

Where Are You Looking?

Fifty-third in a series

Part II

*"I have a team full of shooters with a world class hold;
And almost none of them can deliver the shot!"*

In the previous article, we explored two important aspects of the sight picture for target pistol shooters, both resulting in seemingly large white spaces instead of what are mistakenly thought to be "precise" references. We now take this theme to rifle, with surprising results. Pistol shooters should carefully read this article just as rifle shooters should have carefully read the previous article. Both articles hold insights for both disciplines. The quote at the beginning of this article is from a national team rifle coach a few years ago. He was commenting to me on the inability of many of his athletes to confidently, decisively and consistently deliver quality performances under pressure. Each athlete had his or her own challenges and reasons.

One challenge that many of them shared, and that almost none of them or their coaches understood, was that their front apertures were too small. The vast majority of shooters have selected a size that is too small for them, especially if they have a great hold. On the contrary, a small percentage of shooters use what appears to others to be huge front apertures. What is going on here, and why do we make the assertion that most have their aperture too small?

First, we must explore why smaller apertures, consistent with one's ability to hold the rifle steady, are thought to be best. As an athlete improves his or her ability to hold the rifle steady, he or she may choose to reduce the front aperture size. In all cases, the size is generally recommended to be large enough to contain the hold so that the bull is not disappearing outside the front aperture ring. As a result of this advice, once an athlete develops a tight hold, he or she may choose an extremely tight aperture.

The reason for small apertures is visual precision. Without a doubt the smallbore ten-ring and ten-dot for air rifle are very small and consistently hitting them demands a high degree of repetitive precision. The "engineers" among us want measureable precision; they choose the bottom of the black or thin line of white pistol holds and tight front apertures on rifles. The good news is this provides an opportunity for improved visual precision. The bad news is this causes lots of eye movement and it increases the sensation of movement of the hold. These themes should be familiar from the previous article.

With tight front apertures, one is tempted to "check" all

around the white ring between the bull and the front aperture ring to ensure it is even. This is done by following the ring in a circle or by bouncing around in sort of a star pattern. Additionally, the athlete is constantly trying to discern the very small white ring to evaluate the aim causing eye strain.

A few years ago, triangular apertures were made available on the market. An "engineer" had the bright idea that a triangle provided only three places to check, instead of the entire ring. While that was true, it involved eye movement. The apertures were a failure because holds opened up and results were worse than before. This was no surprise to athletes and coaches who understand the need for, and power of, the quiet eye.

When the eye is moving, the gun is moving. When the mind is thinking, the gun is moving. Both subtle eye movements and increased brain activity cause the hold to open up. The tight front aperture magnifies the apparent movement of the gun. This erodes the athlete's confidence and destroys the ability to follow a high performance style of shot process. Trigger jerking and/or flutter finger become quite common in this situation. Many a triggering problem has been solved with a large front aperture. The result of tight apertures is the perception of increased hold motion, eroded confidence, added eye strain, increased brain processing (visual and otherwise), significant and debilitating triggering issues and a greatly increased difficulty in shooting. When the hold looks bad to the athlete, it may as well be horrid.

A penny's worth of gain through perceived aiming "precision" comes at the cost of a dollar's worth of performance degradation in several other critical areas. Ten years ago, in the third article in this series, we explored the challenges an Olympian and very dominant rifle shooter was having in decisively delivering shots. The primary technical issue for that athlete was a front aperture that was too small.

The appropriate size front aperture is not very tight. See Figure 1 of a typical front sight with a generously sized front aperture and a target bull. (The rear sight is not shown.) This diagram does not represent a specific target with a specific front aperture, meaning that it is not necessarily to scale. It does clearly illustrate two important factors: 1) a wide ring of white between the bull and the front aperture ring (which could be even wider than shown here), and 2) a very thin front aperture ring.

When introduced to an aperture of appropriate size, many a rifle athlete has been stunned at the almost immediate transformation in their shooting. Others have taken a short time to warm up to the sometimes dramatically changed sight picture, but ultimately are very pleased with how it feels to deliver the shot and with the results.

Observant readers will notice that no actual aperture sizes have been given size apertures air rifle and rifle?” There correct answer! answer: “It must know the variables determine the What size is bull? How far target? How the surface of eyeball to the the front sight knowing these is optimal? know? We must question first, in order to determining actual sizes.

