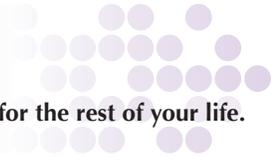




Finn Fitness & Wellness

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WORKING THE CORE

Almost every place you look you will find articles about one of the most popular physical exercises, the *abdominal crunch exercise*. The crunch exercise is also found in many group classes, and we wager that if you ask ten people in your local gym how many crunches they do, probably at least three of them will say more than a hundred crunches a day.

This is not encouraging news for those of us who want to look great, have a flat stomach, reduce the chance of back and neck pain, and perform better at sports. Because the abdominal muscles are only part of what makes up the torso core, conditioning the abdominal muscles *alone* will not improve the essential joint stiffness and stability needed to give the large prime movers of the body a working foundation. On the contrary, a weak and unbalanced core will in fact result in lumbar curve and poor posture, which frequently leads to chronic low back pain. Exercises to strengthen the body's core are most effective when they are balanced in such a way as to ensure that the entire torso works as a single unit. This will help us maintain appropriate posture as well as reduce the stresses and strains on our spine.

In this article you will learn how the core of our body is put together, what our core does for us, and how to keep our core healthy and strong.

THE CORE

The term "the core" is a buzzword created by the fitness industry, which refers to all the muscles that cross the pelvis, and consists of many different muscles deep inside the body next to the bones. These muscles have more leverage, and when functioning properly, serve to stabilize the spine, pelvis, and shoulder, and to provide a solid foundation for our bodies. The core of the torso is like a cylinder around our midsection and is comprised of the following four primary muscle groups:

pelvic floor – a group of six muscles creating the "bottom" of the cylinder

transverse abdominus – encompasses most of the circumference as a girdle around the belly

multifidi fibers – one to four inches long, these muscles fan out from the spine deep within the superstructure of the spine

diaphragm – this muscle forms the "top" the cylinder

The torso core is an important base of support for our legs, arms, and neck, and when all parts of the torso core are strong and functioning together, we can lift, bend, and perform all kinds of movement efficiently and with less risk of injury. When conditioning the torso core, we must target all of these muscle groups to ensure our exercises are effective.

The objective of core stability is to maintain a solid foundation in order to effectively transfer energy from the center of the body out to the limbs, and the collection of muscles that accomplish this include:

rectus abdominis – a long configuration of muscle extending along the front of the abdomen, oftentimes referred to as the “six-pack”

erector spinae – a group of three muscles running along the neck to the lower back

multifidus – these muscles extend and rotate the spine, and are located under the erector spinae along the vertebrae

external obliques – to be found on the side and front of the abdomen around the waist

internal obliques – the muscles are located under the external obliques but run in the opposite direction

transverse abdominis – these are the deepest of the abdominal muscles located under the obliques or waist muscles, and they wrap around the spine like a weight belt for protection and stability

hip flexors – these are located in front of the pelvis and the upper thigh, and include the psoas major, iliacus, rectus femoris, pectineus, and sartorius muscles

gluteus medius and minimus – located at the side of the hip

gluteus maximus, the hamstring group, and piriformis – muscles located at the back of the hip and upper thigh leg

hip abductors – to be found at medial thigh

The fitness industry has historically encouraged people to spend time training these muscles independently, which can have both good and bad results. The body works in chains of muscles to perform movements. When we focus on exercising one muscle in a chain and make it very strong, it becomes the dominant muscle, which can then overpower and sometimes even injure other muscles or joints. It is a very common occurrence that a person will have one muscle along a chain of muscles that is weak. Working this muscle to make it stronger is important. However, that muscle must also be integrated back into the chain so it can contribute to a cohesive movement pattern.

As an example, let us review the popular floor crunch exercise. The crunch exercise only works the upper six segments of the *rectus abdominis*, or “abs” as they are often called. These muscles are also commonly referred to as a “six-pack.” Well, there are really eight segments in that “pack,” and most exercises are not designed to train the bottom two segments of the rectus abdominis. Over the past seven years we have tested hundreds of people for upper and lower abdominal strength. More than half of those tested had adequate upper abdominal strength, however not one of them had sufficient lower abdominal strength, and about 40% could not even activate their lower abdominal muscles.

The floor crunch exercise is a very small movement of just flexing the thoracic and upper lumbar spine while at the same time holding the hips and neck steady. These upper abdominal muscles are just one part of the entire flexion chain of the body. This muscle chain also includes the lower abdominals, including the rectus femoris, psoas major, iliacus, tensor fasciae latae, internal and external obliques, sternocleidomastoid, and the longus /colli. All of these muscles should work in concert to flex the entire body at the hips, lumbar spine, thoracic spine, and cervical spine. If one of these muscles is not functioning properly, or is weaker than the rest, it must be identified and trained in an isolated fashion to build up strength to catch up with the rest in order for the entire flexor. The common “Hanging Leg Raise Exercise” is an example of an exercise that does not incorporate the entire flexor chain, and can result in a weakness in the lower abdominal muscles

because one will flex at the hips and the thoracic spine, but extend at the lumbar spine. In contrast, if the “Crunch on a Ball Exercise” described below is performed correctly, the entire flexor chain will be worked in a full range of motion.

