# The Web Inside:
## The Soma Sutras & Your Inner Body

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All of the materials in this presentation are drawn from the work of the following practitioners, writers and instructors:

Doug Keller: http://www.doyoga.com

Thomas Myers: http://www.anatomytrains.com

Dr. Ben Benjamin: http://www.benbenjamin.com

# What is Fascia & Why Do We Care?

Fascia is made of densely packed collagen fibers that create full body system of:

Sheets, chords & bags that wrap, divide & permeate every one of your muscles bones, nerves, blood vessels & organs.

We are protected & connected by it - it keeps our human shape. Fascia:

- provides a supportive & movable wrapping for nerves and blood vessels as they pass through and between muscles
- allows some structures like muscles to slide smoothly over each other and it suspends our internal organs in place.
- transmits movement from muscles to bones.

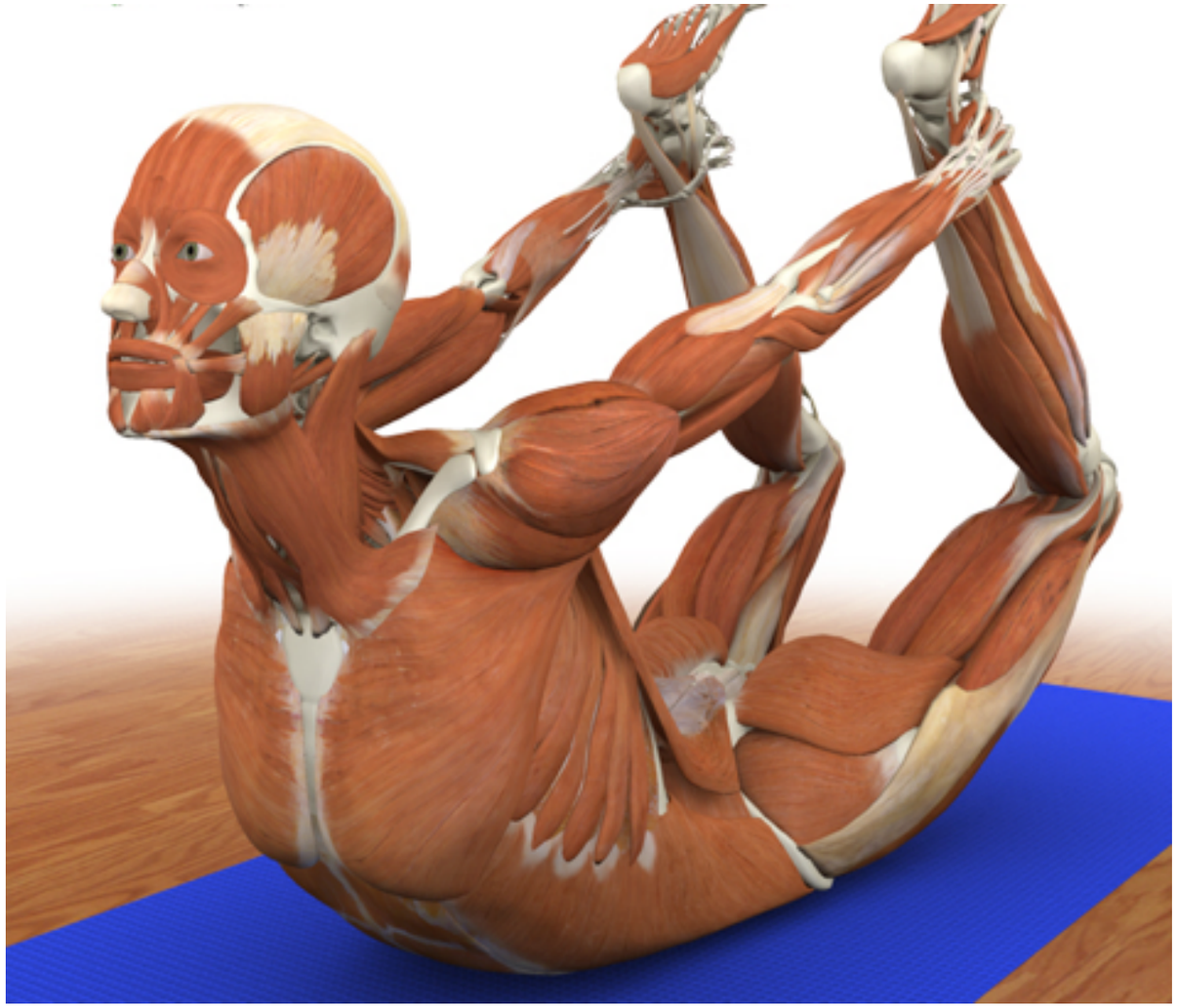
Lack of activity will "glue" fibers in place.

Chronic stress thickens fibers to protect underlying muscle.

Poor posture, lack of flexibility & repetitive movement pull fascia into patterns.

Patterns contribute to a cycle of discomfort & restricted movement.

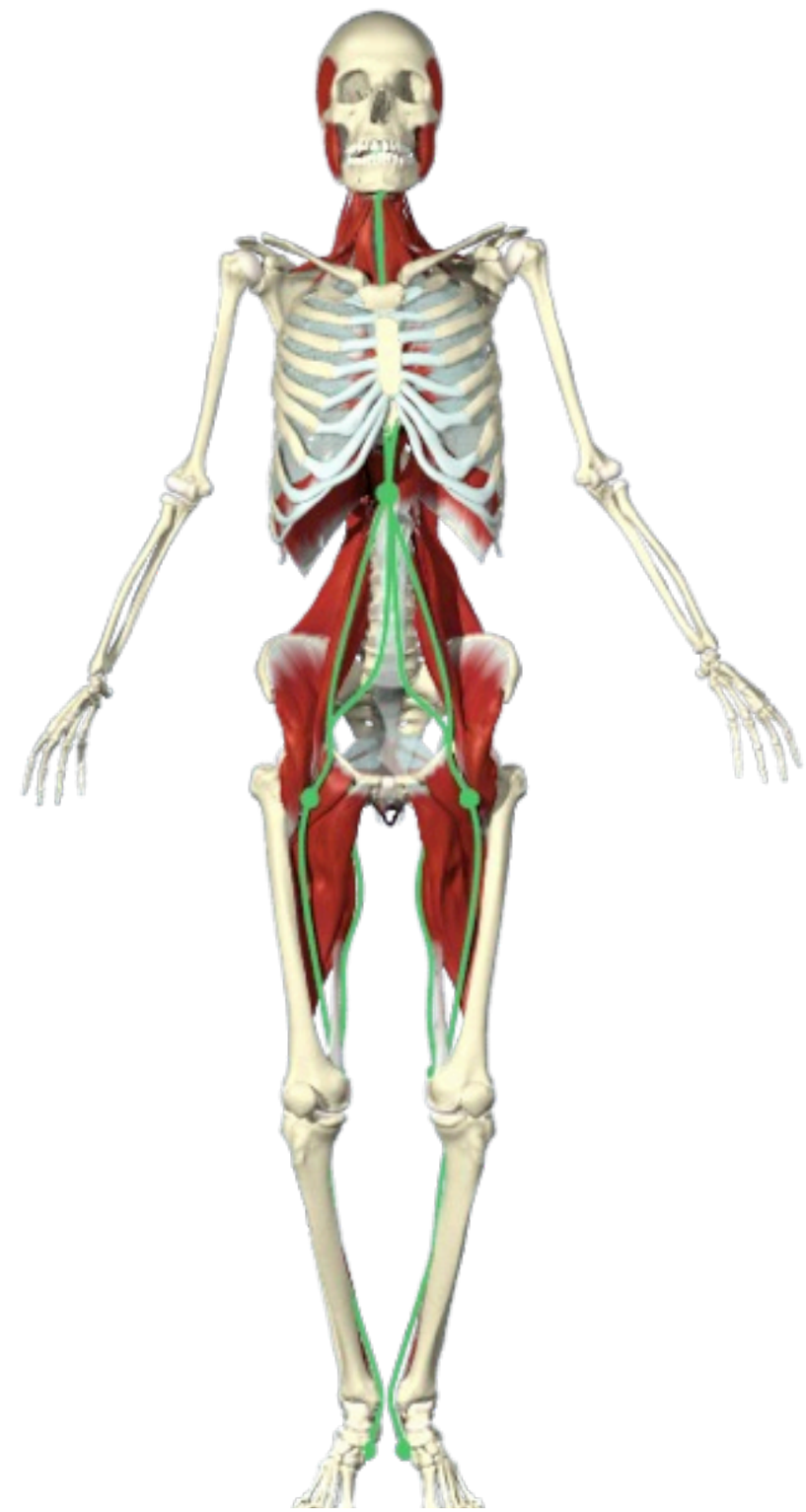
We can reverse these patterns with intelligent stretching, strengthening & self care.



# The Core Sutra: Alignment & Ease

Defining the "Core" & exploring the connective tissue pathways - that interweaving web - through the center of the body at the deepest levels

- Pathways of the Core Connections – this is the connected structure or the web of the core
- Movement practices to reveal how these Core Connections relate to posture and ease of movement through the feet, legs, pelvis and trunk
- Overview of what we mean by the "Core" or "inner body" including the key muscles that contribute to the stability of our torso
- Movement practices to activate muscles of inner body (core container)
- Alignment & the Pelvic Floor: the "3 Diaphragms"
- Specific imbalances that are often the cause of discomfort and/or restricted movement, and practice adapted poses to increase freedom and safety



# Posture: Harmony of Pull Among Supporting Muscles

Centering posture at the core or inner body

- Pelvic shifts & tilts
- Balance between the Back Body & Front Body
- Pull of muscle pairs supporting posture

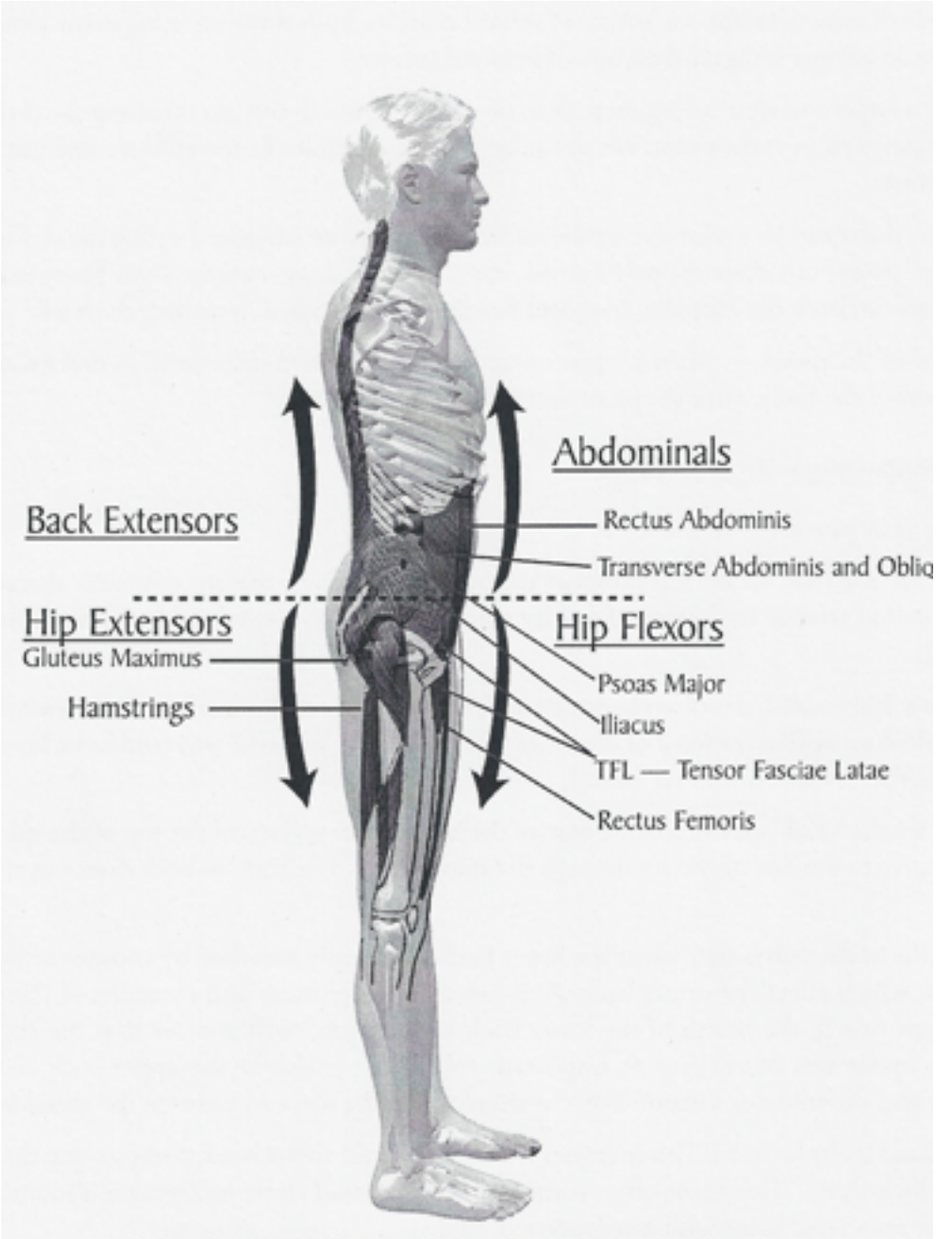
Patterns of compensation: Head & Hips

Types of Posture

- Decreased lumbar curve: Sway Back & Flat Back
- Increased lumbar curve: Kyphosis-Lordosis & Military

Working with posture through Yoga

- Decreased lumbar curve: Sequence emphasizing back bends
- Increased lumbar curve: Sequence emphasizing forward bends



# Pathways of Core Connection

The Core Sutra begins on the sole of the foot

It continues around the inner ankle up through the muscles up the back of the leg, including the muscle behind the knee

The knee is a transition point; from behind the knee:

- the Core Sutra continues upward along the inner thigh through the pelvic floor over the face of the pelvis to the low back

- an alternative track runs up the back of the thigh to the pelvic floor to the low back

As the Core Sutra enters the trunk it branches out through the upper body through the chest

- As it travels up the lumbar spine it splits into 3 portions

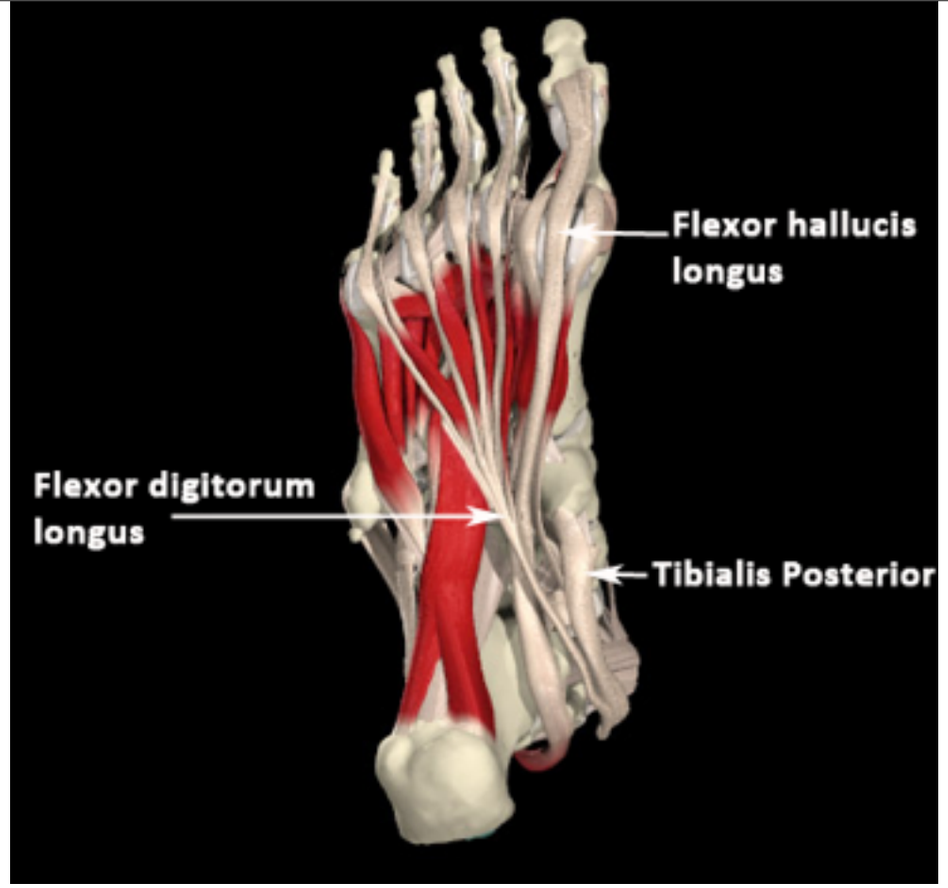
- The front branch follows the respiratory diaphragm attaching to the back of the sternum up to the neck muscles

- The middle branch follows the attachment of the respiratory diaphragm to the heart's pericardium & up to the neck muscles

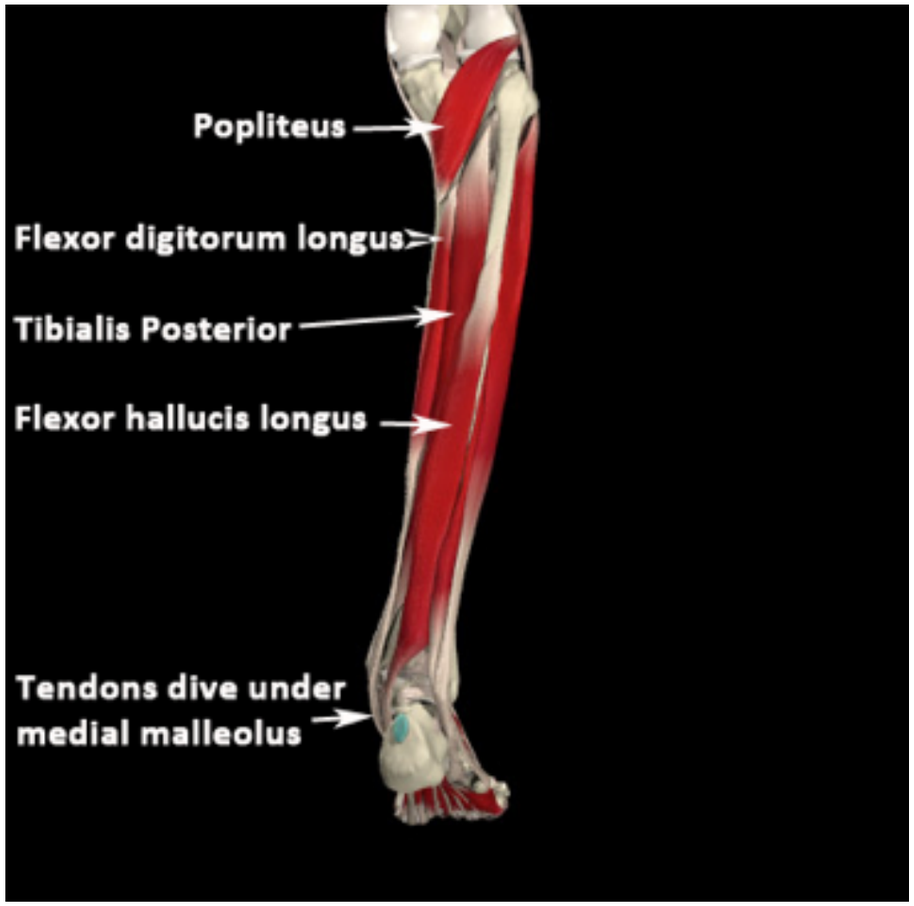
# Moving & Feeling the Inner Lines

Core Sutra begins deep in the underside of the foot, passes up just behind the bones of the lower leg and behind the knee to the inside of the thigh.

