



# Posture and the Core

## The Yoga Studio in Overland Park 2014

with Doug Keller

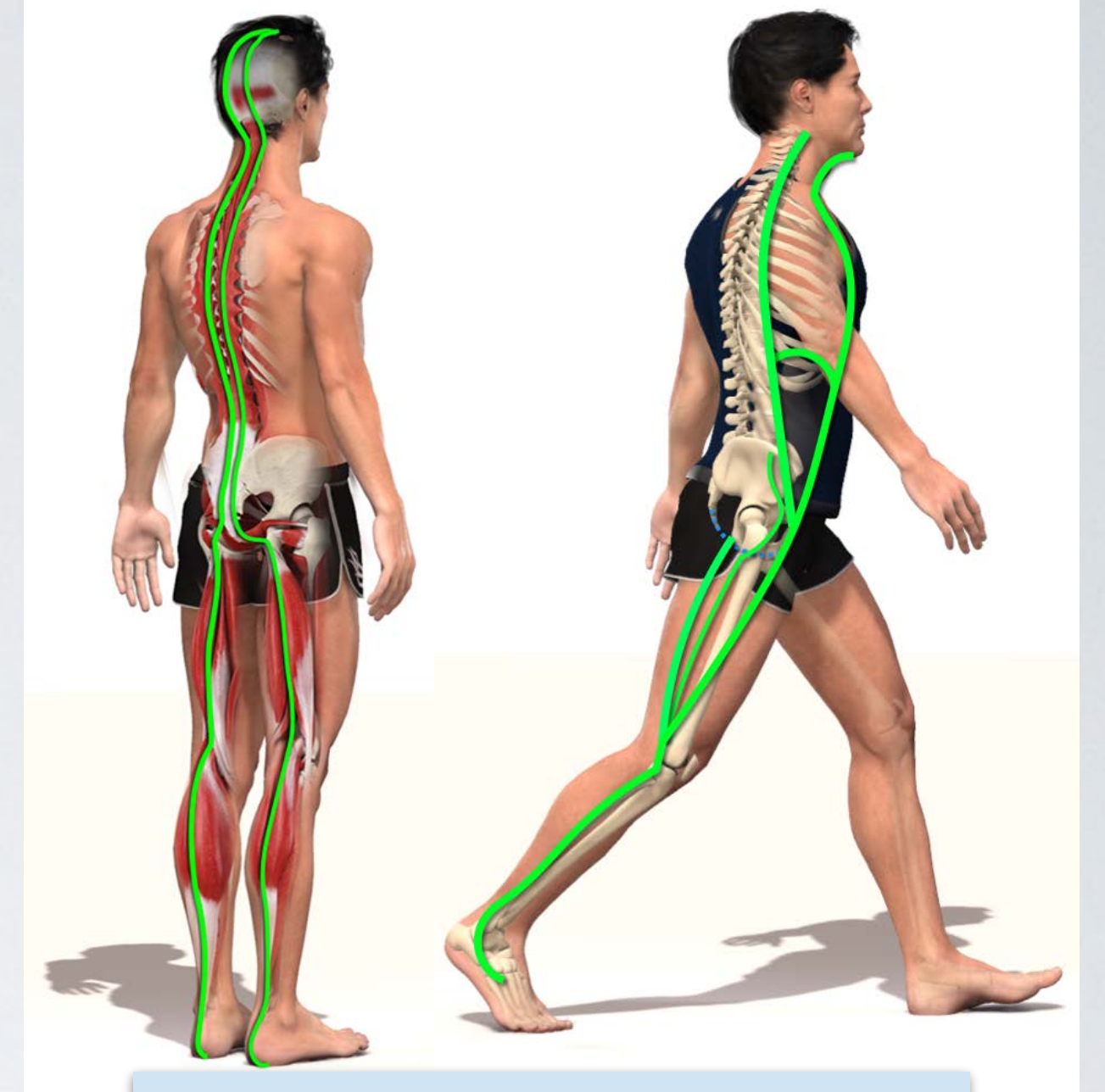
An **essential distinction** for understanding the role of the **bandhas**: to recognize the difference between

- muscles which **move** the body, and
- muscles which **stabilize** the body, preparing it for movement, and supporting the joints during movement.

“**Postural**” muscles that ***stabilize*** the body do not produce significant movement of the body, and they are arranged along the **latitudes** of the body.

- These require a much more subtle actions to engage them, which make them difficult for students to find and appreciate.

**Asana** practice works with **both** sets of muscles and their relationships: this is the **relationship between asana and bandha** in postural practice, which establishes more healthy and pain-free patterns of movement and stillness.



Longitudes — Movement



Latitudes — Stability

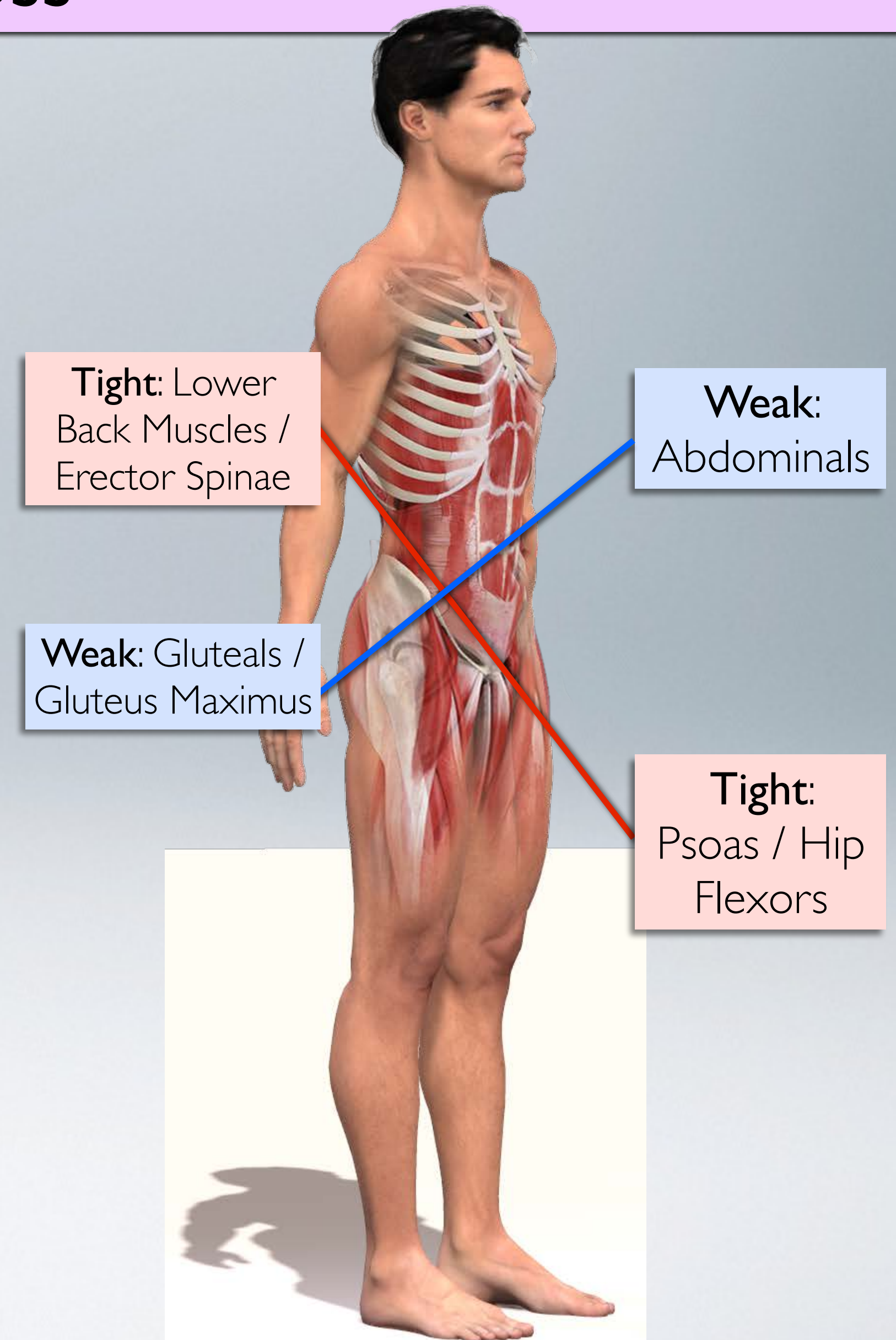
# The Relationship Between Movement Muscles Surrounding the Core: The 'Lower Cross'

## The Lower Crossed Syndrome

- describes the most common relationship between the movement muscles surrounding the core in an imbalanced posture

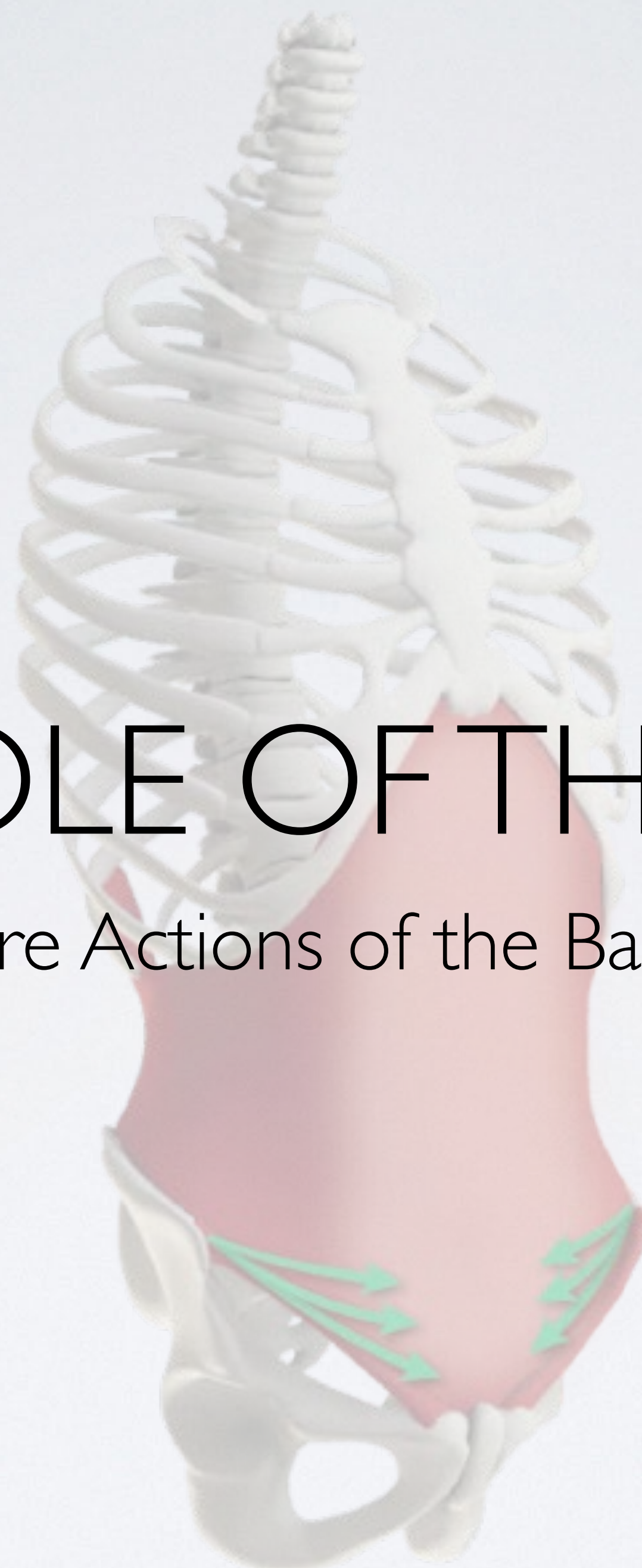
This 'syndrome' is most typical of postures in which the hips are shifted forward of center, causing

- some muscles to become short, tight or hypertonic, while
- inhibiting others, causing them to be weak.