EXERCISE: *Crunch on a Ball*



- a. Lie supine over the ball, head resting and back resting on the ball. Make sure your tongue is touching the roof of your mouth behind your front teeth. The tongue will go there after you swallow.
- b. Draw your belly button in towards the spine and start to exhale.



- c. Curl your head up, one vertebrae at a time.
- d. Continue with the neck, chest, and lower back, curling all the way to the top.



- e. Un-curl your spine as you inhale on the way back down, finishing with the neck and head.

- f. Repeat this exercise eight to twelve times, slowly, for one to three sets.

Another important factor for us each to consider is to make sure we are balancing *all* of the muscles all around our body. It is critical that we train the flexion chain as much as we train the extensor chain on the backside of our body. Many people perform numerous crunches as part of their regular workout regimen, but very few, if any, perform extensor exercises. Working the flexor chain more than the extensor chain encourages poor posture, resulting in a chest that is pulled down and a head that is pushed forward, which can, in turn, lead to lower back pain. Some of us only train the muscles we can see in the mirror. What we really need to do is to train in a way that helps us achieve and maintain a normal posture, which includes lateral flexion and rotation. For example, baseball players, tennis players, and golfers need to train rotation in the opposite direction from the way they swing the bat, tennis racquet, or golf club in order to avoid the common problem of developing pain in the spine from rotational forces always pulling on the spine in just one direction.

HOW TO IMPROVE THE FUNCTION OF THE CORE

Here are some basic recommendations on how we can improve the function of our core muscles:

1. **Train the inner unit to function correctly in every movement we do.** We should be able to maintain proper inner unit function through all movements while exercising, including squatting, lunging, bending, and pushing. If we cannot maintain the inner unit during an exercise because the weights are too heavy, or the exercise is too difficult for our stabilizers, we could be subject to an injury.
2. **Exercise through a full range of motion to work the entire chain of muscles to perform the movement.** If one of the muscles in a chain is weak or not working properly, it is important that we identify the problem and train that muscle in isolation until it is strong enough to work with the entire chain of muscles.
3. **Train our body equally to maintain proper balance of all of our muscles.** Perform an equal number of flexion and extension exercises and sets. This also applies to lateral flexion, rotation, pushing and pulling. If our work demands that we perform a repetitive physical activity every day, we should make sure that we do extra exercises of the opposing movement to counter that activity. As an example, a cashier at the store typically rotates one way while sliding items across the scanner. To counter that repetitive physical action all day long, the cashier should spend time training the body to rotate in the opposite direction to maintain balanced strength in the body.
4. **Always perform the big and difficult exercises that require all the muscles to work first.** Afterwards, we should work our way down to isolation exercises for our weaker muscles.
5. **Exercises that require the most amount of balance should be performed first.** Exercises that require the least amount of balance should be performed last.
6. **Outer unit and core muscles, just like all the other prime movers of the body, should be rested between workouts.** The body's *phasic muscles* should not be trained to fatigue every day, and at the very least require a minimum of one day of rest between workouts. However, this does not mean we should not train every day. By varying our exercise routine we can maintain a healthy daily work out regimen. For example, we can work on training the flexor chain one day; work on training the extensor chain the following day; followed up by training the lateral flexion and rotation on the third day.

7. **Never train a muscle that is still sore from the last training session.**
8. **Never exercise through pain.** Pain is our body's way of telling us that tissue is being damaged. When muscles "burn" it means they are working hard, but we need to be vigilant that we do not overwork our muscles.
9. **Change our exercise routine at least every six weeks in order to continue to improve and benefit from our program.**
10. **Proper rest is as important as the exercise and training.** If we are not resting, sleeping, eating and drinking enough water, our exercise program results will be limited.

THE INNER UNIT

As discussed above, the muscles of our body's torso core, when activated correctly, stiffen, stabilize, and protect the joints in our spine from injury when our spine is put under pressure from normal every-day movement, or from the added stress when we are lifting, holding, pushing, or lunging, or when exercising or playing sports. In 1987 Nikolai Bogduk and Lance Twomey published their extremely important book *Clinical Anatomy of the Lumbar Spine*, noteworthy because this was the first time clinical observations of how the abdominal muscles and back muscles work together as a functional unit were understood and effectively described.

In on-going studies, researchers Richardson, Jull, Hodges and Hides continued to develop our understanding of how a group of deep abdominal wall muscles they call the "inner unit" work in concert with the other core muscles. The muscles of the inner unit include the transverse abdominis, the posterior fibers of the internal obliques, pelvic floor muscles, multifidus and lumbar portions of the longissimus and iliocostalis, and the diaphragm. As the inner unit is under separate neurological control from the other muscles of the core, traditional gym exercises typically do not condition these key muscles so as to improve spinal stability, which oftentimes leads to spinal injury and chronic back pain. When functioning properly, these essential small muscles provide the necessary stiffness and stability to the spine, pelvis, and rib cage to provide a stable platform for the large muscles.