In the sole of the foot muscles & tendons help to lift & support the arches especially during "push off" phase of walking. Muscles contract at inner arch when you come to tip toes.




Calf muscles & tendons help to stabilize & flex the ankle - pulling the heel up in walking.

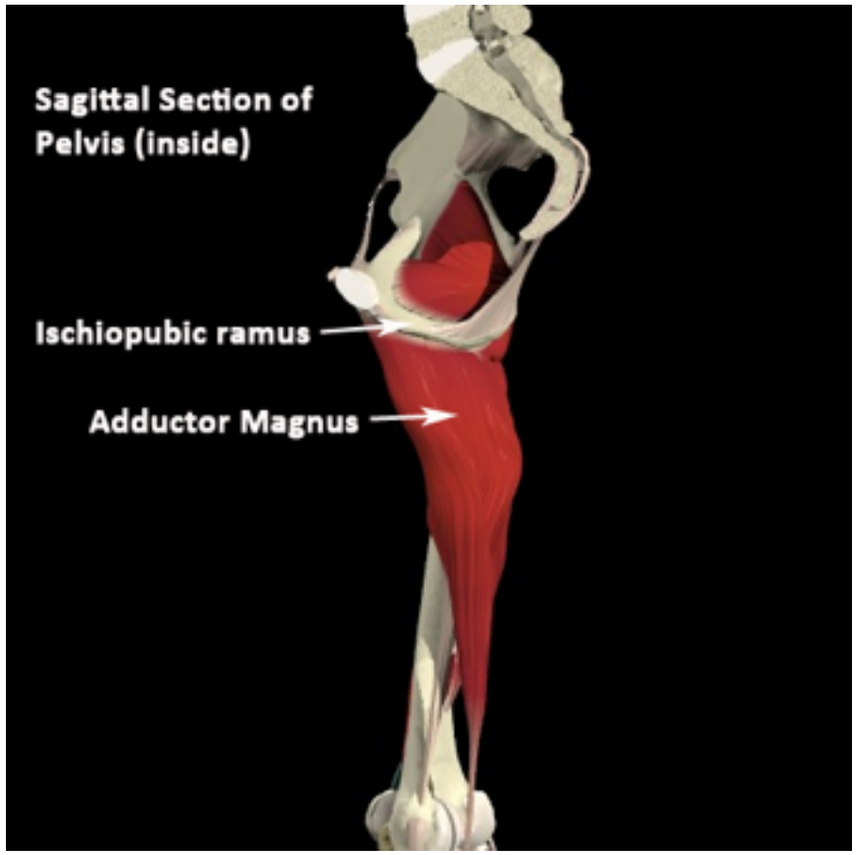



Exercise in Moving & Feeling

Walking
Lifting heel - tip toes
Massage or ball rolling
Repeat walking, lifting heel, feeling

# Moving & Feeling the Inner Lines

From behind the knee, the Core Sutra continues up over the inner thigh through the pelvic floor over the face of the pelvis to the low back. An alternative track runs up the back of the thigh in to the pelvic floor up to the low back.




The inner thigh muscles have a direct impact on the health of the hip joints and sacrum - as well as the tone of the pelvic floor & the support for the knees. They move the thigh to the midline &
help in medial rotation.

Exercise in Moving & Feeling

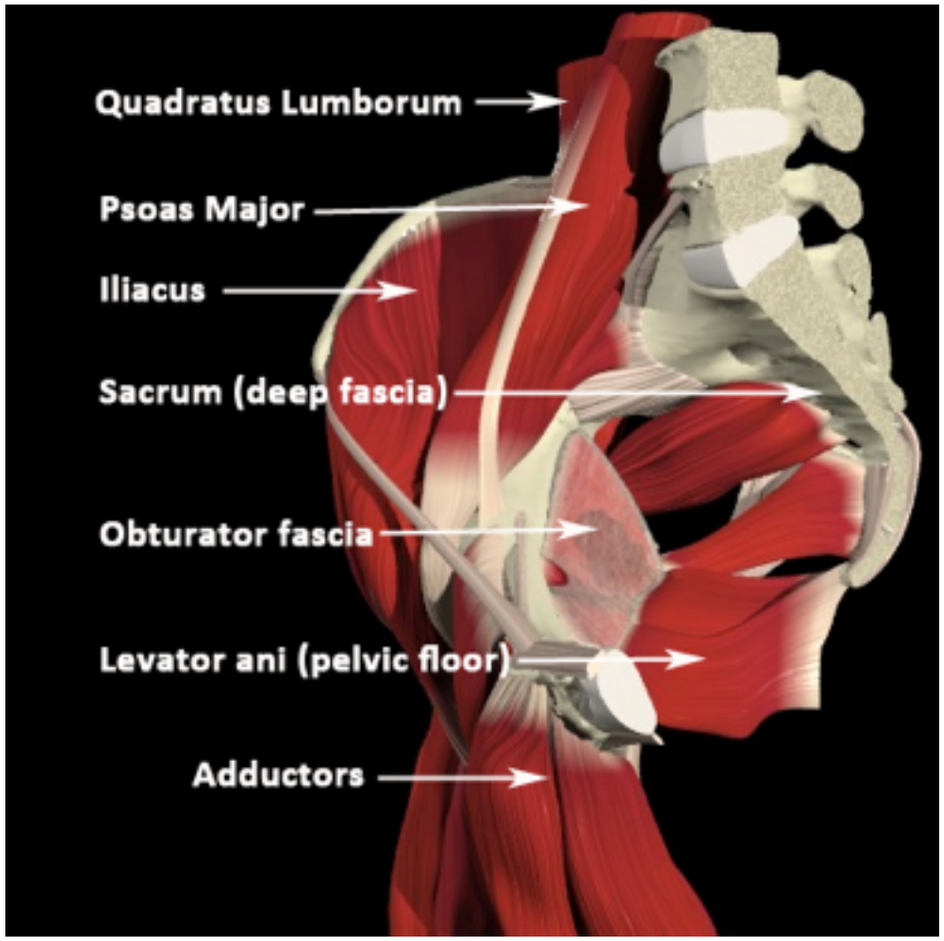
Standing with block between inner thighs. Without gripping the block, draw inner thighs back as if taking the block up & back

Feel the sit bones draw back & apart  Now try drawing your tail bone down & forward toward your pubic bone

# Moving & Feeling the Inner Lines

From behind the knee, the Core Sutra continues up over the inner thigh through the pelvic floor over the face of the pelvis to the low back. An alternative track runs up the back of the thigh in to the pelvic floor up to the low back.

The iliopsoas muscle - is a bridge between the spine, pelvis & thigh. It has a dramatic impact on posture & the health of the back. It plays a role in every action of your body but it has most to do with the core extension of your body through your sacrum & spine.




Exercise in Moving & Feeling

Lie on the back, knees bent, feet on the floor & keep the natural curve in low back & don't try to flatten it.
Slide right heel out along the floor with foot slightly flexed.
Feel release deep inside pelvis & continue down from inside of hip bone to the inner edge of the top thigh.
Lift extended leg 3-4 inches. Hold 3-4 breaths.
Lower & change sides.

# Moving & Feeling the Inner Lines

As the Core Sutra enters the trunk it branches out through the upper body. As it travels up the lumbar spine it splits into 3 portions:

The front follows the respiratory diaphragm attaching to the back of the sternum up to the neck muscles

The middle follows the attachment of the respiratory diaphragm to the heart's pericardium & up to the neck muscles

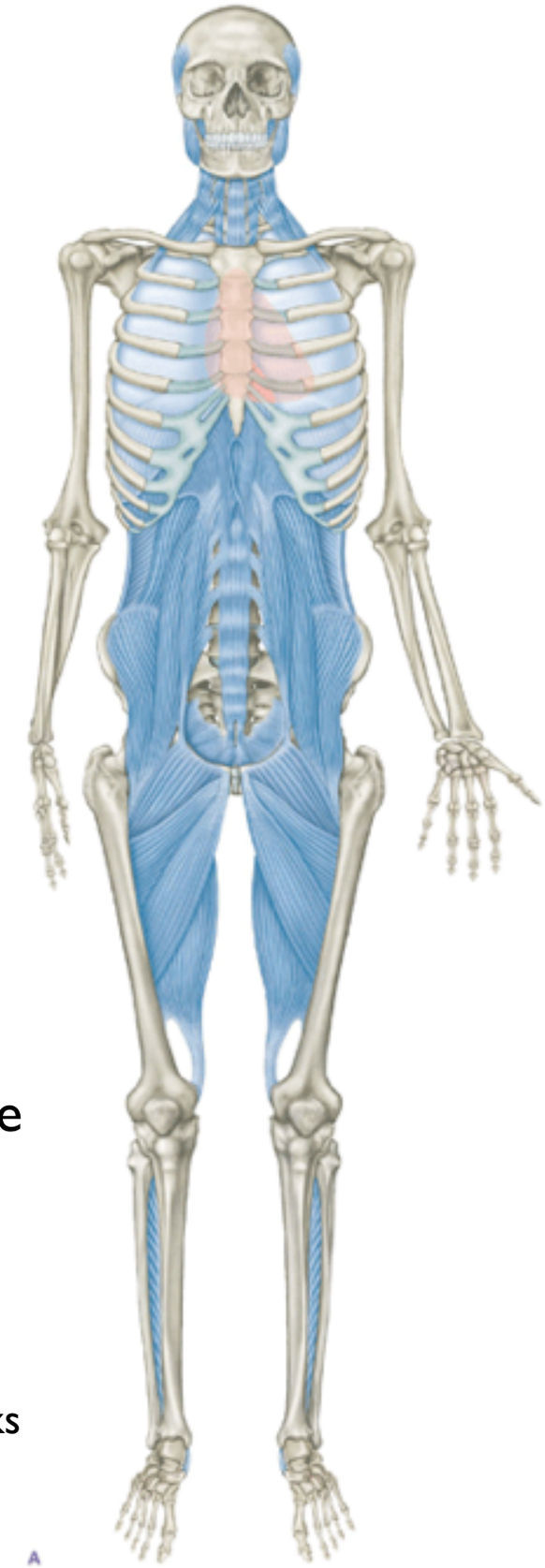
The back branch follows the front spinal ligament to the neck

This fascial line influences the health of the spine & functioning of abdominal organs. Through the chest it supports the space of the heart & breath. In the neck the deepest muscles are key to the alignment of the head & neck.

Exercise in Moving & Feeling

Sitting with legs straight on the floor, back curved forward over the legs & shallow breathing for a few moments. Feel trunk movements anchored from below & inhibited by the weight & curve of the spine.
Now stand to free the restrictions on the spine & chest & practice deep diaphragmatic breathing for a few moments. Notice how you feel.

# Influence of Core Sutra: Legs, Pelvis, Trunk & Neck



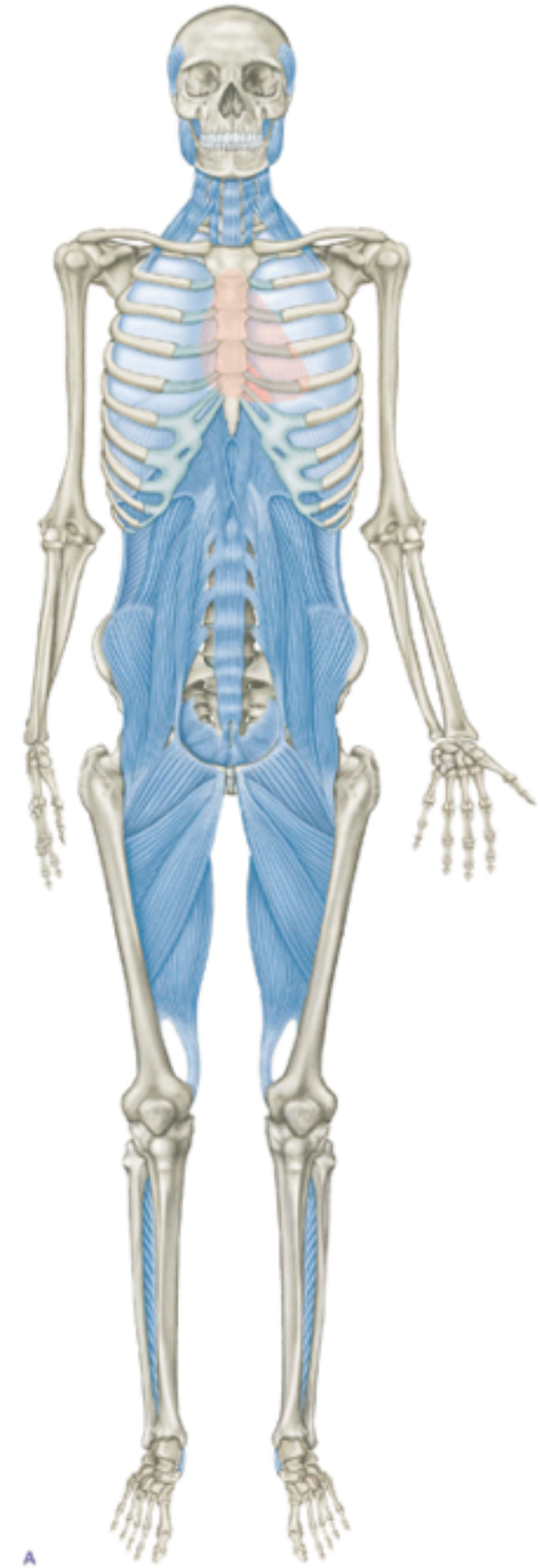
In the Legs: the Core Sutra includes many of the deeper supporting muscles, particularly the deepest muscles in the arch of the foot and running behind the knee, which resist hyper extension in the knee. In the thighs, it governs the inner thighs (the adductors which interact with the hamstrings) and provides the contact and path of communication through the pelvic floor.

Moving & Feeling: Stand in mountain - lift & spread toes as widely as you can. Feel the four corners of feet & arches lifting. Lift heels, balance, breathe & lower. Activate arches again - first lift toes then let them down while keeping arches up. Fold forward & step back to in downward dog. Slightly flex knees - feel as though taking inner thighs in & back, sit bones spreading; hold that orientation then feel tail bone lengthening & pelvic floor lifting. Stay for a few breaths.

In the Pelvis: the Core Sutra intimately relates with the hip joint and the root of the diaphragm via the psoas. The psoas deeply influences posture, the rhythm of breathing and how it is coordinated with movement. The psoas has everything to do with the core extension of the body through the sacrum and the spine.

Moving & Feeling: Come to all fours shift into a modified form of pigeon or swan pose. Use the blocks to help extend the spine upward & the leg back. Stay for a few breaths, change sides.

# Influence of Core Sutra: Legs, Pelvis, Trunk & Neck



In the Trunk: the Core Sutra, through the psoas and other chest muscles, is affects the nervous system. It fans into a three dimensional field that supports the space of the heart and lungs and then rejoins to support the alignment of the neck and head.

Moving & Feeling: Another way to feel this expansive space in the heart & lungs through the psoas is with bridge pose. First let's counter the extension of pigeon with child's pose. Here feel symmetry across the low back, hips & pelvis & also a sense of compression - we're losing space in the torso. Let's expand it by using bridge pose. Come onto the back. Use low bridge to explore how to open the front & sense the deep connections - from your lower abdomen, groins & inner thighs. Breathe as expansively as you can.

In the Neck: the Core Sutra provides the central lift and support of the head. The deepest neck muscles create an upward extension through the crown of the head.

Moving & Feeling: Feel this deep muscles engage by focusing on the orientation of the hyoid bone. The top of the throat is home to the hyoid bone, a floating bone that is connected via various muscles through the core and especially into the digestive system. When the hyoid bone slides back, it draws the neck and head in line over the spine, gently toning the muscles

Place fingers under your jaw line & draw them back toward your ears as if tracing a smile.
Slide the top of the throat back, without tucking the chin, so that the front and back of the neck stay long.

# Major Postural Functions of the Core Sutra

Lifts the arch at the very center or keystone of the foot

Stabilizes each segment of the leg, particularly at the ankle and knee

Supports the lumbar spine from the front, while strongly influencing its curves through the psoas

Stabilizes the chest while supporting the undulating movement of the breath

Balances the head on top of the neck and aligns them both with the energetic core of the body

# Key Muscles of Core Alignment

The Pelvic Floor: is a hammock of muscles that connect the pubis bone at the front to the tailbone and 'sit' bones at the back of your pelvis. Supports the weight of the inner organs & regulates passageways for elimination & childbirth.

