Abdominal muscles

The abdominal muscles are located between the ribs and the pelvis on the front of the body. The four abdominal muscle groups combine to completely cover the internal organs.

The abdominal muscles support the trunk, allow movement and hold organs in place by regulating internal abdominal pressure. Common conditions of these muscles include strains and hernia. Consult with your doctor, physiotherapist or sports physician for proper diagnosis and treatment of abdominal muscle injuries.

Abdominal muscles explained
The four main abdominal muscles are:

- **Transversus abdominus** – the deepest muscle layer. Its main roles are to stabilise the trunk and maintain internal abdominal pressure.
- **Rectus abdominus** – slung between the ribs and the pubic bone at the front of the pelvis. This muscle has the characteristic bumps or bulges, when contracting, that are commonly called 'the six pack'. The main function of the rectus abdominus is to move the body between the ribcage and the pelvis.
- **External oblique muscles** – these are on each side of the rectus abdominus. The external oblique muscles allow the trunk to twist, but to the opposite side of whichever external oblique is contracting. For example, the right external oblique contracts to turn the body to the left.
- **Internal oblique muscles** – these flank the rectus abdominus and are located just inside the hipbones. They operate in the opposite way to the external oblique muscles. For example, twisting the trunk to the left requires the left side internal oblique and the right side external oblique to contract together.

Another muscle that is also involved in moving the trunk is the:

- **Multifidus** – this is a deep back muscle that runs along the spine. It works together with the transversus abdominus to increase spine stability and protect against back injury or strain during movement or normal posture. Proper 'core strengthening' techniques, learned from a skilled allied health professional, can support the combined function of these two muscle groups.

Back injuries and pain
The abdominal muscles support the lower back. People with weak abdominal muscles tend to suffer from back pain. Traditional sit-ups (where the feet are anchored and the upper body is lifted from a reclining position) don't work the correct muscles, so the abdominal muscles that support the spine remain weak.

Effective abdominal exercises
Effective exercises for strengthening all four abdominal muscle groups include:

- **Hollowing** – the abdominal muscles are pulled back towards the spine, so that the abdomen hollows under the ribcage.
- **Bracing** – the abdominal muscles are flattened and flared, so that the waist looks a little wider.
- **Slow speed** – research shows that performing abdominal exercises slowly (such as one repetition per two or three seconds) uses the stabilising muscles more than if the same exercises are performed quickly (such as one repetition per second).

Separation of the rectus abdominus in pregnancy

The rectus abdominus tends to separate in the later stages of pregnancy because of the enlarging uterus. After giving birth, the woman needs to be sure this muscle has healed before starting any vigorous abdominal strengthening routines. In the meantime, hollowing exercises can safely be performed lying down, sitting, standing or on all fours. Seek the advice of a physiotherapist or doctor for correct techniques.

Exercise-induced stitch
A stitch is a sharp stabbing pain felt in the abdominal muscles while exercising. It is also known as exercise-related transient abdominal pain (ETAP).

The cause of a stitch is unknown, but theories include insufficient blood supply to the diaphragm, stress on the ligaments as a result of 'jogging' the abdominal organs, or taking in too much water while exercising. Recent research suggests a stitch may be caused by the two layers of the peritoneum (membranes lining the abdominal cavity) rubbing together.

Suggestions on how to avoid stitch include:

- Avoid distending or bloating your stomach before sport, as the digestive organs may press against the peritoneum and make friction between the layers more likely. For example, don't eat large amounts for around two to three hours before exercise.
- Sip rather than gulp fluids while exercising. A big glass of water will bloat your stomach.
- Don't consume soft drinks as these bloat the stomach. Water is best.

Muscle strains
A violent, poorly performed movement of the trunk can strain the abdominal muscles. Other common causes of strains include overstretching or overusing the muscles. Strains of the abdominal muscles are painful and difficult to manage if they occur close to ribs, pubic bone or hipbone.

Prevention strategies include regular stretching, warming up prior to exercise and cooling down afterwards, and keeping good form while playing sport. Muscle strains are graded according to their severity and include:

- **First degree** – a few muscle fibres are injured. Symptoms include stiffness, discomfort when moving the affected area and bruising. Recovery time is around three weeks.
- **Second degree** – a large number of muscle fibres are injured. Symptoms include pain when stretching and the injury site is tender to the touch. Recovery time is up to six weeks.
- **Third degree** – the injured muscle is ruptured. Symptoms include intense pain. In some cases, abdominal organs push through the tear (hernia). This requires surgery. Recovery time is around three months.

Abdominal hernia
An abdominal hernia is the protrusion of abdominal organs through a hole in the muscle wall. Structural weak points include the navel (belly button) and the groin. A person who has undergone abdominal surgery is at increased risk of hernia because the repair site is weaker.

Where to get help

- Your doctor
- Doctor specialising in sports medicine
- Physiotherapist
- Sports Doctors Australia Tel. (02) 6230 4650
- Sports Medicine Australia – Victoria Tel. (03) 9674 8777
- 'Go for your life' Information Line Tel. 1300 739 899
- AAESS Accredited Exercise Physiologist

Things to remember

- The abdominal muscles support the trunk, allow movement and hold organs in place by regulating internal abdominal pressure.
- The abdominal muscles support the lower back, so people with weak abdominal muscles tend to suffer from back pain.

- Causes of abdominal muscle strains include overstretching, overuse or a violent, poorly performed movement of the trunk.

This page has been produced in consultation with, and approved by:

Kinect Australia (inc VICFIT in Victoria)