The Abdominals:

A Most Misunderstood Muscle Group

By: Dr. Phil Maffetone

When it comes to human movement, nothing is more important than the abdominal muscle group. At the core of their function are diverse fiber attachments on the front, sides, bottom, and back of the trunk, from the mid section down to the pelvis. Not only can these muscles flex, extend, laterally bend, and rotate the trunk, the abdominals can help move the pelvis, thigh, spine, head and neck. They are also vital for proper breathing, and physically protect the intestines. But great abdominal muscles are more than what you look like in the mirror.

In addition to their wide ranges of movement, these muscles play a key role in stabilization. Even before we engage the arms and legs for a run, walk, swim, or other activity, the abdominals must first contract to create a firm foundation. The brain, which manages all muscle action, plans ahead by stimulating the abdominals to assure a stable enough body for follow-up activity that is also efficient and safe.

The abdominals attach, via tendons, to various bones—ribs, sternum and pelvis—and to many soft tissues including other muscles and fascia. This contributes to the movement of additional body areas, such as the shoulders and hips. In the abdomen, good muscle balance can prevent the development of different types of hernias, including inguinal, femoral, hiatal, rectus and umbilical.

Dysfunction of the abdominals is a common cause of posture and gait irregularities, muscle imbalance, and related back, neck, pelvis, shoulder, and other injuries. Practitioners, trainers, coaches and others often assess these muscles through observation (watching a person walk or run), an oral history (such as asking, “what movement is most and least painful”), and muscle testing (simple biofeedback). Only rarely is high-tech evaluation, such as MRI, necessary.

The abdominal muscles include the rectus, transverse, external oblique, and internal oblique. From the brain, the nerves that control them exit through a large number of spinal vertebrae—from the 5th to the 12th thoracic area.

Contraction, relaxation and actions associated with muscle control can be complex. But during natural activity, a single muscle does not usually work in isolation but in harmony with others, not unlike an orchestra with individual instruments that must play just at the right time. Physical activity involves a nearly infinite number of variations all regulated by the brain. (In return, the brain receives significant stimulation from each muscle cell, or fiber—the reason why movement is a powerful brain therapy.)

Instead of attempting to isolate an abdominal or other muscle in a workout, such as with tradition sit-ups, it is best to create natural activity for activation of more muscle fibers. An example is lifting a heavy weight off the ground, especially when bringing it up to the waist, chest or above the head. These actions activate many muscles in a more balanced way, including all the abdominals.

Virtually all actions involve the abdominal muscles to some degree—from biking, running and walking, to swimming, swinging a golf club and playing chess. Even when the body is at rest, the abdominals help keep it stable and balanced.

Despite the hype, the abdominals don't bulk up nearly as much as other muscles because they are relatively thin structures. Those with so-called six-pack abs look that way to a large degree because of low belly fat, showing muscle detail very well. But reducing this fat won't happen by performing sit-ups—spot reducing is a myth. Burning off body fat is best accomplished by improving the metabolism, where diet plays a dominant role.

Sit Up Stress

Modern society has created many so-called luxuries like cushiony sofas, chairs and car seats, which render the abdominal muscles less active. The result is the common bulging belly (although much of this problem is excess fat), muscle imbalance, back pain and other physical problems. Taking advantage of this dilemma is a hyped-up industry marketing expensive abdominal exercise equipment. And most of these workouts don't work well and can even create other imbalances since they don't stimulate all abdominal fibers. Likewise for popular sit ups.

Performing traditional sit-ups learned in gym class usually won't help because of limited action, not contracting nearly enough abdominal fibers. In fact, this routine sometimes worsens fitness as evidenced in the exacerbation of low back tightness and even pain in many individuals.

Developing all the abdominals means stimulating those associated with multiple movement including flexion, rotation, extension, and lateral bending, both in the lying and upright position. A great abdominal workout is swimming with different strokes on your back, while face down, and sideways. This can play a more important role in development than traditional sit-ups because you can contract the full spectrum of muscle fibers.

For the few who truly need more abdominal power, which includes those athletes in boxing, martial arts, football and other contact sports, but usually not endurance, performing "crunches" can help. Lying on your back with knees bent to 90 degrees, sitting up 30 to 45 degrees only, then slowly back down. Reverse crunches, where the pelvis is lifted off the floor, encourages even more lower muscle contraction. Adding rotation, lateral bending and other actions, including stimulation of the pelvic floor muscles as described below, can help even more. But don't perform these to the point of any significant fatigue—soreness should not exist the next day. Enlisting the help of a professional to properly learn these or other effective routines is best.

The Optimal Abdomen

Not everyone has poor abdominal function. But there is a good chance that part or all of this muscle is impaired if you have back tightness or pain, poor posture, irregular gait, or have injuries in areas influenced by these fibers. And, if you have been unsuccessfully toning your belly, you may have neglected too many abdominal fibers while overworking others.