Retraining the pelvic floor step by step:

Step 1: Isolation of the Pelvic Floor Muscles (PFMs)

Lie on your back. Firmly palpate abdomen 1-2 inches inside hip bones.

Gently & slowly lift muscles around urethra/vagina or that draw testicles up & forward into abdomen.

Think about a guy wire or line from the anus up to back of pubic bone & engage muscles that connect along this line.

Step 2: Learning to Co-contract Pelvic Floor with Transversus Abdominis & Relax Deep Posterior Pelvic Muscles

Lie on back, knees bent, feet on floor. Find neutral spine position. Squeeze muscles in buttocks & turn hips out (buttocks grip), feel the muscles in deep posterior pelvis contract, draw sit bones together. Now completely relax these muscles & maintain relaxation while gently and slowly contracting the PFMs.

Repeat a few times then palpate transversus abdominis just inside hip bones. Contract anterior pelvic floor & feel light, deep toning in lower abdomen.

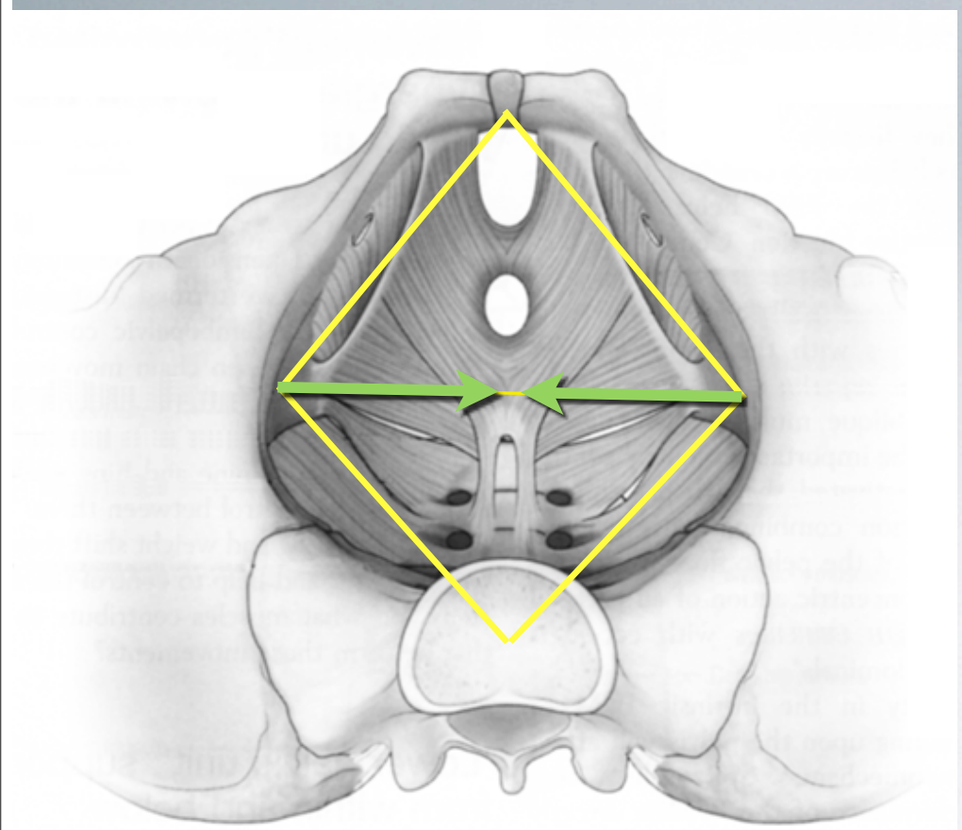
# Mulabandha and the Sit Bones

## Initiation of Mula Bandha from the Pelvic Floor

**A more tangible initiation of Mula Bandha which strengthens the muscles of the pelvic floor is to draw the sit bones toward each other, as if there were a string between them that you shorten.**

This is done without gripping the outer buttocks or hips: it happens within the 'diamond' of the pelvic floor.

**At the same time as you narrow the space between the sit bones, draw the lower abdominals — just above the pubic bone — in and up, 'hollowing' the pit of the abdomen. This adds the lift of Uddiyana Bandha to Mula Bandha**



These actions can be practiced seated on a block in Baddhakonasana, with the legs passive and supported by the hands.

See how the action concentrated in the pelvic floor and pit of the abdomen releases the hips into opening with less effort in the gluteals

# Key Muscles of Core Alignment

The Psoas: is a bridge between the upper & lower body. It is one of the centermost muscles of the body & is involved in nearly all our movements. It functions primarily as a hip flexor - it contracts to flex your legs to your spine (almost impossible to avoid tightening in abdominal exercise).

The tone of the psoas has a strong influence on the tilt of the pelvis, health of the low back and freedom of movement in the hips.



Warrior Pose for effective & challenging psoas stretch.

Step left leg back, lean forward on right knee as it bends. Distance between feet long enough to extend left leg keeping right shin perpendicular to floor. Turn back foot out 30-45 degrees to plant heel on floor. Imagine line running from right heel to left heel). Spiral left hip inward bring hip points even with each other, facing forward. Keep inner arches lifted.

To refine action of abdominals imagine ball of energy at core of pelvis. Rotate front of ball up through lower belly & back of ball down along front of sacrum to tailbone.

## Spiraling In to the Core:

Hip Points 'Squeeze' Inward

Sitbones 'Back and Apart'

Tailbone draws back

# Nutation

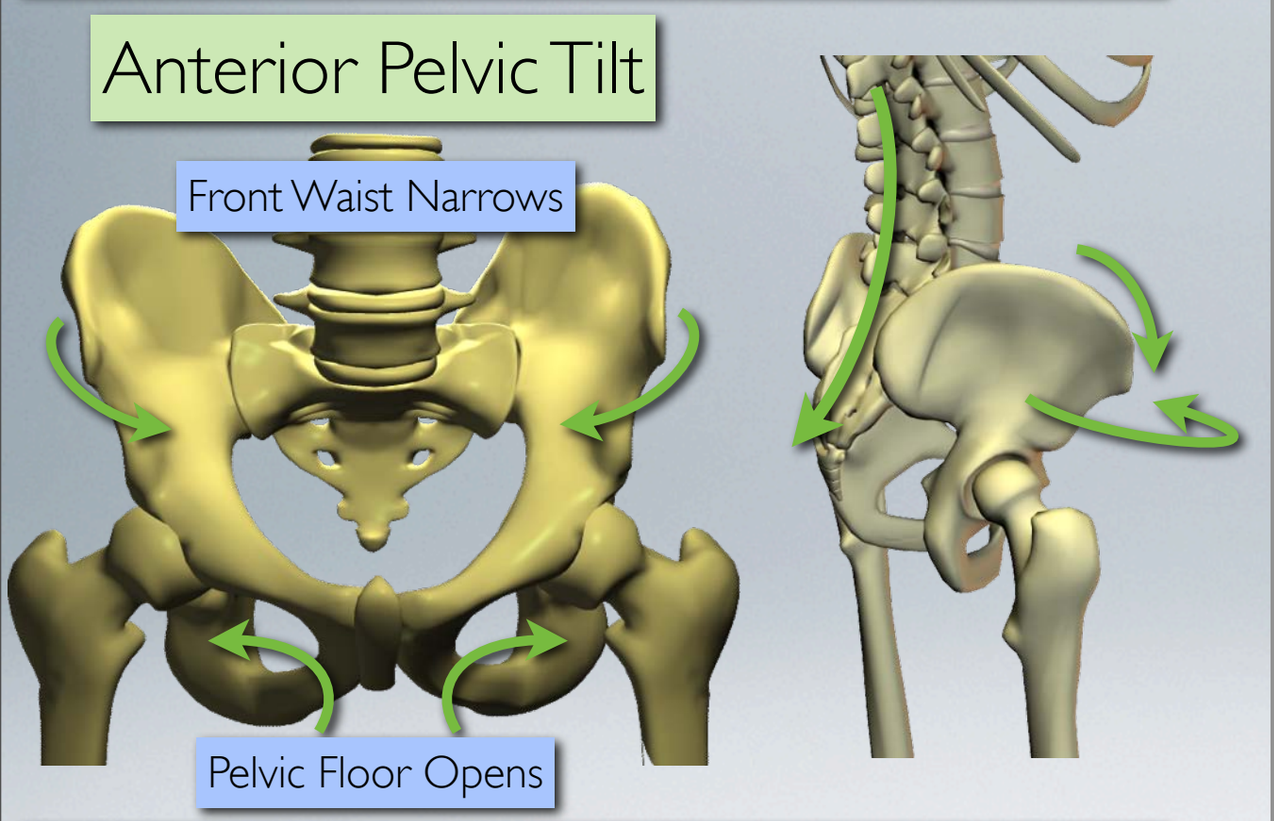
## Extending from the Core:

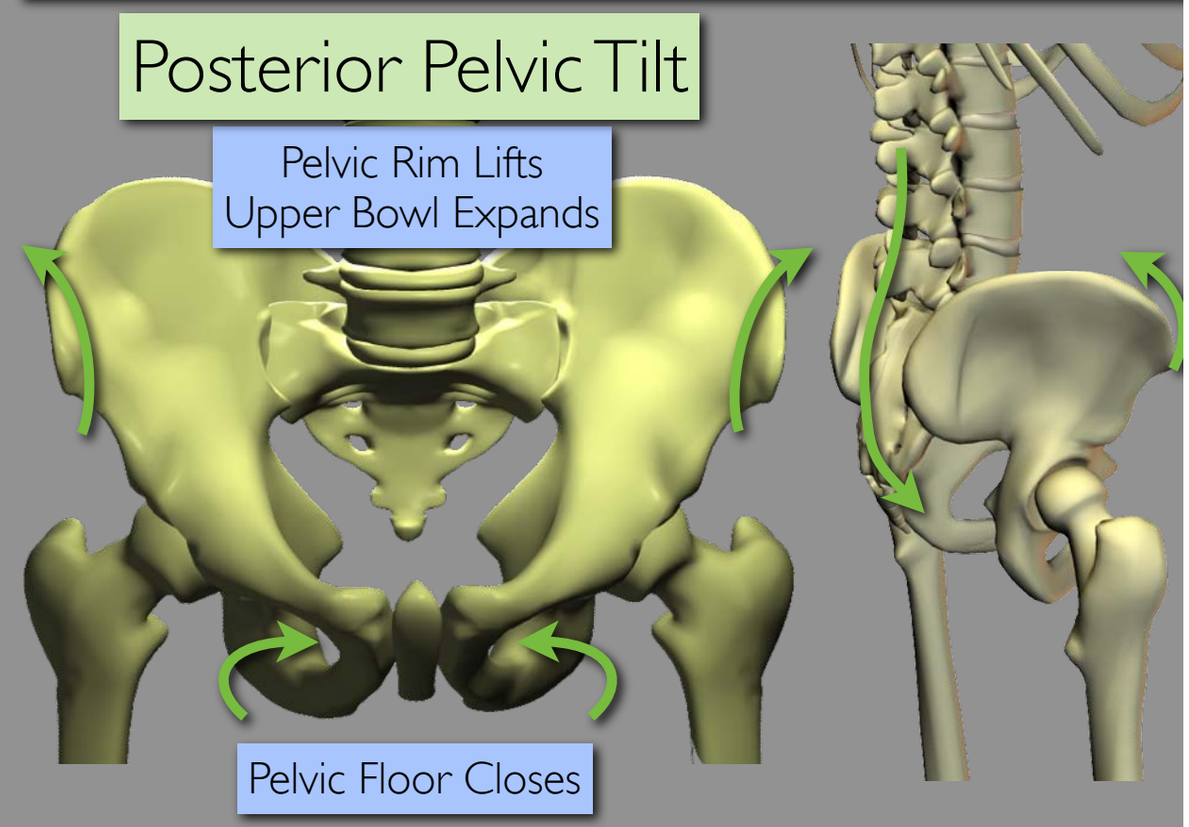
Hip Points Lift and Flare Outward

Sitbones Narrow

Tailbone lengthens down and forward

# Counternutation




### Sacrum nutates:

Actions of Hip Bones make space for nutation:

Transverse Abdominals Narrow; Front Pelvic Rim descends, tailbone back as sacrum tips forward

Lumbar Lordosis Increases

### Sacrum counternutates:

Pit of the Abdomen Lifts; Front Pelvic Rim Lifts & Widens

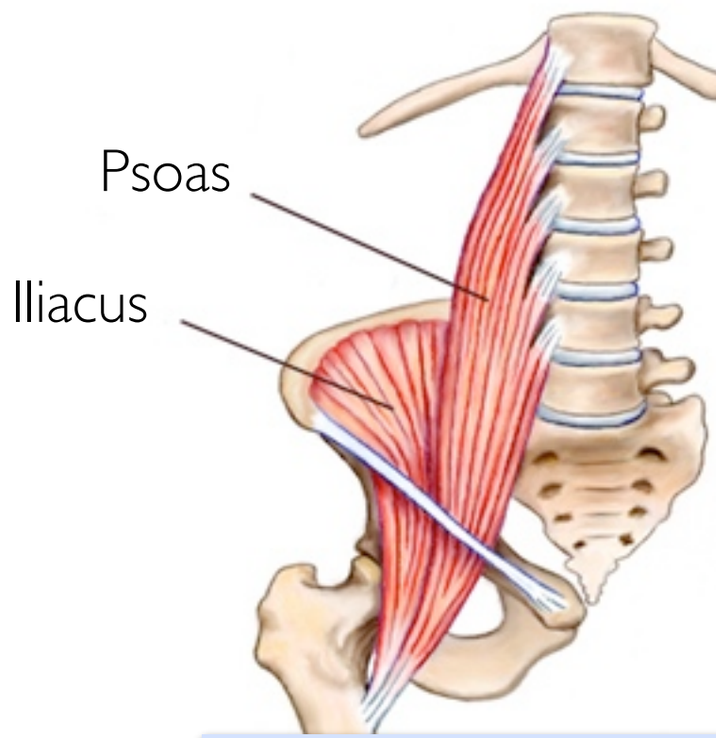
Back of the waist narrows as sacrum lengthens down, tailbone forward

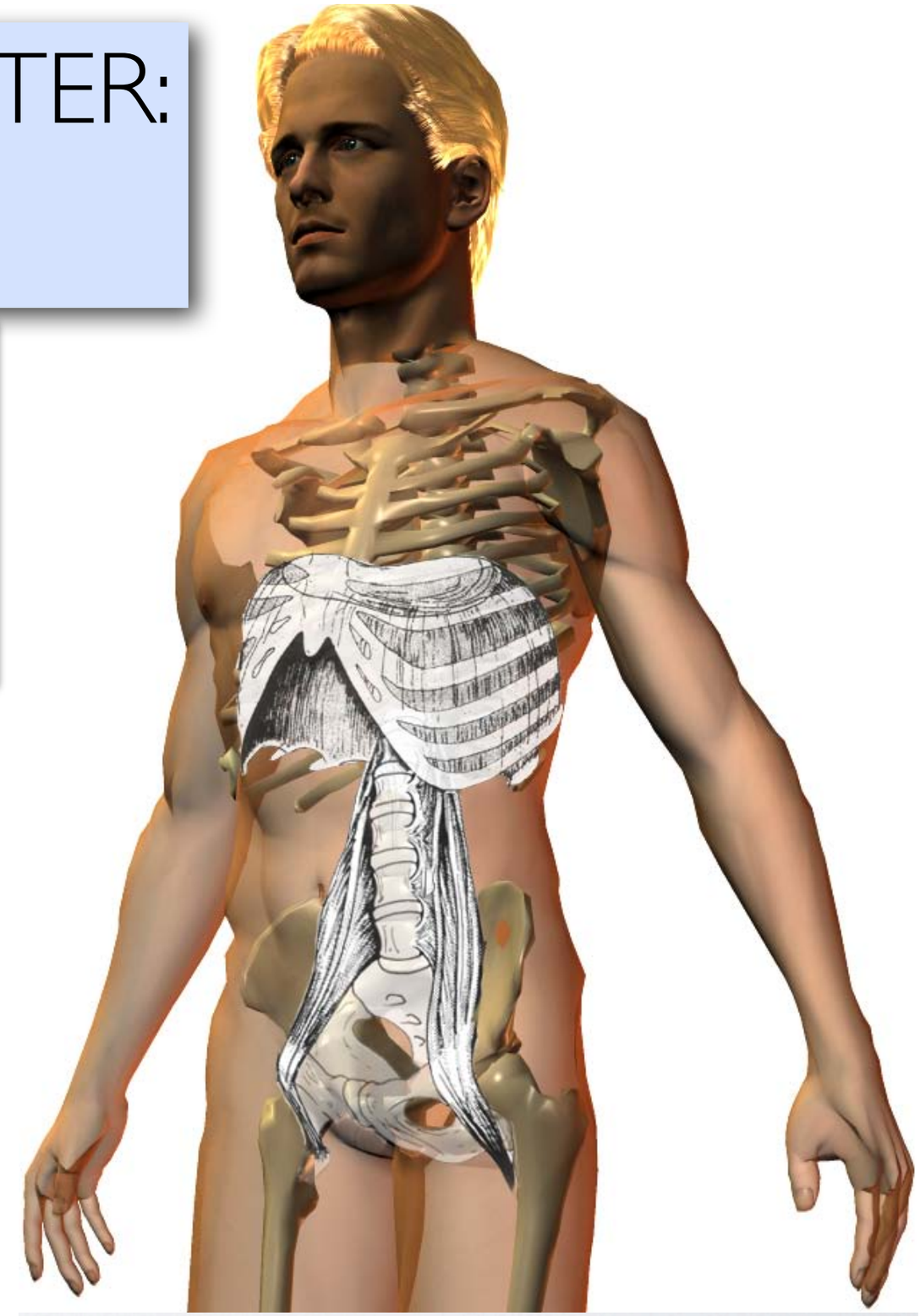
Lumbar Lordosis decreases

# THE PROBLEM AT THE CENTER: THE PSOAS

**The Psoas:**

- Flexes the hip (lifts the leg)
- Flexes the trunk (bends the torso forward)
- Helps us stay erect, balancing the low back muscles
- Critical in moving and stabilizing the low back and pelvis

