Dear Colleagues

**Sight adjustment to centralise the group of a medium-level shooter**

**The Problem:**the first articles in this series (Sight Adjustment, Parts I and II) described practices used by team coaches before and following WWI. The next article for the coach of an advanced shooter, provided techniques to enable the shooter to quickly achieve a 1 MOA group.

This article describes how a coach may centralise the group of a medium-level team shooter, who allows it to expand through releasing shots too quickly. He/she also puts up with wide shots, splitting and moving of the group around the target. An experienced coach can work with such shooters, before and during a team shoot, to avoid many of the unwanted effects and produce the smallest groups.

**Practical:**a team coach in the 2020s has a much better understanding of the sizes of groups produced by shooters with different levels of experience. When a change of wind or mirage occurs, a shooter who has not been taught by an experienced coach, will typically expand the size of a group produced within a single shoot. For example, a change in wind velocity or direction, which indicates a need for the shooter to get shots away while the flags remain unchanged, may achieve an increase of group size from 1 to 2 MOA. This occurs because shots are released without waiting for the temporary increase in concentration of adrenaline in the shooter’s bloodstream to return to base level. Expansion of a group can also occur, particularly if the muzzle is wandering while trying to aim. As well, trying to control elevation changes due to the refraction of light, can lead the shooter to release shots faster.

A TR or F Class shooter today seeks to group within the V-bull or 6-ring, respectively. To overcome this, the shooter must be aware of what causes group size to expand. If the group is not to become wider than 1.0 MOA (TR and F Class), several factors must be managed and controlled at the same time during the release of a string of shots:

* a TR or F Class shooter’s minimum time for shot-release, measured with dry shots just before a shoot, will result in the smallest group (e.g. 4 seconds measured from the start of trigger bite until release)
* an apparent minimal degree of sight wandering or bodily movement, experienced by the shooter waiting for say 4 seconds before release, while the concentration of adrenaline dissipates naturally (TR, F Class)
* supporting the rifle really dead still with limp arm muscles, to ensure the sling does all the work (TR)
* avoiding unwanted tensions in upper and lower sections of the supporting arm (TR)
* avoiding the creation of unwanted tensions against the butt from the face and/or loading hand (TR, F Class)
* awareness and avoidance of body-wide neurological tensions around the body, which change the natural point of aim, e.g. repositioning of a foot will move the foresight (TR)
* awareness and avoidance of pulsation in the upper part of the supporting arm (TR)
* awareness and avoidance of the need for the hand on the pistol grip to be stabilised with respect to the three largest palm muscles, the thumb, the trigger finger and the locations of fingers 3-5 (TR, F Class)
* the relative diameter of the foresight ring and width of its annulus (TR)
* setting of the diameter of the rear aperture so that the smallest diameter just allows ambient light intensity to enter the eye, causing the pupil to have the same diameter (TR)
* changes in the paths taken by light rays, indicated by the refraction of light observed around the centre of the F-Class target (F Class)
* changes in the refraction of light, measured as differences in elevation of shots found upon releasing the sighters at two different wind velocities (TR, F Class).

Shooters with mid-level skills commonly experience the following group changes:

* wide random shots, often more than 2 MOA from the centre of the target (from an inability to support the rifle really dead still, due to tensions in arm muscles) (TR)
* a sub-group of shots centred at 9 o’clock within the inner ring (due to tension of the face of the RH shooter against the butt) (TR)
* sub-groups of shots centred at both 3 and 9 o’clock outside the bullseye ring (due to varying tension of the loading hand of the shooter against the pistol grip) (TR, F Class)
* splitting or complete removal of a group in any direction across the target, commonly as far out as the inner ring (due to the neurological transmission of a change in bodily tension during a shoot), i.e. from anywhere in the body (a foot, an elbow, the pelvic girdle or through sliding the trunk forward or backward between shots 1 to 10) (TR, F Class)
* splitting of a V-bull group into 2 or 3 sub-groups typically < 1 MOA, often located above one another and entirely within the bullseye (i.e. due to tensed rather than limp arm muscles, or pulsation from unequal tension of the sling around the upper arm) (TR)
* wide random shots that accompany a small group (due to varying the position of the hand and fingers on the pistol grip) (TR, F Class)
* a group often wider than the V-bull or bullseye (due to incorrect selection of the diameter of the foresight ring) (TR)
* a group often 2 to 4 MOA (i.e. further unwanted light entering the rear aperture) (TR)
* a group often as wide as the bullseye or inner ring (due to changes in refraction of light observed near the centre of the target) (TR)
* shots as far out as the corners of the target in directions that correspond to increase or decrease in wind velocity (no observation of the difference in elevation of the two sighters, intended to detect changes in refraction of light associated with the increase or decrease of wind velocity) (TR. F Class).

An observant team coach will often be able to watch indications of these factors as they occur e.g. as the shooter’s position changes. If the shooter has confidence in the coach, each of these factors can be immediately detected and corrected.

**Conclusions and Recommendations:** these experimentally measured factors indicate many abnormal shot patterns, which may are expected from less-experienced shooters. Before coaching a team, the coach should gain an understanding of each shooter’s skills and difficulties. When shots appear as described above then this should not be a surprise.

It is recommended that during a coached shoot, the coach should observe bodily changes as they occur in the shooter. The coach is then in a position to immediately ask the shooter to apply a well-known remedial action to prevent it happening again. Each of the changes listed here may likewise be observed during club shooting. As a result, an opportunity exists for a club to ensure that its coaches are able to assist shooters to avert or correct such wide shots.

It is common to find that a club or DRA when seeking nominations for shooters and coaches, may specify that the coach should be a wind-coach. This is a statement that it is acceptable for a team coach to not have responsibility for assisting each medium-level shooter to avoid wide shots as above. If this occurs, then the committee responsible for calling for team nominations, should be required to justify their individual suitability for selecting a team. If there is insufficient skill among team selectors, then the committee should be required to explain why it has not established a program among clubs for enhancing the skills of both selectors and participants in teams matches.

Best regards

Geoff