# THE ROLE OF THE 'CORE'

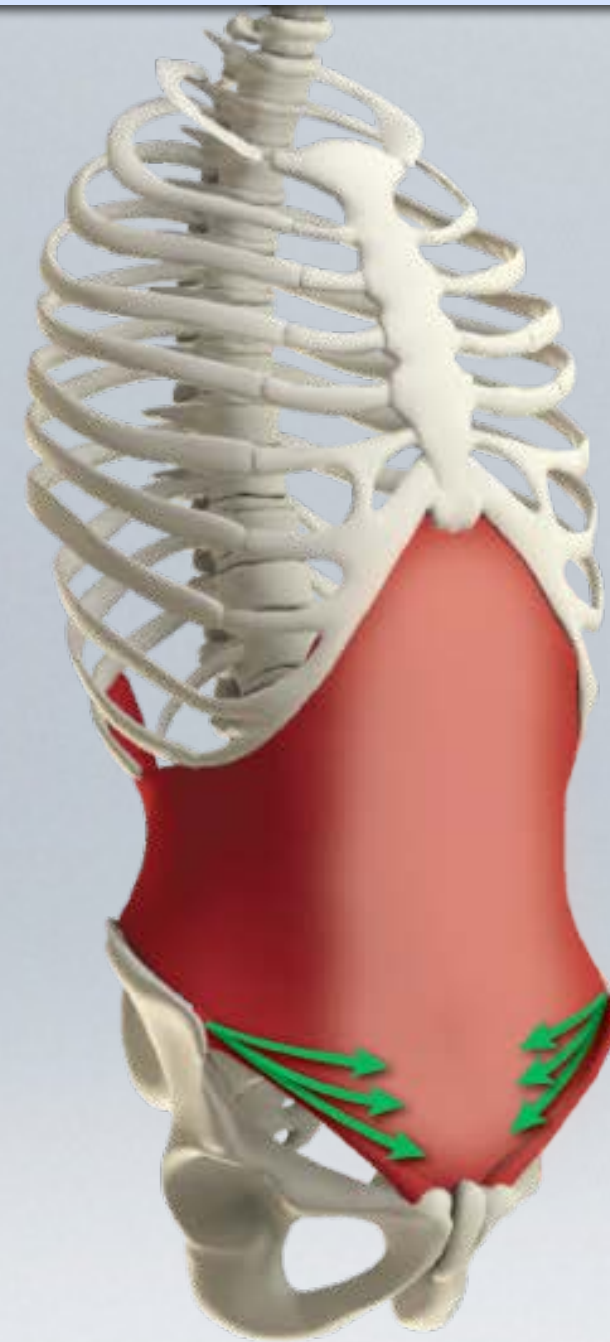
Core Actions of the Bandhas



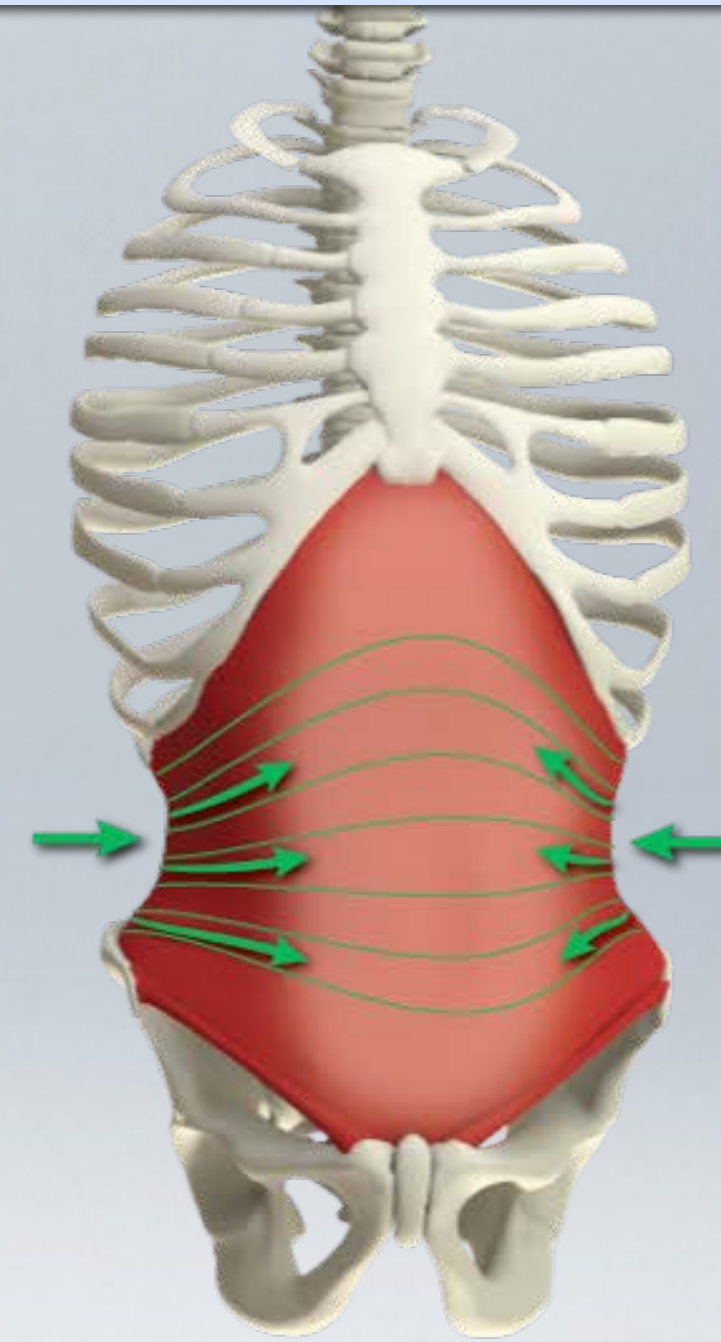
# Support for the Psoas: the Transverse Abdominals

The transverse abdominal muscles act as a **stabilizer**; they do not produce any significant movement of the spine.

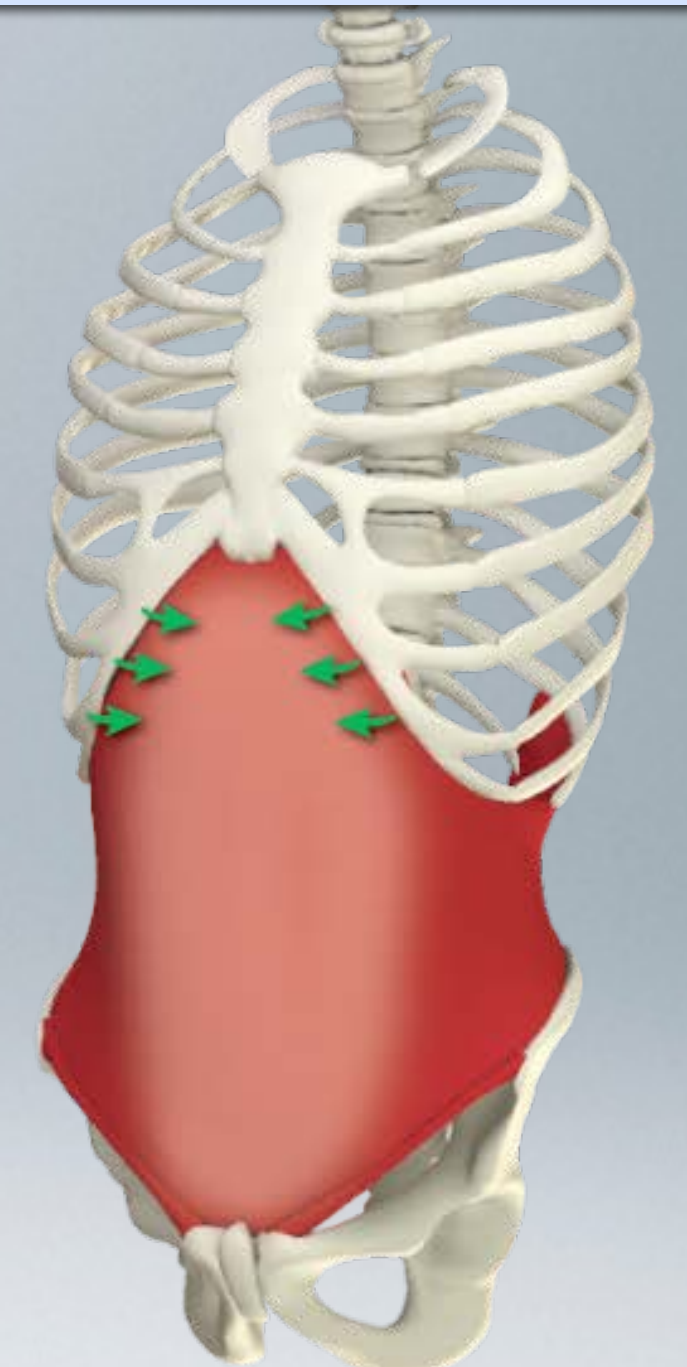
They can be contracted region by region, the first two of which are involved most in **Uddiyana Bandha**.



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.