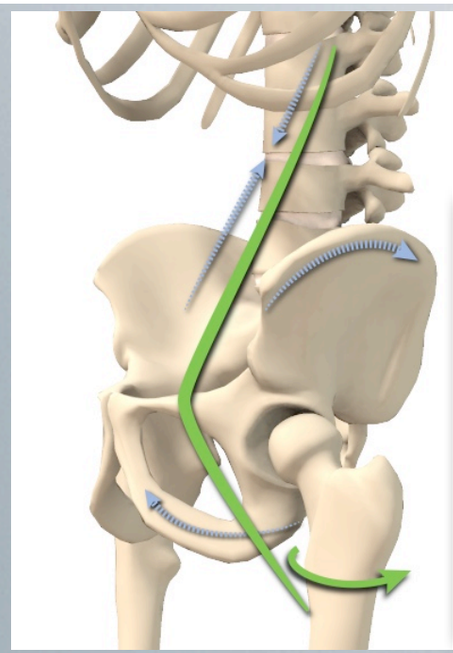


**Injuries to the Psoas:**

- Compromise low back functioning
- May occur at the attachment or in the muscle belly
- May place stress on discs and ligaments

# The Iliopsoas

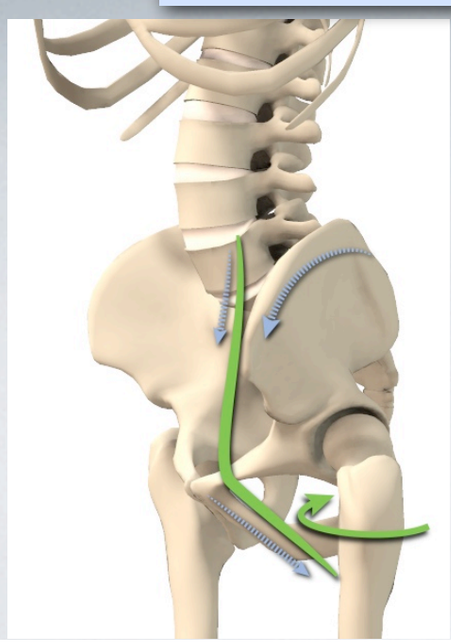


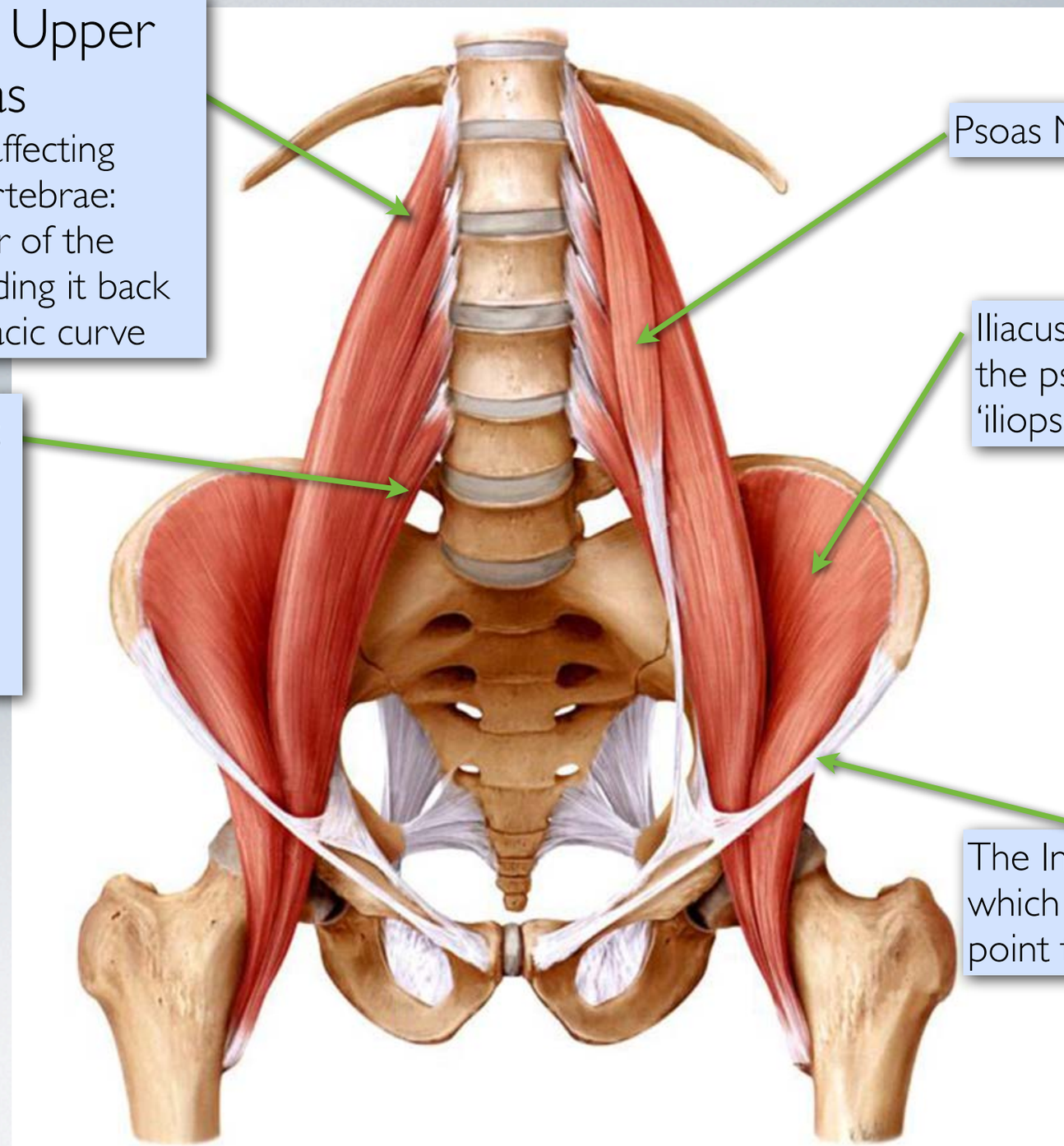
## 'Outer' or Upper Psoas

— lateral fibers affecting upper lumbar vertebrae: Psoas as extensor of the upper spine, bending it back to start the thoracic curve

## 'Inner' or Lower Psoas

— medial fibers affecting lower lumbar vertebrae: Psoas as flexor of the lower spine, bending it forward to start the lumbar curve



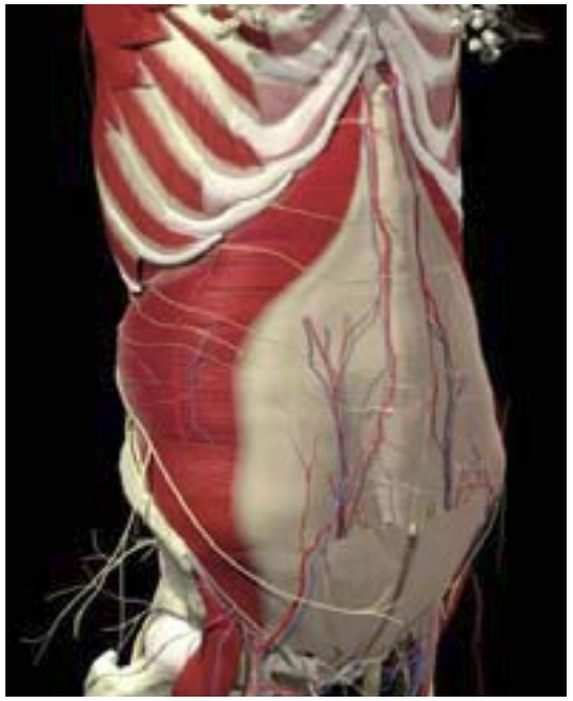


Psoas Minor

Iliacus, which merges with the psoas to form the 'iliopsoas'

The Inguinal Ligament, which runs from the hip point to the pubic bone

# Key Muscles of Core Alignment



## The Inner Corset: Transversus Abdominis (TA)

The deeper abdominals provide postural support (rather than flexing or twisting the spine). They are capable of remaining lightly toned for long periods of time without fatigue. Toning the TA along the front of your spine activates the lumbar multifidus which supports the back of your spine.

Step 1: Isolation of TA – Train Before Strengthening

Lie on your back with spine in a neutral posture. Gently isolate a contraction of TA by:

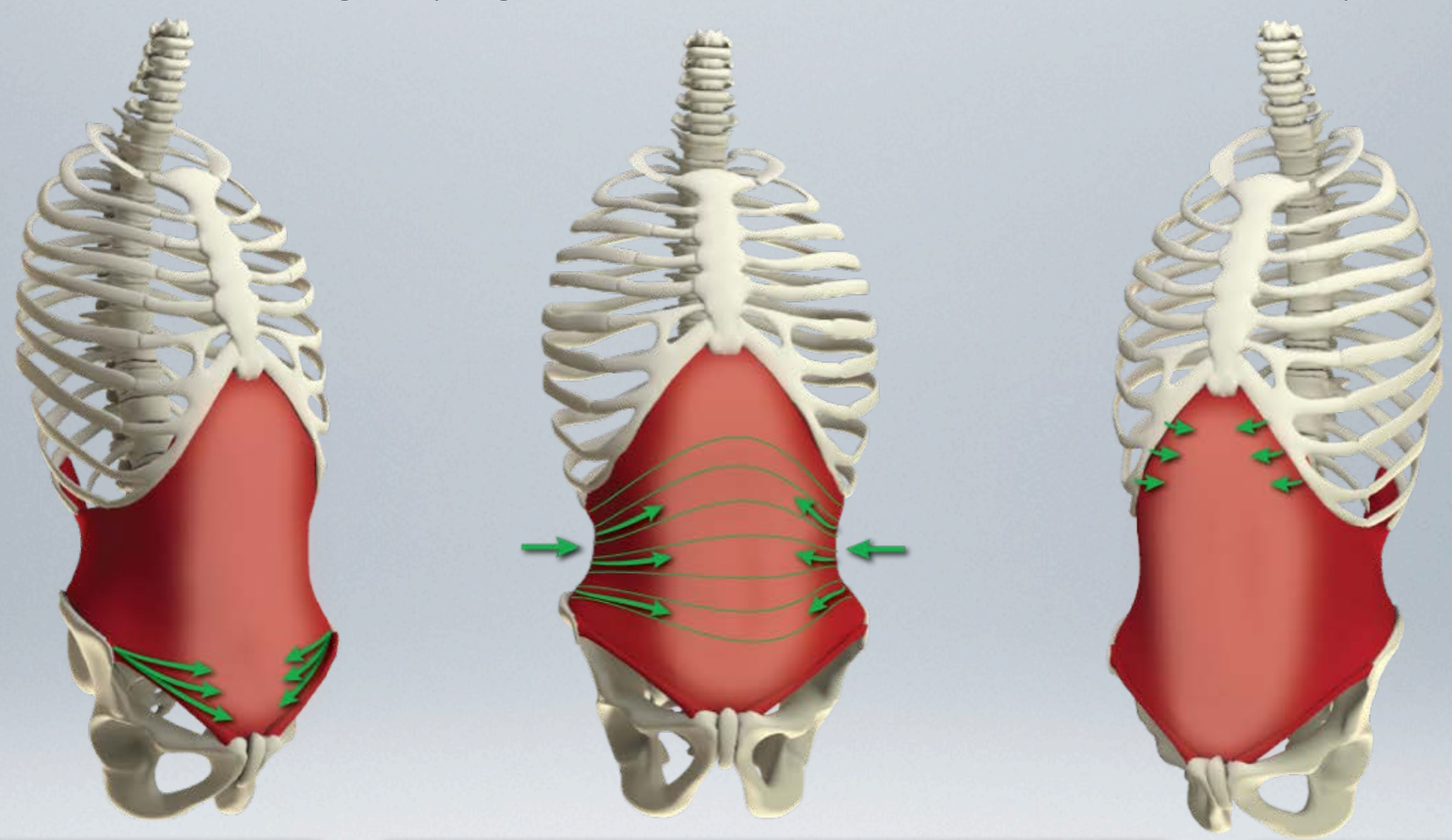
Gently closing the muscles around rectum, then connect the rectum to the back of the pubic symphysis. Slowly lift the urethra, vagina or testicles up and forward into abdomen. Imagining & engaging a line connecting the inside of two hip-bones in the front of pelvis. No actual movement of the hip, pelvis or spine should occur. The isolated contraction of TA will feel like a light, deep tension under fingertips, not a contraction that pushes the fingers out.

Step 2: Strengthen the co-activated Core

Slowly let right knee move to the right, keeping low back and pelvis level. Change sides.
Slide the right foot along the floor, straightening the knee. Slide the foot back towards the hip. Change sides. (use blanket under foot to help it slide)
Lift the right foot off the floor keeping the knee bent. Change sides.
Lift the right foot off the floor and then straighten the leg only as far as you can control your core. Bend the knee and return the foot to the floor. Change sides.

# Transverse Abdominals

The transverse abdominal muscles act as a stabilizer; they do not produce any significant movement of the spine. They can be contracted region by region, the first two of which are involved most in Uddiyana Bandha.

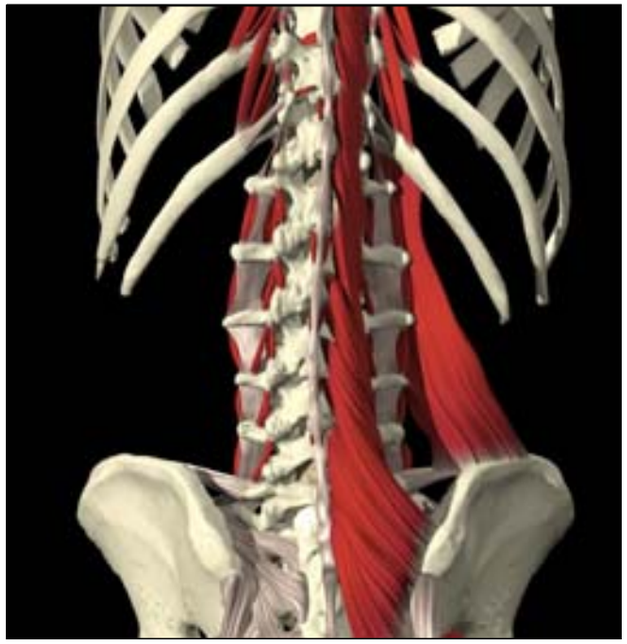


At the lower end, the fibers of the transverse abdominals run along the inguinal ligament to a point about midway along the ligament. Contraction here helps support the lower abdomen, with the help of the internal oblique muscles.

In the area between the ribs and pelvis, its fibers are longest and most numerous. Here it narrows the waist, squeezing the contents of the abdomen both upward and downward. But this narrowing action is **weak** and needs to be supported by the other abdominal muscles.

The transverse abdominals can also pull the ribs closer together at the front of the body; but its fibers are very short here, and so the action is minimal and has to be supported by the internal obliques.

# Key Muscles of Core Alignment



The Lumbar Multifidus: extend the back.
These deep muscles lie on either side of the lumbar spine. They work with the psoas to protect against disk herniation. They help prevent pinching at the point where the lowest spinal vertebra meets the sacrum. The deep fibers of the multifidi also work with the TA to stabilize the Sacro-Iliac joints (where the sacrum and the

Multifidi in Action

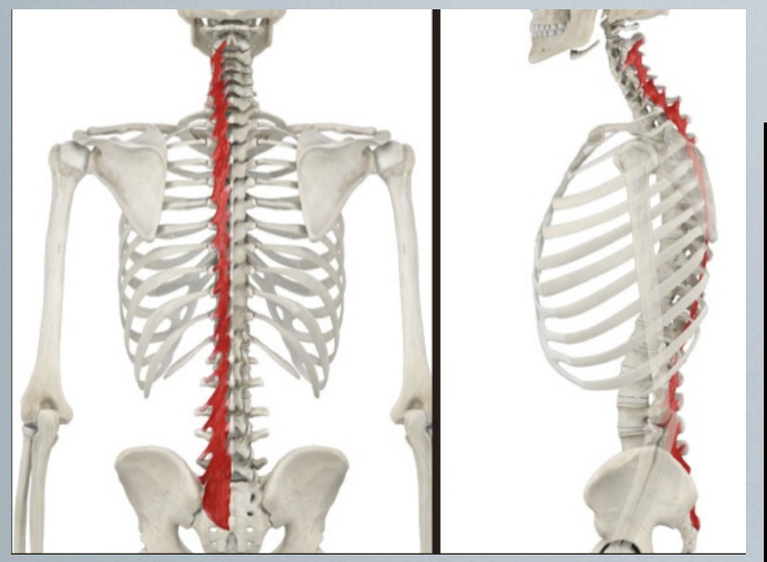
When standing, bending forward, twisting, lifting heavy objects, walking. They are active in back bending when the spine is lifting against gravity. To strengthen:

Leg extension: Starting in table top, extend left leg back. Keep big toe pointing to floor to stabilize pelvis. Hold for two breaths. Extend right arm with inhalation. Engage abdominals to stay balanced. Change sides.

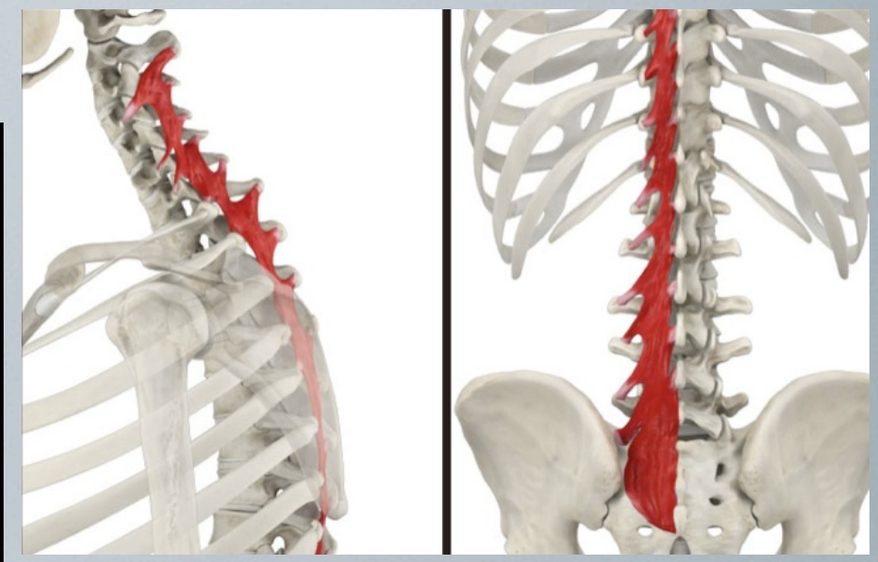
Downward Facing Dog.

