

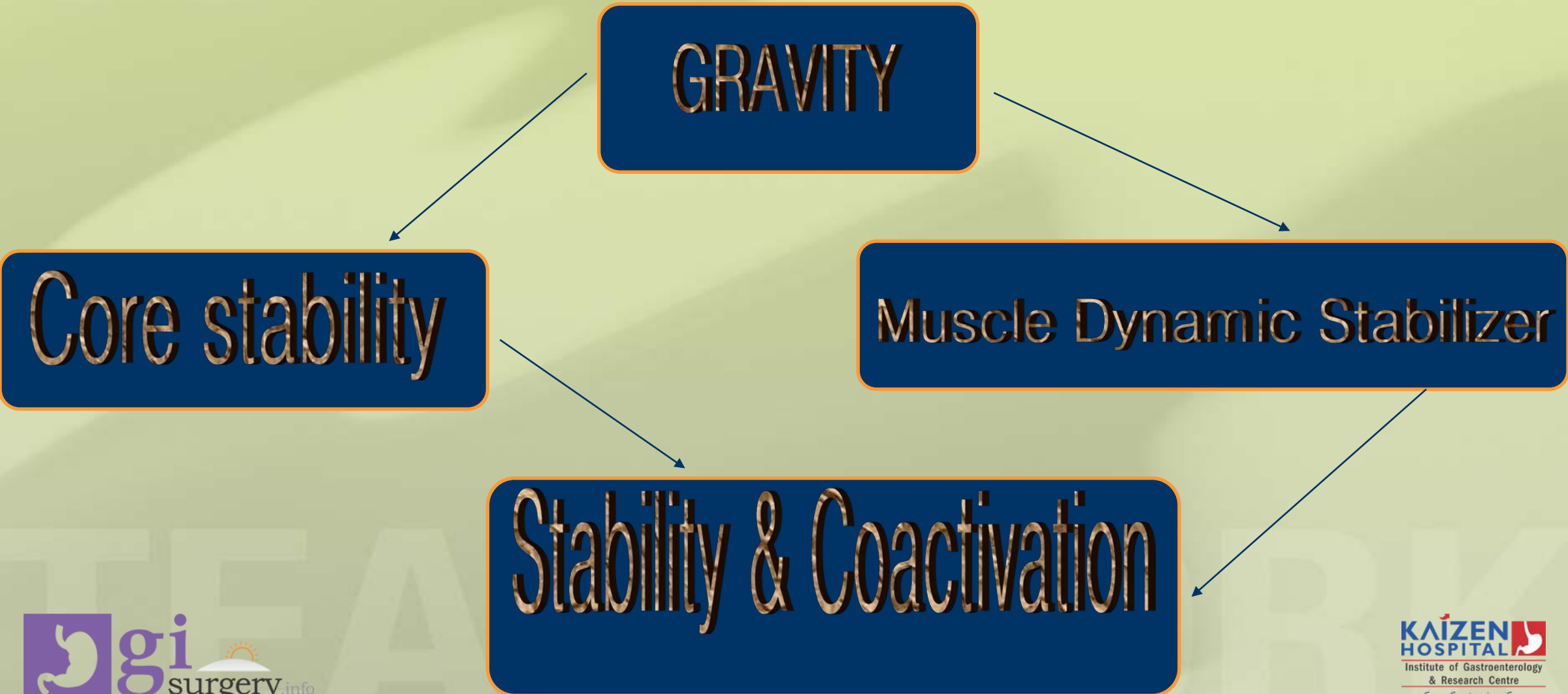
Core stability

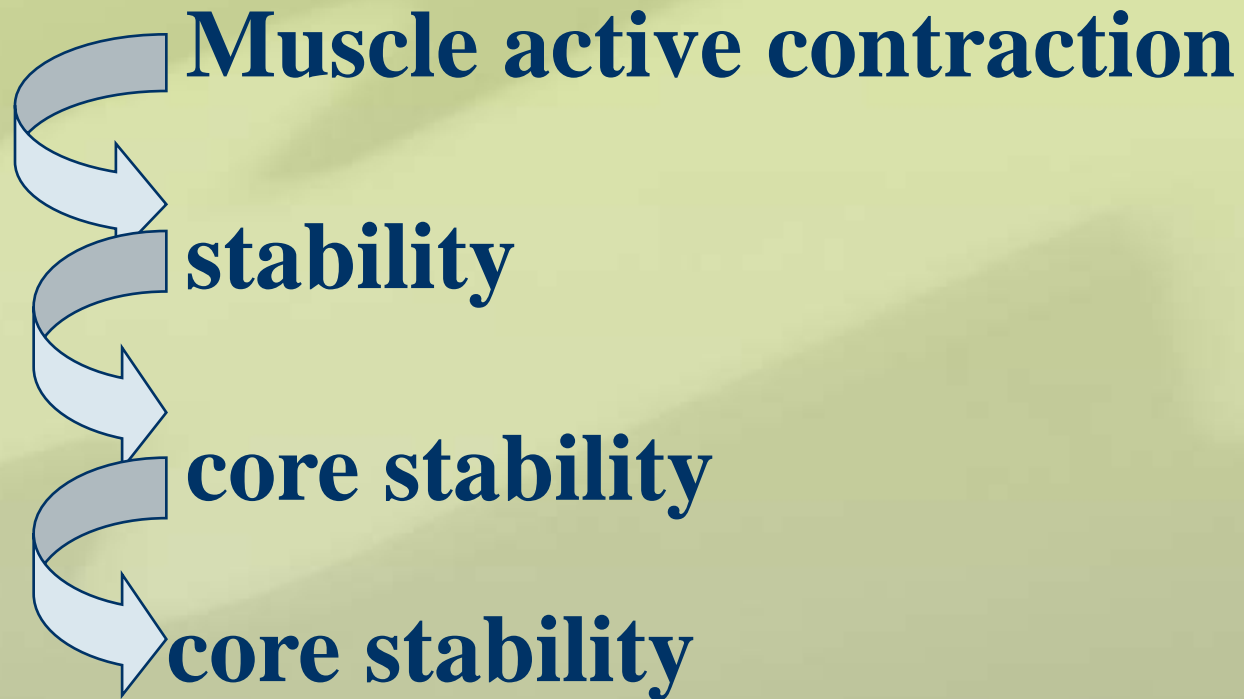


By:-

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Proximal stability for distal mobility







- ❖ **Marshall(2005) : global stability system
local stability system**
- ❖ **Akuthota(2004) : global muscle
local muscle**
- ❖ **Neumann(2002) : intrinsic muscular stabilizer
extrinsic muscular stabilizer**
- ❖ **Arokoski(2001) : deep local stabilizing muscle –
multifidus, transverse abdominis
global muscle –**

prime mover ,