Below are two easy-to-implement activities that can significantly help improve abdominal muscle function.

1. The first is a natural biofeedback therapy, great for those just starting to get into shape, people with back problems, and many others, including athletes who have indications of abdominal dysfunction. While lying comfortably on your back, place the hands on the mid-abdomen and slowly breathe in and out. Feeling the belly push out on inhalation and pull in during exhalation is the basic breathing mechanism. If you are not able to perform this simple action easily, or especially if you breathe backwards, just practicing the movements two or more times each day for a few minutes can significantly help the abdominals (and diaphragm) function better.

This activity is part of a great relaxation technique called “The 5-Minute Power Break” that can help balance many muscles, reduce stress, improve breathing, and enhance brain function.

2. The second activity involves a combination of forced exhalation, pelvic floor muscle activation, and varying ranges of motion. This can be done lying on your back or standing, and eventually you will be able to perform them in any position. Here is the process:

- Blow air out of the lungs; then force more air out through contraction of additional abdominal fibers.

- Be sure to activate the transverse abdominals, an often-neglected part of the group, which encourages contraction of the pelvic floor muscles. Place your hands on the sides and lower most part of the abdomen to feel them tense up.

- At the same time, tighten your pelvic floor muscles. If you’re not sure how to do this, think about stopping the flow of urine. (These are the muscles stimulated during Kegal exercises for incontinence and sexual dysfunction.)

- Even more abdominal contraction will occur when your belly button is strongly pulled inward, as if it is trying to touch the spine.

- As you are able to perform all these actions, begin adding various movements—left and right rotation and side bending, flexion, extension, and combinations. This will help develop the full range of abdominal muscles.

Many people can benefit from performing this routine regularly to help retrain unused abdominal fibers. In a short time you will be able to use these muscles at other times:

- Before getting up and down from lying and sitting positions to avoid over-tightening the back.

- While sitting to counter the physical stress of this position.

- When bending to maintain stability.

- Just prior to lifting objects for added support and strength.

- While standing to maintain a better posture.

As you consciously use this natural biofeedback action, it will become easier for the brain to utilize more of the abdominal muscles when the need exists, which is much of the time. Ultimately, you may not even be aware of how much contraction is taking place. This activity is especially important while working out to maintain a better gait and protect joints, bones and other tissues from injury. Improved abdominal muscle function can also enhance athletic performance.

Pain Control

Poor abdominal muscle function can significantly contribute to common pain syndromes. If your back, neck, pelvis, hip or other area is hurting, try this simple activity:

- Stand barefoot looking straight ahead, with feet spread about shoulder width.

- Perform the abdominal biofeedback movements described above with forced exhalation, belly button back, and contraction of the pelvic muscles.

- While the abdominal muscles are contracted, avoid holding your body too rigid—maintain a relaxed support. Even though you obtained this position with forced exhalation, now you can breathe normally while keeping the body firm.

- For most people, performing this simple routine can immediately reduce—often eliminate—pain. Learning to maintain the necessary support from the abdominals can keep pain away.

- Once the abdominal muscles are better able to contract as needed, the brain can more easily correct other imbalances that cause pain.

If you have pain while moving, perform the same procedure. Stimulate abdominal contractions while walking, running, swimming, biking or during any activity. Improving gait through better muscle function can reduce pain and make movement more efficient.

Muscle Dysfunction

Like other muscles in the body, abdominal dysfunction can occur for two main reasons. First, the muscles may lose tone, or strength, from disuse. Too much sitting is a common reason, even in athletes. Well-intentioned but poorly designed exercises, such as traditional sit-ups or a single ab machine, can result in muscle imbalance, resulting in some fibers that are too tight while others stay weak.

The result is poor posture, altered gait, and tightening of the antagonist muscles, especially those of the lower back. This is the clinical picture in most patients with back pain. But just contracting the abdominals sufficiently and regularly in the course of the day as described above can significantly help improve muscle function and reduce or eliminate pain.

A second cause of abdominal muscle dysfunction is the condition of abnormal inhibition. This is a neuromuscular problem that includes the brain and nerves connecting to each muscle fiber. In this situation, the same type of low back pain or other problems can develop. But exercise won't help much as this is caused by the nervous system, not disuse or true weakness. It is as if a "circuit breaker" was tripped, turning off the muscle. A healthy body can sometimes correct this problem. But often, finding the right therapist who can properly evaluate the muscles and apply the appropriate therapy may be necessary.

To address the needs of both situations—poor strength and neuromuscular dysfunction—simple biofeedback can be effective. This helps train the brain to better communicate with more muscle fibers during each contraction resulting in better function and increased strength. (See Manual Biofeedback.)

The abdominal muscles may be our greatest fitness friend. Proper care involves using them wisely—don't avoid or abuse them. Retraining communication between the brain and muscle is easily accomplished and maintained, and can result in better body function, elimination of pain, and improved athletic performance.