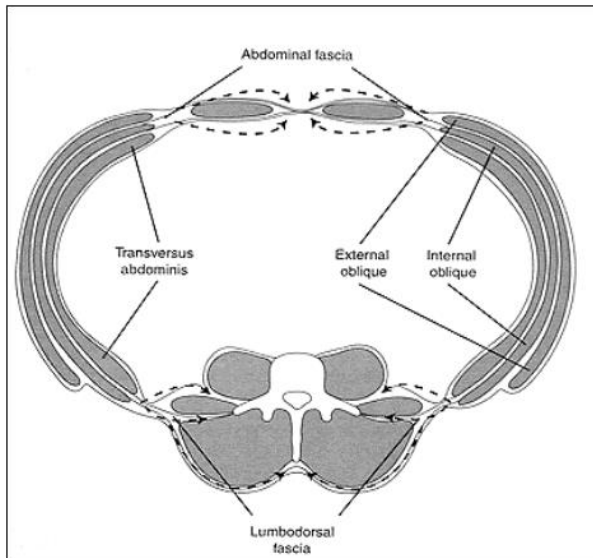


Strengthening the core muscle groups

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The trunk region of any athlete is of vital importance. With only 5 lumbar vertebrae joining the upper body skeleton to the lower, the main structure of support derives from the muscular system and in particular the 'Core' muscle.



This picture shown opposite is a cross sectional drawing of the trunk cut through the lumbar or lower back region. You can see there is only one region of bone shown as the white irregular shaped lumbar vertebrae. Surrounding the lumbar vertebrae are a number of muscles that support the spine and maintain alignment and function of these vertebrae. They include the erector spinae shown as the large muscle at the rear of the vertebrae and include the Multifidus

The remainder of the tissue that wraps around the core is a combination of both muscle and fascia and includes the internal and external oblique's, the Transversus abdominus (TA) and the rectus abdominis (RA). The abdominal and lumbar fascia plays a vital role in providing a connective structure for these muscles to

attach to and knit their functions closely together. These muscles provide the 'walls' to the core of the trunk in the same way as a drum has sides.

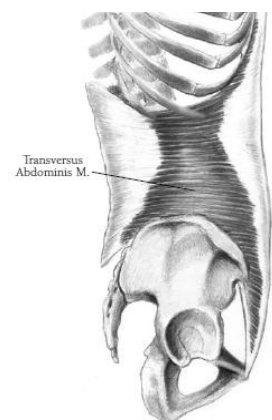
Core stability however is difficult to quantify and it raises such questions as:

1. What does "stable" refer to?
2. How much movement denotes instability?
3. Are interventions prescribed accurately?

In static postures such as shooting the abdominals function to increase intra-abdominal pressure. This intra-abdominal pressure serves two purposes. Firstly, it increases in internal pressure and unloads the lumbar spine. When the TA contracts (picture opposite) it pulls the girth of the trunk in making it smaller much like tightening a belt. This is a very effective contraction and can be sustained for extended periods at low levels of effort such as in a competition.

Secondly, this pressure serves to provide structural support to the upper body by becoming the strong 'other' sides of the core to support the upper body along with the lumbar spine support.

When the TA contracts so too does the pelvic floor (the bottom of the drum of the 'core'). It is this combination of contractions from the TA, the pelvic floor, the RA, the obliques and the diaphragm that produces a strong 'core'.



The central nervous system (CNS - brain) uses different strategies to coordinate this contraction of the 'core' muscles to produce a strong and stable posture. The TA actually contracts in anticipation of movement and its job is to stiffen the spine before moving. The other muscles of the trunk contribute to stability by counteracting any disturbance that may occur from movements that you don't wish to have happen. Further, we also now know that people who suffer low back pain have a delayed response to when the TA switches on. This delayed response to movement means that there is more likelihood of poor spine stability during movement and shooters with low back pain would do well to get this issue

checked out by a health professional. If you can retrain the TA to work in anticipation of movement it may provide the means of reducing back pain and improve shooting performances.

Imagine that during a shooting competition you are preparing to raise the pistol to assume the firing position. Firstly, your TA will switch on in anticipation of this movement and it will stiffen the spine to allow this action to occur. Once achieved, the other abdominal muscles will switch on and off as required to maintain this ideal shooting posture that you have assumed.

Training the abdominal muscles that counteract movement once a position has been assumed is quite different to training the TA and its partner muscle, the Multifidus, to switch on in anticipation. It has been argued that training the TA cannot be done through traditional exercises and that it requires additional training of the Central Nervous System to create awareness of this muscle's activity and its role. It is known that in individuals with no lower back pain and with normal TA activity, any movement will activate the TA and many static postures such as normal shooting stance will reinforce its strength.

Ideally in a training environment we want to provide as many different methods as possible for these muscles to be exercised. We can coordinate these into three main training categories:

- Every day activities
- Sports specific training
- Strength & Conditioning training

Every day activities such as work, gardening, walking and playing social sports will provide opportunities for these muscles to be strengthened. Assuming that you have general fitness and that you challenge your fitness in these activities regularly you will gradually over time strengthen and maintain these muscles in those actions.

Sports specific training such as work at the range or dry firing drills will also provide a specific action for these muscles to be trained. It is often hard for these types of actions to challenge these muscles as they do not provide a level of effort that make them work very hard, but they do reinforce the role they play in those specific activities.

It is really only in the true fitness training environment that we can challenge these muscles and make them stronger through the progression of activities. I am a big believer that any strength exercise makes these muscles work and if you have a normal gym program it is likely that it will include exercises that work these muscles both as a support role and in a specific targeted manner. Squats, lunges, dead-lifts, chin-ups, seated rows, bench press and most other major compound exercises will provide opportunity for your 'core' muscles to be trained.

If you wished to train these muscles, but had little or no access to a fitness centre or strength training facility you can perform specifically targeted exercises at home. Here are some exercises and training loads for you to work on along with ideal performance levels that you should reach. Remember there are many benefits to improving your core strength. If your trunk muscles are strong, it is also more likely that your shoulder region will have improved stability and this relates directly to your shooting performance as well.

Each of the following exercises can also be used to test your static and core stability. Try each of them and record your performances up to the ideal levels shown then train until you can achieve those targets.

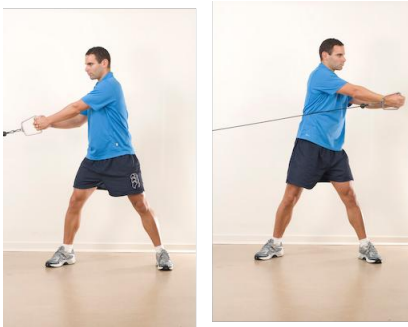
Crunches and sit ups – try doing 8- 12 repetitions, try with different arm positions to make it harder and easier as required. **TARGET** – 20 repetitions with your hands crossed behind your head



Different forms of support positions include the front support on elbows and knees, front support on hands and feet, back or rear support and side support. Try doing each of these positions for 30 seconds to start with and then gradually increase the time. TARGET - 2 minutes for each position.



Bridging positions on the ball or floor are excellent for strengthening static core control. Start with 10 seconds and try to build them up to 60 second holds. Try with both bent legs and straight legs to create different types of exercises. TARGET – 2 minutes in each position



Trunk twists or wood chops are also good for basic trunk rotational stability control. Start with a stretch chord and complete 12-15 to each side. Try with a low to high twist and a high to low twist for different actions. Once this is achieved you can move towards weighted rotations either with a small weight in your hands or on a cable as shown in the picture to the left. TARGET – 20 rotations to each side with 25% of body weight on the cable.