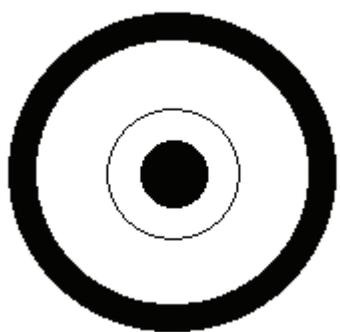


Figure 1: Note the very thin front aperture ring and the wide white ring between the aperture ring and the aiming black. Ideally, the front aperture should be floating as shown (no crossbars) and should usually be a very light salmon (pink) color. This diagram is not to scale, and the inner white ring is often even wider.

thus far. “What do I need for for smallbore is no single ...except this depends.” One value of several in order to correct answer. the aiming away is the far is it from the athlete’s aperture inside globe? Even variables, what How do we answer this

Many years ago, *Precision Shooting*, in one of their magazines or annuals, published an article that discussed research on front aperture size. It turned out that the width of the white ring between the front aperture ring and the aiming black must cover at least three minutes of angle (MOA) from the shooter’s point of view. Angles are often measured in degrees, with 360 degrees in a circle. A degree may be further divided into 60 “minutes”. Thus, 60 minutes of angle (60 MOA) make up one degree of angle.

About 50 to 60 years ago, the Soviets studied many aspects of rifle sights and sighting systems, among other things, in great detail. Front aperture size, aperture ring thickness, and interestingly, front aperture insert color, were among the numerous factors studied. For shooting outdoors, they found light pink apertures to be most effective. Now you know why Anschutz sells that color! They also found that very thin front aperture rings were the most effective. Air events were not studied as they were not part of Olympic shooting at that time. Sadly, the paper(s) with the results of the research activities cannot be found; however, references to the studies shed some light. Taking the published statements and translating them in terms of MOA, one gets identical results to the above article.

It was interesting to discover that these two different resources came to the same conclusion. Unfortunately, there are no other known studies or resources on this topic. Therefore, a number of empirical observations and informal studies were performed with athletes at all levels to explore this

topic. In some exercises, athletes used aperture sizes that were changed randomly for each shot, ranging in size from very tiny, with almost no white ring between the bull and the front aperture, all the way to so large the bull seemed to be floating on its own.

In all cases, when the front aperture size was chosen to show the athletes a white ring width of 3 MOA or more (often much more), the athletes felt confident about their shot delivery, were decisive, had smooth triggering, and shorter holds. Sometimes the difference was so profound that the athletes would comment on how much easier it was to shoot and that the results were better and more predictable than normal. It was discovered that front aperture sizes could be larger than the 3 MOA size by as much as 0.5 mm or more with identical and sometimes even better effects.

When the aperture size was such that the athlete was presented with a white ring width that was less than 3 MOA, even by the tiniest amount, profound changes took place: confidence took a dive, hold times increased, triggering became rough, and overall shot delivery was less decisive. If the aperture size was only 0.1 mm too small, the negative effects were observed by both coach and athlete.

Remember the minority of coaches and athletes, and those few elite athletes, with the really big apertures? Now you know one of their “secret” keys to success. What about the common advice to change aperture sizes between positions? What about the advice to try a smaller aperture in order to decrease the hold area? Be careful! In the case of an elite athlete with an extremely small hold area in the sling positions, one might consider a slightly smaller aperture. The hold area must be considerably smaller than in the standing position and the athlete must not already have any issues with decisiveness or clean triggering. Even then, careful experimentation is required.

In the standing position, some athletes have developed extremely small holds. (E.g. hold area contained well inside the diameter of a pellet on the air rifle target.) Again, very careful experimentation is required.

In both of the above cases, more often than not, the athlete and coach, even at the elite level, in search of what they believe is good visual precision, talk themselves into using an aperture that is too small, rather than obeying all the signs to the contrary.

However, an increase in size for a shooter with a looser hold (e.g. a newly beginning shooter’s standing position) is certainly appropriate. One is well advised in almost every case to stick with the three MOA rule as the bare minimum size. One may use an even larger aperture, 0.5 millimeters or more, with no problem. To go smaller, even by the tenth of a millimeter, is fraught with serious peril. There are exceptions, but regardless, it is very rarely safe to assume you are one of those exceptions. Refer again to the Olympic

athlete in the third article in this series; only a handful of current athletes in this country shoot as well as that athlete and a three MOA or larger aperture was needed even in that case.