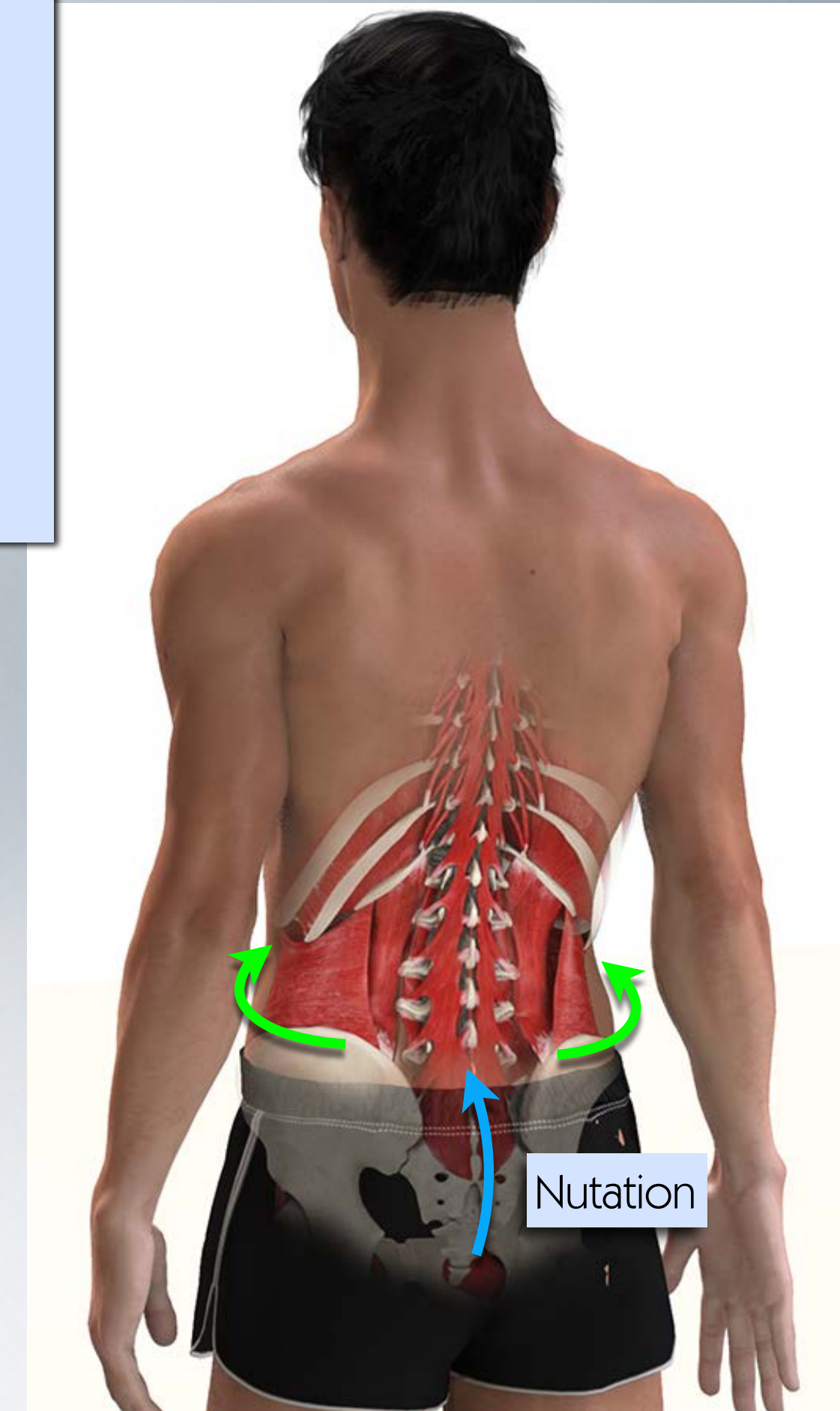
# Basic Actions for Supporting the Iliopsoas: Uddiyana Bandha as Postural Support

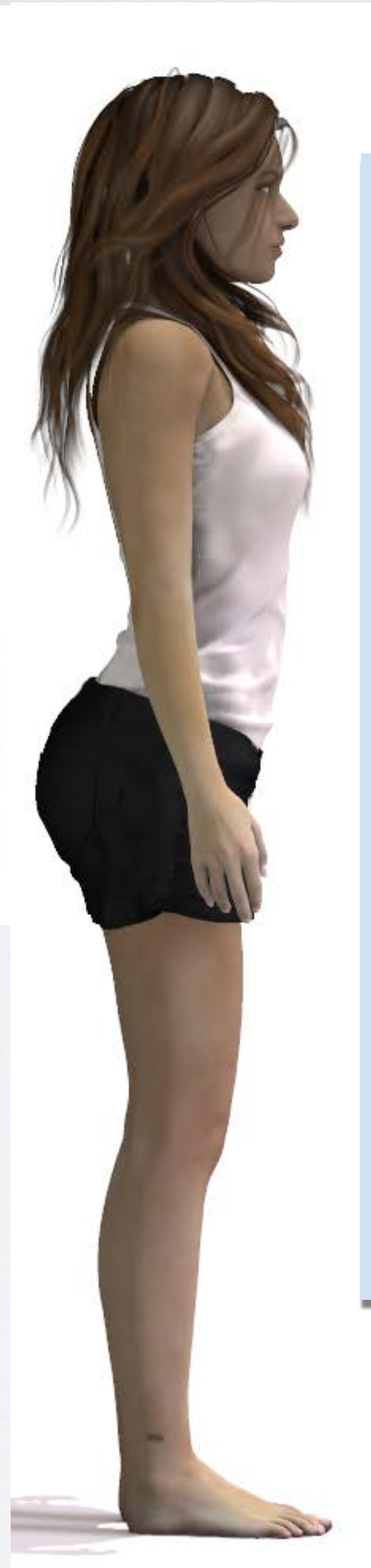
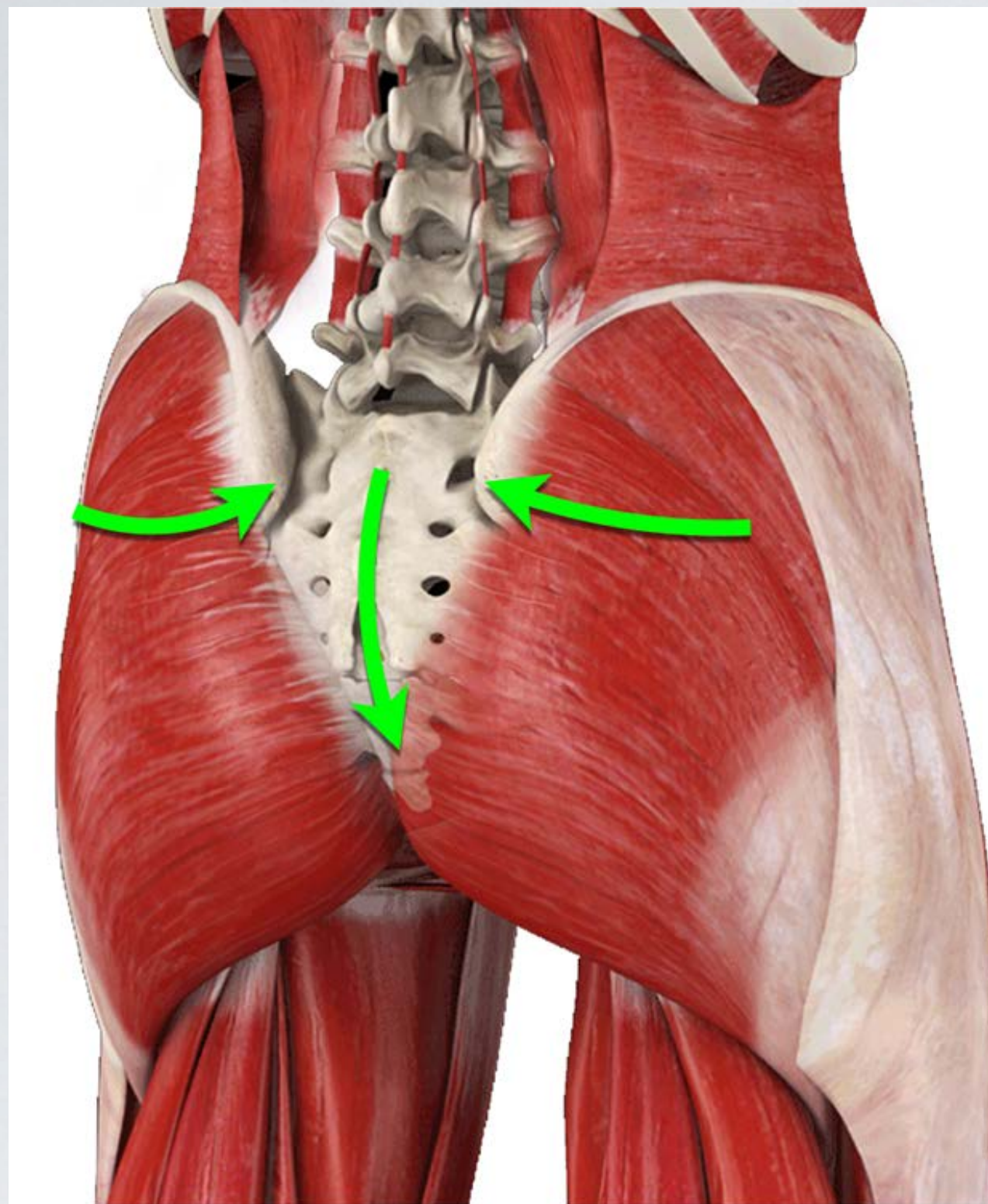
## Key Actions:

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

When a slight abduction of the thighs is added, the sacrum also tips slightly into the body (nutation) as space is created in the sacroiliac joints.

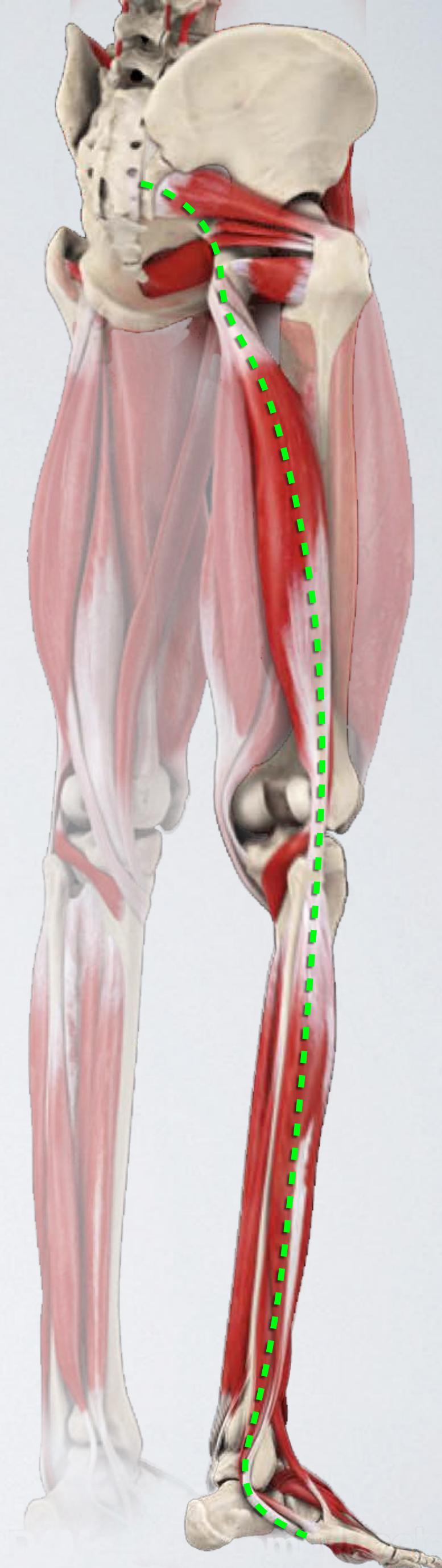
This slightly increases the inward curve in the lower back, and encourages the sitbones to move back.





