Dear Colleagues

**A 1.0 MOA TR group which did not centralize in response to rear-sight adjustments**

**The Problem:**A TR test-shooter produced a 1.0 MOA group and despite rear-sight adjustments, it did not move to the centre of the V-bull. The group was shot at 700m and was centred in the bullseye at 9 o’clock to the V-bull. This no doubt occurred upon the shooter moving part of the body during the shoot. Changes to the natural point of aim otherwise occur to new positions as far away as the inner or magpie rings. Attempts to re-centre such a group upon adjusting the sight are usually unsuccessful.

The solution by most shooters is to first overcome the bodily change which led to the new group position. Change of the natural point of aim can be seen upon bringing the rifle up into the aim position with the aiming-eye half-closed. The new natural point of aim can be indicated by the position where the rifle tends to aim naturally. The shooter then moves the left foot position as little as a cm or so sideways, which moves the group into line with the target. Moving the foot to the left will move the foresight to the right. Moving the navel a cm or so forward will then bring the group down into the V-bull.

However, the test- shooter experienced a very small change of group. It opened up the question of how to shoot a V-bull group in TR. That is, the test-shooter has no way of knowing whether a bullseye just out of the V-bull is really part of the same group, i.e. wider than the 1.0 MOA V-bull.

The problem occurs in F Class as well as TR. Moving a group occurs not only as a result of bodily movement, but due to a change in tension of the hand holding the pistol grip.

This article describes the effects upon a group which result from a minute bodily movement. Many shooters are otherwise capable of producing a group entirely within the V-bull or X-ring. TR and F Class shooters are able to examine factors which widen groups, which enlarge a 1.0 MOA TR group out to 2.0 (the size of the bullseye ring) or a 0.5 MOA F Class group out to 1.5 (across part of the bullseye ring).

**Analysis:** the TR test-shooter who produced an immovable 1.0 MOA group, which did not move toward the centre of the V-bull, was experimentally confirming the effectiveness of his techniques. He was absolutely thorough in his use of the technique for holding the rifle dead still. As well, he released the imagined second stage of the trigger without the slightest discernible movement of the aiming mark, which remained exactly in the middle of the foresight ring. He was very aware of the need to not allow movement of any part of the body between shots 1 to 10. He knew this would lead to change of the natural point of aim.

While observing the test-shooter from a position immediately behind the firing point, the writer could see that he was not allowing his legs to move at all. Both legs were straight, the right being parallel to the barrel and the left foot positioned to bring the foresight sideways into line with the aiming mark. Yet, small movements of the lower left leg occurred due to normal fluctuations of his nervous system. He was completely unaware of this. It was also noted that the shooter was reloading and aiming, without confirming beforehand whether the natural point of aim of the rifle was changing while shooting. Otherwise, the shooter had resolved to keep some techniques in the back of his mind, while focussing his immediate thoughts upon:

* ensuring the rifle was really dead still before and during trigger release
* commencing the imagined second stage of the trigger, where he was intent upon keeping the aiming mark dead still within the foresight ring and at the same time, increasing tension in the trigger finger
* mentally estimating progression of the second stage of the trigger through to the moment of release
* ensuring that the positions of flags remained the same before and after shot release.

**Practical:** there was however valuable information to be gained by the test-shooter:

* upon reloading and aiming the rifle with the eye half-closed, watching to see where the rifle was naturally aimed for each shot
* if any part of the body (foot, pelvic girdle, forward elbow, head, hand on the pistol grip, or position of butt on the shoulder) moved even a cm, which the shooter should expect to occur and then adjust it
* if the natural point of aim was found to not coincide exactly with the aiming mark, then the left foot could be moved a little sideways (a cm or so), while the navel could be moved a little forward or backward (a cm or so), which in most instances would be enough to bring the rifle back onto the natural point of aim
* if the weight of the shoulders, arm and forward part of the body are balanced upon the forward elbow (as fulcrum), this enables the loading arm and elbow to be raised and replaced approximately without affecting the natural point of aim
* if however, the weight of the rifle and forward part of the body are spread across both elbows, then it must be assumed after each shot that either elbow has moved a few mm, i.e. is not in the same position as for the previous shot, which must lead to a change of the natural point of aim.

**Conclusion:**  the test-shooter experienced a very small change of the natural point of aim, which would have been corrected by moving a foot during the shoot. The required movement was only a cm or so to the left, to bring the group 1 MOA to the right and into the V-bull. That is, changes to the natural point of aim result from the smallest movement of part of a shooter’s body. This includes the hand on the pistol grip, which leads shooters to experience such minute changes. It is fortunate today to have the F Class discipline, which confirms that difficulties result from the hand on the pistol grip, i.e. as well as other parts of the body.

In the days before F Class became a shooting discipline, Perce Pavey stated repeatedly that the hand on the pistol grip was critically important. Now that both TR and F Class disciplines exist, it can be concluded that change of the natural point of aim occurs as a result of minute movements of many parts of the body. The vast majority of rifle shooters, TR and F Class, need to be aware of the change of natural point of aim, which follows the smallest change of muscle position and tensions. Yet, most are apparently unaware that their wide groups result from this factor.

Best regards

Geoff