Once in the pose, step left foot a bit closer to midline & lift right leg until in line with upper body. Point big toe straight down to keep hips level. Firm lower belly by engaging muscles below navel to spine & up to chest. Lengthen tail bone.

# The Lumbar Multifidus Muscles as Stabilizers



The multifidi, which originate at the transverse processes of the vertebrae and insert below that at the spinous processes, are **involved in rotation** of the spine — but because they run vertically to the vertebrae, they do not directly cause rotation of the vertebrae, but rather **stabilize by *resisting* rotation**. They are similarly involved in **side-bending**.



The multifidi, because they are at the back of the spine, have a '**bowstring**' effect in the lumbar, **supporting the lumbar curve**. Without them, when the obliques cause the torso to twist, they would also cause the torso to bend forward. **The multifidi keep the spine upright during twisting**.

## The Transverse Abdominals and Lumbar Multifidi Work Together

They **co-contract**: when the transverse abdominals activate to stabilize the trunk — **particularly in the area below the navel** — the lumbar multifidus muscles activate as well.

Their **combined** action **helps the vertebrae facets stack firmly against each other,** so that the individual spinal segments can work together as one strong cohesive unit.

- If the **transverse** works **unevenly**, or if there is a **failure in one or two segments** of the **multifidus**, the vertebrae at that segment are vulnerable to having the disc slide — which is one of the most common dysfunctions in low back pain.

- In particular at L5, the **multifidus** must produce enough tension to ensure that L5 does not slide forward on the sacral plateau (spondylolisthesis), which can happen especially because this surface naturally, and sometimes significantly, slopes downward. To counter this, the multifidus is amassed especially at this segment of the spine. Unfortunately, it often suffers from disuse, atrophy, and is often infiltrated with fat.

- And beyond the matter of the discs sliding, research has shown (Carolyn Richardson and others) that **failure of a particular segment of the multifidus is the most common denominator in cases of chronic back pain — in precisely the location where the failure takes place**.

# Study Results

**Transverse Abdominals**: only 10% of those with a history of low back pain could activate the transversus abdominis, while 82% of those ***without*** back pain ***could***.

- Those who performed exercises that **specifically targeted the transversus abdominis** over the course of 10 weeks experienced a **significant decrease in pain**, compared to the control group, which received conventional treatments including swimming and situps.

**Multifidus**: **motor skills** practiced with ***high repetition*** change the size of the inhibited levels of the multifidus, suggesting that **the problem was not muscular weakness**, but a **disconnect in the brain–nerve–muscle organization**

The job of rehabilitation is to **reawaken a circuit** so that the muscle will be recruited.

These two sets of muscles, taken together as this coordinated system, we can refer to as the '**Core System**' or Core System of Stabilizers — in some cases it is called the 'Transverse System.'

The internal obliques also play a strong supportive role to the transverse abdominals

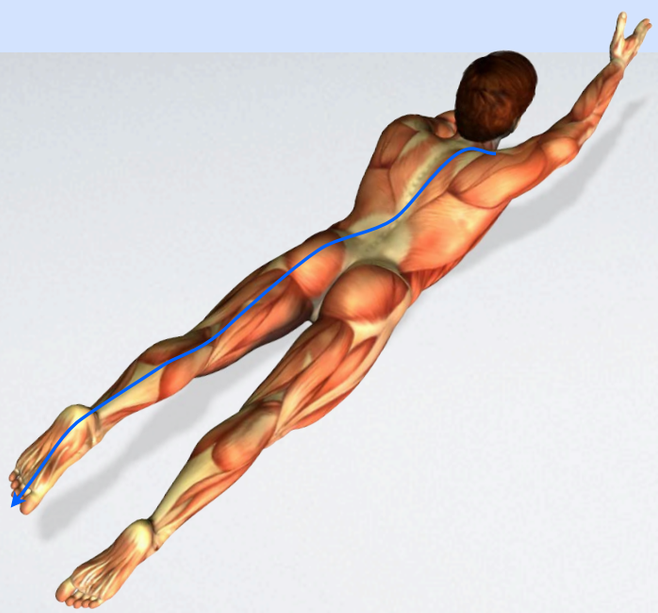
# How Do You Get Them To Work Together?

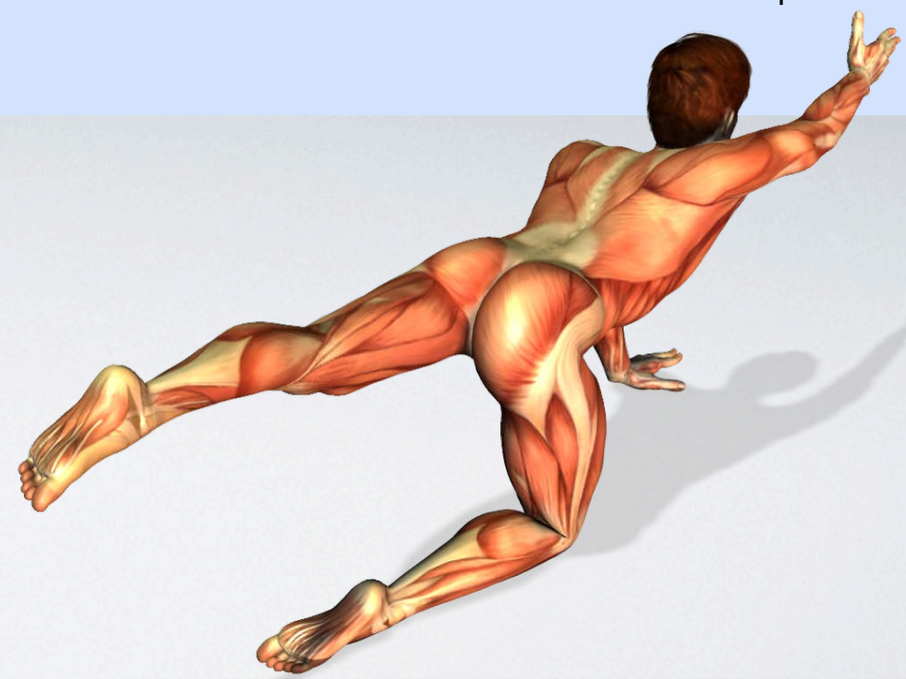
These are not movement muscles: their job is to stabilize. And so the "exercises" for these muscles should challenge them to stabilize the trunk, without putting more load upon them than they can bear.

- In other words, for these muscles, **you don't need to go outside of the "neutral zone"** (i.e. toward the outer reaches of a stretch or action — no extreme yoga poses necessary)
- And **if you overload the body**, you will simply **recruit other 'movement' muscles** rather than the stabilizers to do the action and fail to work effectively with the stabilizers.

The **multifidus muscles** are worked best by **<u>small extension movements</u>** of the spine (small versions of back bending / slight extension of the spine that does not overly 'kink' the spine at any particular point).

When you **challenge the body to maintain its balance** — particularly in hands-and-knees versions — the body is forced to recruit the **transverse abdominals** to stabilize the trunk while the spine is being extended.





## As stabilizers, the transverse abdominals and multifidus work together best ***within*** the "**neutral zone**" — or in the range of a relatively **neutral spine**

### The Multifidus:

- The **multifidus** muscles work to **support the inward curve of the lumbar spine.** They **continue this work as you go into a forward bend**, stabilizing the spine.
- Their work is made ***harder*** when the **spine compresses or overly rounds in a forward ben**d from the action of the **abdominals pulling the rib cage downward**.
- Hence a **forward bend begins with a neutral spine** and the lifting action of the **bandhas** — maintaining the connection with the abdominals — and can round progressively. As the forward bend goes further toward the **end range of motion**, it's up to the **ligaments** of the spine to protect it.
- In **abdominal exercises**, ***flattening*** the back against the floor **denies** the multifidus muscles their proper function — so while strengthening to the abdominals, **such exercises do not truly integrate the core**. **Uddiyana Bandha** — pulling the **navel back toward the spine** — **goes along with** establishing or maintaining a **neutral curve in the spine**, so that the **multifidi can co-contract**!

### The Transverse Abdominals:

- The **transverse abdominals** likewise are less and less effective as a stabilizer as you go ***beyond*** the 'neutral zone' of muscular stabilization and deeper into a **backbend;** it is up to the ligaments to protect the spine in deep backbending, as the core becomes less and less effective.

### The Ligaments:

- By the same token, **if the stabilizer muscles take too long to fire while in the 'neutral zone**,' then the **ligaments are at risk for injury** — since they are **not sufficiently taut to protect themselves or the joint**.

# Key Muscles of Core Alignment

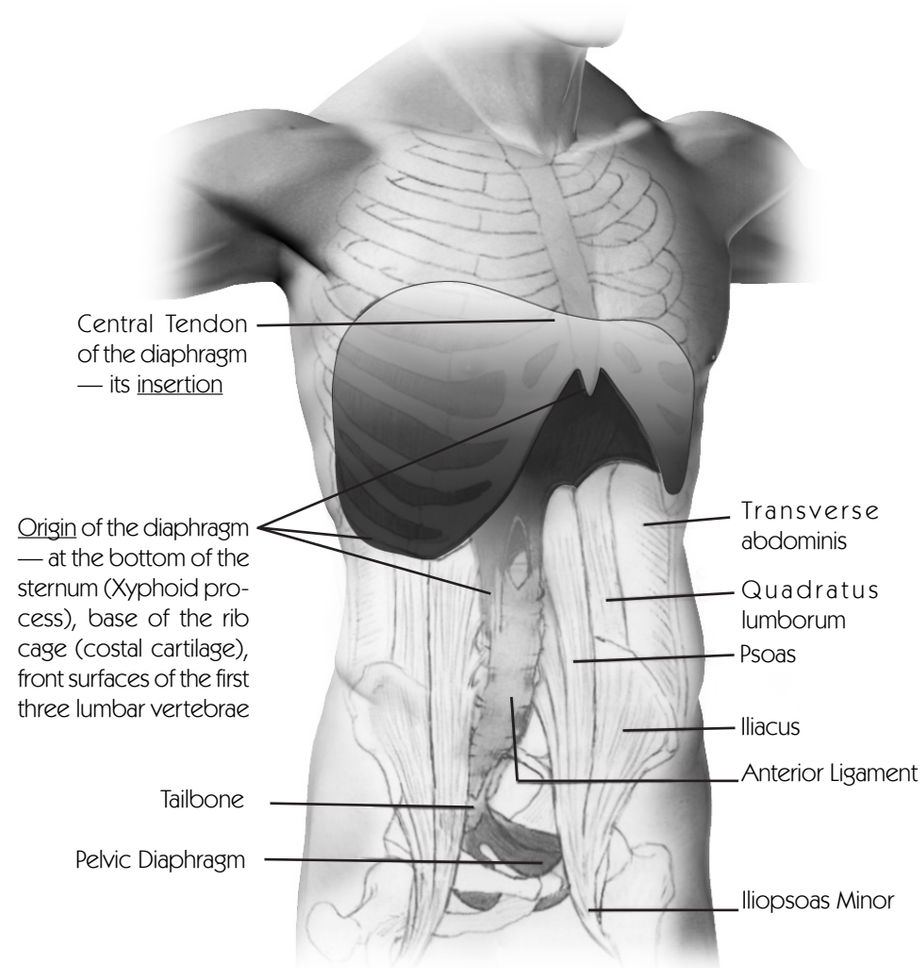
The Diaphragm: Three dimensional support
True diaphragmatic breathing is a 3 dimensional expansion especially around the lower ribs. This provides symmetrical postural support by centering the upper torso and while supporting the spine.

Feeling & Moving the Diaphragm

Diaphragmatic inhalation when ribs are fixed: central tendon moves downward, belly & lower ribs expand. Abdominal cavity changes shape as contents & lower ribs are displaced. Breath is 3 dimensional, expansion encircles lower ribs.

Diaphragmatic breathing when abdominals are held firm: central tendon cannot move, so contraction of diaphragm pulls upward on the lower ribs, causing the lower rib cage to expand outwardly. Here the diaphragm initiates the breath in the chest.

Fullest expression of diaphragmatic breath comes when both belly & chest move in coordination with each other.




The Diaphragm: Its Origin and Insertion

Redrawn from illustration in International Journal of Yoga Therapy no. 16 (2006) p. 72

# Core System of Local Muscles: the inner "Container"

The 'local' system is a subset or "container" of core muscles that provides stability within the pelvic & low back region itself.

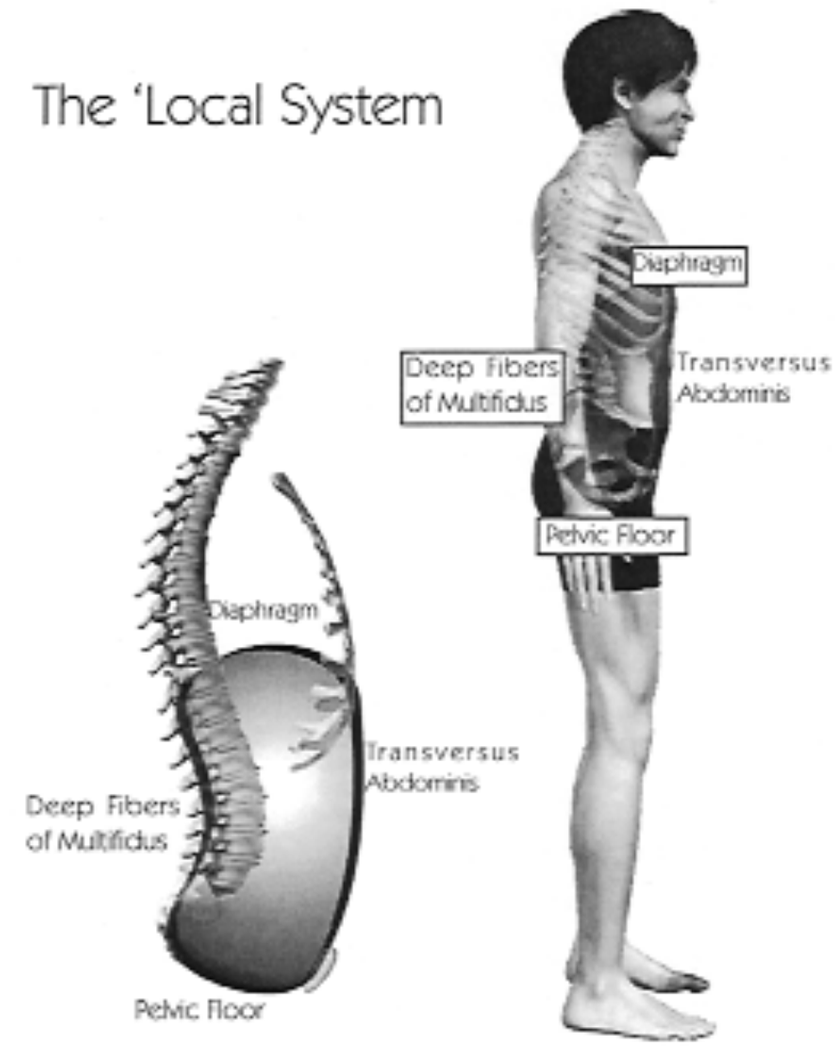
The purpose of the local system is to stabilize the joints of the spine and pelvic girdle as a preparation for an increased load on the joints.

There is a significant difference between the local and global sets of muscles:

When the load about to be placed on the body is predictable, the muscles of the local system contract before movement actually takes place regardless of which direction the body moves.

The muscles of the global system contract later upon initiating actual movement and how they act depends on the direction in which the body is moving.

The actions of the local system happen in coordination with the breath (due to the diaphragm's movement). Ideally they should be working at all times (they increase their activity before any action involving a load occurs.)




The sacrum and low back are stabilized by a 'local' system of muscles that form a 'container' for the abdominal and pelvic areas.

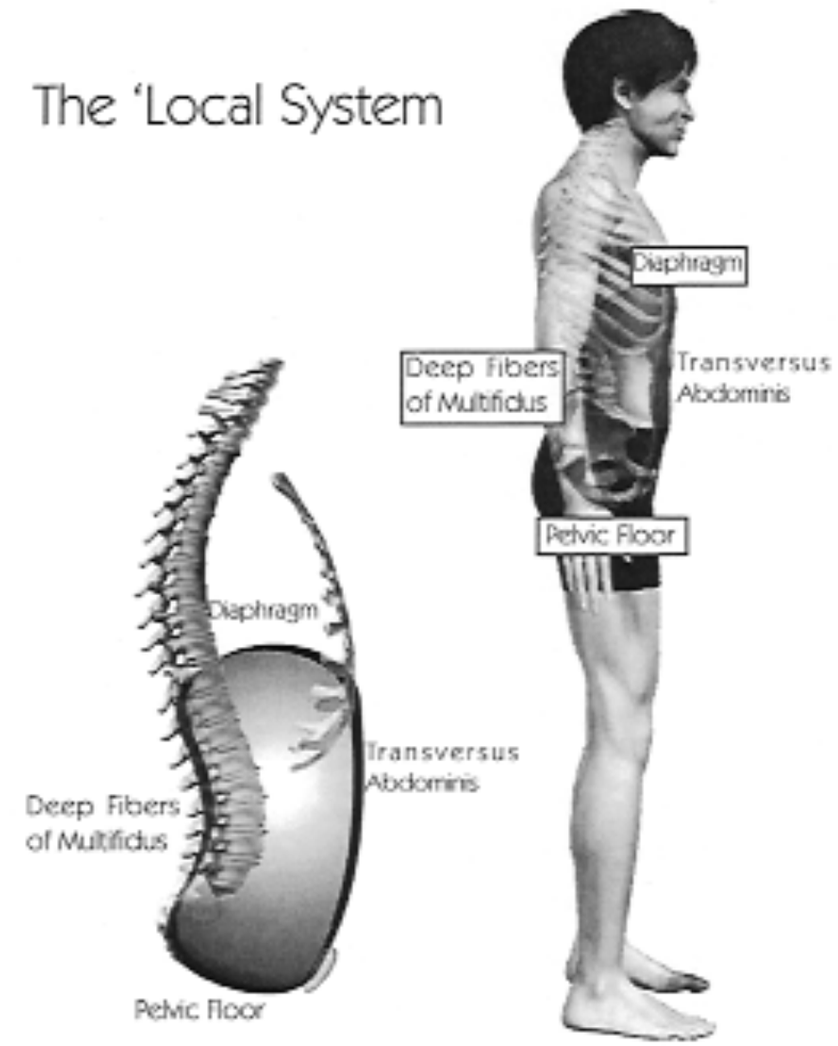
# Core System of Local Muscles: the inner "Container"

Transverse Abdominis (TA) deepest layer of abdominal muscle. TA acts by narrowing the waist, primarily between the ribs and the pelvis (pushing viscera up toward thorax or down toward pelvis.)

