Dear Colleague

**Keeping tremor shots from escaping across the 6-ring and bullseye**

**The Problem:**shooters are generally aware that they need to trick the nervous system into not generating a tremor at the moment when a shot is discharged. Many begin by ascertaining the degree of care required to avoid generating a tremor. The result can be a shot within the V-bull (TR) or X-ring (F Class).

However, most shooters find this difficult and some have only ever been able to release 10 shots with perhaps 1 to 3 unaffected by tremors. On some days distracting thoughts appear to interfere and result in such shoots

When examining groups the writer has repeatedly found that TR shooters, who generate tremors, tend to produce patterns of shots closely around the V-bull or which follow the outer boundary of the bullseye ring. F Class shooters on the other hand, tend to generate tremors with a pattern of shots closely around the X-ring or which follow the outer boundary of the 6-ring. Some shooters find they produce straight lines of shots that run across the bullseye and inner rings. An interesting phenomenon is the halo of shots located above the V-bull (or X-ring), below it, or both above and below. A previous article described tremor-affected shots as groups larger than the V-bull, centred anywhere, although commonly at 4 o’clock on the perimeter of the bullseye.

This article contains a description of two techniques used by the writer, coaches of Australian Rifle teams and individual TR shooters to keep tremor shots closely around the V-bull, instead of escaping across to the edge of the bullseye and further out. F Class shooters have likewise been able to contain tremor shots closely around the X-ring.

**Discussion:** the advice generally given to shooters to avoid creating tremors is to:

* begin a shoot by discharging a dry shot, using a spent shell or dummy cartridge, to ascertain the degree of care needed for no trace of movement to occur at the moment of discharge, i.e. as seen at either the foresight or scope element
* then pull the trigger quickly (during an imagined first stage) until the trigger is felt to bite, followed very slowly (in an imagined second stage) while keeping the mind focussed upon progress of the pull until discharge occurs as a sudden surprise.

The conditions for this technique are for the shooter to:

* keep the foresight dead still, starting well before trigger pull and continuing right through to the moment of discharge (TR)
* pull the second stage of the trigger much slower than needed to ensure the degree of care is achieved.

Every shooter is aware that there are different ideas of dead still. It is possible for an observer to stand behind a shooter and observe small movements of the muzzle, seen against a background of grass in front of the firing point. As well, there is the unhelpful character who volunteers that it is not biologically possible to achieve a dead still foresight. However, some shooters regard the rifle as dead still, if at the moment of discharge the sight is momentarily on aim. Hence, for many shooters there is an ongoing effort to see how still the foresight can be held. In trying to achieve this, the shooter is focussed entirely upon the foresight, without thinking of support by the sling and the skeletal structure of the arm.

From this, it appears that the vast majority of shooters experience a version of dead still, which is insufficient. Not surprisingly, many shooters find that preventing tremor shots altogether is impossible with the techniques they are using.

The rate of pull of the second stage of the trigger is clearly a deciding factor. If the pull is faster than a particular rate then the nervous system will generate a tremor. The shooter needs therefore to be able to measure the speed of trigger pull when using live rounds. This can be roughly indicated from the positions of shots outward from the V-bull or X-ring. However, speed of trigger release appears to depend upon the shooter’s memory, which can fade or disappear during the noise and recoil. Hence, when a shot appears midway across the bullseye (TR) or 6-ring (F Class), the shooter theoretically needs to slow up the speed of trigger pull to bring the next shot into the centre, i.e. instead of altering the sight!

**Practical**:  the small number of shooters who appear to:

* successfully avoid generating tremors
* prevent tremor shots from escaping across to the boundary of the bullseye (TR) or the 6-ring (F Class)

start by applying considerable effort to ensure the rifle is really dead still. As well, they also pull the trigger expertly through the second stage. These shooters have practised the pull until they are able to control the timing of trigger-release. An experienced coach will be aware when a shooter is doing this. The coach will give a get ready signal that the word go is about to occur. This allows the shooter time to take the first stage, then upon hearing the word go, the second stage is gone within about 4 or 5 seconds. The shots being sought by the coach and shooter working together are within the V-bull (TR) or X-ring (F Class).

Australian Rifle Team coaches who were renowned for doing this well were Jim Reilly and Reg Rowlands. They often referred to it as pinhole stuff. They were aware that if the second stage were taken too quickly, then a tremor shot would appear out around the boundary of the bullseye or further out. This same technique also resulted in considerable success for the writer when coaching Australian Rifle Teams, the NSW State Teams to Bisley, the Kenyan Rifle Teams and the County Tyrone Teams of Northern Ireland.

In practice, the technique for supporting the rifle dead still before and during trigger release, requires the TR shooter to adopt a position where the forearm is vertical, i.e. the elbow is positioned exactly under the rifle stock. The wrist is not allowed to bend, but is straight out from the forearm, with no sideways muscular tensions to maintain the rifle resting on the large thumb muscle (not the palm). The shooter’s body provides the stability for this as a result of being balanced upon this forward elbow. Every shot is aimed following observation when raising the rifle, that there has been no change in the natural point of aim. The shooter’s hand is held in place on the stock by the sling around the forearm aided by the Bisley twist, not a glove or smallbore hand-stop. That is, the sling alone determines the position of the hand on the rifle stock. Note that many shooters try to set up the forearm vertically under the rifle as a final step, using sideways force against the elbow, which creates tensions that change the natural point of aim (see separate article on the technique).

The shooter in a teams’ match works with the coach and tells him/her when the group begins to expand. This enables the shooter to adjust the degree of care during the second stage of trigger pull and as a result, reduce the size of the group. The coach also looks for signs of group splitting, from the appearance of left and right or higher and lower sub-groups, each measuring from 0.5 to 1.5 MOA. That is, tremor shots complicate a group. Every precaution has to be taken to overcome tremor shots and if they cannot be avoided, their effects can still be managed.

**Conclusion:**tremor shots that appear at various distances across the bullseye, having not been retained within the V-bull or X-ring, can be controlled upon first ensuring the rifle is really dead still. As well, the second stage of trigger pull must be maintained at less than the maximum rate to achieve the required degree of care. This is first found upon discharging a dry shot which avoids generating a tremor. Controlling these two factors ensures that a shooter’s group is maintained close to or within the V-bull or X-ring. There are however many factors, which can handicap the management of a group that fits within the V-bull or X-ring.

Best regards

Geoff