multifidus, transverse abdominis ≙ global muscle

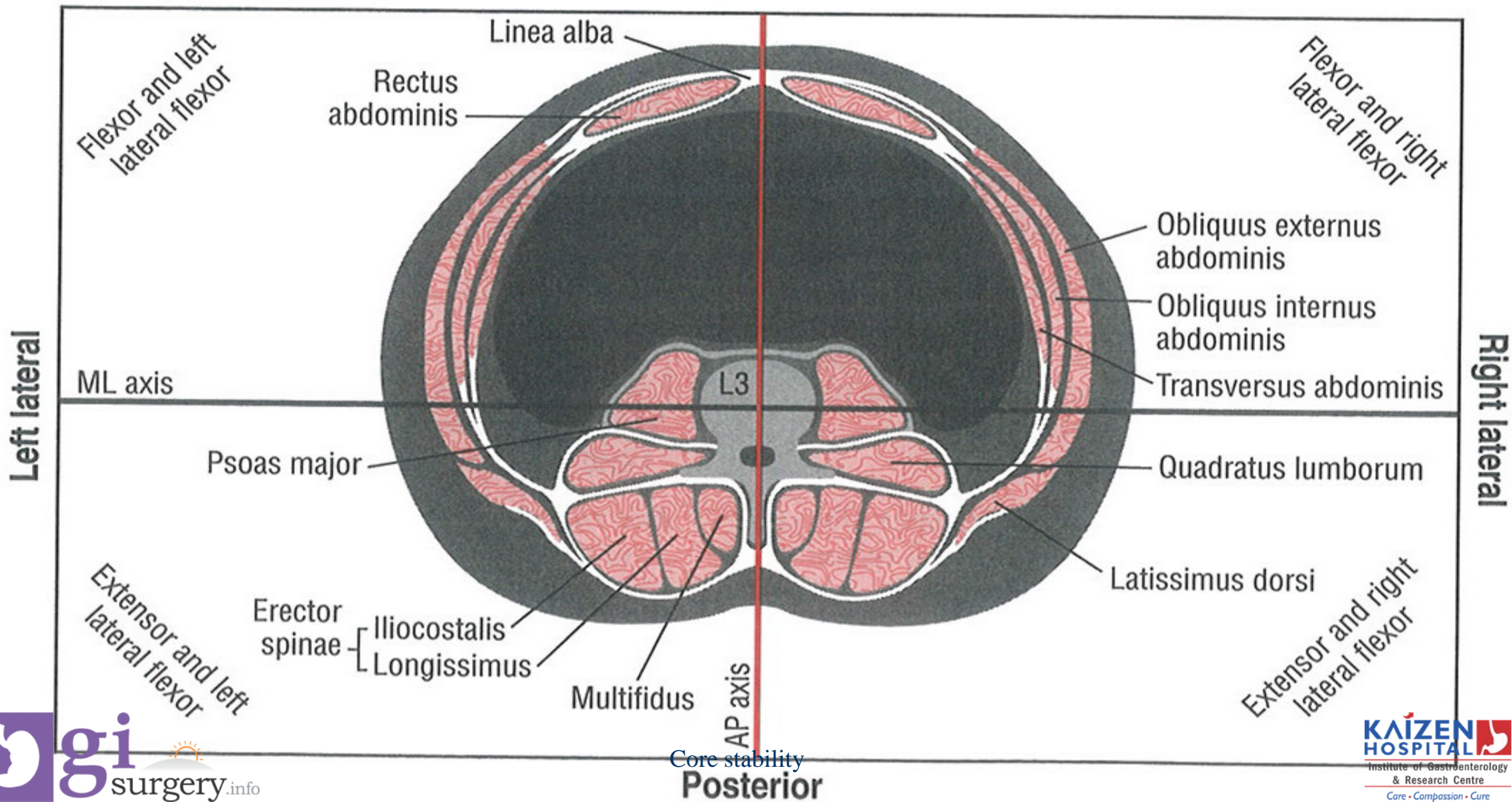
Core stability



- ❖ **Abdomial muscle** = rectus abdominis, external oblique, internal oblique, transverse abdominis
- ❖ **Rectus abdominis** = iliopsoas trunk flexion prime mover
- ❖ **External oblique & internal oblique** = trunk “primary axial rotators”
- ❖ **Transverse abdominis** = corset muscle
- ❖ **Erector spinae** = spinalis, longissimus, iliocostalis
- ❖ **Multifidus** = dynamic spinal extensor
- ❖ **Psoas major** = vertical stabilizer
- ❖ **Quadratus lumborum** = hip hiker