Multifidus muscles perform both local and global actions. At the deepest (local) layer, they broaden or swell, pumping up the tissues at the back of the sacrum like air bags. This action helps to stabilize the sacro-iliac joints.

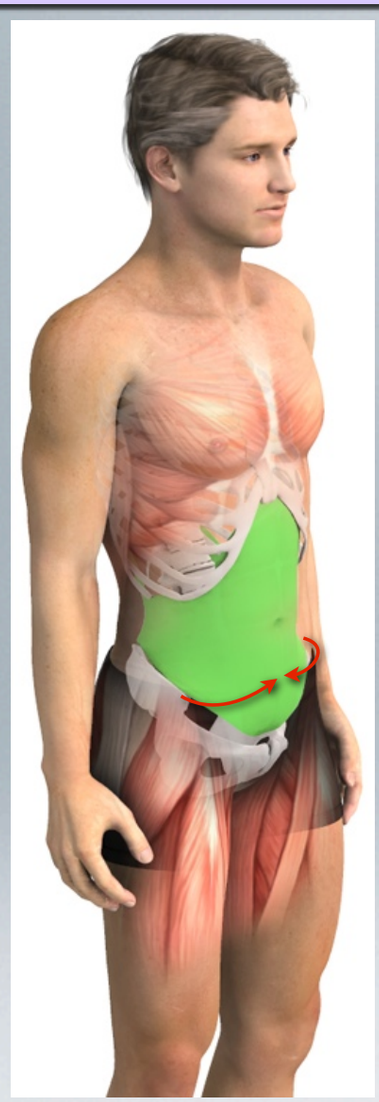
Diaphragm is primary muscle of respiration & serves to stabilize the trunk. The sections of the diaphragm at the ribs and 'root' (crura) reflexively tone simultaneously with the TA in anticipation of movements, especially raising the arms overhead. Effective diaphragmatic breath consists of 60% expansion of lower ribs and 40% expansion of the upper belly.

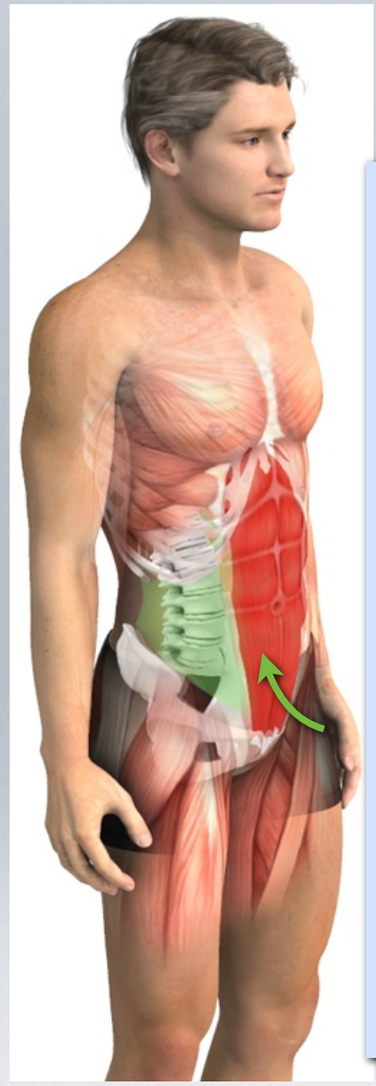
Pelvic floor array of muscles extending from the pubic bone back to the tail bone and 'sit' bones affect the SI joints by acting on the tailbone and sit bones in all movements of the hips and pelvis.




The sacrum and low back are stabilized by a 'local' system of muscles that form a 'container' for the abdominal and pelvic areas.

# Transverse Abdominals as Stabilizers: Finding Uddiyana Bandha for Postural Support





## Key Actions:

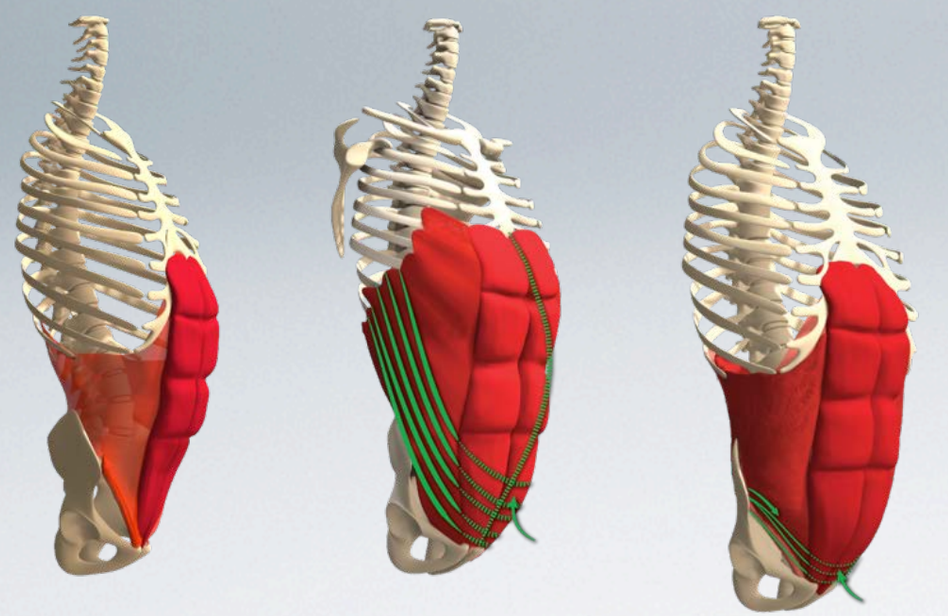
1. **Hip points 'narrow'** or draw toward each other via the **Transverse Abdominals**

2. Draw the lower abdomen in & up: **Rectus Abdominis**

**These actions might be described as 'tightening the drawstring' and 'zipping up'**

## Hip Points 'In' — Tightening the Drawstring

The first action takes place along lateral lines, and so it involves primarily the Transverse Abdominals at a level below the navel.



## 'Zipping Up'

The second action of toning and lift at the 'pit of the abdomen' involves the combined actions of Rectus Abdominis and the Internal and External Obliques, while keeping the spine stable (particularly at T12, while stabilizing the tilt of the pelvis).

The work of Rectus Abdominis prevents the obliques from tilting the chest and pelvis and impinging on the spine.

# Engaging the Core — Along the Latitudes

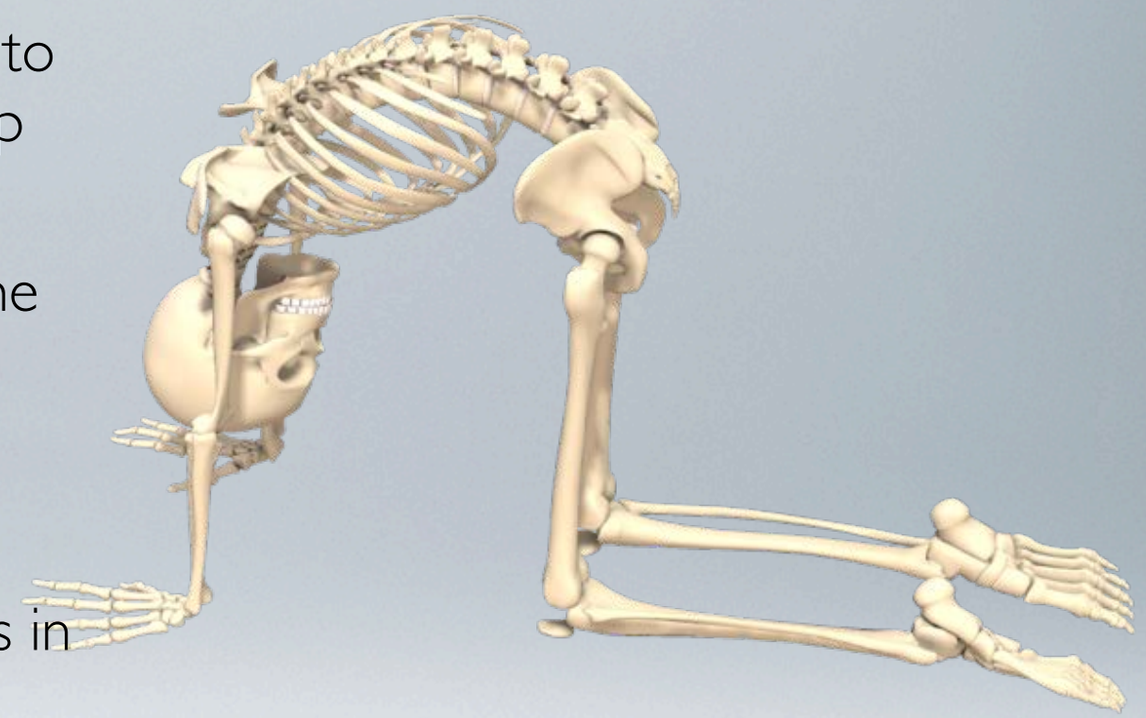
## 'Zipping Up'

A first practice for learning to "zip up" from bottom to top is to practice the "Cat Tilt", rounding the spine up vertebra by vertebra.

Initiate from the tailbone, but let the movement come from the lower belly.

It is helpful to practice with a partner, to see if any segments of the spine are "stuck".

Release the "stuck" areas by engaging the abdominals in that specific area to release and round the spine.



Press the hands into the earth to help you engage the abdominal muscles.

Focus not just on the flexion or forward bending of the spine, but on the feeling of "wrapping around" through the abdominals along the latitudes of the spine to lift up toward the spine.

# Narrowing the Hip Points: Transverse (and Obliques)

**To engage the Transverse Abdominals**, work the legs as if you are trying to lift them — without actually lifting them.

- The hip points squeeze toward each other
- The thighs firm and 'spiral' inward

Notice also the relationship between:

**The big toe mounds and the hip points**:

- when the big toe mounds press toward each other, so do the hip points,
- when the big toe mounds move away from each other, the hip points flare.

**The heels and the sit bones:**

- when the heels move toward each other, so do the sit bones; the pelvic floor closes toward the tailbone and the sacrum tips backward
- when the heels move away from each other, the sit bones move back and apart, opening the pelvic floor, allowing the low back to arch

# Example: Plank as Core Work

Start with a neutral spine

Press the left foot into the floor to engage the quadricep (and psoas); draw the energy up to the hip point. Press the hands into the floor to help engage the lower abdominals, narrowing the hip points

To integrate the core, lift the right knee slightly up off of the floor

Step the right leg back into a plank, working the core evenly. Repeat to the other side. Pay attention to the timing of the actions and to the sensations in the lower belly, pelvic floor, and low back.

A sagging plank pose is counterproductive!

It is better to lift the hips up higher, so as to better engage the abdominals between the hip points, narrowing the hit points and creating tone and length in the low back without rounding the low back or tucking the pelvis.

Notice the participation of the abdominals — especially of the oblique muscles in assisting the stabilization.

The internal oblique muscles especially work in concert with the transverse abdominals as part of the core system.

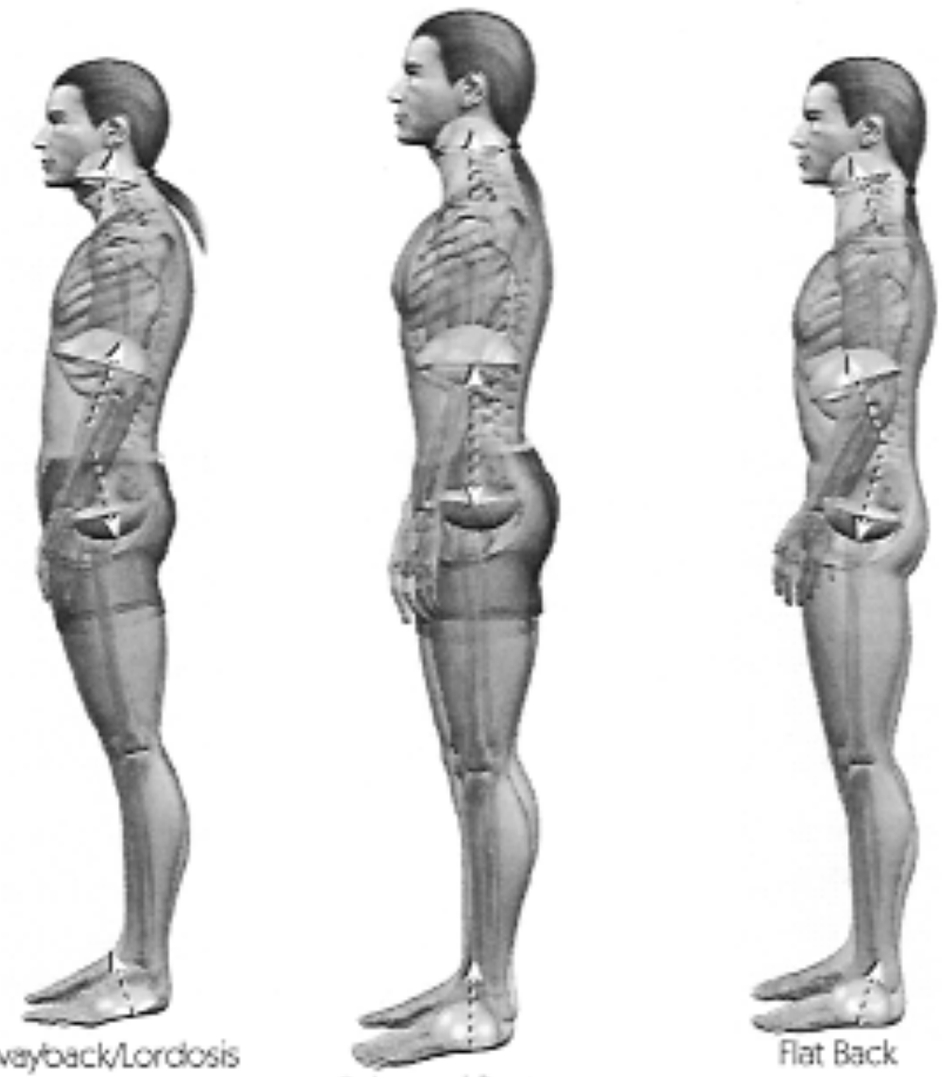
# Alignment and the "Three Diaphragms"

Good posture as the healthy alignment of Respiratory, Pelvic & Vocal Diaphragms involved in breathing.

As respiratory diaphragm lowers upon inhaling, pelvic floor and abdominal muscles have to release and elongate to make space for displacement of the internal organs. During exhalation pelvic floor and abdominals contract to push the organs upward again as the diaphragm releases and moves upward.

Among the abdominal muscles internal and external oblique muscles are most closely involved with the movements of the abdomen during the breath cycle. Transversus Abdominis plays supportive role in postural integrity, pressurizing the abdominal cavity to support the lumbar spine.

The vocal diaphragm is the root of the palate: with proper alignment of the hyoid bone, this network at the back of the throat lifts upward with the in breath (as in yawning), opening the upper body to a full diaphragmatic breath; and releases downward with the out breath. When the hyoid bone slides back, it draws the neck and head in line over the spine, gently toning the muscles.



Swayback/Lordosis

— over-arched back; diaphragms and arches tilted 'forward,' limiting full diaphragmatic breath

Balanced Posture:

— diaphragms and arches properly aligned for full diaphragmatic breath

Flat Back

— diaphragms and arches tilted 'backward,' limiting full diaphragmatic breath

# Alignment and the "Three Diaphragms"

Imagine balanced posture by visualizing:

Arches of feet as "overturned bowls" demonstrating toned lift at arches below pelvic floor

Pelvic floor as "upturned bowl" balanced at floor of core container demonstrating slight forward rotation of pelvis & natural lumbar curve

"Dome" of respiratory diaphragm as overturned bowl aligned over pelvic floor

Vocal diaphragm as "upturned bowl" balanced over respiratory diaphragm

The most important thing to do is align the pelvic floor with center of gravity.

Balanced Posture:

— diaphragms and arches properly aligned for full diaphragmatic breath

# Excercise: Zeroing the Postural Balance

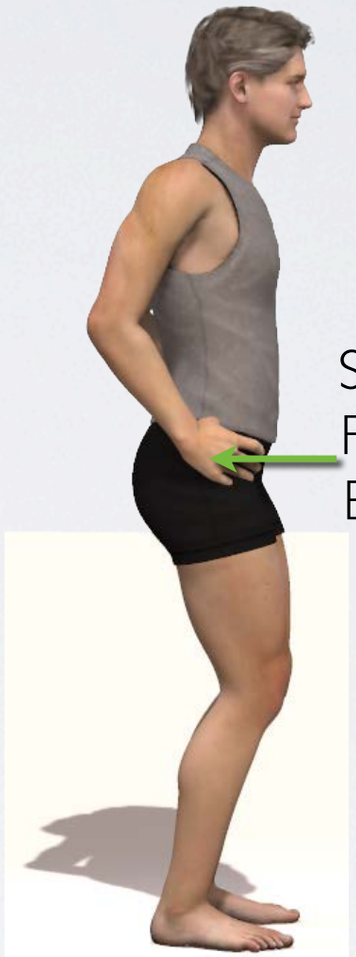
Most common postural misalignment involves fundamental forward shift of pelvis. As a result groins harden (the muscles you can feel at hip creases); lower back tends to compress at sacrum; hamstrings shorten & calves & arches of feet tighten. When the forward shift of pelvis is corrected tensions release.

