

## **Assessing upper body endurance**

Mark McKean Dip.T (HPE/Sc), CSCS, ASCA Level 2 S&C Coach, MAAESS, PhD candidate

As shooters progress their training programs, questions are often raised regarding the ideal levels of strength in a shooter's posture, how this can be tested and how it can be improved. In previous issues I have discussed the need for general fitness of the pistol shooting athlete and why being a good athlete makes you a good shooter also. In this article I will address the specifics of shoulder strength and how you as a shooter or coach can determine if your shoulder strength is at the level required for your shooting.

Firstly let's look at two very simple tests of the shoulder that can be performed to determine if the shoulder is of good general strength and fitness.

### **Test 1 – General Shoulder Strength**

This test is performed with the shooter standing in the shooting posture with arm raised so that the arm is above horizontal by about 10-15 degrees. The coach stands to the side of the shooter and places one hand on the upper arm between the elbow and shoulder with palm facing down. The coach then places his/her second hand on the shooter's shoulder blade holding it back in place. The coach then applies pressure in a downward direction. The shooter should be able to resist this significant downward pressure and maintain the angle of the raised arm above horizontal (see picture 1).

If the shooter cannot maintain the raised arm against this pressure and the arm drops below horizontal then it can be said that the shooter's shoulder strength is poor (see picture 2).

If the shooter can hold the raised arm, but the shoulder blade and shoulder posture changes to resist this force then it can be said that the coordination of the shoulder muscles is poor (see picture 3). This may be seen in the shooter's performance by the shooting posture changing during the course of a match as the shooter gradually fatigues through the shoulder and has to adjust the shoulder and back posture to maintain the raised arm while shooting.

### **Test 2 – Upper Trapezius strength**

This test is performed with the shooter seated. Holding the head in a forward direction the shooter tilts his/her head towards the shoulder of the shooting arm. The shooter then raises his/her shoulder as close as possible to the side of his/her head (see picture 4). The coach then places one hand on the shoulder and the other hand on the side of the shooter's head (see picture 5) and applies pressure to both the head and the shoulder in an attempt to move the shooter's head away from his/her shoulder.

If the shooter cannot hold this position with the top of the shoulder close to the side of the head, the strength of the Upper Trapezius is considered weak (see picture 6). This is commonly seen in shooters with low shoulders and long stretched Upper Trapezius giving the appearance of sloping and forward shoulders (see picture 7).

If the shooter can hold this position, but in normal posture appears to display an unusually high shoulder with his/her head forward and up then the Upper Trapezius may be short.

### **Strengthening the shooter's shoulders**

Once you have performed these tests you will have a good indication of the two main reasons why shooters may have poor shoulder strength. This will generally fall into two categories. Either the shoulder is weak, usually from general poor physical condition, or the shooter has some pre-existing condition that prevents proper shoulder strength development. Remember that before a muscle can

have better endurance it must have a good level of strength. If you are at all in doubt then make sure you get a professional opinion from a Physiotherapist, Exercise Physiologist or Strength Coach.

General shoulder strength as measured in test one can be improved through both general strength work and specific shooting drills.

### General Strength Exercises

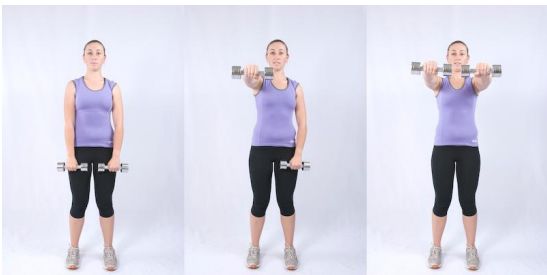
General strength exercises can include the following, which should be performed in a slow controlled tempo of 2 seconds up and 2 seconds down.



External shoulder rotation – perform 2 sets of 8 with DB or 2 x 20 with a stretch chord



Internal shoulder rotation – perform 2 x 20 with a stretch chord



Forward DB raises – perform 2 x 8 with DB



Bent over Raise – perform 2 x 8 with DB



Lying Row – perform 2 x 8 with DB

### Upper Trapezius Exercises

Upper Trapezius strength as measured in test 2 can also be improved through exercises, but they need to be trained slightly differently. Long and weak Upper Trapezius muscles need to be shortened as well as strengthened. All exercises should be performed with a 2 second up lift and then a 6 second hold and 2 second lowering phase.



Bent over side raise and hold – perform 2 x 6 (6 second holds at top)



Upright Shoulder shrug – perform 2 x 6 (6 second holds at top)



Bent over shoulder shrug – perform 2 x 6 (6 second holds at top)

### Specific Strength Exercises

Specific exercises for improving shoulder strength can be performed in full shooting posture with pistol in hand. The NCC Director supplied the following load and exercise examples for specific strength work that could be used at the start of a shooter's development. It is important to note that

the number of repetitions in these exercises below should reflect the shooter's level of fitness. If the shooter is not able to control sight alignment the number of repetitions and rest period should to be adjusted. Coaches should be conscious of not progressing the athlete beyond his/her level. There we are assuming that

	<b>Exercise</b>	<b>Loads</b>	<b>Comment</b>
	Holding the gun in the aiming Position.		All exercises require that the shooter maintains control of sight picture
	Standard interval method		
1	Hold 20 sec, break 15 sec Break after series – 1 minute	6 times	Method of repetition with fixed time intervals
	Hold 20 sec, break 15 sec Break after series – 1.5 minutes	6 times	To correct periodically the sight picture
2	Hold 30 sec, break 30 sec series – 1 minute	6 times	To correct periodically Break after a sight picture and to activate the trigger squeeze
	<u>Various interval method</u>		
1	Hold 20 sec, break 15 sec Hold 30 sec, break 20 sec Hold 40 sec, break 30 sec Hold 50 sec, break 40 sec Hold 1 min Break 1 min 30sec	5 times (Any number)	Progressive time decreasing interval. To control stance
2	Hold 1 min, break 15 sec Hold 45 sec, break 15 sec Hold 30 sec, break 15 sec Hold 20 sec, break 15 sec Hold 15 sec Break 2 min	5 times (Any number)	To control trigger squeeze
3	Hold 10 sec, break 10 sec Break 30 sec Hold 20 sec, break 10sec Break – 45 sec Hold 30 sec, break 10 sec Break 45 sec	5 times (Any number) 5 times (Any number) 5 times (Any number)	To control sights alignment

Similar exercises and loads can also be performed with a dumbbell instead of the pistol. The mistake can be made in thinking that if the pistol weighs between 1 and 1.5 kg and if these exercises

are performed with a 5 kg weight then the athlete will develop much greater strength. Any specific strengthening exercises performed in a sports specific posture, the athlete should use a weight no more than 10% above the weight of his/her sports equipment. Because of the small weight of a pistol it is best for pistol shooters to use a 1 - 1.5 kg dumbbell or any weight that is 10% heavier than his/her pistol.

Once general strength is achieved, endurance of the shooting posture and arm action can only be improved by performing these specific types of exercises. Ideally coaches should test the shooters' strength every three months and if the shooter is weak in these areas then he/she should include these additional exercises in his/her normal training sessions.