Why must the white space be three MOA or more? If the band of white between the front aperture ring and the aiming black is too thin, there is so much “flicker” that it overwhelms the perception of the ring of white, making it more difficult for the mind to center the sights and increasing the visual processing load in the brain. There are likely additional visual processing factors also involved.

Tight front apertures encourage “checking” with eye movement. The tighter the ring, the more the perception of movement is magnified, eroding the athlete’s confidence. The wider the front aperture ring, the smaller the aiming mark appears. Thin front aperture rings and unobstructed apertures (no cross bars) help reduce the perception of “grey bull” some shooters experience.

In pistol, using a wide rear notch in order to have wide gaps of white on either side of the front sight is very beneficial, especially when one is looking at the right spot.

This is imperative in the rapid fire events and stages, and is very important in the precision events and stages. All the same theories apply.

Theory is of limited value without practical application. Let us now finally translate the three MOA rule into actual rifle front aperture sizes. The question may be reduced to a single answer chart requiring one simple measurement, shown in Table 1. Measure the distance in inches from the surface of the athlete’s eyeball to the aperture inside the front sight globe (please measure off to the side of the eye). The chart uses eye distance in inches since that is the most commonly available measuring unit in the U.S., and the apertures are listed in millimeters since that is the most common sizing unit used in most target rifle apertures. In some cases, two sizes are shown for a given distance. In those cases, it is best to choose the larger size of the two, especially if the eye distance is “...and a half” inch.

Table 1 – Minimum Rifle Front Aperture Size – Millimeters – Use of apertures smaller than listed, even by only 0.1 mm, cause numerous triggering, confidence, and shot process problems.

Rifle Front Aperture Size - Millimeters						
Eye Dist. Inches	ISSF Air 10m	ISSF SB 50m	USAS SB 50ft	USNRA SB A-36 50ft	USNRA SB A-17 50ft	USNRA SB A-7 50ft
28	3.5	2.9	2.8	2.7	3.0	3.1
29	3.6	3.0	2.9	2.8	3.1	3.2
30	3.7	3.1	3.0	2.9	3.2	3.3
31	3.8	3.2	3.1	3.0	3.3	3.4
32	3.9	3.3	3.2	3.1	3.4	3.5
33	4.0	3.4	3.3	3.2	3.5	3.6/3.7
34	4.1/4.2	3.5	3.4	3.3	3.6/3.7	3.7/3.8
35	4.3	3.6	3.5	3.4	3.7/3.8	3.9
36	4.4	3.7	3.6	3.5	3.9	4.0
37	4.5	3.8	3.7	3.6	4.0	4.1
38	4.6/4.7	3.9	3.8	3.7	4.1	4.2
39	4.7/4.8	4.0	3.9	3.8	4.2	4.3
40	4.9	4.1	4.0	3.9	4.3	4.4
41	5.0	4.2	4.1	4.0	4.4	4.5
42		4.3	4.2	4.1	4.5	4.6/4.7
43		4.4	4.3	4.2	4.6	4.7/4.8
44		4.5	4.4	4.3	4.7	4.9
45		4.6	4.5	4.4	4.8	5.0
46		4.7	4.6	4.5	4.9	
47		4.8	4.7	4.6	5.0	
48		4.9	4.8	4.7		

Remember to always re-measure and adjust the front aperture size if you move the front sight forward or back as you refine your rifle setup and position to assure that you still have the correct size aperture.

As with many of the articles and ideas in this series, one’s perception and beliefs are tested by some of the ideas in this and the previous article and one is asked to consider ideas that seem counter-intuitive or are even thought to be wrong by some. The best athletes are the ones who work the hardest and have the most open minds. Results are results. Enjoy! ■ J.P O’Connor

Based in the Atlanta, Ga., area, JP O’Connor (jpoc@acm.org and http://www.america.net/~jpoc/) is involved in shooting as a competitor, is a former Assistant National Coach – USA Paralympics Shooting Team, serves on the National Coach Development Staff in both rifle & pistol, coaches the rifle and pistol teams at North Georgia College & State University, and coaches a junior club. He enjoys working with a number of pistol and rifle athletes from around the country, ranging from beginners to the highly advanced, in clinics and one-on-one private coaching. Previous installments of this series may be found at www.pilkguns.com.