Correct the shift and tilt of the pelvis to feel the transformation in muscle tone:

Stand with your feet parallel, hip distance apart.
Place fingertips at the hip creases (the V where your thighs meet your hips) to feel muscle tone at front of the hip joints. Notice the more you shift hips forward in space the more these muscles harden.
Bend knees slightly – about 20 ° releasing your inner knees forward to "unlock" them.
Thighs and knees parallel with each other & kneecaps point forward.
Lift toes to draw energy from the arches up through legs into hips.
Shift hips back so that more weight comes into your heels.
Tip hip points slightly forward, as if beginning to sit back onto a stool – bringing an inward curve to lower back.
Tip pelvis forward so that sit bones move back and apart. Muscles at hip crease will soften. Let inner thighs "melt" back toward sit bones & feel a softening or broadening in sacrum just below waistline at back.
The muscles of the pelvic floor will release & open. Breath may feel much deeper as more space is made for movement of the diaphragm.
Try enhancing this affect by placing a block between upper inner thighs. Keep knees parallel and draw block back by arching lower back so that sit bones move back and apart.

# Working with Postural Shifts: 'Zeroing' Your Posture

Forward Shifted Hips

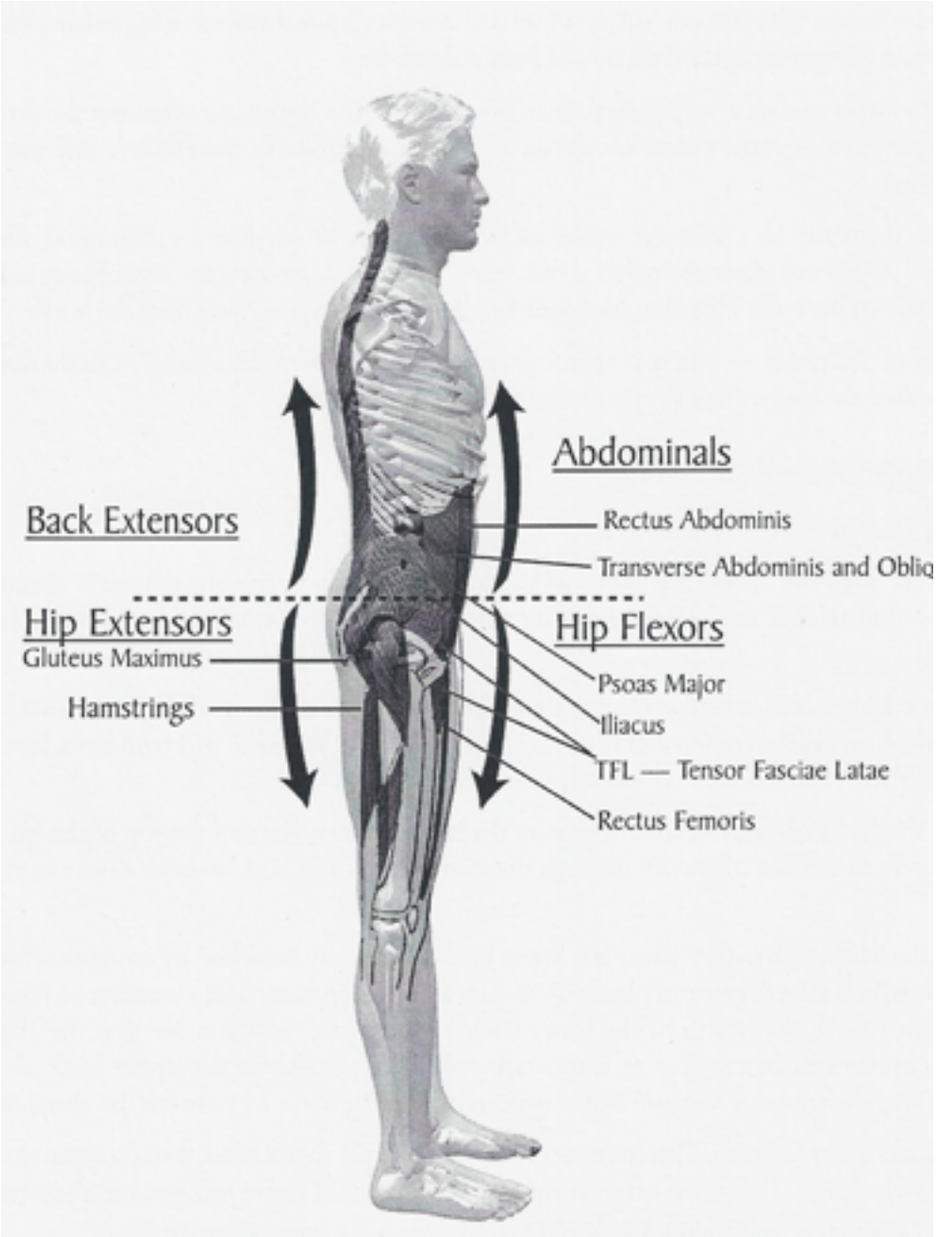




*Hip Points Narrow:*
*'Tighten the Drawstring'*


*'Zip Up'* —
Centered Posture

# Posture: Harmony of Pull Among Supporting Muscles

The normal tone of muscles exert a steady pull, like wires stabilizing a pole. The principle of this postural pull is this: in a neutral standing posture the balanced action of the Extensors (back) and Flexors (front) exert a steady pull in the opposite direction of their normal action:



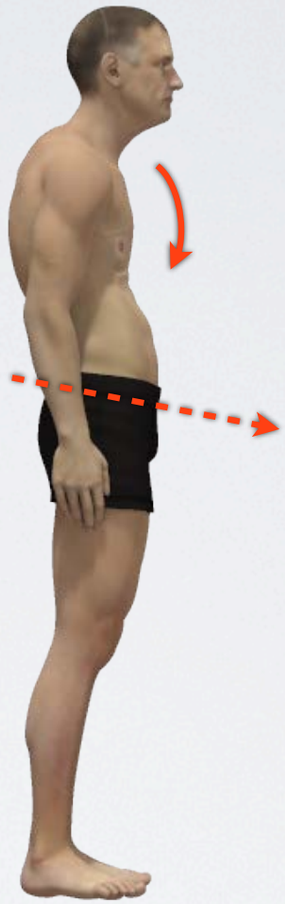

The hip flexors which usually pull up to lift the leg will draw down on the pelvis when the leg is fixed, especially if they are tight.
The abdominals which usually pull down to bend us forward will draw up when the spine is held upright.
The hip extensors usually pull up to take the leg back (extending the hip) will draw down if the leg is fixed.
The back extensors which usually draw down to take us into a back bend, will draw up holding us upright when we don't take the spine back past vertical.

The pelvis is the center of these lines of pull. When the tilt and shift of the pelvis is affected it influences the curvature of the spine.

The pull of the hip flexors and hip extensors affect and determine the tilt of the pelvis through the hip bones.
Key hip flexors include the iliopsoas, tensor fascia latae, rectus femoris
Key hip extensors include the gluteus maximus, hamstrings
The pull of the front flexors – the abdominals – and the back extensors affect the curvature of the spine as well as the tilt of the sacrum.
Key front flexors include rectus abdominis, transversus abdominis, internal and external obliques
Key back extensors include erector spinae

# **Abdominal Tone** in Particular Gets Lost in the Midst of these Postural Shifts

Postural Habits in any one part of the body — such as either slumped shoulders [on the left] or overly 'opened' shoulders [on the right] — cause shifts and pulls on other segments of the torso, along the lines of these 'Sutras'



Here, along with the forward shift of the hips, the rib cage collapses downwards as it tilts forward, pressing the belly outward. This compresses not only the abdomen, but the pelvic floor/perineum.

The chest is shifted forward, along with a forward tilt to the pelvis and backward tilt to the chest. The tightness of the low back muscles and hip flexors/psoas ***inhibits*** the abdominals, and so the belly distends regardless of abdominal strength.

# Evaluating Posture: Compensation Patterns at Head & Hips

Check whether and how far hip joints of pelvis are shifted forward relative to the line of gravity through the spine.

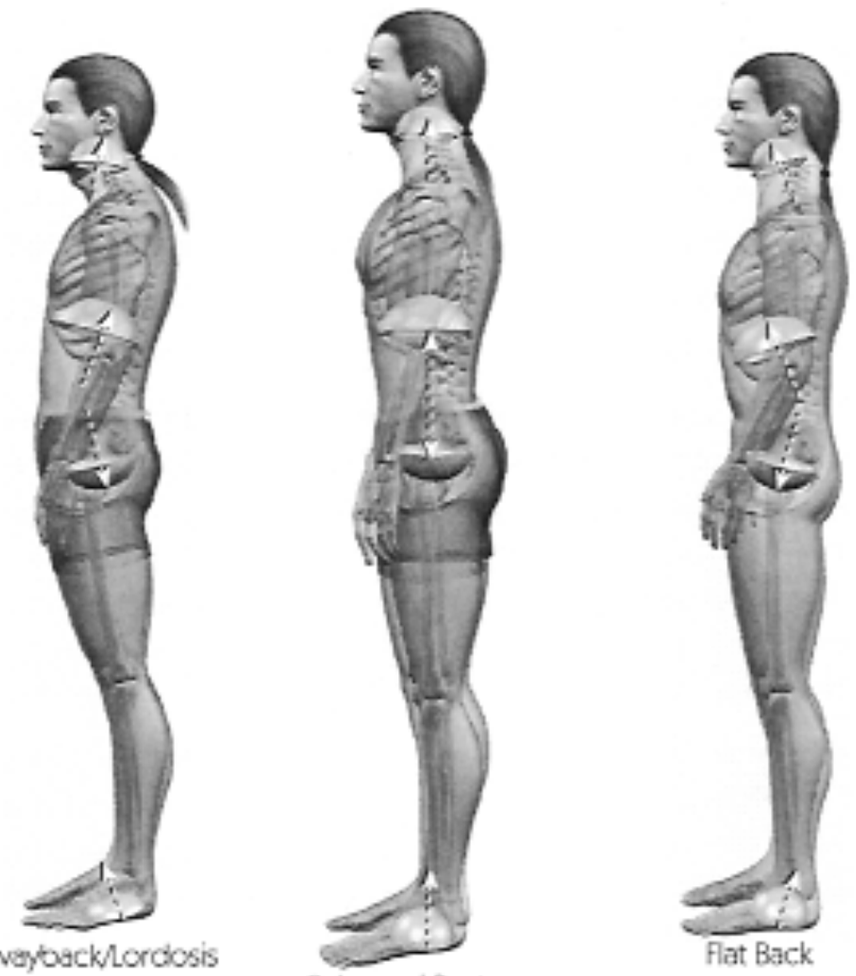
Check two 'hip points' and position of two heads of arm bones to determine whether one hip is tilted or shifted forward of the other (forward side will appear lower than side shifted back).

Check how far head (specifically the base of the head where it rests on the top of the spine) is shifted forward relative to line of gravity through spine itself.

Shifts & tilts of pelvis that affect lower back are usually matched by compensating shifts & tilts to head which affect upper back.

Most often head shifts forward. This increases the backward tilt to head compressing the neck bones as muscles 'lock short'. This most often comes with a collapsed chest and weaker abdominal tone and a more lax posture associated with a sedentary lifestyle.

When head shifted back, chin appears tucked. This extends back of neck and hardens neck muscles as they are locked long. This most often comes with lifted chest and greater tone at front body and is associated with more active performance oriented lifestyles such as military or dance.



Swayback/Lordosis

— over-arched back; diaphragms and arches tilted 'forward,' limiting full diaphragmatic breath

Balanced Posture:

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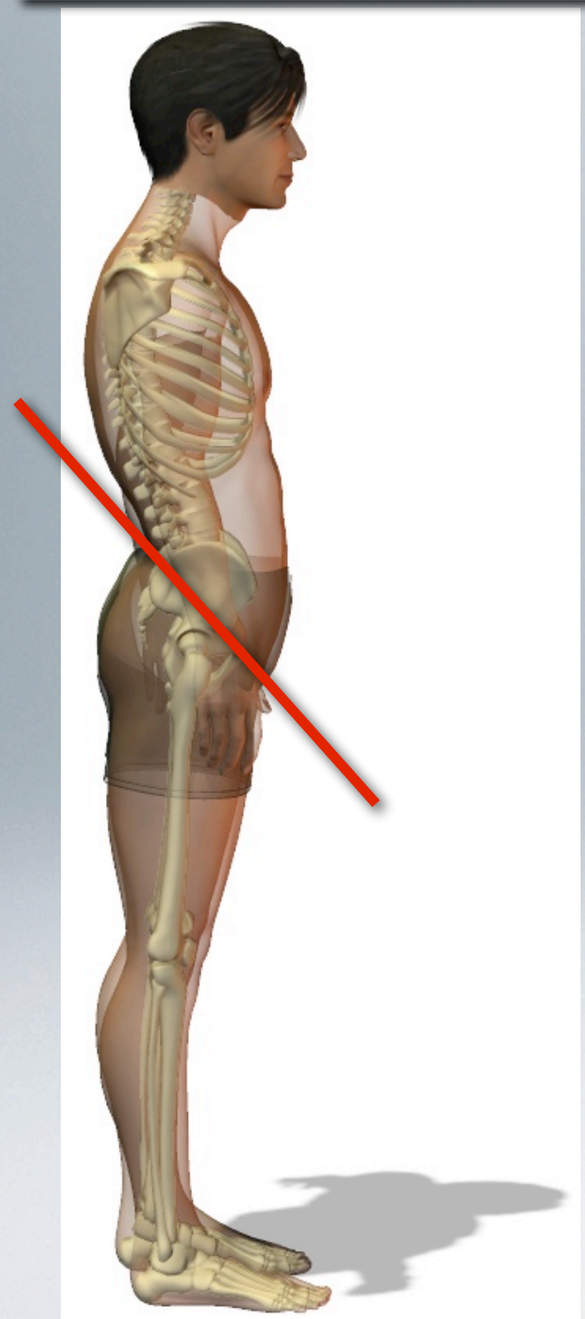
# Postural Effects of a Tight Psoas on Both Sides

## Tight Lower Psoas / Tight Low Back Muscles



Chronic tightness of the (lower) psoas can **increase** the lumbar curve **if the low back muscles are tight**.

Psoas spasm can manifest as low back pain

## Tight Upper Psoas / Gluteals Weak Low Back Muscles

Chronic tightness of the (upper) psoas can **reverse** the lumbar curve **if the low back muscles are weak**.

Psoas spasm can manifest as abdominal pain when coupled with a stooped posture

## Deep Work with Pelvic Tilt

Deep Work with 'Cat' and 'Dog Tilt' to refine the balance of the pelvic tilt

- Imagine weights attached to the tailbone and pubic bone
- Alternate subtly lifting and dropping the two weights while minimizing the effect on the curve of the spine
- To feel the influence upon the adductors, add a block between the thighs; distinguish between initiating the actions with the adductors from the deeper work of imagining the 'weights'

# Types of Posture - Decreased Lumbar Curve

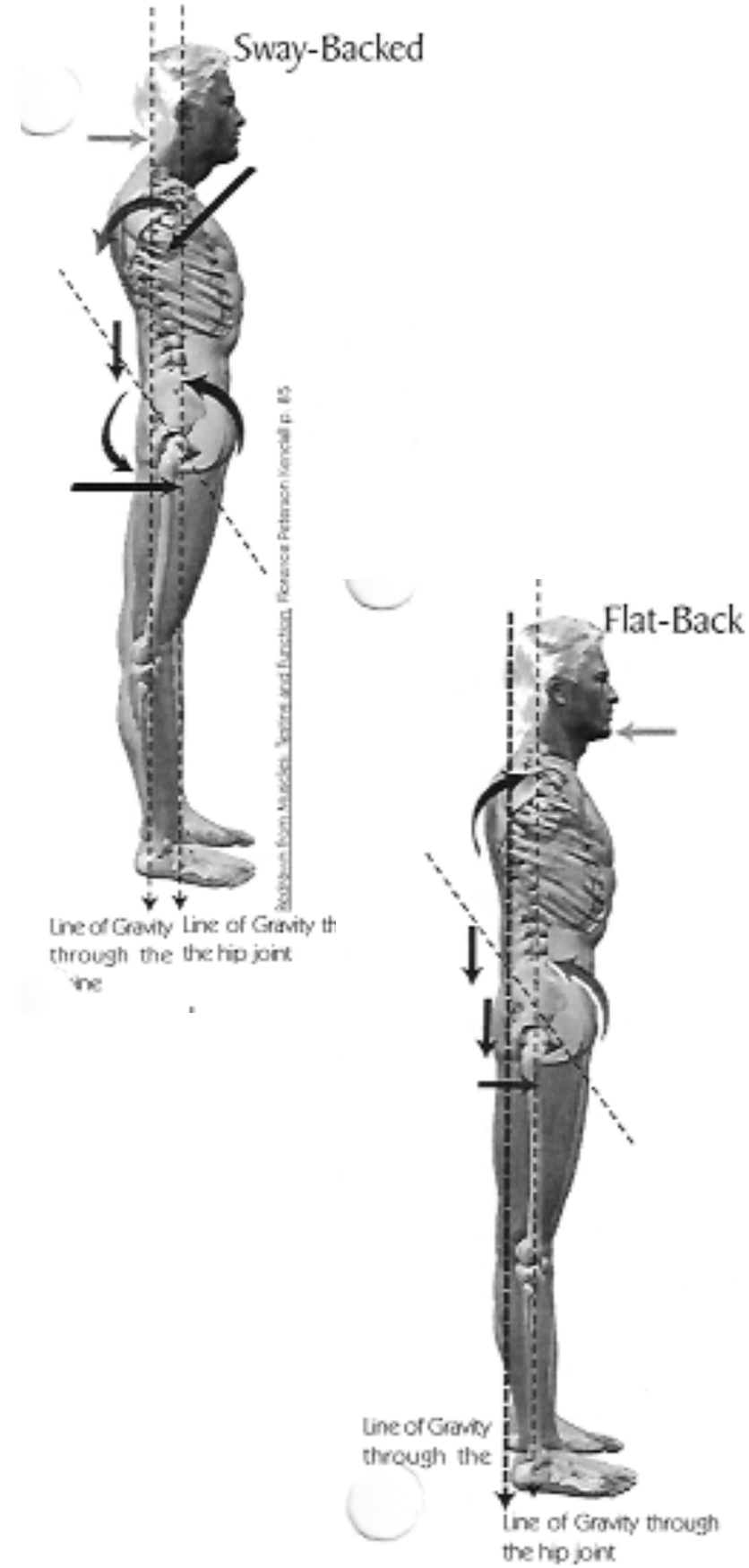
Sway Back and Flat Back. Both cases reflect hip joints – and line of gravity through thigh bones and legs – shifted forward of the line of gravity through the spine. Lower back is 'flat' because of the backward tilt of pelvis, 'tucking' pelvis while thrusting hips forward causing the muscles at front to extend.