The inner unit is like an internal weight belt. When the transverse abdominis is activated it pulls on the thoracolumbar fascia membrane covering the deep muscles of our back, stretching it across the back of our spine. This stiffens and stabilizes the spine. When we sit improperly with poor posture, or wear weight belts, the inner unit is effectively "turned off." This is how many people who lift with weight belts can injure their back – they take the weight belt off and because the inner unit is turned off, the spine is free to move in ways it was not meant to. Another example of this is how sedentary people can sometimes damage their spine by just simply reaching for something while they are sitting down.

In our evaluation of the strength of the inner units of over a hundred people from all walks of life, in varying degrees of physical condition, we discovered that less than 5% of these had adequate inner unit function and strength. Without the inner unit properly conditioned and activated, we are each increasing the risk of spinal injury with every crunch, squat, or even such simple activities as bending down to pick up the newspaper.

CONDITIONING THE INNER UNIT

The inner unit must be turned back on and conditioned to be active during all of our movements in our daily lives. Below are two beginning exercises to start conditioning the inner unit. Should you experience any pain while performing any part of these exercises, we strongly recommend that you seek the advice of a top exercise specialist or physical therapist.

EXERCISE: Four Point Transversus Abdominis Trainer



- a. With the spine in neutral alignment, take a deep breath in and allow your belly to drop toward the floor.
- b. Exhale and draw your navel in toward your spine as far as you can. Once the air is completely expelled, hold the navel toward your spine for ten seconds, or as long as you comfortably can without taking a breath (but not longer than ten seconds). Throughout the breathing pattern, keep your spine motionless.
- c. This process should be repeated ten times to complete a set.
- d. Rest for 30 seconds after completing one set. When you are ready, build up to completing three sets of the exercise.

EXERCISE: Horse Stance Vertical



- a. Place your wrists directly below the shoulders and your knees directly below their respective hip joint.

- b. Your legs should be parallel and your elbows should remain turned back toward the thighs with fingers directed forward.
- c. Place a dowel rod along your spine and hold perfect spinal alignment. The rod should be parallel to the floor. The space between your lower back and the rod should be about the thickness of your hand.
- d. Draw the navel inward toward the spine to activate the inner unit.
- e. The Horse Stance Vertical is initiated by lifting one hand off the floor just enough to slide a sheet of paper between the hand and the floor of mat. The opposite knee is then elevated off the floor to the same height. Keep the dowel rod level at all times. Hold this position for ten seconds. After ten seconds, alternate hands and knees, again lifting them only enough to slide a sheet of paper between the extremity and the mat.
- f. The target number of repetitions is ten per side, with a ten second hold in each position. When you are able to complete the exercise for three sets and take a one-minute rest between sets, you are ready to add the Horse Stance Horizontal exercise to your program. Perform one set of the Horse Stance Vertical exercise as a warm up for the Horse Stance Horizontal exercise.

EXERCISE: Horse Stance Horizontal



- a. The start position is identical for all Horse Stance exercises.
- b. Raise one arm to a point 45 degrees off the midline of the body and hold it in the same horizontal plane as the back. Always keep the thumbs pointed upward to increase lower Trapezius activation.
- c. Elevate the leg opposite the arm you have raised to the point at which your leg is in the same horizontal plane as your torso. As you elevate the leg, do not tilt your pelvis forward; you will know if this happens if the space between the stick and your lower back increases. Hold the leg out straight, activating the muscles of the buttocks.
- d. At no point during the exercise should your shoulder girdle or pelvis lose their horizontal relationship with the floor. It is quite common for the shoulder to drop on the elevated arm side and for the hip to rise on the side of the extended leg, but focus on avoiding this as either of these faults constitutes poor form.
- e. The arm and opposite leg are now held in this position for ten seconds before switching sides. Repeat ten times per side, providing you can maintain perfect form. Lack of attention to detail is exactly why many exercise programs fail.

If you cannot perform at least two sets of ten repetitions of both of these exercises the first time you try them, then please seek some coaching from an exercise specialist with a vast knowledge of conditioning the inner unit to assist you.

The exercises described above are beginner exercises. To condition the inner unit for upright activities and to perform typical daily tasks will require more advanced exercises. Athletes that are exposed to higher intensity loads on the spine need even more advanced training of the inner unit.

THE OUTER UNIT

The outer unit is made up of *phasic muscles*. The phasic muscles are meant to move the spine in flexion, extension, lateral flexion, and rotation. These muscles are also meant to work together with the inner unit to be gross stabilizers of the spine. The outer unit is made up of four independent systems that work together to stabilize the spine: the deep longitudinal system, the posterior oblique system, the anterior oblique system, and the lateral system. The function of the outer unit is described in greater detail in the book *Movement Stability & Low Back Pain* by S.A. Gracovetsky. When we walk, all four of our outer unit systems are working at a low level, accepting and creating forces from our arms and legs with every step. Gracovetsky demonstrates in his book how all movement starts and ends at the spine with the creating of forces and the dissipation of forces.

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