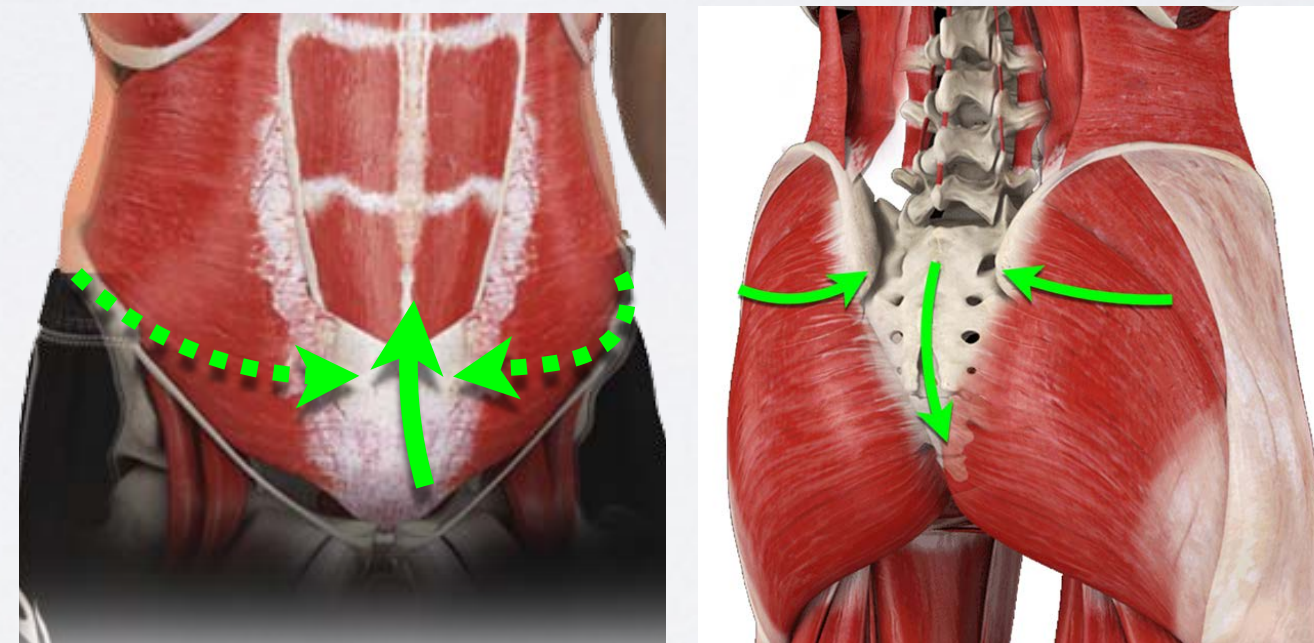
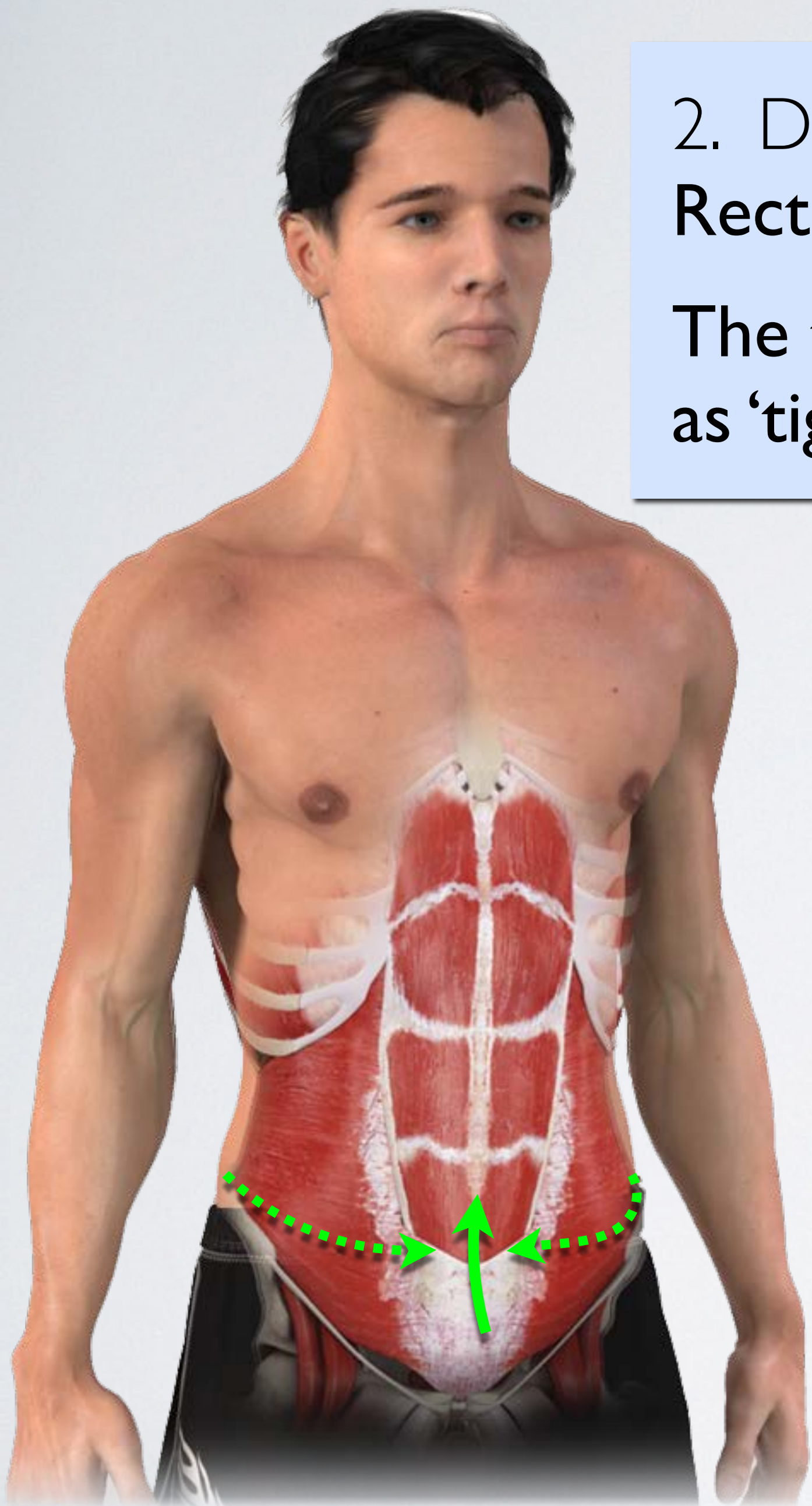
If there is already too much nutation (a forward tilt of the pelvis and a lordotic spine) then more effort can go into narrowing the hip points at the back with the help of the piriformis.

This is done by grounding through the outer heels to activate the piriformis, and squeezing the hip points at the back (PSIS) toward each other.



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

The two core actions might be described as 'tightening the belt' and 'zipping up'

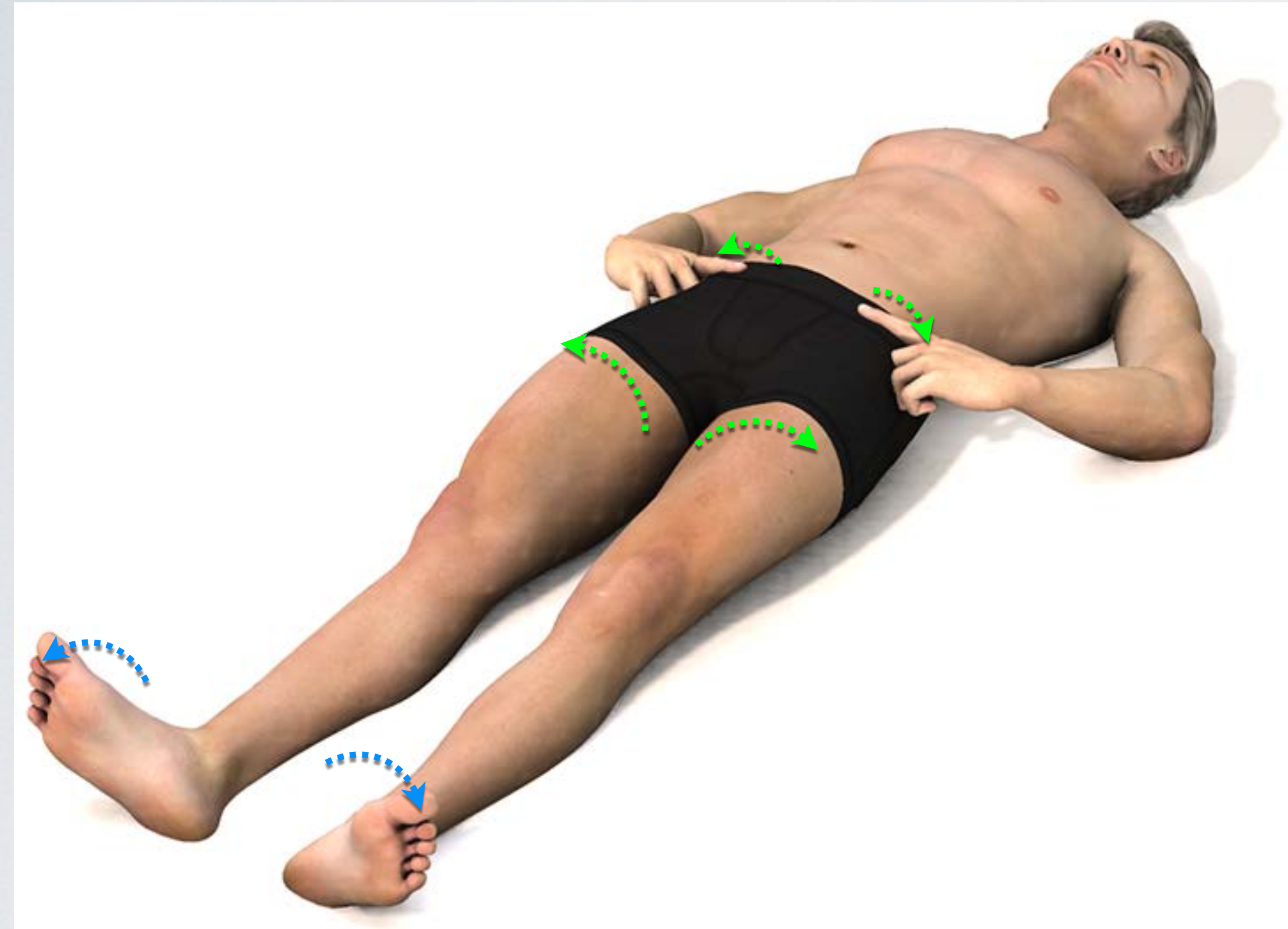


The balance between narrowing the hip points at the front (ASIS) and the hip points at the back (PSIS) creates a 'circle of integrity' for the pelvis at the level of the hip points.