In Sway Back posture, upper chest drops, head shifts forward and upper back sways to accommodate load. Cervical curve increases compressing neck bones. As curve in lower back decreases, curves of the upper back increase.

Short and Strong Muscles: hamstrings, upper fibers of internal obliques; lower back muscles are strong but not short
Long and Weak Muscles: hip flexors, external obliques, upper back extensors, neck flexors

In Flat Back posture, drop in chest is not as prominent, head is drawn back, flattening neck as well. There is less forward shift to hips and upper chest begins to tilt forward relative to lower back, flattening lower back.

Short and Strong Muscles: hamstrings
Long and Weak Muscles: hip flexors, abdominals are long but often strong, back muscles are also long and strong



# Types of Posture - Increased Lumbar Curve

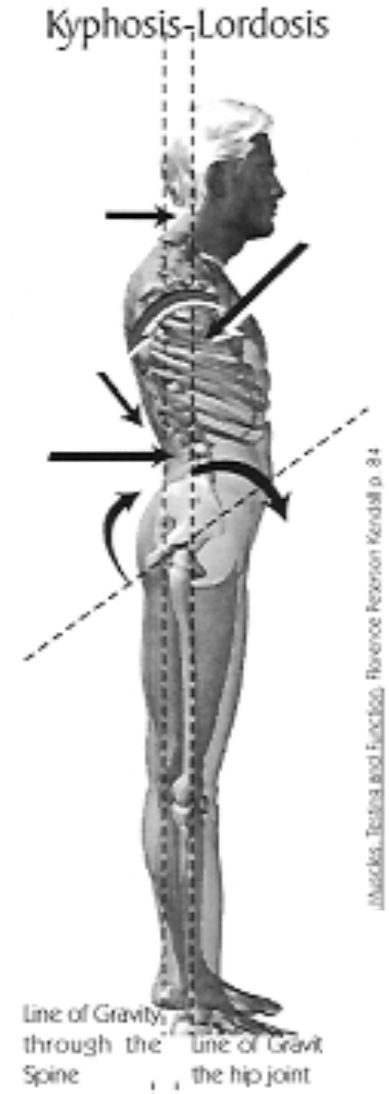
Kyphosis-Lordosis and Military. In these two postures hip joints & the line of gravity through thighbones & legs not shifted forward so much, while curvature of lower back is increased due to forward tilting pelvis.

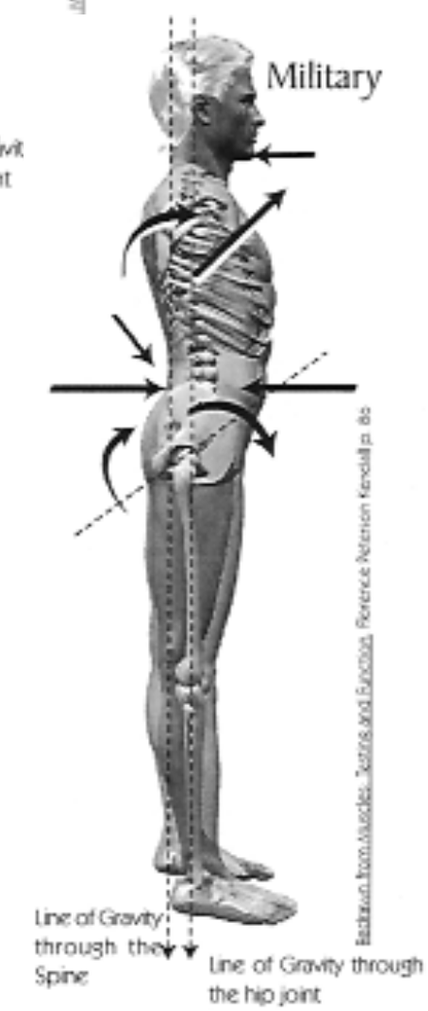
In Kyphosis-Lordosis posture chest is collapsed giving a strong backward tilt to rib cage relative to lumbar spine. Pelvis tilts strongly forward usually worsened by lack of abdominal engagement. Head shifts forward to compensate for backward tilt of chest. Hips shift slightly forward relative to center line of gravity. Weight of spine is more directly over line of gravity through legs.

Strong and Short Muscles: Hip flexors and neck extensors. Low back is strong and may or may not be short.
Long and Weak Muscles: Upper back spinal muscles, neck flexors, external obliques. Hamstrings are slightly long & may or may not be weak. Rectus abdominis is not necessarily long due to drop in chest. Abdominals don't have much tone.

In Military posture chest is strongly lifted & slightly tilted back relative to lumbar spine while pelvis is tilted forward relative to thigh bones. Hips shift forward only slightly; exaggerated lift of chest compensates for forward tilt of pelvis. Head is shifted back flattening neck more than in Kyphosis-Lordosis posture. The two tilts – pelvis and chest – cause compression in lumbar spine, which is usually moderated by tightly held abdominal muscles.

Short and Strong Muscles: low back and hip flexors.
Long and Weak Muscles: Abdominals in front body. Hamstrings are somewhat lengthened but may or may not be weak.



# Working with Posture Through Yoga: Posterior Tilt

Yoga practice works with muscle pairings to bring balance, integrity & freedom from unnecessary postural stress.

Generally those with flat backed or sway backed postures would benefit from emphasizing back bending postures. Those of us with arched or lordotic lower backs benefit from emphasizing forward bending postures.

In a backward tilting pelvis (flat backed posture) the back muscles are often weak (locked long) & may be accompanied by a collapse in the front body (locked short). Tightness of hamstrings presses thigh bones and hips forward, inhibiting forward bends. This is often paired with week quadriceps. These forces decrease arch in low back.

Focus on strengthening the back body through back bending poses and stretches while opening up the front body. Work with forward bending postures should emphasize strengthening the inner thighs by taking the tops of the thighs back while stretching hamstrings. Lift the abdominals to open the space between the hip points and tops of thighs.

# Working with Posture Yoga Sequence for Flat Back

Arm Circles
To warm up, strengthen upper back, balance the downward pull of collapsed chest

Cat & Dog Tilt Variations & Leg Extensions
To work back muscles, shoulders & increase arch in low back

Low Bridge Lifts with Lower Back Curved; Baby Back Bends
To work back line in a way that encourages restoration of spinal curves

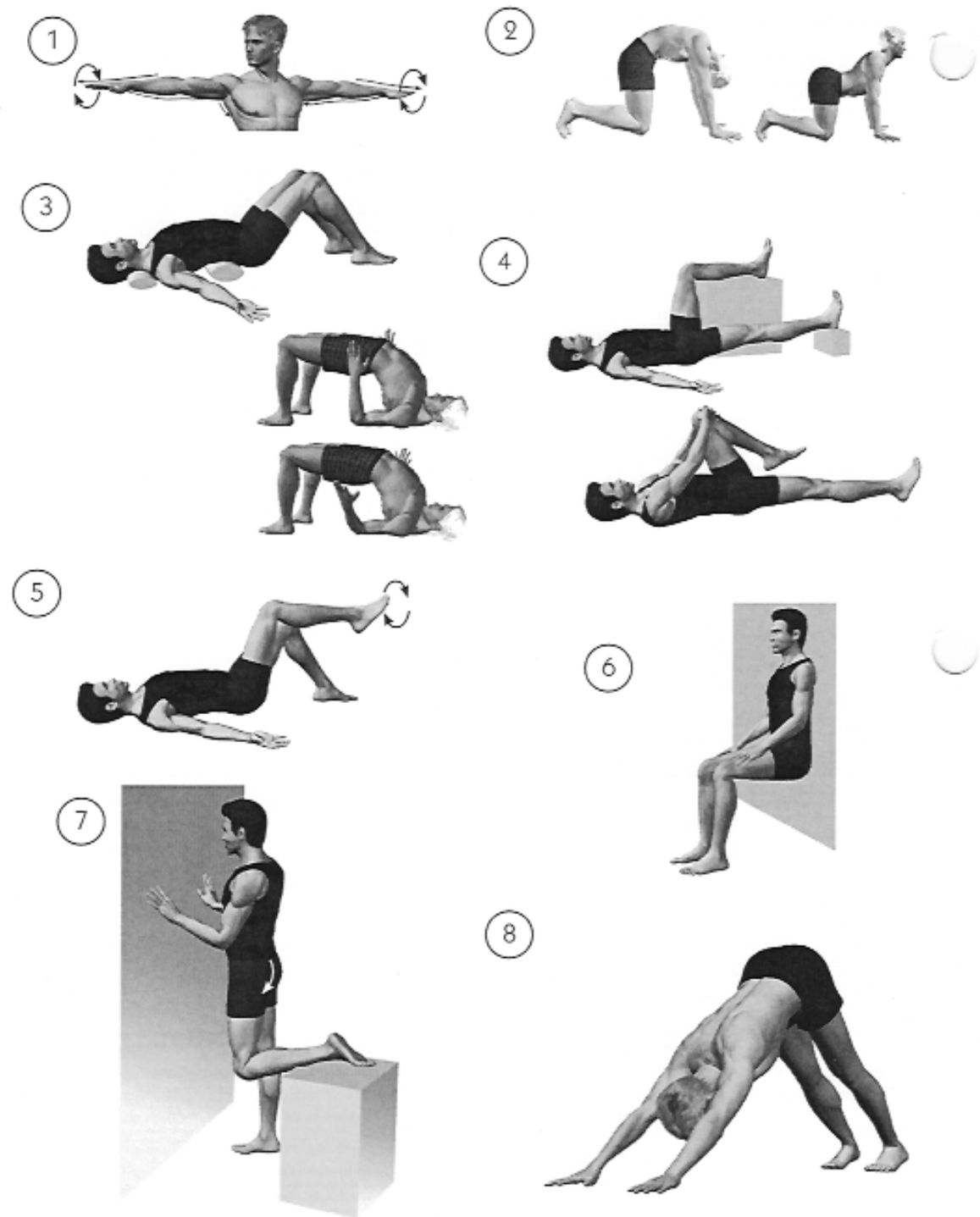
Groin Stretch/Knee Squeeze
To stretch & release inner thigh (groin) with leg at anatomically neutral and arch in low back

Foot Circles/Point & Flex
To loosen, tone & increase range of motion in ankles

Chair Pose/Variation at Wall
To strengthen quadriceps as postural support for trunk (as opposed to the hip flexor)

Standing Quadriceps Stretch
To release pull of quadriceps as hip flexors & stretch abdominals & open chest

Downward Dog
To stretch back line of the body while maintaining tone in the front body; attention to level of hips and rotation of pelvis




The series of postures presented for each postural type is based upon, but also expands and introduces variations into the series presented in The Egoscue Method of Healing through Motion, p. 84-128

# Working with Posture Through Yoga: Forward Tilt

Yoga practice works with muscle pairings to bring balance, integrity & freedom from unnecessary postural stress.

Generally those with with arched or lordotic lower backs benefit from emphasizing forward bending postures.

A forward tilting pelvis (arched back posture) arises from pull of hip flexors against relatively weak abdominal muscles. Lower back muscles (extensors) are locked short in a tight position, while abdominals are locked long in a weakened position.

Hip flexors, including the psoas are locked short, while the hamstrings are locked long (they may still be tight). Hamstrings while longer, more flexible are also weaker. Thigh bones are back, making forward bends easier. Tightness in quadriceps & possibly & lower psoas tilts pelvis forward.

Focus on the relationship between hip flexors (the 'groins') and abdominals to open space between the hip points and tops of thighs. In back body the hamstrings need to be properly strengthened. Back muscles should also be strengthened to provide greater lift to spine.

# Working with Posture Yoga Sequence for Arched Back

Arm Circles
To warm up, strengthen upper back, balance the downward pull of collapsed chest

Elbow Curls/Eagle Arm Variations
To awaken the shoulders to full range of motion, relieve stress in slumped shoulders & forward head

Static Back Press/ Knees on Chair
To release lower back & psoas contraction from forward pelvic tilt, relieve lower pack pain

Groin Stretch/Knee Squeeze
To stretch & release inner thigh (groin) with leg at anatomically neutral and arch in low back

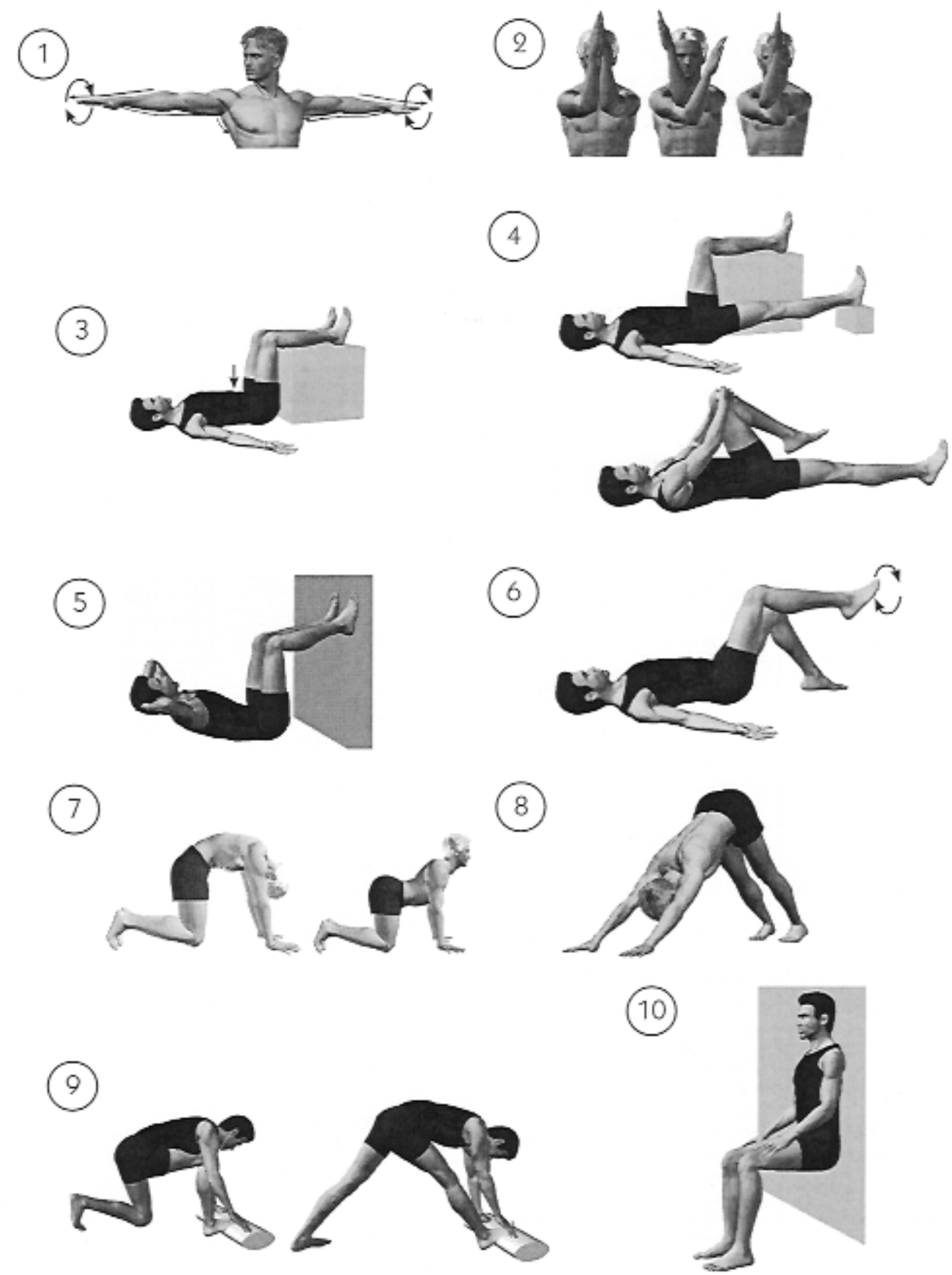
Abdominals Feet to Wall Crunches or Variations
Strengthen & support abdominals while isolating them from hip flexors

Foot Circles/Point & Flex
To loosen, tone & increase range of motion in ankles

Downward Dog
To stretch back line of the body while maintaining tone in the front body; attention to level of hips and rotation of pelvis

Lunge/Pyramid Variations
To target hamstring stretch, tone quadriceps, focus on knee alignment & balanced action of inner quadricep (vastus medialis)

Chair Pose/Variation at Wall
To strengthen quadriceps as postural support for trunk (as opposed to the hip flexor)




The series of postures presented for each postural type is based upon, but also expands and introduces variations into the series presented in The Egoscue Method of Healing through Motion, p. 84-128