Superior view

Anterior





Core stability

- ❖ “feedforward postural response”
- ❖ “anticipatory mechanism”
- ❖ 3 major parts of core stability
 1. Muscle performance
 2. **CARDIO PULMONARY ENDURENCE**
 3. **FUNCTIONAL ACTIVITY**



Core stability

❖ Lumbar spine stability & postural control

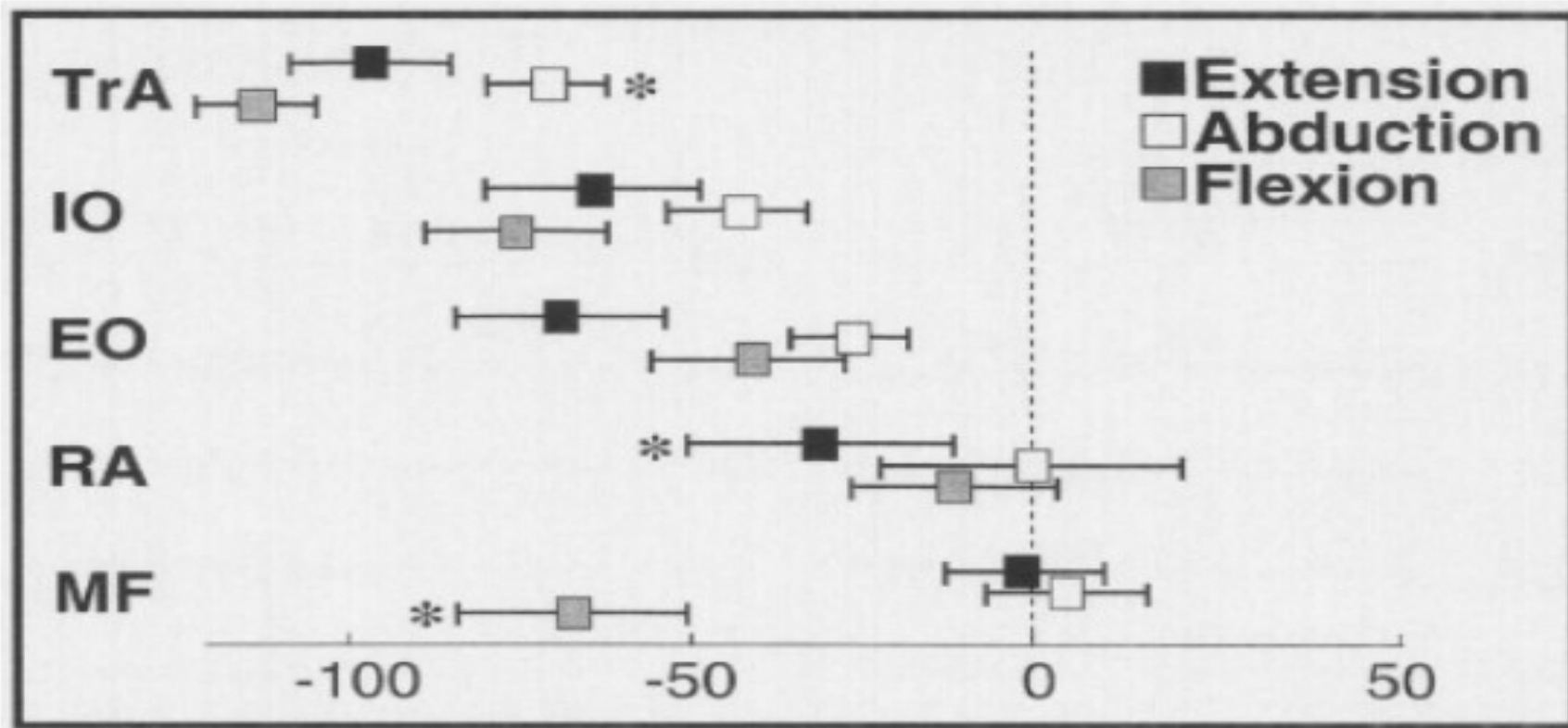
❖ Muscle movement — perturbation

activation





Anticipatory Mechanisms



Mean time of onset of EMG activity of each of the trunk muscles relative to that of the prime mover for all subjects for movement in each direction.



