NFPT
National Federation of
PROFESSIONAL TRAINERS

The Core

The core is where most of the body's power is derived. It provides the foundation for all movements of the arms and legs. The core must be strong, have dynamic flexibility, and function synergistically in its movements in order to achieve maximum performance. Motion of the human body is not isolated to one muscle or tissue moving in one specific direction. It is a complex event involving agonist and antagonist structures that work together to create changes in position and stabilizes the body in all three directional planes of motion. Regardless the type of sport it is essential to have core strength and trunk stability to maximize performance and prevent injury, especially in active daily living.

The foundation of the core consists of more than just the abdominal muscles. It includes muscle attachments deep within the torso, from the pelvis up to the neck and shoulders. Abdominal muscles work together to transmit a compressive force and act to increase intra-abdominal pressure that stabilizes the lumbar spine. They can work individually to perform trunk rotation, while the internal and external obliques on the same side can work synergistically to laterally flex the spine. The muscles of the core include the following structures:

External Obliques – Abdominal muscles that attaches at the lower ribs, pelvis, and abdominal fascia.

Internal Obliques – Abdominal muscles that attaches at the lower ribs, rectus sheath, pelvis and thoracolumbar fascia.

Transversus Abdominis – Abdominal muscles that attaches at the lower ribs, pelvis, and thoracolumbar fascia, and rectus sheath.

Rectus Abdominis –Abdominal muscle that attaches at the fifth through seventh ribs, the lower sternum and the front of the pubic bone. This muscle flexes the spine, compresses the internal organs of the abdomen, and transmits forces laterally from the obliques. It is a common fallacy that the upper and lower rectus are isolated.

Erector Spinae – helps to counterbalance all the forces involved in spinal flexion. They begin as the sacrospinalis tendon which attaches at the sacrum and ilium. This tendon gives rise to different muscles that run up the spine and obliquely to attach at lateral parts of the vertebrae and ribs. In the cervical region, these muscles attach at the base of the skull.

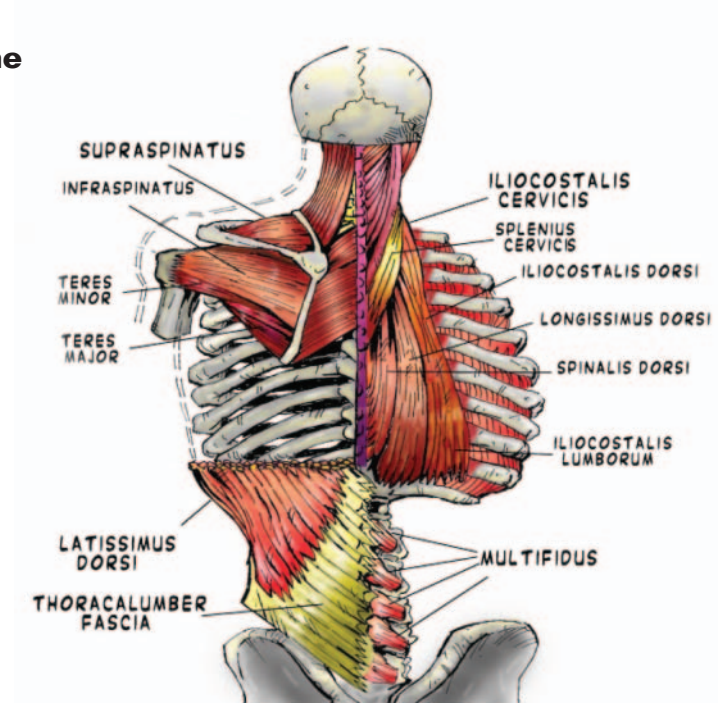
Quadratus Lumborum – Attaches at the 12th rib and the upper 4 lumbar vertebrae and the pelvis. It stabilizes the lumbar spine in all planes of motion while stabilizing the 12th rib. It attaches to the diaphragm during respiration and laterally flexes the trunk.