HOW TO MAKE A SHOTGUN TEAM

I receive phone calls every week from shooters who would like to get started on the path to their Olympic Dream. I often get the same question: "How do I get started?" I understand the process may seem rather complicated, so this article will explain the various teams and how to win a spot on a team.

There are several levels of teams within our shotgun program. The entry level team is our Junior Olympic Team. This team is open to anyone under 21 years old and who has at least some international shooting experience at the local club level. The Junior Olympic Team is unique because that it is the only team not selected based on the results of the selection matches.

Athletes must apply for Junior Olympic Team selection and they are selected using a variety of criteria to include shooting, school grades and letters of recommendation. All of these criteria are reviewed by a panel including the National Coaches, and then athletes are appointed to the Junior Olympic Team for the calendar year.

The rest of our shotgun teams are selected based on score and placement in USA Shooting selection matches. These matches are held at clubs around the country and include: a Spring Selection match (between Feb. and April), a Fall Selection match (between Sep. and Nov.), the USA Shooting Shotgun National Championships (between June and July) and the National Junior Olympic Shotgun Championships.

The National Junior Team is strictly for junior shotgun shooters. To make this team you must be a competitor under the age of 21 by Dec. 31 of the year in which you are competing. The first step for the National Junior Team is finish first or second at the National Junior Olympic Championships or at the USA Shooting National Championships (junior category). Thus, the top two finishers in each event at the Junior Olympic Championships will be added to the National Junior Team. Lastly, at the Fall Selection match, the scores from the USA Shooting National Shotgun

Championship and the Fall Selection match are combined and the top three finishers in each event are named to the Junior World Championship Team for the following year (excludes Olympic years).

The top-level is our National Team. To make this team you must finish first, second or third in a men's or women's event at the USA Shooting National Shotgun Championships. These medal winners become the National Team. Then, at the Fall Selection match, just like the juniors, the scores from the Nationals and Fall Selection match are combined and the top three in each event are added to the World Championship Team for the



National Shotgun Teammates (L to R) Jaiden Grinnell, Kim Rhode and Caitlin Connor qualified for the 2011 World Clay Target Team with top scores.

following year.

In a normal shooting season for USA Shooting we not only conduct our domestic matches but we compete at four World Cups and a World Championship or the Olympics every year at shooting venues around the world.

We use the above teams to select athletes to compete in these events for the USA. Scores from the Spring Match are also used to fill open slots in these events. Usually, the top three in each event (no juniors) are selected to participate in a World Cup and these athletes are named to the National Development Team. This team is a non-funded or partially funded branch of the National Team.

Olympic team selection procedures must be approved by the United States Olympic Committee (USOC) and often change, but for this quadrennial we will

shoot a Fall Selection match in Kerrville, Texas (between Sep. or Oct.) and a Spring Match in Tucson, Ariz., in the spring of 2012. These match scores will be added together to select the Olympic Team in London 2012. All these matches are open to any member of USA Shooting up to range capacity. There is also a point system that aids in the selection process. Athletes are awarded a certain number of points at an eligible competition for a finish above seventh place. If an athlete reaches a set threshold, then he or she will be nominated to the team provided no other athletes have accumulated the same or greater number of points. If no athletes reach the point threshold, then the U.S. Olympic Trials are used to select the team.

As you can see, all the shotgun teams, with the exception of the Junior Olympic Team, are selected based on scores. Most of the teams are intact from the National Championship to the next National Championship; however, sometimes the World Championship Team overlaps.

In reality, it is fairly simple—come shoot the National Championship and the Fall Selection match and try to make a team. If you don't reach your goal then, add the Spring Selection match for a second chance. If you are a junior, then don't forget to sign up for the National Junior Olympic Championships.

In order to start shooting and competing, first join USA Shooting and visit a local gun club that throws international targets. Practice, shoot often and seek out the help of other shooters or a coach. Then, come to the National Championship and see how you stack up against some of the best shooters in the world. It's never too late to start on your path to the Olympic dream; I made my last Olympic Team when I was 48 years old and the 1984 Olympic Gold Medalist was 52 years old. So give your Olympic dream a chance and start shooting today!

■ National Shotgun Coach Bret Erickson