Dear Colleagues

**Change of the natural point of aim due to the nervous system**

**The Problem:**every shooter’s nervous system causes movements of muscles, unknown to the shooter, many of which lead to changes in the natural point of aim. The most common occurrence of this is when a right-handed TR shooter unknowingly experiences a small shake of the left foot. It is only observed by a scorer standing behind. This can result in an inner at 9 or 3 o’clock. The important feature of this occurrence is that the shooter can be completely unaware of his/her foot shaking. The left foot may rise a cm or two then settle back onto the ground. This is one of many different occurrences originating from the nervous system.

As a result of being unaware, the shooter will tend to conclude that he/she had let a loose shot go. Hence, the shooter could decide not to adjust the sight in order to centralise the next shot. A second shot alongside, starting a 9 o’clock group, leaves the shooter mystified. When this happens it is not uncommon to hear a coach tell anothermy shooter’s wind zero is changing.

Every shooter needs to understand that movements such as this, originating from the nervous system, are quite normal and must be expected. The shooter therefore has a need to check for unknown occurrences and correct any muscular change before releasing the next shot.

There are many muscular systems and movements unknown to the shooter, which often result in a change of the natural point of aim. The task of taking precautions to guard against a list of possibilities can be daunting. Here, the shooter is alerted to the need to use a common precaution to detect and correct every change of the natural point of aim.

Advice given to shooters, to raise the rifle with the eyes half closed and gain an indication of the natural point of aim, then correct any change in body position, appears not to be taken seriously. That is, many shooters do not immediately believe the enormity of the problem and so, the need for a routine precaution does not register in the mind..

**Discussion: s**hooting techniques depend upon the nervous system, which makes possible all bodily communications and hence, the control of everything a shooter does. Commonly occurring nervous system and other effects described here, should enable the reader to accept that changes of the natural point of aim are to be expected. Hence, it is so common that a shooter must constantly watch for and correct suspected changes. Among the physiological changes, unknown to a shooter, which result in alteration of the size and position of a group, are:

* interruption of mental concentration upon a key function, such as maintaining the dead still position of the foresight right through to the release of a shot (TR)
* unintentional flexing of arm muscles to complement tension from the sling (TR)
* a shift in balance of the total supported weight from one elbow to both elbows (TR)
* the sideways position of the forward elbow under the rifle stock (TR)
* the position of the sling on the mid-forearm, providing tension above the cuff of the shooting coat (TR)
* the position of the loop of the sling around the upper arm (TR)
* blood-flow constraints causing noticeable pulse-beat, a result of tensions of the sling looped around the upper arm (TR)
* shift of the stock from the web of the forward hand to the palm of that hand (TR)
* change of the angle of the forward hand, from directly in-line with the arm to an angle where the stock rests across the palm (TR)
* movement of the position of the supporting hand to a point where it also touches the front sling swivel (TR)
* the position and tension of the butt plate at the shoulder (TR, F Class)
* the tension of the face in contact with the butt (TR, F Class)
* the tension of the reloading hand upon return to the pistol grip (TR, F Class)
* the position and tension of the thumb against the pistol grip (TR, F Class)
* the tensions of the large index finger muscle and the two palm muscles of the hand, while resting on the pistol grip (TR, F Class)
* repositioning of the navel forward or to the rear by as little as a cm (TR)
* reposition of either foot laterally by as little as a cm (TR)
* minor attempts to achieve comfort, e.g. by raising and lowering the pelvic girdle (TR).

From the cited illustrations of movement by a cm or so, of a foot or any part of the pelvic girdle, the shooter has a clear indication that a change of the natural point of aim may result from such small changes anywhere in the body. From the initial illustration provided, the change in a group can be the splitting of a 1 MOA F Class group within the 6-ring, or a 2 MOA TR group occupying a bullseye, to a new group centred upon the inner ring at 9 o’clock. The list given here is not complete.

**Practical:**an experienced shooter is well aware that it is futile to try to consider every possible origin of a group change. Hence, a leading TR shooter will routinely watch where the rifle tends to settle upon being raised to the shoulder, then momentarily close and open the eyes to confirm where the sight is aiming. A RH shooter has already positioned the right leg parallel to the rifle barrel. The shooter will immediately adjust the sight sideways by moving the left leg as little as a cm or so. If the foresight requires vertical correction, then the navel is moved as little as a cm or so forward or backward.

The experienced shooter would hope to not have to make the correction again during the shoot. However, experience shows that a change may occur again, the result of the nervous system acting upon muscles anywhere in the body. Hence, the shooter may repeat raising the rifle and watching, followed by adjustment of the foot and/or navel.

A new shooter will soon find on undertaking this precaution, that every shot is watched when re-aiming and if necessary, adjusted by movement of a foot or the navel. Note that either foot may be used, but the shooter’s comfort will remain if the leg parallel to the rifle is not moved. That is, the spine should remain relaxed and as straight as possible, without bending or contortion. Both buttocks should be relaxed and positioned evenly on the ground, avoiding the use of tension to position one side of the trunk up and the other down. However, bending the right leg is a widely-practise style of shooting, which appears to lock a large number of muscles of the legs and trunk under tension. This can make it difficult to adjust small areas of muscular tension with relaxation of the body. Despite this, many excellent shooters have learned to shoot with the right leg bent up under tension, provided it is not moved throughout the period of a shoot.

An F Class shooter who positions the butt ahead and free of contact with the shoulder, is able to free the body of many sources of group change. This shooter reduces total bodily contact to the hand that releases each shot. There are however important group-control factors which can be maintained, e.g. focussing the mind upon a quick initial trigger pull, followed by a much slower pull, right through to the point of shot release. This ensures completion of the critically importantfollow-through technique. This shooter is as a result able to use sight adjustments to group within 0.5 MOA, i.e. within the X-ring.

On the other hand, a shooter who pinches the trigger against the rear of the trigger guard, has difficulty in using the quick initial pull followed by a slow and controlled follow-through (to avoid tremor shots). This can be seen when scores tend to be based upon a 1.0 instead of 0.5 MOA group. That is, scores for these shooters often tend to be possibles with few Xs. On the other hand, this shooter has clearly removed many of the unwanted tensions arising from changes of the nervous system in the hand against the pistol grip, i.e. from the thumb, tension differences upon reloading and tensional differences due to changes of major palm muscles. Some shooters have claimed that group changes arising from thoughts of where the group is appearing, may not occur.

**Conclusion:**there are so many sources of change of the natural point of aim, that a leading shooter soon develops a routine for watching for the likely point of aim, then adjusting this with the foot or navel. Thankfully, this happens without the shooter having to think whether it is occurring for every shot of a shoot. The experience of many leading F Class shooters would suggest the numerous possible causes of group change, do not necessarily lead to the conclusion that pinching the trigger is the answer to it all. Although this technique works for a while, monitoring of groups has shown that care must still be taken to estimate the likely point of aim, with adjustment, even though only one hand is in contact with the rifle, i.e. to pinch the trigger against the trigger guard.

Best regards

Geoff