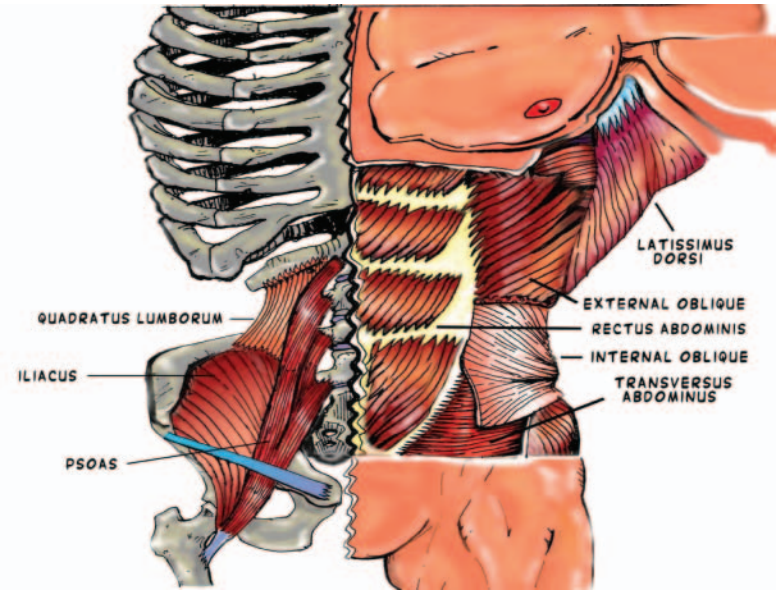
Latissimus Dorsi – It is the largest spinal stabilizer attaching from the thoracolumbar fascia to the lumbar vertebrae, sacrum and pelvis, traveling superiorly to the humerus. It assists in lumbar extension and stabilization, and also performs pulling motions through the arms.

Thoracolumbar Fascia – Connects the latissimus dorsi, gluteal muscles, internal obliques and transverse abdominis, supplies tensile support to the lumbar spine, and is used for load transfer throughout the lumbar and thoracic regions.

Abdominal Fascia – Connects to the obliques, rectus abdominis, and pectoralis major. Fascia connections that cross the midline transmit forces to the muscles opposite side.