❖ **Trunk muscle 20~40msec (recruitment)**

stability

Reaching (postural stability)

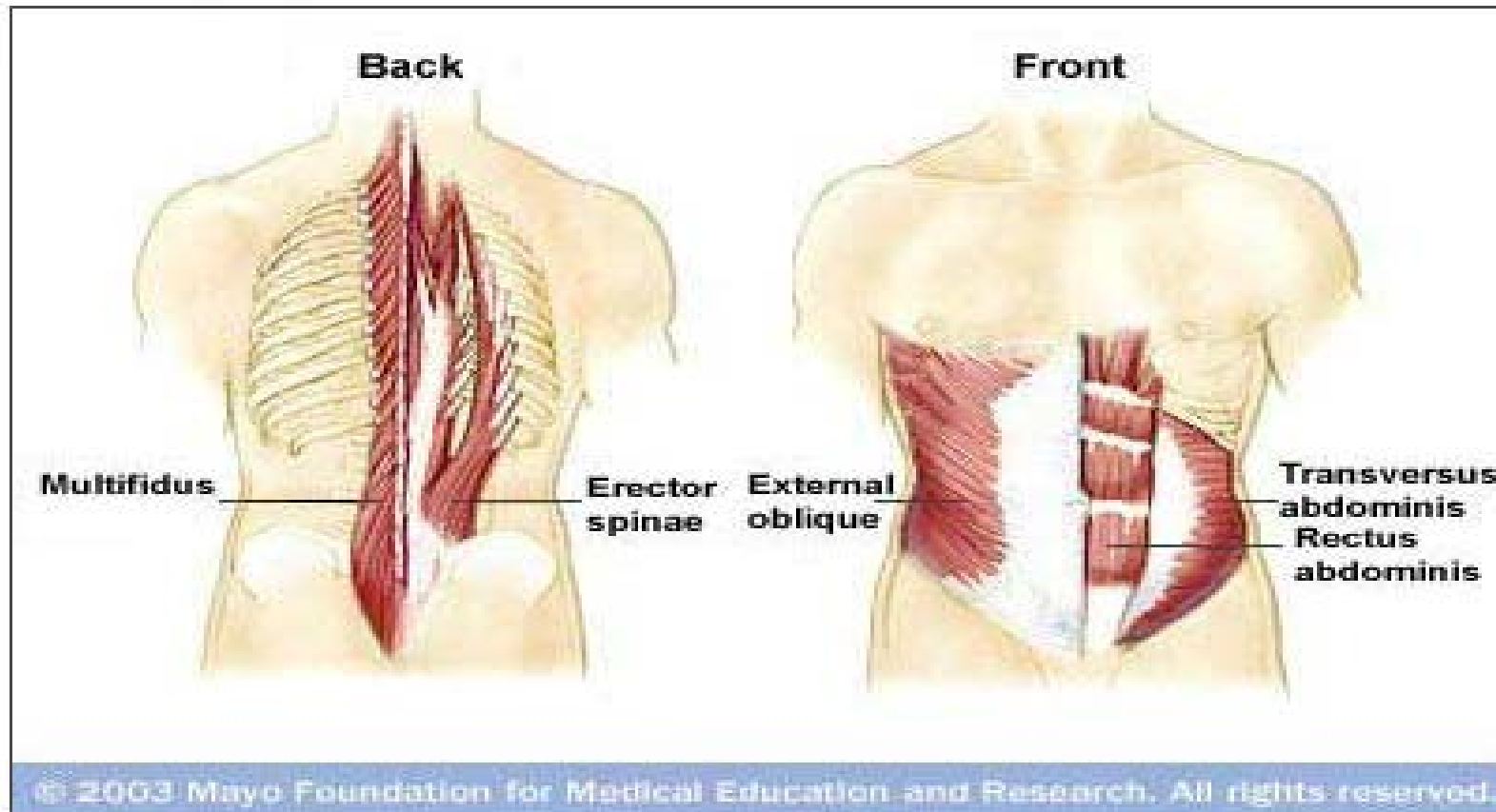
Transverse abdominis & multifidus co-contraction

Stance postural control

erector spinae, abdominals, gluteus medius, iliopsoas muscle

“synergistic relationship”

Core muscles



Twenty-nine muscles make up your body's core. Some of the major muscles include those in your back (multifidus, erector spinae) and your abdomen (external oblique, transversus abdominis, rectus abdominis). Your core muscles work in harmony to provide stability to your body and protect you

Core stability



❖ Core stabilization

Kinesthetic training

Spinal stabiliation exercise

Functional activities



Core exercises: Beyond your average abs routine

A well-balanced core exercise routine focuses on more than your abs. Gain a better understanding of the role your body's core muscles play and how to strengthen them.

Did you know that your core is where all movement in your body originates? Core exercises are an important part of overall fitness training that, except for the occasional sit-up or crunch, are often neglected.

To get your core muscles in better shape, it's important to understand what your body's core is and how you can strengthen it.



Core exercises: Beyond your average abs routine

Understanding your core

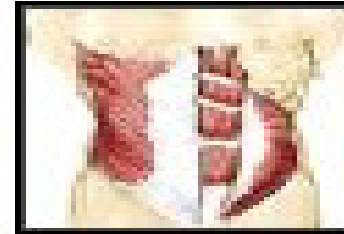
Your body's core — the area around your trunk and pelvis — is where your center of gravity is located. A strong core gives you:

- Increased protection and "bracing" for your back
- Controlled movement
- A more stable center of gravity
- A more stable platform for sports movements

When you have good core stability, the muscles in your pelvis, lower back, hips and abdomen work in harmony. They provide support to your spine for just about any activity.

