

Core Power

“Absorb what is useful, reject what is useless”. – Bruce Lee

Core training has taken the exercise world by storm. This is evident in the variety of books, articles, and videos available on the subject. You can walk into almost any health-club facility today and see individuals engaged in some form of core training.

This article will look at what the core is, how it works, and most importantly, how individuals can activate their core properly.

What is The Core?

The core is essentially where our center of gravity is located and where movement begins. Core musculature consists of 29 pairs of muscles, and they support the lumbar/pelvic/hip complex in order to stabilize the spine, pelvis, and kinetic chain during functional movement.

The core can be divided into two categories of muscles:

- 1) local – stabilization oriented;
- 2) global – movement oriented. The local muscles are further broken down into primary and secondary categories.

Local Muscles

Think of local muscles as the deeper muscles, the ones close to your spine and responsible for keeping your spine stabilized. The primary local muscles are the transverse abdominis and multifidi (the two most critical muscles for providing stability), and the secondary are the internal obliques, quadratus lumborum, diaphragm, pelvic-floor muscles.

Global Muscles

The global muscles are superficial and are responsible for controlling your body's movement. They are made up of the following muscles: rectus abdominis, external oblique, erector spinae, psoas major, and iliocostalis.

The Difference Between Local and Global Muscles

The local muscles are made-up of slow-twitch fibers, while the global muscles are made-up of fast-twitch fibers. Local muscles are active in endurance activities, while global muscles are used in power activities. Local muscles are activated at low-resistance levels (30-40% of maximal contraction) while global muscles are activated at higher resistance levels. (About 40% of maximum contraction).

That last point is the most important because it is the main reason why many people have weak core muscles. In most people, global muscles take over and dominate the local muscles in jobs that should be done by the local muscles (see Core Injury).

Core Function

The core operates as an integrated functional unit (where the local and global muscles work synergistically to allow movement). When working optimally, each component distributes,

absorbs, and transfers forces. Therefore, allowing the kinetic chain to function efficiently during dynamic activities.

Core Injury

After the first episode of back pain, the deep stabilizers (local muscles) change how they function in that they have delayed action and are only turned on after you move. Because deep stabilizers do not function as they should, the brain recruits global muscles to compensate. The result: pain in back, pelvis, glutes.

One mistake many people make is to try to train the movement system before, or in place of, the stabilization system. Always train stability before mobility.

Performing traditional abdominal exercises without proper internal pelvic stabilization has been shown to increase pressure on the disks and compressive forces in the lumbar spine. In addition, performing traditional low-back hyperextension exercises without proper internal pelvic stabilization has been shown to increase pressure on disks and ligaments in the lower back.

Best Exercises for Preventing Low-Back Pain

As seen in the Journal of Orthopaedic Sports Physical Therapy, 38, p. 596-605, 2008 - abdominal brace, curl-up, side-bridge and bird-dog.

The abdominal brace allows all the contracting muscles in the abdominal wall without drawing in or pushing out to activate (obliques and rectus). These aforementioned muscles along with the transverse abdominis, allow for a co-contraction via their attachment to the lumbodorsal fascia with the multifidi. These bracing allows for an increased spinal stiffness.

How to Brace

- You'll have to reach behind your back and press your thumbs into your lower back extensors while you slightly bend from your hips.
- Feel the extensors contract
- Then extend to an upright posture to the point where they feel flaccid again
- Without moving, contract abs and feel the extensors contract again
- This is called a brace

Dr. Rob's "Hot & Not" List of Ab. Workouts

Hot	Not
Curl-up	Sit-up
Side-bridge	Leg raises
Bird-dog	Hang-leg lifts

Dr. Rob's 3 Favorite Exercises for Core Activation

1) Curl-up for Beginners

- Trains the rectus abdominis
- Starting posture is lying supine with your hands supporting lumbar spine
- Bend one leg
- Do not flatten back to floor
- Head and neck unit locked onto the ribcage
- Elbows remain on the floor while elevating the head, with shoulders slightly off the floor
- Rotation focused on the mid-thoracic region
- For those with neck discomforts, place tongue on the roof of the mouth. This helps stabilize the neck muscle patterns



Curl-Up Beginner



Side-Bridge Beginner

Curl-up for Intermediate/Advanced

- Pre-brace abs (only advanced)
- Lift elbows (intermediate and advanced)
- Push tongue to roof of mouth
- Raise head and shoulders slightly

2) Side-Bridge for Beginners

- Training quadratus lumborum, lateral obliques and transverse abdominus
- Above mentioned muscles are spine stabilizers
- Abdominal bracing at all levels
- Starting position is on the side
- Use down-side shoulder and elbow to elevate upper body (see pic.)
- Top leg is in front of bottom leg (heel of lead foot to toe of bottom foot)
- The free hand caps the opposite shoulder



Front-plank



Curl-up for Intermediate/Advanced

Side-Bridge for Intermediate/Advanced

- Upper body same as beginner
- Hip-hinge to bring lower body off floor (see pic.)
- Advanced - ability to roll into other positions (i.e. front plank – see pic.)

3) Bird-Dog

- Training back extensors (including longissimus, iliocostalis and multifidii)
- Ab brace
- Raise opposite arm and leg simultaneously (see pic.)



Side-Bridge for
Intermediate/Advanced



Bird-Dog

Conclusion

The core is a compilation of many muscles that can be divided into two categories, for ease of explanation. One category is the stabilization (local) group that has little ability to move joints and is best suited for stabilization. The second category is a movement (global) system that is designed to produce enough forces to move joints.

Both group must work together to produce efficient and effective human motion. Since the core is the center of all motion, it is a critical part of any individual exercise routine. So, brace up and train for core power!

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