Muscles of the Spine

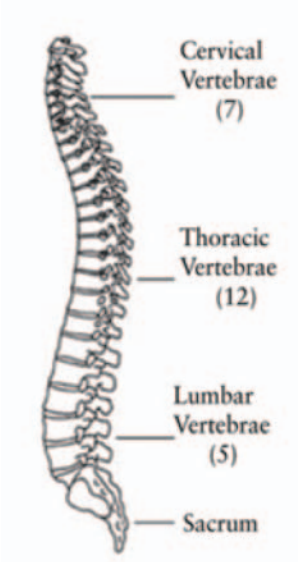


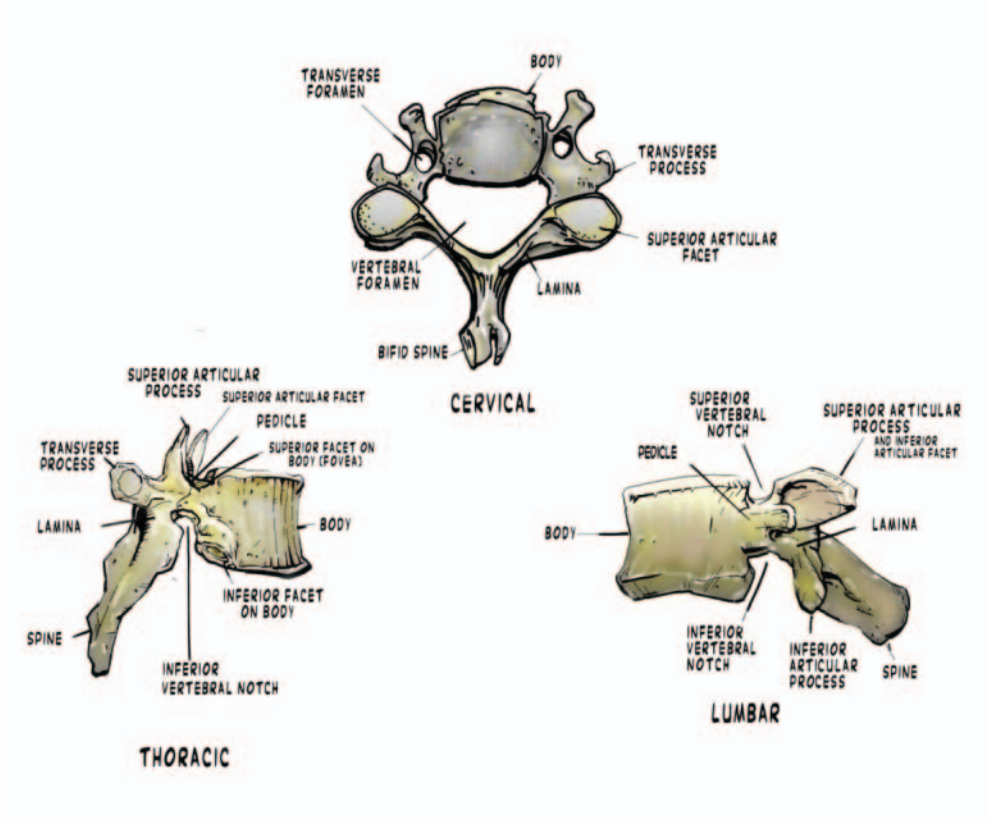


Multifidus – Deep spinal muscles that run segmental from the cervical spine (C2) to the sacrum. They allow for extension, and, to a lesser degree, rotation and lateral flexion providing stability of joints at individual discs of the spine.

Interspinales, Intertransversarii, Rotatores – Deep structures that directly attach to the spinal column. These are very important for rotational motion and lateral stability.

The Spine and its Vertebrae





Functional Core Routine

The common myth is that training the core simply involves sit ups and back extensions. An efficient core routine consists of multiplanar movements or training in all planes of motion. As the body moves its center of gravity changes, and forces exerted by and on the body's tissues are constantly changing. Dynamic stabilization must be included to increase proprioception and stability in the trunk and rest of the body. This allows the parts of the body to react efficiently to external forces and stresses, such as gravity, changes in terrain, carrying loads, and internal forces exerted by other muscles.

A proper functional core routine consists of dynamic movements, challenges the center of gravity and isometric exercises. To completely train the core, you must also include dynamic stabilization, isometric and proprioceptive movements not just for the mid section but the entire trunk. Medicine balls, balance boards, foam rollers and physio balls are great tools for core training and should be integrated into every program. It is a fact that training on the physio ball (challenged environment) is superior to traditional floor exercises. As a person ages, balance and stability become compromised. If balance and stability are not addressed they will consistently degrade.

Dynamic stability is best achieved through training in functionally practical positions that mimic activities or movements in a particular sport or daily activity. With this in mind, an observation has been drawn remarking most core training is done while sitting or lying down limiting pelvic movement which has little functional value.

A weak core contributes to poor stability and inhibits proper limb movements causing muscle imbalances in the kinetic chain. This is why falls are common in the geriatric population. Many back and hip injuries are related to weak core muscles. There are many small muscles in the core that the general population knows little about or addresses during exercise. MRI images show atrophy in these small muscles in most spinal injuries. These little muscles need to be trained in order to maintain a healthy spine. Without stability, even the strongest person can not effectively propel a force into the environment.

The goal of functional core training is to develop the core as a system of efficient automatic responses to work as a stable base from which to generate optimal force and motion. A key term to know is proprioception, the sense of the relative position of neighboring parts of the body. Dynamic Stabilization is another key term to be familiar with and this relates to strengthening of the core muscle stabilizers of the spine (transverses, abdominis, and multifidus) while keeping the client in a 'Neutral Spine' position.

Core Stability Testing to evaluate your client's core strength is crucial when creating a solid exercise program. We will show exercises which are good to incorporate into your clients evaluation as well as into the routine you set for them. To train the core effectively you must establish motor control, mobility, and stability as well as developing core strength and increasing its power.