A weak core can make you susceptible to poor posture, lower back pain and muscle injuries. Strong core muscles provide the brace of support needed to help prevent such pain and injury.

CLICK TO ENLARGE



Core muscles

Core stability.



Focus on your core

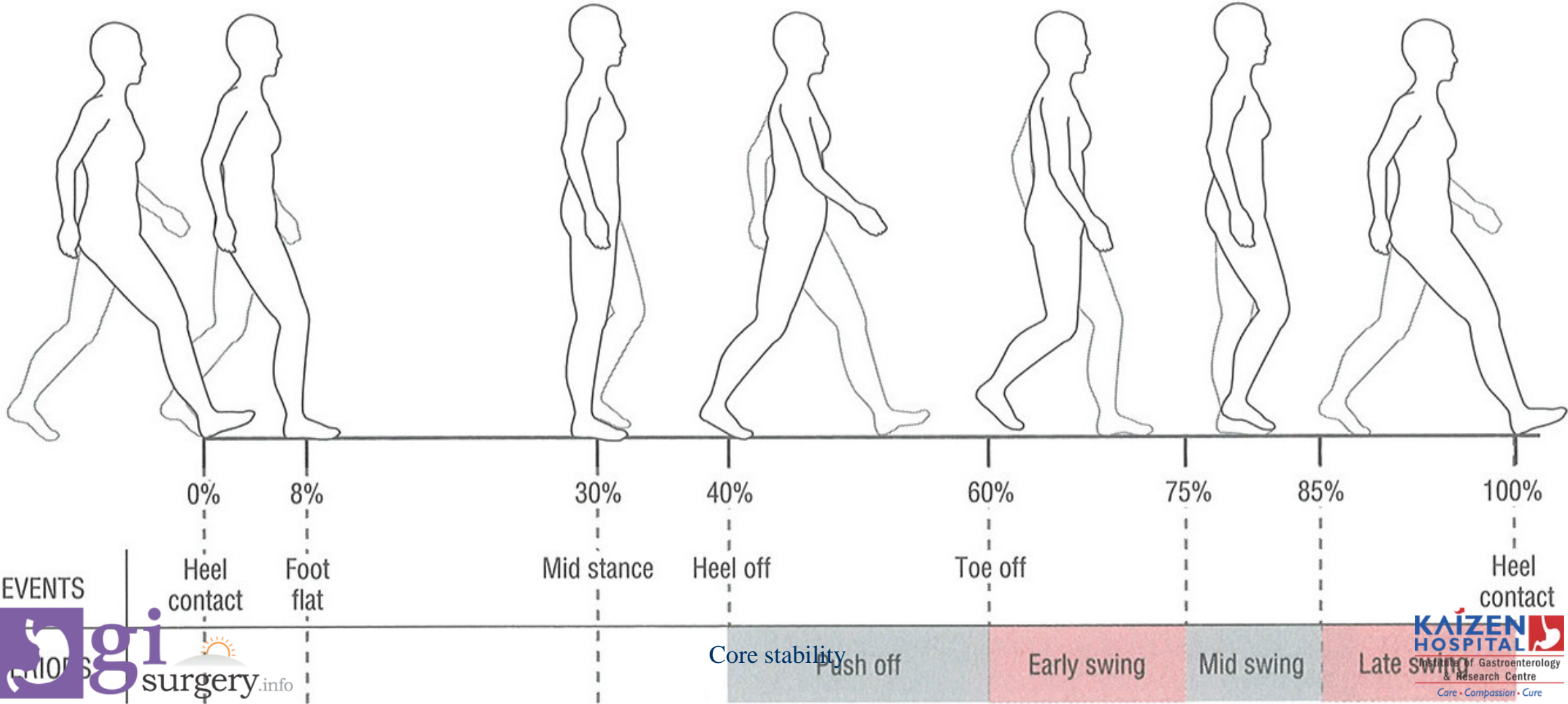
Transversus abdominis



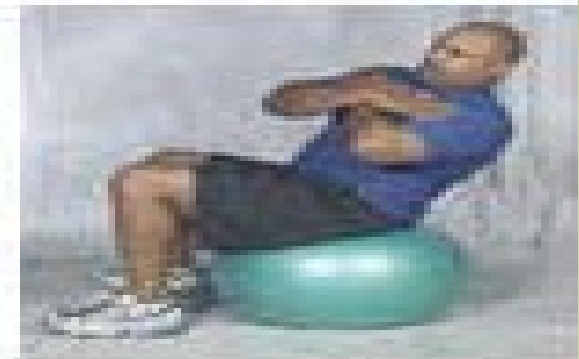
Core stability

❖ Before you start to exercise your body's core, locate your deepest abdominal muscle — the transversus abdominis — by coughing once. The muscle you feel contracting is your transversus abdominis.

❖ With each exercise, breathe freely and deeply and avoid holding your breath. Coordinate your breathing with the activation of your transversus abdominis to get the maximum benefit.



