9 at 9 o'clock."

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SHOT CALL EXAMPLES



ADVANCED SHOT TECHNIQUES TO PRACTICE AND MASTER

- Visually check butt-plate location in the shoulder before every shot.
- Use breathing to stimulate support arm relaxation before every shot.
- Do a conscious balance check before starting to aim for each shot.
- Change rear sight aperture and front sight ring sizes to more optimum sizes.
- Outdoor Shooting: Check the target number before bringing the front sight onto the aiming point, before every shot.
- Apply intense visual focus (concentration) to minimize front sight movements.
- Check and align the NPA precisely on the target before each shot.
- Apply interrupted pressure on the 3rd trigger stage.
- Call shots precisely; make sight adjustments based on shot calls.
- Follow through after each shot.

Developing the ability to accurately call shots fulfills several purposes. First, continuing to focus attention on the sight picture until recoil starts ensures that errors like starting to move the head from the stock before the shot is finished do not occur. A second reason for calling shots is to confirm that the rifle is zeroed. If shots are not going where they are called, the rifle is probably not zeroed and sight adjustments are needed. Calling shots is also a way to evaluate shot performance. If shots are going on call, this usually means the athlete is performing shot technique correctly. Conversely, shots going off call is often a sign that some aspect of shot technique is being done wrong.

It will take lots of practice before young athletes can call their shots accurately, but when they develop the ability to do this, shot calls become a great tool for making sure they are performing shot technique well and keeping their rifles zeroed.

Recoil Control. .22 rimfire rifles have some recoil movement (jump) after shots are fired. Even air rifles have a very slight recoil movement. Since this recoil movement begins when the bullet or pellet starts to move down the barrel, it is possible to influence where the bullet impacts by how the firing position allows the rifle to recoil. If sling tension on the fore-end, shoulder or cheek pressure changes, the rifle will recoil differently and the bullet's impact will change. Effective recoil control for a rifle athlete means being absolutely consistent in how the rifle is held. Shoulder and cheek pressure and sling tension must be the same for every shot.

Follow-Through. Follow-through is required in performing virtually all sports skills. In shooting, there is a time-lag between when the trigger is released and when the shot leaves the barrel. If the rifle is moved in any way while the shot is developing it can change the point of impact of the shot. With adequate follow-through, the shooter continues to aim and hold the rifle on the aiming point until the bullet or pellet is well out of the barrel and can no longer be diverted from where it was aimed when the trigger was released. Air rifles have a longer shot development time than .22 rimfire rifles so follow-through is especially important in air rifle shooting.

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PRACTICING SHOT TECHNIQUE

Shot Technique for New Rifle Athletes. These two **OTM** articles on shot technique (Part I and Part II) examined the five sequential phases of shot technique from the viewpoints of both new and advanced shooters. Even new shooters must perform each of the five shot technique phases, but there are core functions within those phases. New shooters should not try to learn all of the complex details within each shot technique phase. When they begin their first dry fire practices and make their first trips to the range, they must instead focus on doing the following core functions that are the priority functions within each phase:

a) **SHOULDER.** Place the rifle in the shoulder and place the cheek on the stock to see through the rear sight aperture;

b) **AIM.** Align the sights and bring them onto the aiming point;

c) **START THE SHOT.** Exhale and stop breathing; apply initial pressure to the trigger (take up the first stage with 2-stage triggers);

d) **CENTER & PRESS.** Center the sight picture movements over the target and smoothly press the trigger to fire the shot; and

e) **CALL** the shot.

As the new shooter gains experience and becomes comfortable following this basic shot technique sequence, there are many additional details involved in advanced shot technique that will be learned and practiced.

Shot Technique for Advanced Rifle Athletes.

Becoming an advanced shooter with the skills to shoot scores high enough to earn Junior Distinguished Badge points and ultimately attain high rankings in competitions is a slow, gradual process. Advanced shot technique details must be mastered one at a time. Each new technique must be studied, worked out in home dry fire practice, tried on the range, tested in competition and finally evaluated. For example, an athlete who wants to start trying to use a breathing technique to relax the support arm in the prone position must give priority attention to developing the ability to perform that one technique before trying others. Only after perfecting that new technique and using it successfully in competition, can he/she move on to the next step in technique improvement. The chart lists advanced shot techniques that rifle athletes will want to try, but when they do, they must work on just one new technique at a time.

STEPS TO MASTER NEW SHOOTING TECHNIQUES

1. **Learn—study the technique.**
2. **Dry Fire Practice—learn to do the technique in dry fire practice.**
3. **Range Practice—rehearse the technique during live fire practice at the range.**
4. **Competition—test the technique in competition.**
5. **Evaluate—decide whether to continue the technique and whether fine-tuning is necessary.**

About the Author

Gary Anderson, Director of Civilian Marksmanship Emeritus, retired as the full-time CMP Director at the close of 2009. He continues to work with CMP as the senior marksmanship instructor. During his remarkable career, he won two Olympic gold medals, seven World Championships and 16 National Championships. He is a Vice President of the International Shooting Sports Federation, the President of USA Shooting, a former Nebraska State Senator and was one of the two Olympic Games Technical Delegates for Shooting during the 2012 Olympic Games in London.

In June, 2012, the International Olympic Committee awarded Gary Anderson the IOC's highest honor, the Olympic Order, "for outstanding services to the Olympic Movement."

In 2014, the CMP expanded their world-class air gun center at Camp Perry and renamed the facility the Gary Anderson CMP Competition Center, in honor of Anderson's contribution to the organization and the marksmanship community.

