

Why The Six Pack Is Out!

You may already be familiar with the terms 'pelvic stability', 'abdominal stability' or 'pelvic stabilisers'. This is especially so if you have ever suffered from low back pain or have ever seen a physiotherapist for any lower limb injury.

For those who are not familiar with this terminology, I am talking about the muscles that assist in supporting the two halves of the pelvis and hold and support the lumbar spine.

The problem with most generic exercise programs for the stability muscles for athletes is that the emphasis is more often on making the exercise difficult rather than teaching the muscles the correct sequencing of activation and hence developing correct patterns of stability rather than incorrect patterns.

Your abdominal muscles have a variety of roles to perform. The most superficial layer (the six pack) consists of the rectus abdominis, the external oblique muscles and the internal oblique muscles. These muscles are large and designed for movement control of the trunk. In other words they twist turn and flex our trunk. They also counterbalance forces in the case of loading the trunk. Counterbalancing is when, for example you catch a ball overhead creating an extension moment to the spine, the rectus abdominis will strongly contract to create an opposite flexion force moment to prevent your spine hyperextending. We need counterbalancing for almost every task we do in simple daily activities.

There is another deeper layer of abdominal muscles that protects the spine. This muscle is the transversus abdominis muscle. Unlike the other abdominal muscles this muscle has no ability to move the spinal column. Rather the alignment of its muscle fibres means that when it contracts it pulls tension on the pelvic bones and so creates a muscular 'closure' of the pelvis and corseting effect of the lumbar spine and pelvis.

Physiotherapy researchers at the University of Queensland some years ago found a very important difference with this muscle and the other abdominal muscles (Hodges and Richardson 1996). If your body is subjected to an external perturbation (in their experiment the subjects moved their arm rapidly), the transversus abdominis muscle contracts even milliseconds prior to contraction of the arm muscle involved in the perturbation. The other abdominal muscles wait to see what direction the trunk will move in and then contract depending upon the stimulus they sense.

Hence the transversus abdominis (in normal uninjured people) 'knows' we are going to disturb our spine, and contracts in a 'feedforward' manner to protect it. The other abdominal muscles wait for the perturbation to occur and then contract as a 'feedback' response.

It appears that this special muscle in our abdominal region is a crucial

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Diagnostic ultrasound reveals the deeper abdominal muscles for rehabilitation of low back pain patients

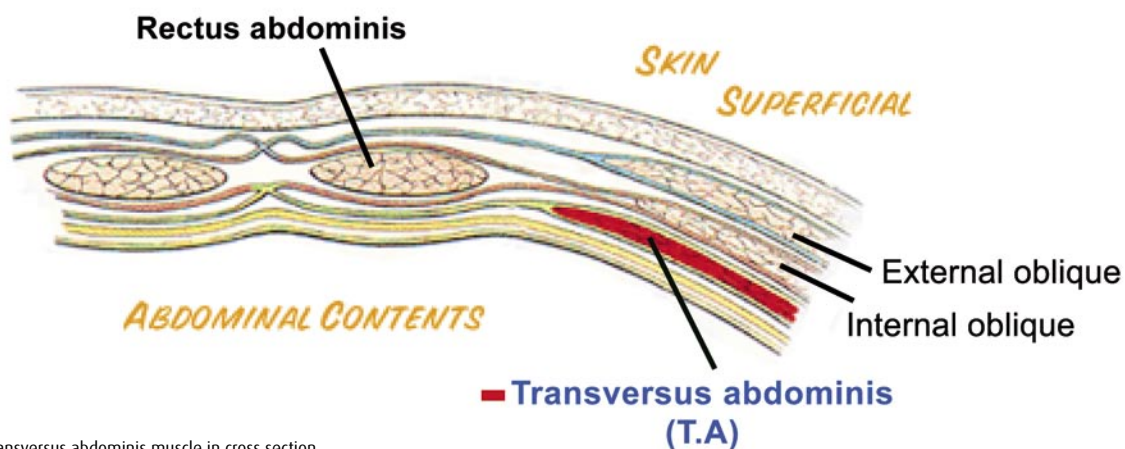


Figure 1 • The transversus abdominis muscle in cross section.

component of a protective loop within our nervous system to protect our spine.

These researchers also found a difference between the low back pain patient and 'normal' controls (another group of people, who did not have low back pain). In the low back pain patient the transversus abdominis loses its feedforward mechanism.

Once the pain has gone the muscle changes the way it functions forever (unless specifically retrained). This loss of normal activation and sequencing of the transversus means that the person who has had low back pain no longer protects their spine in the normal manner and so exposes themselves to more incidents of low back pain (re-occurrences).

Get To Know Your Pelvic Floor

The transversus abdominis has also been shown to be intricately associated with the pelvic floor muscles and also to have an important relationship to breathing control, and the diaphragm.

The pelvic floor muscles form the floor of the pelvis and so stabilise the pelvis from underneath. The attachment points are (roughly): the pubic bone at the front, the sitting bones underneath and the tail bone behind. The pelvic floor slings between these bony points and forms apertures around the spinctal apertures (urethra, vagina and anus).

To contract your pelvic floor there are a couple of cues you can try:

* Think of the muscle that would halt urine flow mid stream – this is your pelvic floor muscles. (To halt the urine during urination is not teaching your pelvic floor good habits so it is not an exercise to practise whilst urinating but contract those muscles at other times).

