The sport of shotgun shooting requires a unique balance of skill, endurance, strength, fine motor control and mental focus. As mentioned by SFC Theresa DeWitt, in the Aim with AMU section of this magazine, sport shooting does not require the physical attributes needed by an Olympic swimmer or professional football player. However, shotgun shooting does demand its own unique balance of physical and mental skill for optimal performance at the elite level. While SFC DeWitt talked about the importance of upper body strength and flexibility, this article will compliment her article with information on core stability for shotgun shooters.

When working with athletes I look at their body as a biomechanical machine. Meaning all parts (muscles, joints, etc…) should operate in a particular way. There is an ideal posture. Certain muscles should activate first to provide stability, while others activate later to provide dynamic movement off of this stable base. There are even specific structures that are highly populated with proprioceptive receptors, which provide feedback about where one’s body is in space and provides the basis for hand-eye coordination. While the scientific information is not necessary for you to memorize, it is often helpful to understand the basic medical rationale behind a particular program.

While shotgun shooting is often referred to as a unique event, the basis of a good performance enhancement program is actually the same for sport shooting as it is for football, soccer or any other sport. The basis of a good program begins with the core! First of all, what is the core? The core refers to your trunk region (area between your hips and shoulders). This includes your abdominals and back muscles. Here is where it gets tricky, but I will try to keep it simple…. There are two kinds of core muscles: I will refer to them as Local and Global Core muscles. Here is the difference.

Local Core muscles include the transverse abdominis, multifidus, and half of the internal oblique. These local muscles connect one spinal segment to the adjacent segment in the back, which provides good structural stability. In the front, the transverse abdominis travels in a horizontal manner across the abdomen providing a corset brace like stabilizing effect. Functionally, the local muscles provide a stable base, in the correct position and maintain the optimal stability and position throughout our movement while providing the feedback necessary to react should our target not travel as we expected.

Global Core muscles include the larger back extensor muscles, rectus abdominis (six-pack muscle), the external oblique and half of the internal oblique. While these are the more commonly trained muscles, they are actually less important when it comes to sport shooting. Structurally, these muscles will cross several vertebral levels in the back and are oriented in a vertical/diagonal manner over the abdomen. Thus their primary function is to create forceful movement in forward bending, back bending and trunk rotation. None of these motions are desired movements by elite shotgun shooters while shooting, so why would we focus on training them? Rather, the ideal movement displays is a stable spine (as far as flexion and extension) with rotation actually occurring below the trunk, allowing the hips and shoulder to rotate together to create a smooth tracing to the target.

So how do we train the Local Core muscles? Well it is a very specific, slight and a bit tricky exercise to perform since many of us have never consciously activated these muscles. I will describe how to initially activate these muscles (1) a progression of the muscle activation, and (2) how to incorporate the muscle activation into your normal daily posture and shooting.

1) Transverse Abdominis Draw-In Maneuver:

- Lay on your back with knees bent and feet flat on the ground. Notice how when you lay relaxed you have a little curve in your low back (your low back is not completely flattened to the table). We call this your neutral spine. We want to maintain this neutral spine throughout the exercise, meaning don’t flatten out or raise up your low back at any time.
- Place your index and middle fingers just to the inside of your hip bones on the front of your hips.
- Take an easy breath in and as you breathe out try to draw-in your belly from below your belly-button, where your pant waist band is. You can simulate this to putting on a tight pair of pants or trying to
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squeezes between a fence.

- When performed correctly you will feel a slight tensing under your fingers just inside those hip bones.
  - Make sure not to just flex or tighten all of your abdominals (i.e., don’t brace your abdomen)
  - Also make sure not to draw-in from up high by your rib cage

Once you are able to activate the Transverse Abdominal muscle correctly via the Draw-In Maneuver, the next step is to work on the muscle endurance. This is done by performing the exercise for five minutes. At first you will not be able to hold the activation for five minutes. Rather you might be able to hold it for 10-20 seconds before activating the wrong muscles, holding the breath or losing the proper activation. When any of these things occur just let everything relax, take a five second rest, then re-activate the draw-in. Then by the end of the five minutes you might be able to hold the Draw-in for 40-50 seconds. Eventually you should be able to hold it for the entire five minutes. Once you can maintain the Draw-in for five minutes, you are ready for the second level.

2.) Single Leg March:
   The Second Level is called the Single Leg March.
   - This is performed by activating the same Draw-in Maneuver previously mentioned while lying on your back with the knees bent and feet flat on the ground.
   - First activate the Draw-In Maneuver, then march one leg at a time bringing the knee toward your chest to the point where your hip is at a 90 degree angle, then lower it back down.
   - Then do the same with the other leg.
   - Continue marching one leg at a time (alternating legs) at about a walking pace. The marching should be controlled and smooth without any hesitation in the movement.
   - While marching the legs, your goal should be to maintain the Draw-in and don’t let your Rectus Abdominal Muscle (six pack muscle in front of abdomen) kick on.
   i. Start with 3 sets of 10 Marches with each leg.
   ii. Progress the number of marches to 15-20 reps if you can maintain the Draw-in and keep the rectus turned off

3.) Transverse Abdominis into Posture and Shooting
   - The final step is to incorporate this draw-in maneuver into your daily posture and eventually shooting. While performing the previous exercises you should be activating your Transverse Abdominis muscle close to as much as you can. We will call this a 100 percent maximal contraction of that muscle. While this is effective for training a muscle, it is not practical for daily activity or shooting. Thus we want to train the functional aspect of that muscle at about 15 percent of the maximal contraction. Thus instead of Drawing-in as much as you can, Draw-in just a little bit but try to maintain it as much as you can throughout the day. This includes sitting, walking and eventually during shooting practice. The drawing-in just a little bit all the time helps your body automatically activate the muscle as part of your normal daily posture. The idea is if the draw-in contraction becomes part of your normal posture, when it comes to competition you won’t have to think about it at all. Your body will naturally activate this muscle just a little bit, producing a stabilizing effect on the spine, connecting your hips with your shoulders and heightening your body's hand-eye coordination, helping produce a smooth, controlled and accurate move toward your target even if it isn’t where it is suppose to be!

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