Dear Colleagues

**Managing the adrenaline response to shoot a 1 MOA instead of a 2 MOA group**

**The Problem:** when coaching a rifle shooting team at 400m, the writer found that some shooters chose to take slightly longer to release each of their 15 shots and as a result, achieved the highest scores. They averaged 10 V-bulls with most shots grouping within 1 MOA. Whereas, other shooters who released shots quickly, were disappointed with their lower scores. The slower shooters had 2 MOA groups across the bullseye, with an average of 5 V-bulls.

The shooters who grouped largely within the V-bull were aware of the adrenaline introduced into their bloodstreams, which needed to be reduced before each shot. This enabled them to avoid the tremor that accompanied the adrenaline response for each shot. Otherwise, the muzzle would shake at the moment when each projectile departed. However, the shooters who released shots quickly (within about 3 seconds), with no awareness that the tremor and muzzle movement could be avoided, experienced 2 MOA groups.

This article describes the adrenaline response which precedes the release of every shot and how a shooter may avoid it almost entirely. This technique was widely practised before 1914.

**Discussion:** the release of adrenaline into the bloodstream is largely triggered by memory of dangerous situations. The memory contains images of many situations, including explosions, loud noises and the recoil of a rifle, which moves part of the shooter’s body. As a result, the central nervous system enables the shooter to take sudden evasive action to avoid the danger.

One approach for avoiding the bodily tremor associated with a rush of adrenaline in the bloodstream, has relied upon measuring the time for release from the moment the trigger is felt to bite. However, it is also possible for a shooter to deceive the body into releasing less adrenaline and hence, score smaller groups.

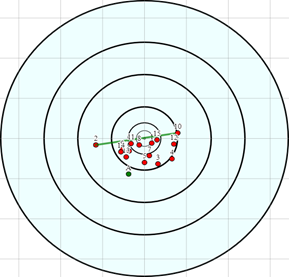
If responses received from the nervous system indicate the subject is moving, then this reinforces the sense of danger. If the shooter is absolutely still, then most of the factors that warn of danger are from the memory alone. That is, a shooter has a greater sense of danger if the nervous system is also associated with movements of part of the body, e.g. trying to contain movements of the rifle when aiming at the target.

The vast majority of shooters are however unaware of the adrenaline response in their bodies, responsible for the minute tremor that causes mm vibrations of the head, shoulder, hand on the pistol grip and at the muzzle of the rifle. On the other hand, shooters who are aware of the need for adrenaline and the associated tremor, also recognise what occurs when a shooter releases a shot:

* a group across the 2 MOA bullseye, which appears to extend out as far as the boundary of the bullseye ring (equivalent in smallbore to scoring in the 8-ring)
* a time interval of about 4 seconds, during which muzzle vibrations occur, measured from the moment when the trigger starts to bite.
* a shorter time interval of about 2 to 3 seconds where muzzle vibrations occur, measured from the moment when the trigger starts to bite.

The longer period of vibrations occurs for the shooter who needs to frequently return a wandering foresight (or even scope element) back to the target. The shorter period occurs for a shooter who supports the rifle so still, that very little correction is needed to keep it on aim.

**Practical:**



This first 15-shot (F Class) shoot at 300m formed a group which completely occupied the lower half of the bullseye, scoring 78.2 out of 90.15. The shooter was unaware of the need to allow say 4 seconds for an adrenaline tremor to occur and dissipate, so that there is no longer any movementof  the muzzle (seen in dry-shooting) at the moment of release.

A TR shooter as well, should have allowed 4 seconds to elapse from the moment when the trigger started to bite. However, this shooter may also have set up his/her body position so that there was no need to frequently bring the foresight back onto aim. He/she would then only require 2 or 3 seconds from the moment when the trigger started to bite.

This second 15-shot (F Class) shoot formed a group which largely occupied the 0.5 MOA X-ring, scoring 90.11 out of 90.15 at 700m. This shooter was fully aware of the need to allow 4 seconds for an adrenaline tremor to dissipate without moving the muzzle.

**Keeping the shooter’s body and aim dead still to minimise the adrenaline tremor:**note that both TR and F Class shooters need to ensure that the hand on the pistol grip does not introduce any movement from the moment when the trigger starts to bite. An F Class shooter is concerned solely with movements due to this hand. The hand must be anchored with the three largest palm muscles all in contact with the grip, uniformly for each shot. Fingers 3 to 5 should also help anchor the hand, so that the trigger finger is under full control for each shot. The thumb may rest loosely anywhere, without absorbing any recoil from the moving rifle.

A TR shooter may succeed in scoring a 0.5 MOA X-ring group, i.e. if the rifle is dead still  overcomes the need to often return the wandering foresight ring back onto aim. The TR shooter needs to also use the above technique with the hand on the pistol grip. Perce Pavey regarded the hand on the pistol grip as the least understood, yet most important technique.

To set the rifle into a dead still position, the RH shooter begins by almost planting the forward elbow well out in front, exactly between the eye and target. Keeping that elbow still, the rifle is brought from a high-left aim across to a position above the target, simply by moving the left foot a cm or so to the left. Keeping the forward elbow still, the rifle pointing above the target may then be lowered by carefully moving the navel a cm or so forward, until the aiming mark is within the foresight. Check that the forward elbow is exactly under the rifle. If not, start again as above; without trying to force the elbow in and under the rifle. Adjust the weight of the arm, shoulders and head, so that this mass is completely balanced solely upon the forward elbow. Confirm this by loading a dummy round and noting the ease of closing the bolt and returning the right elbow to a comfortable position. Finally, allow muscles of the supporting arm to go completely limp. The weight of the rifle then pushes down onto the limp mass, from which the foresight is seen to be dead still because it is under no tension.

**Recommendation:**the test for this body position (both TR and F Class) is the noticeably dead still position of the foresight or scope element from the moment when the trigger starts to bite. Each shooter needs to then ensure that there is no trace of movement of the scope element or foresight, while the mind is occupied estimating how far the trigger release has progressed, i.e. ¼, ½, ¾, when release occurs as a surprise. The shooter must ensure that follow-through has occurred. It must not be allowed to wander off before release occurs. Commence releasing shots at about 4 seconds after trigger bite. If release is reduced to 3 seconds, determine whether the group remains within the V-bull or 6-ring. There is no point in trying to release at 2 seconds, where further errors may be introduced. If the group begins to widen, then slow the release to 4 or even 5 seconds.

Best regards

Geoff