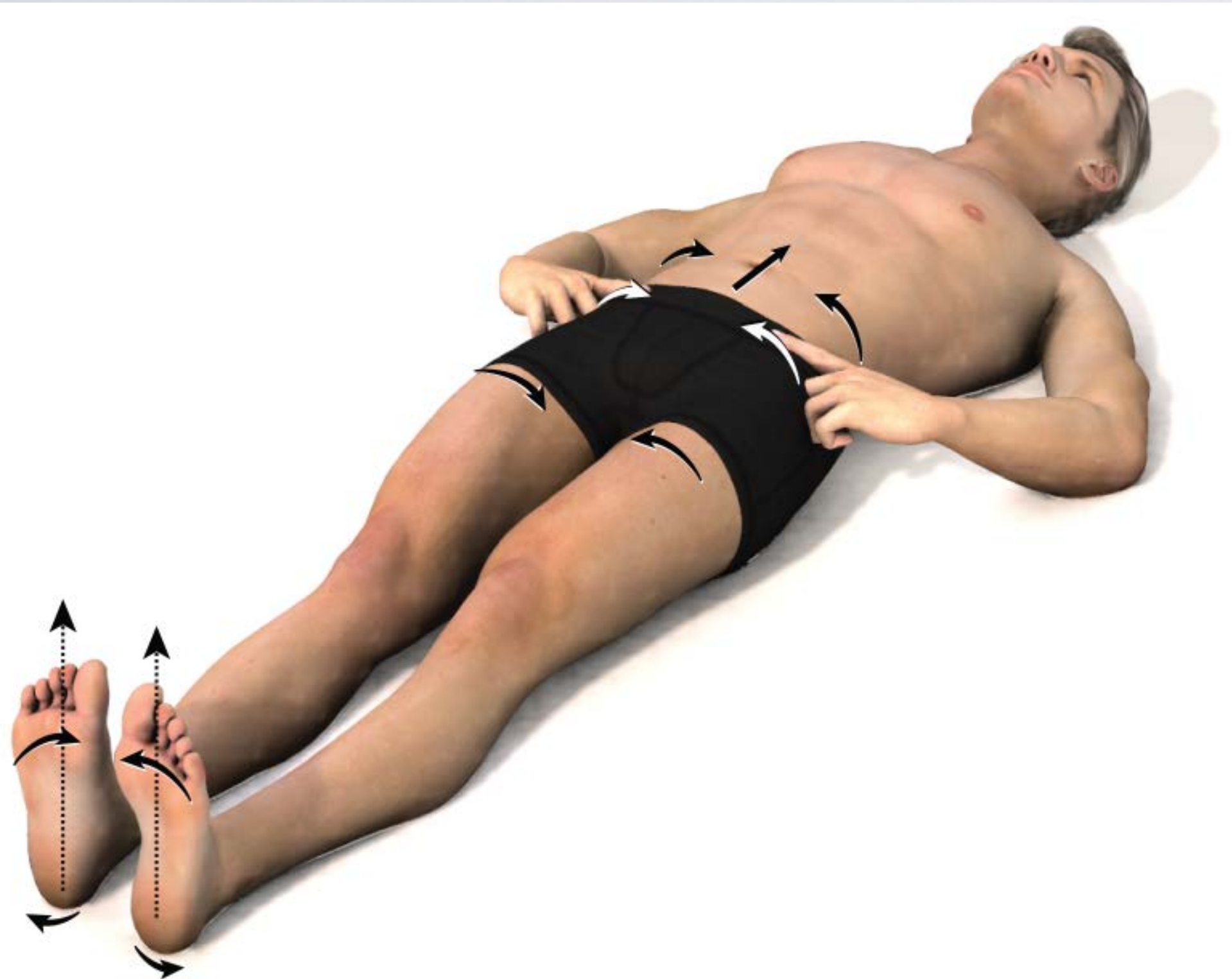
# Reclining Experience of Narrowing the Hip Points — Finding the Transverse



When you relax on the floor, your feet and legs naturally fall out to the sides, externally rotating. This is because the pressure of the floor against the sacrum causes the sacrum to tip backwards, or “counternutate.”

In order to spiral the legs inwards into a neutral position, you will have to engage the core muscles to work against this tendency. If you simply attempt to rotate the legs inwards, it will only serve to tighten your adductors at the groins, and without sufficiently affecting the sacrum or engaging the core.

# Narrowing the Hip Points: Finding the Transverse



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

This intention will signal the psoas muscles to engage as they attempt to lift the legs. You will feel a firming in the lower belly in the space between the hip points: this is the transverse abdominal muscles engaging to hold the belly and spine steady to support the action of the psoas.

The engagement of the Transverse Abdominals will cause the hip points to 'narrow' or squeeze toward each other — i.e. the 'Drawstring' action.

the inward arch of the lumbar spine will increase slightly due to the pull of the psoas muscles on the low back as they attempt to lift the leg, and also due to the narrowing of the hip points.

The Rectus Abdominis muscles — at the pit of the abdomen — will also engage to prevent the pull of the psoas from over-arching the lumbar spine. So you will feel your lower belly tone, drawing in and up — the 'Zipper' action.

Usually both the 'Drawstring' and 'Zipper' actions happen simultaneously.

You will also feel the thighs naturally 'spiral' inward, without the tightening or 'hardening' of the grinds that comes with the effort to rotate the legs inward.

The "spiraling inward" toward the Madhya or 'Middle' is initiated from the core — at the level of the hip points

# Baby Backbends Also Increase The Core Connection — *With* The Proper Firing Order



## Firing Order In Hip Extension

The Optimal Firing Order In Prone Hip Extension (Shalabhasana) Should Be:

- hamstrings
- gluteus maximus
- contralateral lumbar erectors
- ipsilateral lumbar erectors

The most common problem: a weak gluteus maximus fires late, causing substitution by the hamstrings and lumbar erectors. This commonly happens in runners who suffer recurring hamstring pulls; gluteus maximus is not helping the hamstrings enough during “pushoff”



# Another Example: Plank as Core Work



Start with a neutral spine



Press the left foot into the floor to engage the quadriceps (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 hip points and creating tone and length in the low back without rounding the low back or tucking the pelvis.

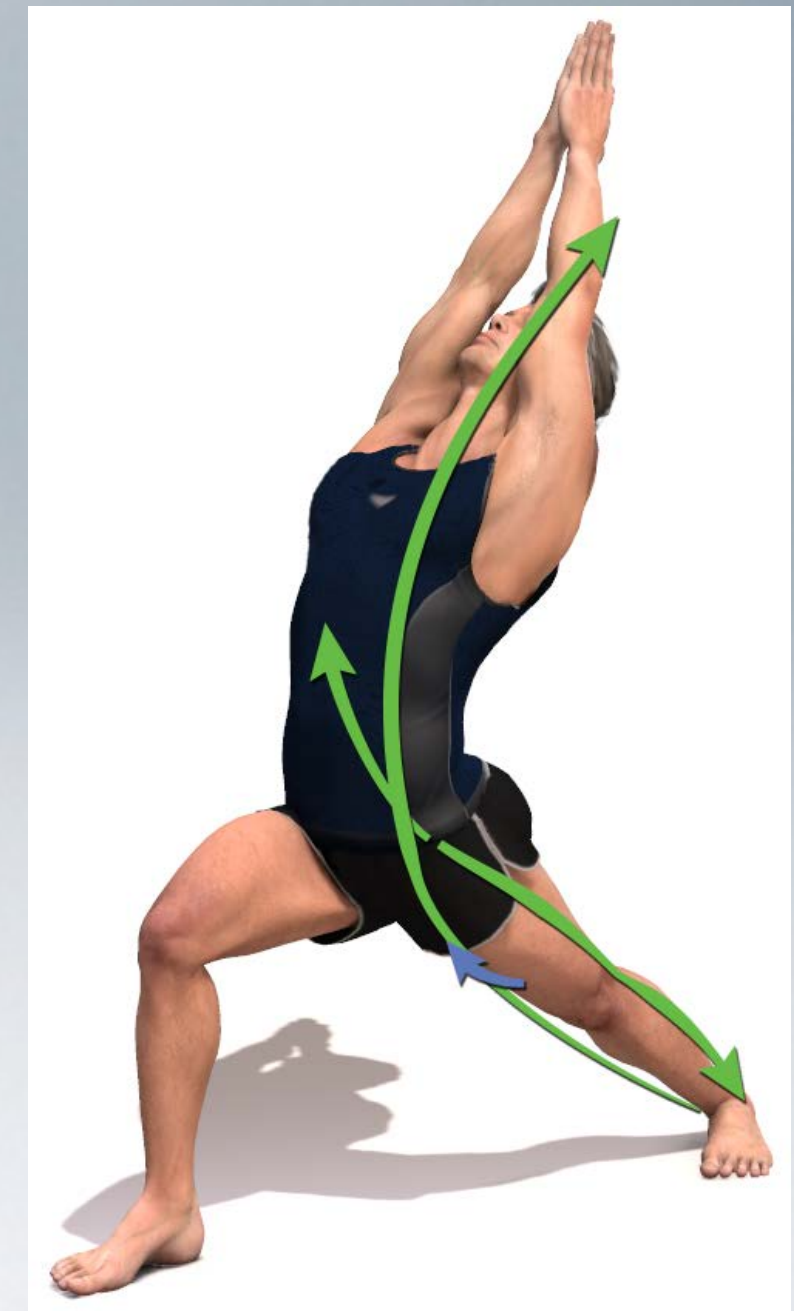
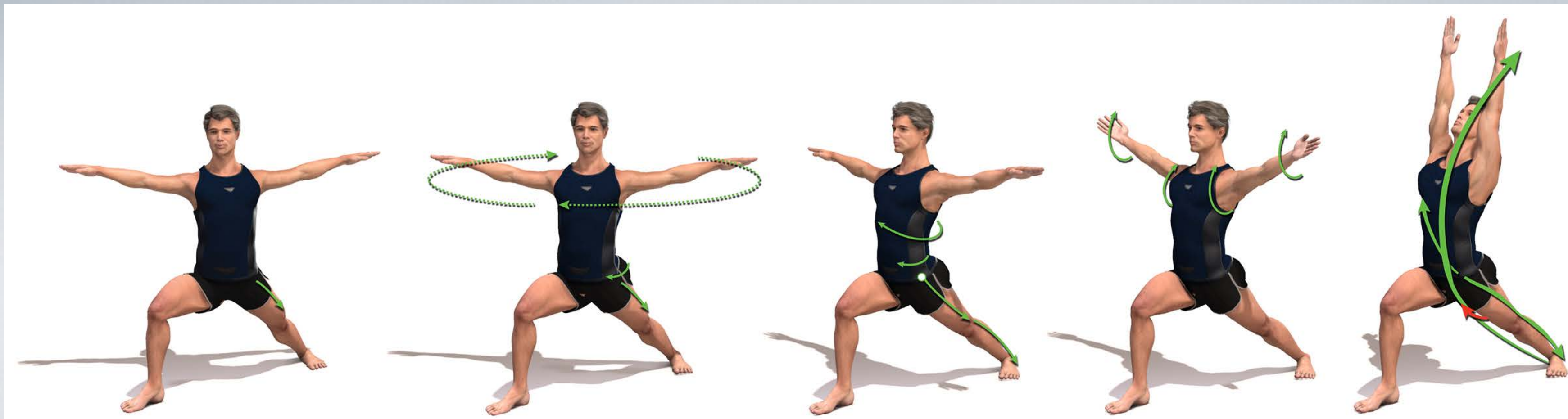
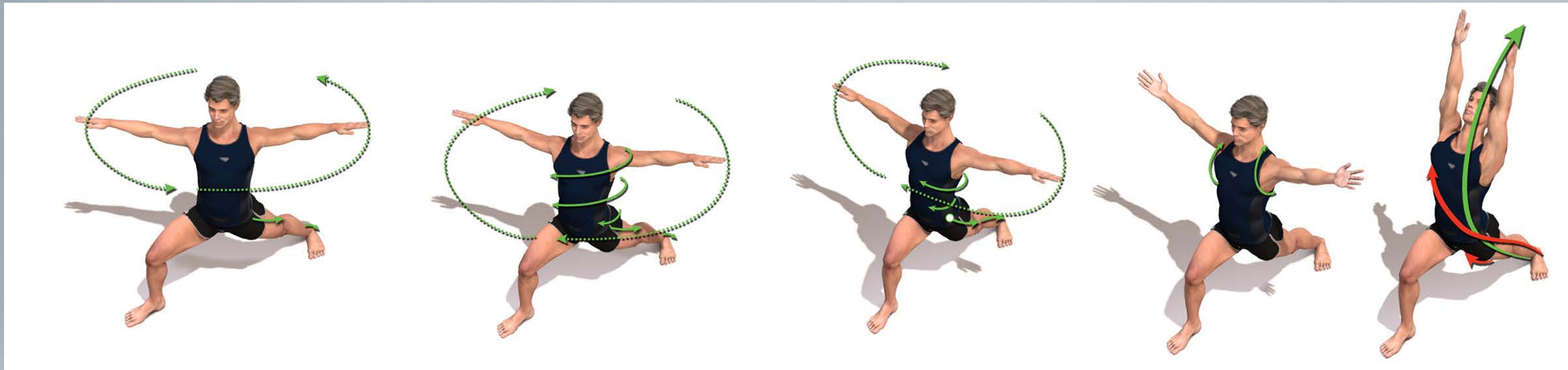
Notice the participation of the abdominals — especially of the oblique muscles in assisting the stabilization.