Core exercises strengthen abs and other core muscles





Squat and reach





Plank





Advanced exercise Reverse crunch





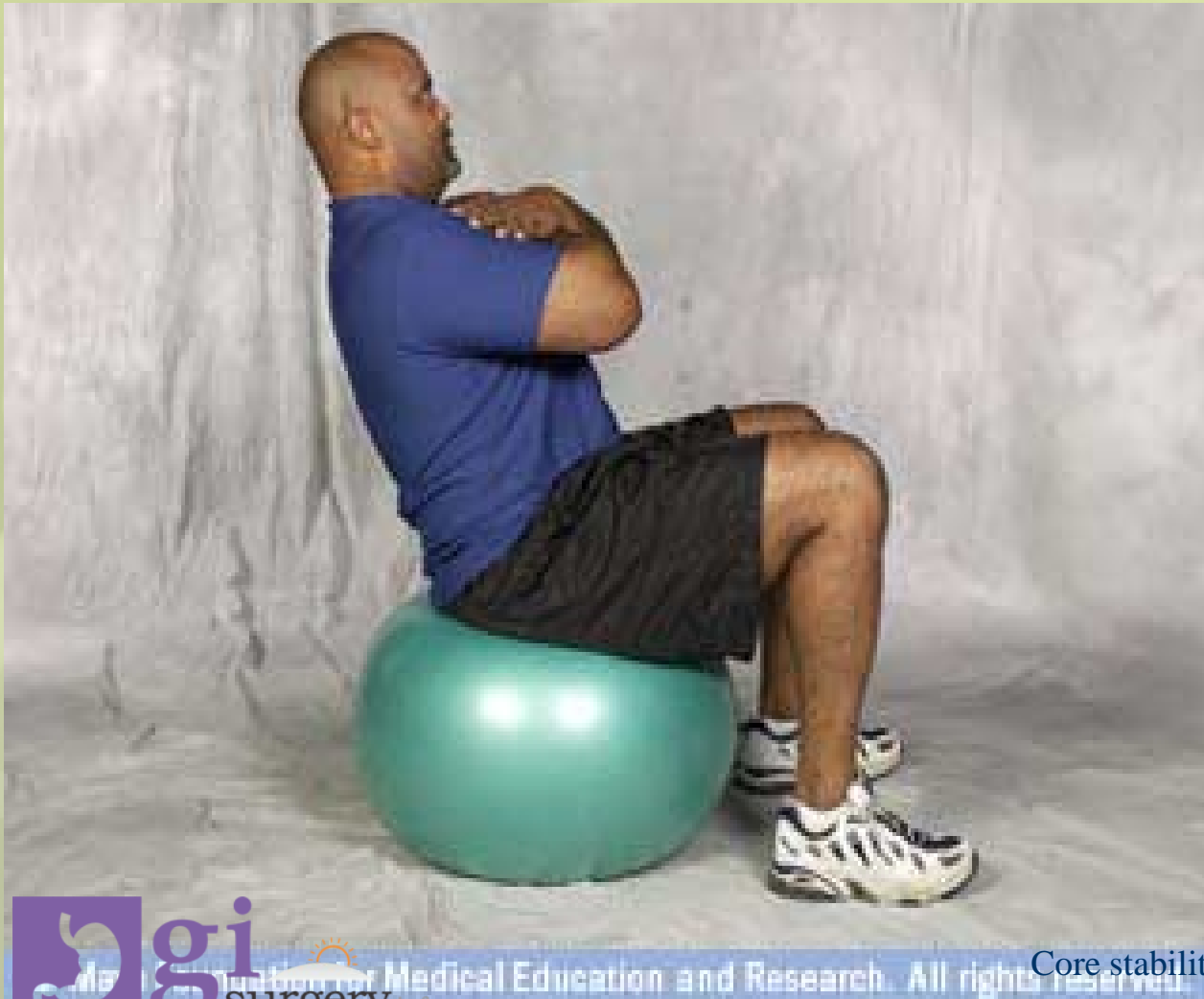
Advanced exercise: Reverse crunch



Core stability



Abdominal sit-back



- ❖ Cough and hold to activate your transversus abdominis, then slowly lean backward until you feel your abdominal muscles kick in. Remember to keep breathing through the exercise.

Bridge



❖ Hold this position for three deep breaths before returning to the start position. Besides your core muscles, you'll feel the muscles along your backside — the gluteals and hamstrings — contract to keep you in place.

Bridge with heel dig



❖ Dig your heels into the ball for traction and to engage the muscles along the back of your thighs (hamstrings).

❖ Hold for three deep breaths before returning to the bridge position



Abdominal ball raise



- ❖ Lie on your back on the floor and rest your legs on top of the ball. Your legs should be about hip-distance apart. Cough and hold to activate your transversus abdominis muscle.



Abdominal ball rotation



❖ Before you reach the floor, use your core muscles to pull your legs back to the start position. Keep your shoulders on the floor throughout this exercise. Repeat on your left side.

Side exercise



- ❖ Protect your neck by resting your head on your hand. If this places too much strain on your neck, straighten your arm along the floor and rest your head directly on it. This removes any pressure on the side of your neck.



Advanced exercise: Kneel on ball





Core exercises strengthen abs and other core muscles



Core stability



- ❖ The core, or trunk, of your body is your center of gravity
- ❖ Strong core muscles — abdominal, back and pelvis — provide support to your spine for everything from walking, lifting and standing to sitting.
- ❖ Weak core muscles may lead to poor posture, lower back pain and injury.



This exercise works many of your core muscles in combination.



❖ Lie on your back with your knees bent (A). Keep your back in a neutral position — not overly arched and not pressed into the floor. Avoid tilting your hips up.