Other pelvic floor habits that will help good pelvic floor control are -

- Drink plenty of fluids (non-caffeinated)
- Urinate large volumes of clear fluid (try not to empty your bladder until it is full)
- Don't pre-empty your bladder – wait until it needs to be emptied.

Why am I talking about the pelvic floor – I thought this article was about my abdominals?

Most of the time the best way to teach someone to contract their deep stabilisers is via their pelvic floor. Regular pelvic floor contractions will not only strengthen the pelvis but prevent incontinence and hemorrhoids in later age.

To activate your transversus abdominis do the following -

- Lie on your back
- Place your hands on the lower abdominal region just inside the pelvic bones
- Activate your pelvic floor
- You may feel some tension (drawing in) underneath your hands

Other techniques you can try are either a 'hiss' or a 'hum' to develop the tension

Try and hold the contraction and maintain breathing control for 5 breaths

If you feel pushing out on your fingers or 'bearing down' on your pelvic floor you are trying too hard.

Anyone who has had chronic back problems needs to spend a lot of time on low level exercises before progressing to more advanced stabilising exercises. Those who are not injured would do well to practise some of the above techniques and then try and 'set' their transversus and pelvic floor prior to other abdominal work.

People who have chronic back pain and gross inhibition of the transversus abdominis can be retrained using ultrasound technology to view the deeper muscles. The physiotherapist places the ultrasound sound head on the abdominal region and guides the patient through a contraction of the transversus. The patient can view the contraction of the muscle on the visual display from the machine.

So Why Is The six Pack Out?

The outer muscles concerned with motion of the spine and trunk are exercised during common abdominal exercises such as sit-ups, curls and crunches. These types of exercises place high loads on the hip flexor muscles which can strain the lower back and also over-activate or over-recruit the outer layer which often results in a loss of the deep layer (especially if there has been back pain or injury prior to commencement).

The type of abdominal exercises that carry less risk are ones in which the trunk remains still and the limbs (arms or legs) are moving. These

types of exercises are the basis of many swiss ball programs and will be covered more in my next article.

For cyclists in particular the trunk remains still, the two halves of the pelvis are held stable whilst the limbs articulate repetitiously. Our transversus abdominis maintains the tension across the pelvis whilst our leg muscles put the power down. To "strengthen" the abdominals via moving the trunk (as in sit-ups, curls, crunches) does not in anyway replicate the way we require our abdominals to work during the motion of cycling.

So the six pack not only is a lot of pain for not much gain but attempting to get it can potentially damage your spine and lead to back pain.

My advice, forget about the six pack and enjoy your cycling! ●

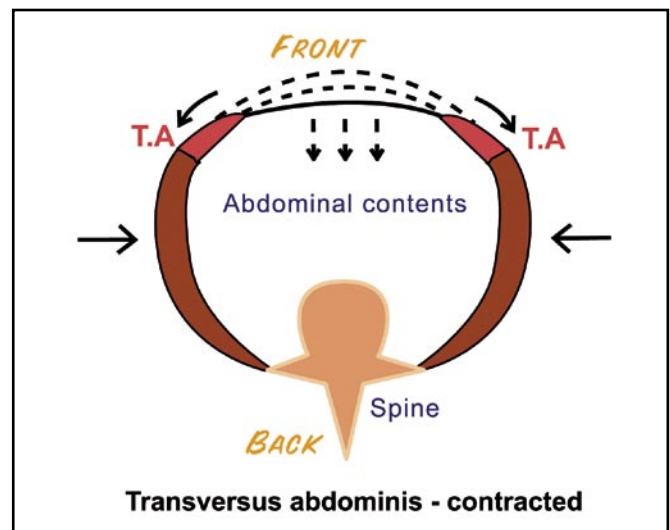
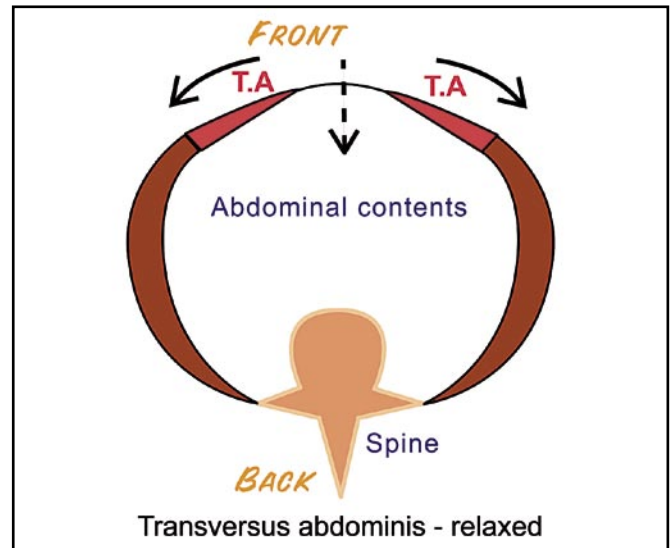
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For information on the ultrasound retraining www.lowbackpain.com.au

For information on Emma Colson www.topbike.com.au and follow the physio links

REFERENCES

Inefficient muscular stabilization of the lumbar spine associated with low back pain. A motor control evaluation of transversus abdominis. Hodges PW, Richardson CA. Spine 1996 Nov 15;21(22):2640-50



Figures 2 & 3 • show the effect of the transversus abdominis contraction on the pelvis and lumbar spine.