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

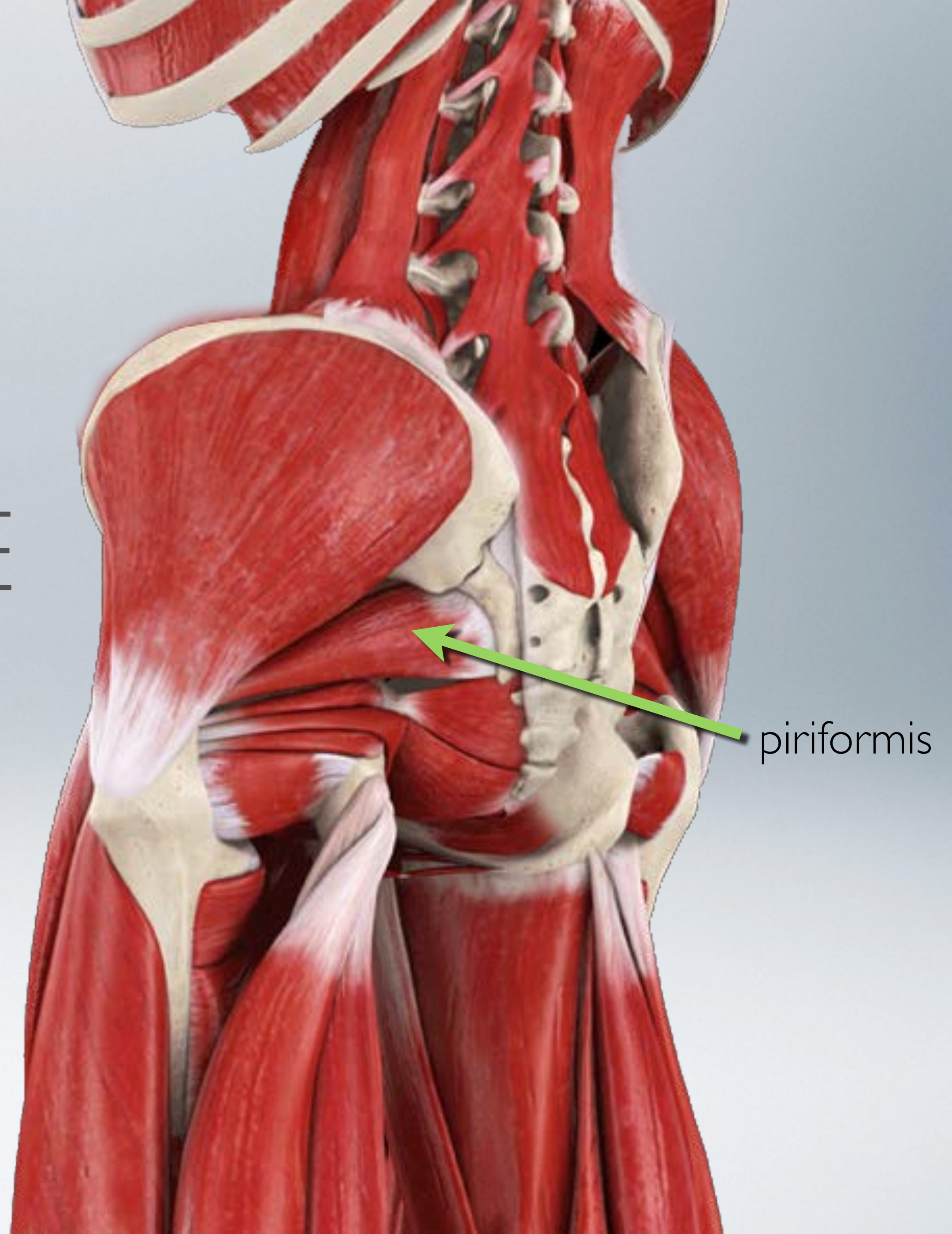


# The Iliacus and Psoas in Virabhadrasana I

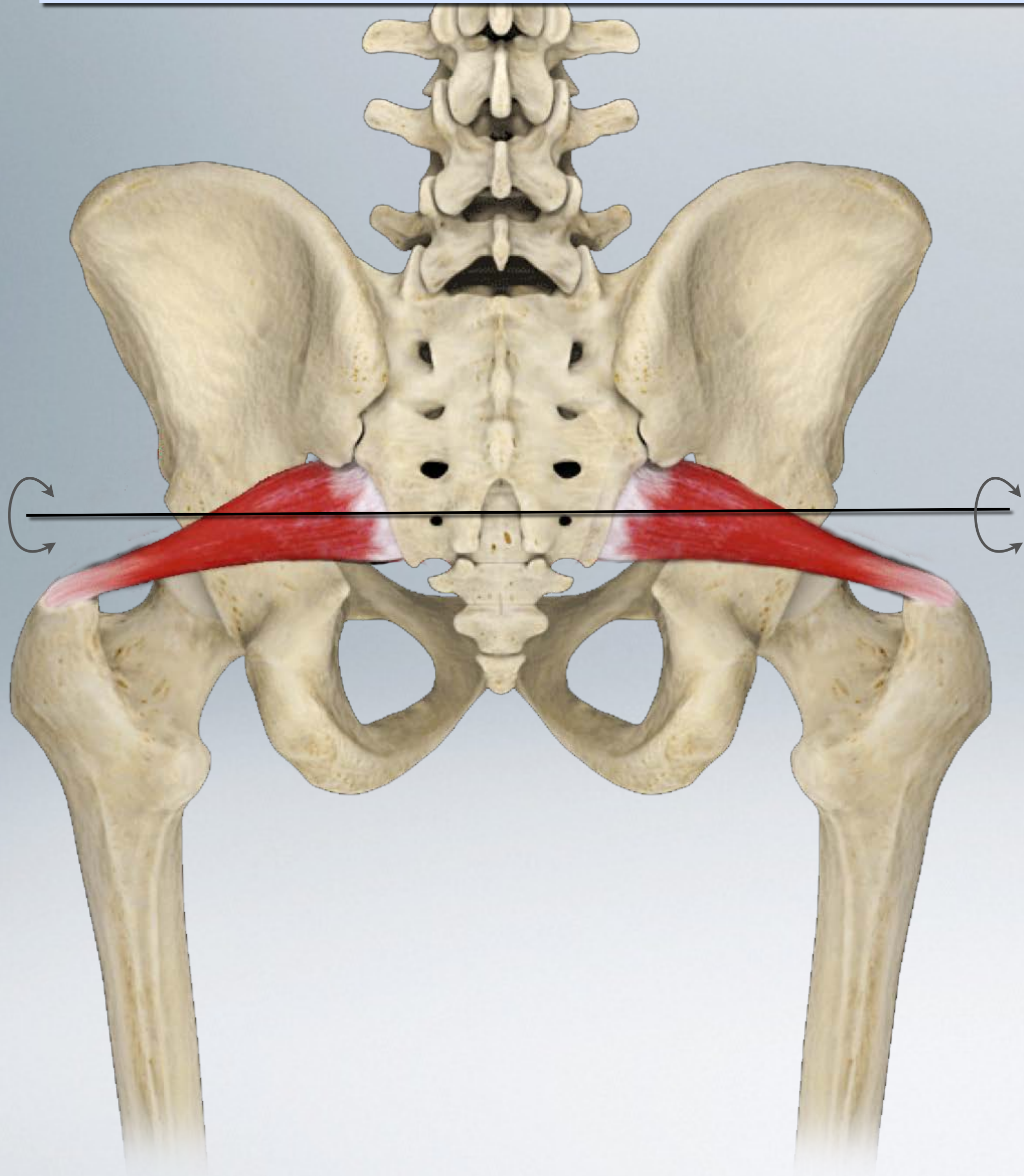
Hip Points — Iliacus — first - lifting heels  
Psoas Major second — extending, grounding heels



# THE ROLE OF THE PIRIFORMIS



# THE PIRIFORMIS AS POSTURAL STABILIZER



The Piriformis crosses over the hip joint and sacroiliac joint

The Piriformis is *usually* treated as a **lateral rotator**; but its role as a **stabilizer of the sacrum** and sacroiliac joint is far more important!