❖ Cough to activate your transversus abdominis. Holding the contraction in your abdominal muscles, raise your hips off the floor (B).



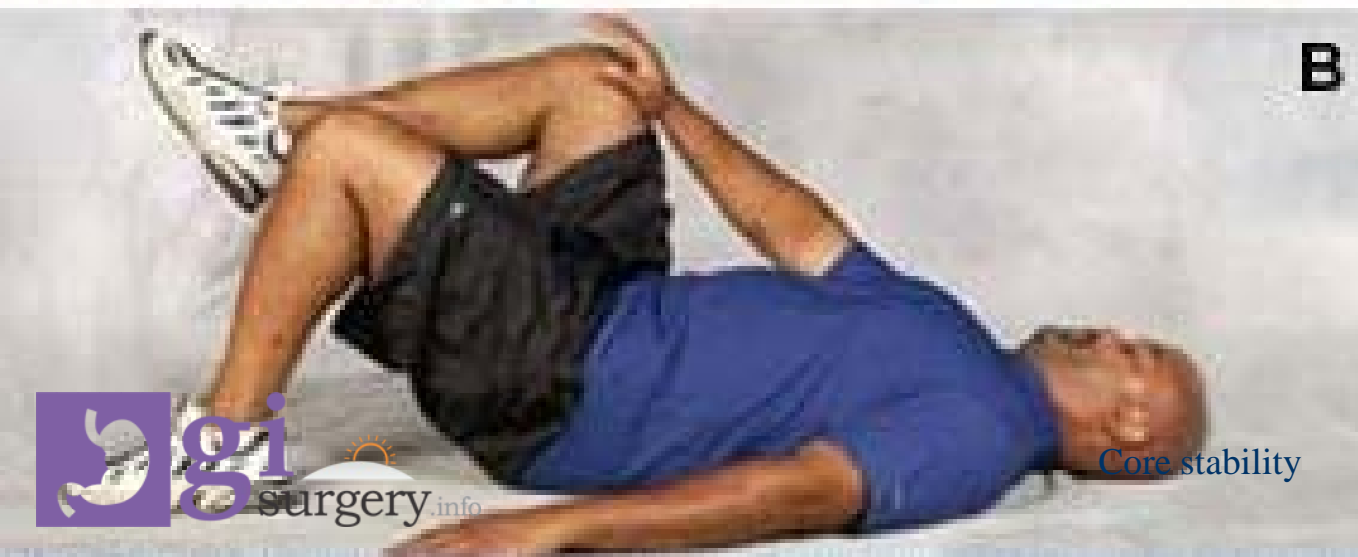
Core stability



Single-leg abdominal press



❖ Lie on your back with your knees bent and your back in a neutral position (A). Cough and hold to activate your transversus abdominis.



❖ Raise your right leg off the floor — so that your knee and hip are bent at 90-degree angles — and rest your right hand on top of your right knee (B).



Single-leg abdominal press variations



To work your core muscles more completely, vary your routine:

❖ **Opposite hand on opposite knee.** Push your right hand against your left knee while pulling your knee toward your hand (A).



❖ **Hand on outside of knee.** Place your left hand along the side of your left knee (B).



Double-leg abdominal press



This is an advanced version of the single-leg abdominal press.

- ❖ Lie on your back with your knees bent and your back in a neutral position (A).



- ❖ Raise your legs off the floor one at a time and rest your hands on top of your knees (B).

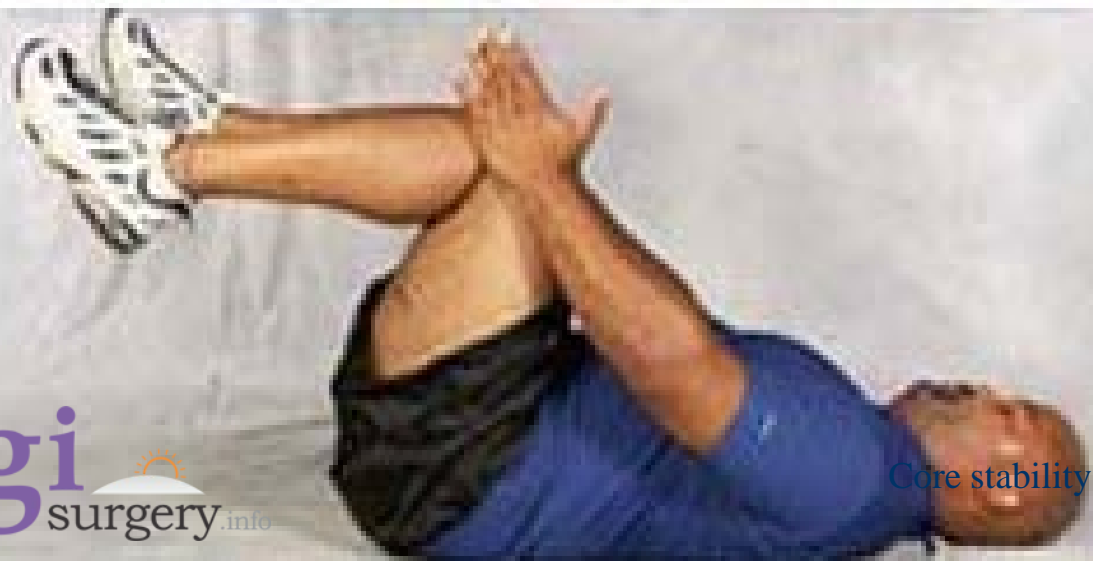


Double-leg abdominal press variations



To work your muscles more completely, try these variations

❖ **Opposite hands on opposite knees.** Place each hand on the opposite knee, toward the inside of your knee (A).