Though there are two separate piriformis muscles, one on each side, **fascially they join across the front of the sacrum**, just below where the sacrum 'rocks' at its fulcrum.

There the piriformis contracts to make tiny **adjustments during the side-to-side bending of the spine during movement.**

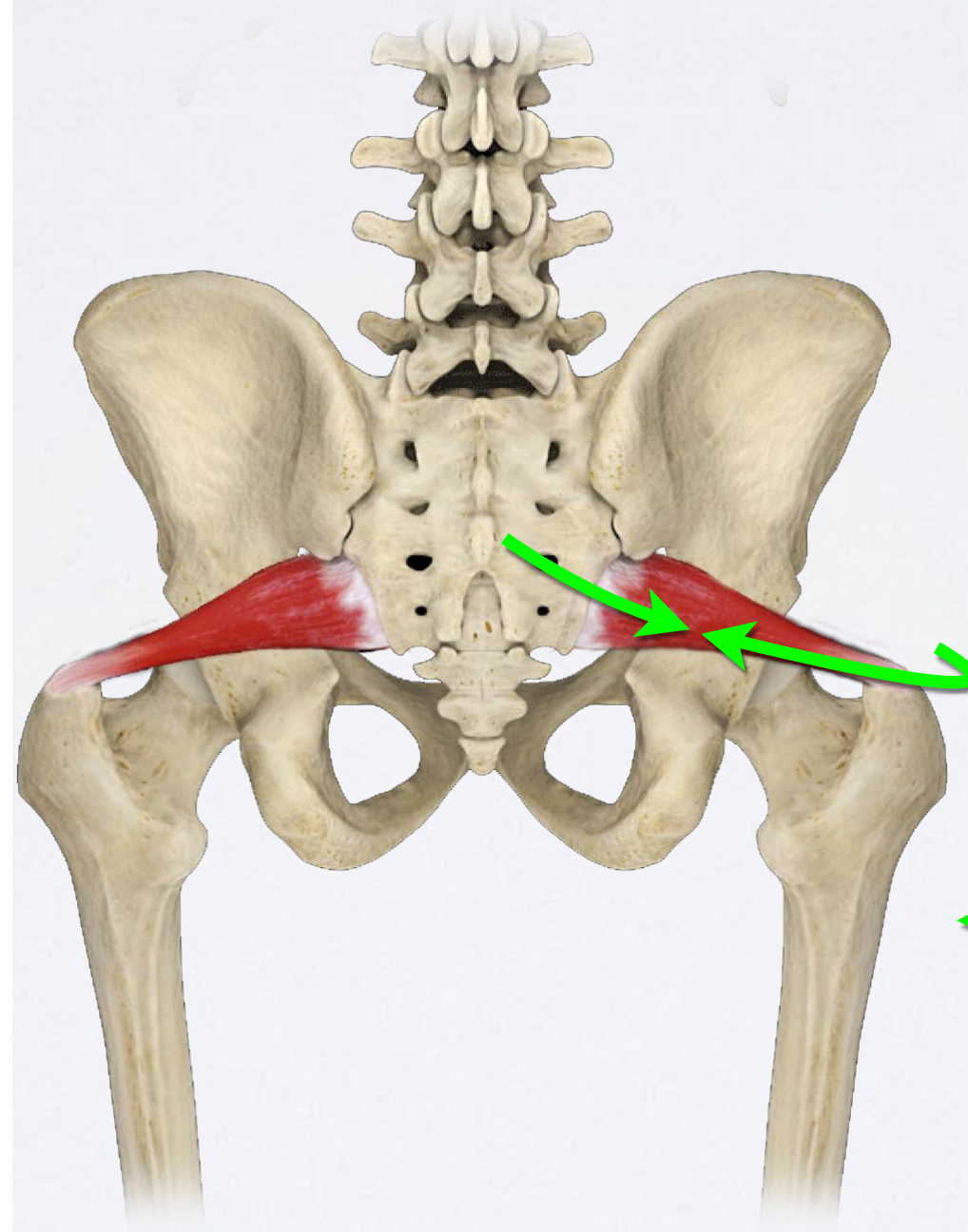


# The Significance of the Piriformis and Its Connection to the Outer Heel



Weight on the outer heel activates the complex of muscles through a fascial line connecting the outer edge of the foot (concerned with balance) to the outer shin, knee and outer hamstring — ultimately activating the piriformis to stabilize the sacrum while the leg is weight-bearing.

The piriformis then acts as an **abductor** as well as a stabilizer for the sacroiliac and hip joints — while causing the hip point to 'lift' as the sacrum counternutates slightly.



Because the thighbones have a natural inward rotation due to the way in which the head of the femur angles into the hip socket, the external rotation created in part by the piriformis makes it act as an abductor as well as a rotator: as the femur rotates out, the greater trochanter abducts away from the hip.



# Toning the Piriformis



A simple warmup and light strengthener for the piriformis, which stabilizes the sacroiliac joint as well as strengthening the fascial connection to the outer heel, is to do small external rotations of the thigh in the hip socket (only about  $10^{\circ}$  to  $15^{\circ}$ ), rotating the leg on the axis of the big toe mound.

Be sure not to allow the pelvis itself to lift or rotate: isolate the action to the rotation of the leg, independently of the pelvis. Feel the slight firming deep in the buttock behind the head of the femur/greater trochanter.

# Virabhadrasana I Variation

Keep a slight bend to the standing leg knee, and ground especially through the **outer heel** to engage the gluteals — drawing the sit bone toward the heel by engaging the gluteal



Keep the hips level, hip points facing toward the floor.

Without turning the pelvis, rotate your left leg out slightly, feeling a firming of the outer hip, deep in the gluteal muscle (engages the piriformis). Only rotate the leg as far as you can without turning the hip.

This challenges the standing leg hip to stay aligned and grounded as well.

Keep the rotated leg firm, straight and steady

Reach your arms forward as you begin to bend your right knee, dropping in a slow, controlled way into Virabhadrasana I.

Maintain the rotation of the left leg, and grounding of the right heel



Reach up into the full pose, stretching the hip flexors of the back leg.