❖ **Hands on outside of knees.** Place your hands along the sides of your knees (B).



Segmental rotation



❖ Keeping your shoulders on the floor, let your knees fall slowly to the left (A). Go only as far as is comfortable — you should feel no pain, only a stretch.



❖ Use your trunk muscles to pull your legs back up to the start position. Repeat the exercise to the right (B).



Quadruped



Core stability

Proper crunch



- ❖ Lie on your back and place your feet on a wall with a 90-degree bend at your knees and hips. Cough and hold to activate your transversus abdominis.

Modified plank

- ❖ Squeeze your core muscles. Create resistance by pressing your elbows and your knees toward one another. Neither should move from their positions on the



Core stability



Modified plank variations



❖ Starting from the modified plank position, concentrate on contracting your core muscles. Raise your right arm off the floor and hold for three deep breaths (A). Repeat with your left arm.



❖ Next lift each leg, in turn, from the modified plank start position (B). Hold for three breaths before returning to the start position.

Superman



❖ Tighten your core muscles. Raise one arm a few inches off the floor (A). Hold for three deep breaths, and return your arm to its starting position. Repeat with your other arm.



❖ Now try the exercise lifting first one leg then the other (B). You need only raise your arms and legs a few inches to begin strengthening your lower back.

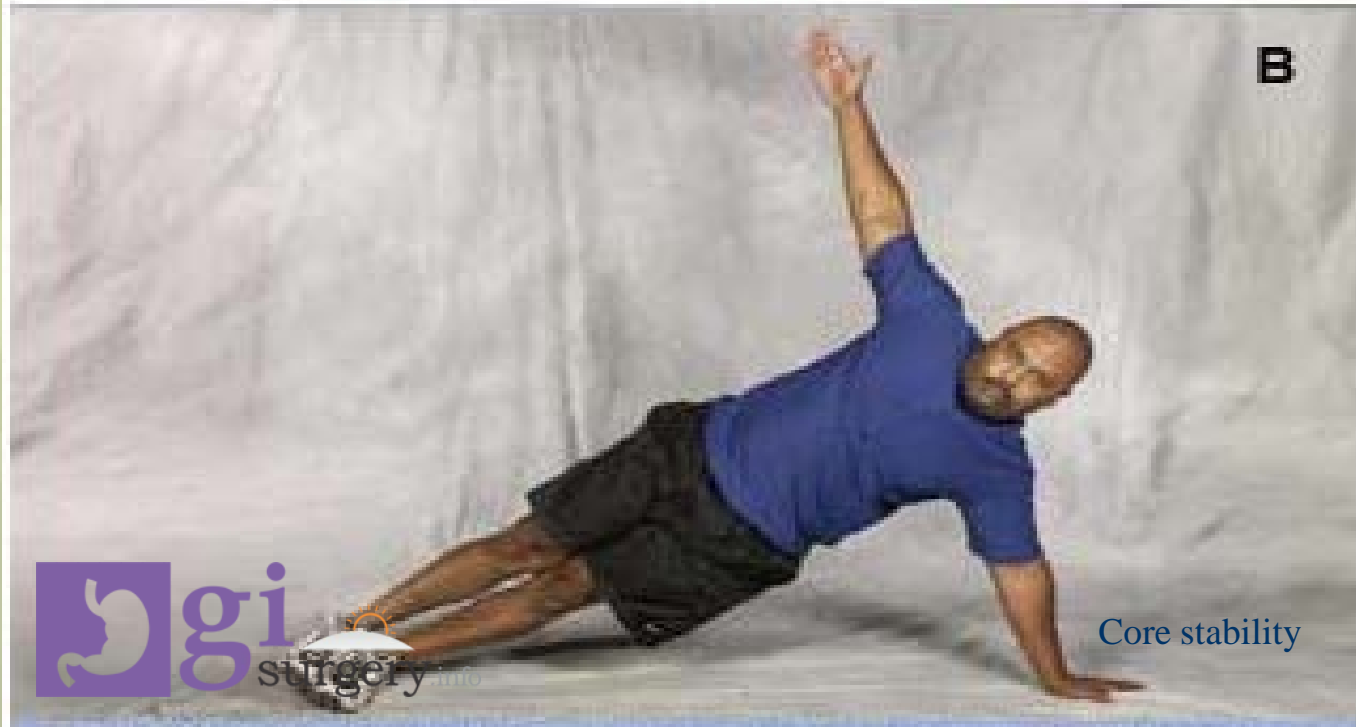


Side plank

Side planks challenge your stability and work the muscles along the side of your body.



❖ Starting on your left side, raise yourself onto your left forearm. Tighten your core muscles to keep your shoulders, hips and knees in alignment (A). Align your left shoulder directly above your left elbow. Rest your right arm along the side of your body.



❖ For an added challenge, balance on your left hand, raise your hips off the floor and extend your right hand toward the ceiling (B). Hold for three deep breaths, relax and switch sides.