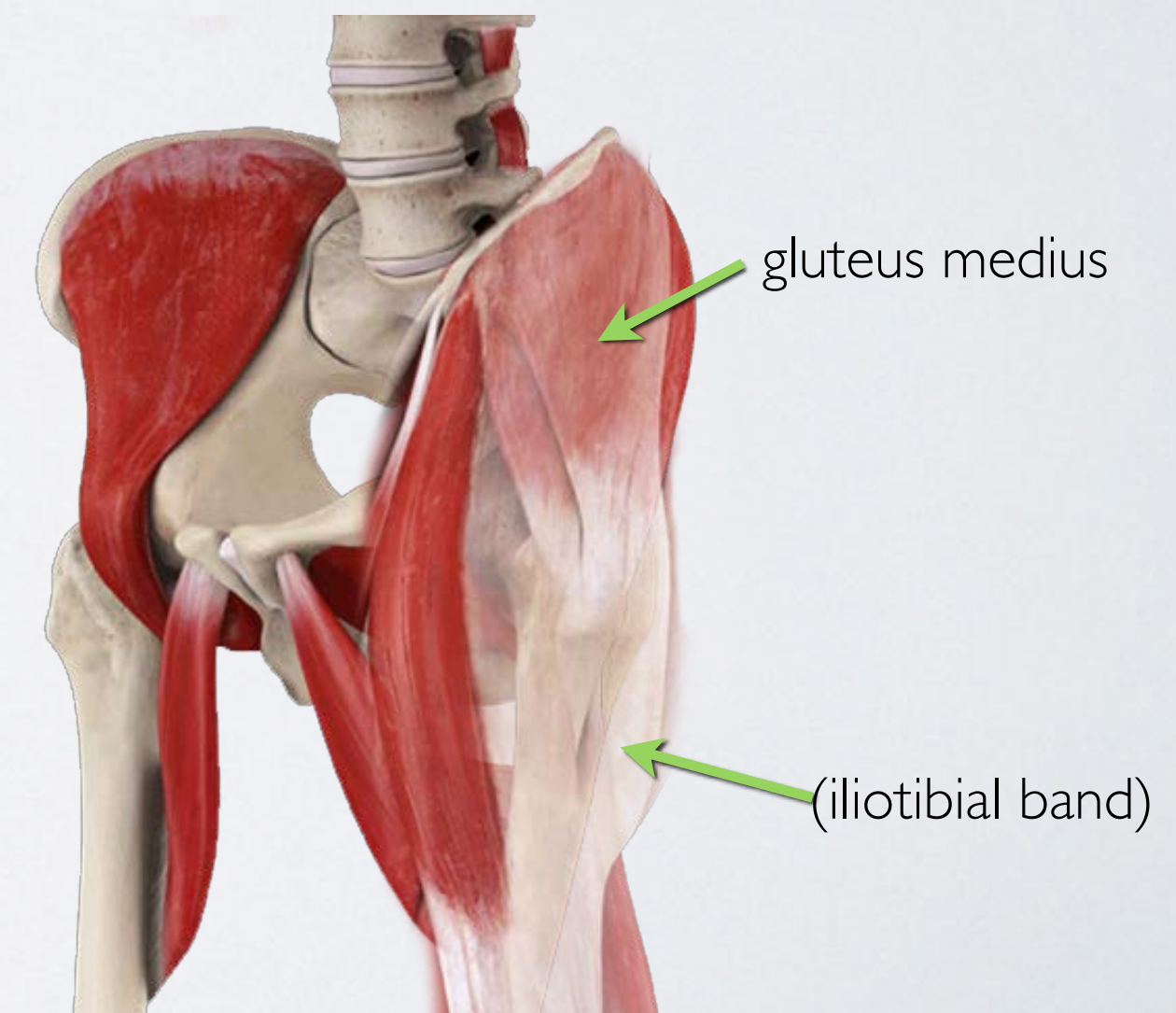
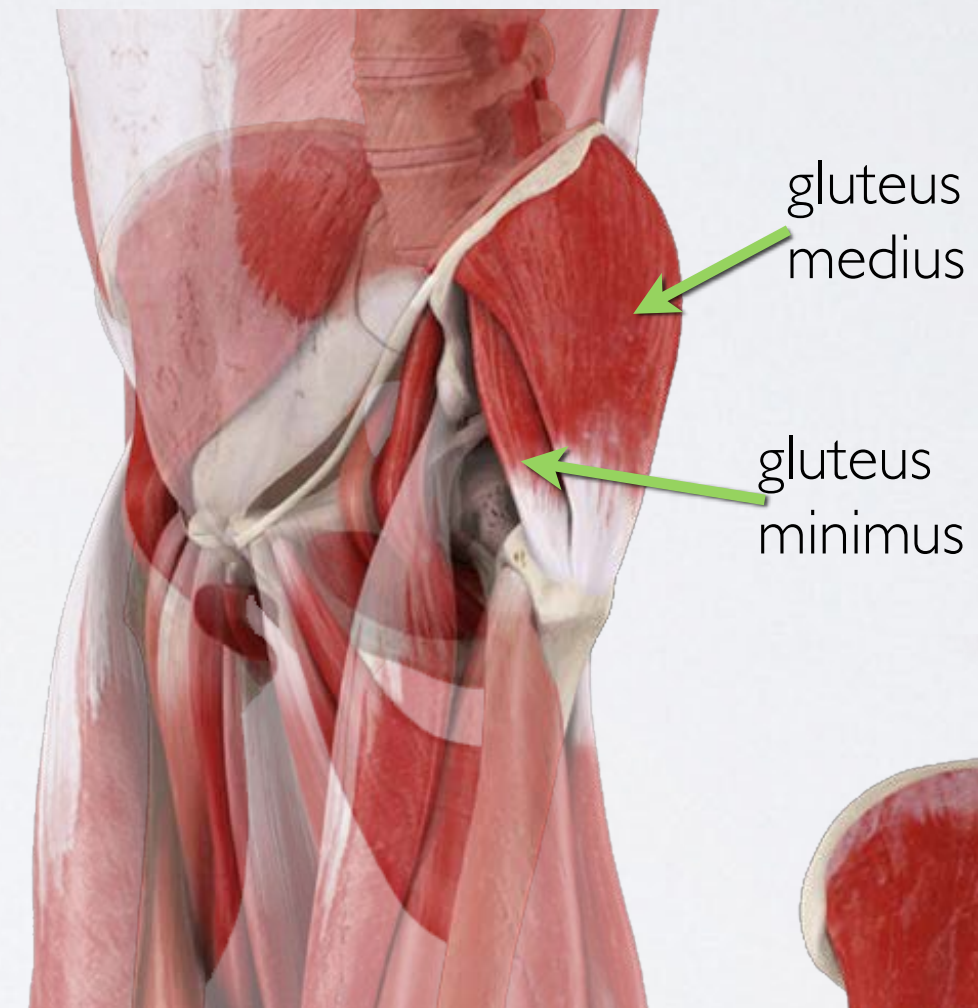
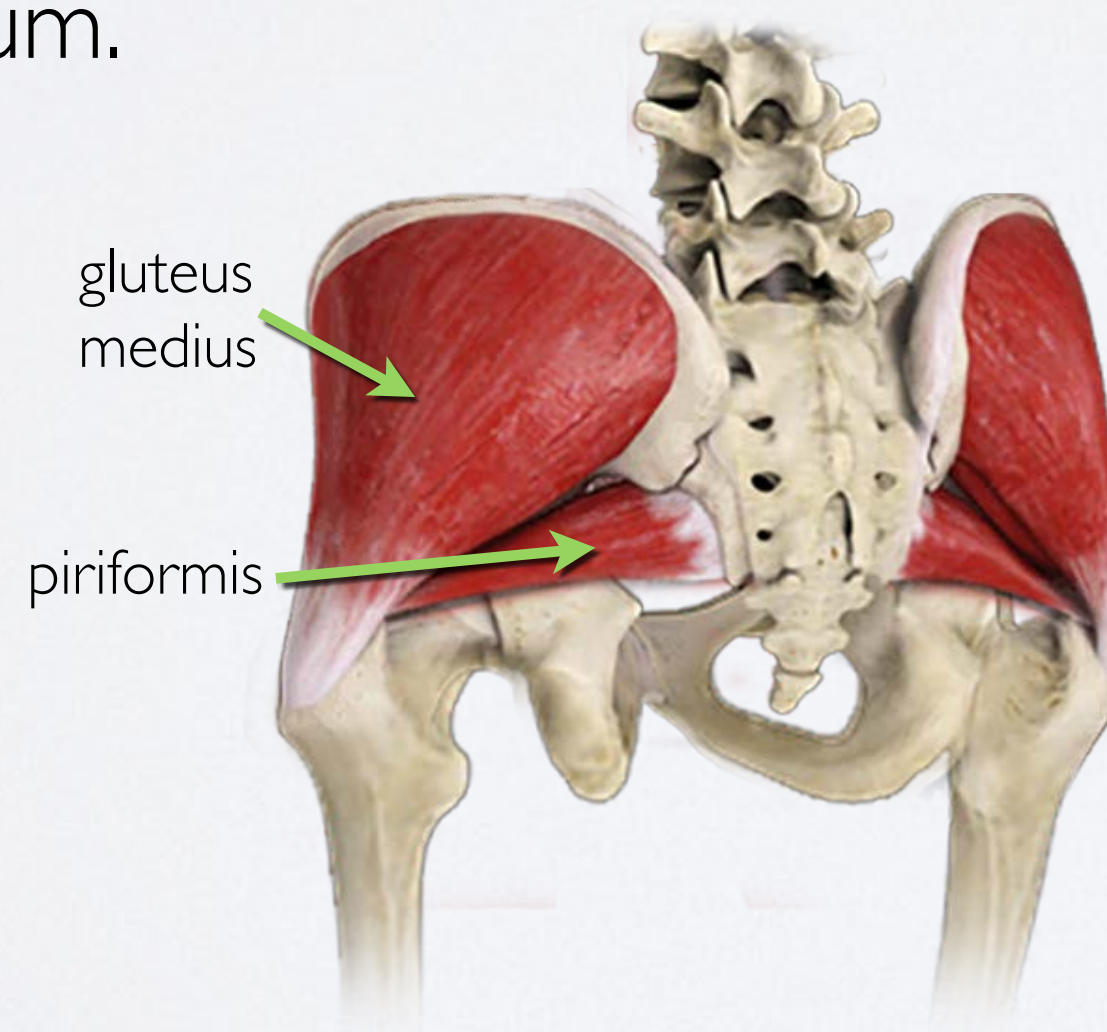
Practice the series on both sides, but give special attention to working with balancing on the same leg with which you stood on the block!

# The Role Of The Abductors

The action of the transverse abdominals is to “Hug the Midline” of the core, while activating the muscles that stabilize the spine during movement.

This is balanced by an action of **expansion** which makes space for movement, particularly in the hips and pelvis.

- This “expansion” or abduction comes from the outer hips – gluteus medius – while also involving the piriformis as an abductor and stabilizer for the sacrum.

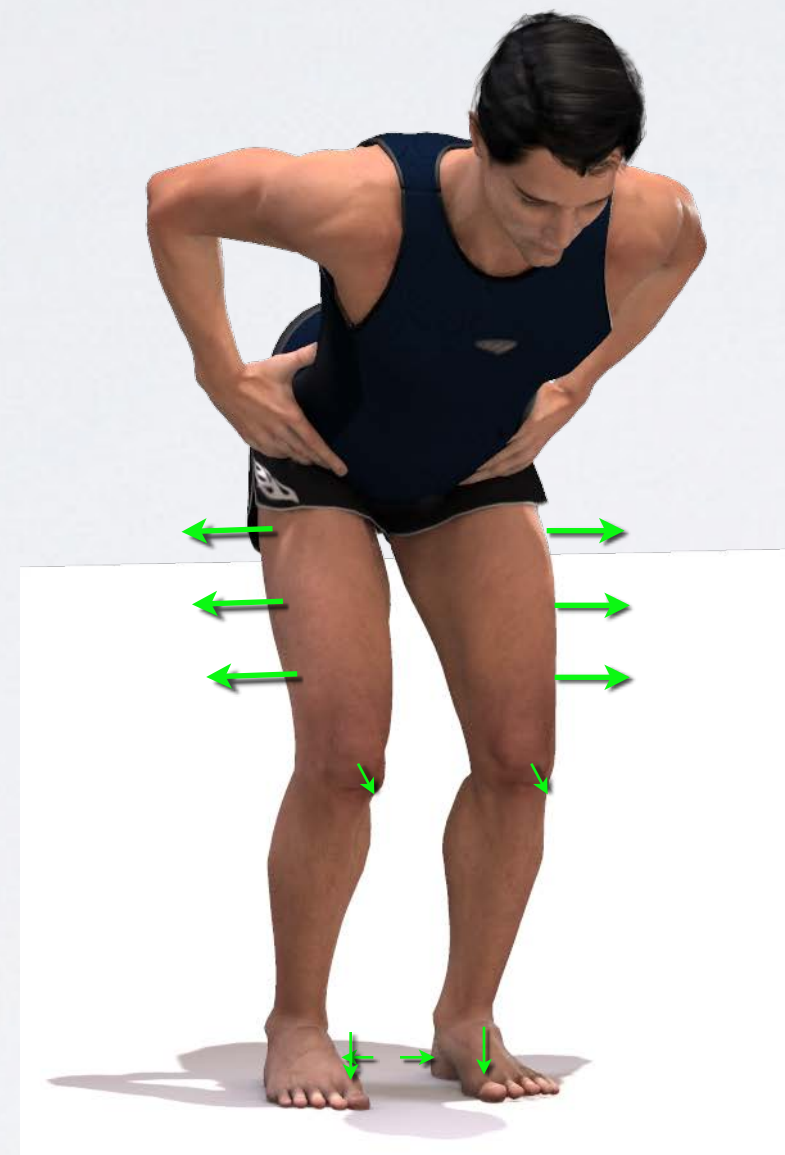


# Abduction In Uttanasana



Bend your knees to prevent twisting of the knee joint. Keep the mound of the big toe and inner heel grounded, and isometrically draw your thighs apart (as if trying to stretch the sticky mat between your feet) until both kneecaps face straight forward, and you feel your outer thighs and hips activate.

(Keeping the inner edge of the foot grounded at the big toe mound and inner heel has the effect of activating the perineal muscles or firming the “shins in.”)

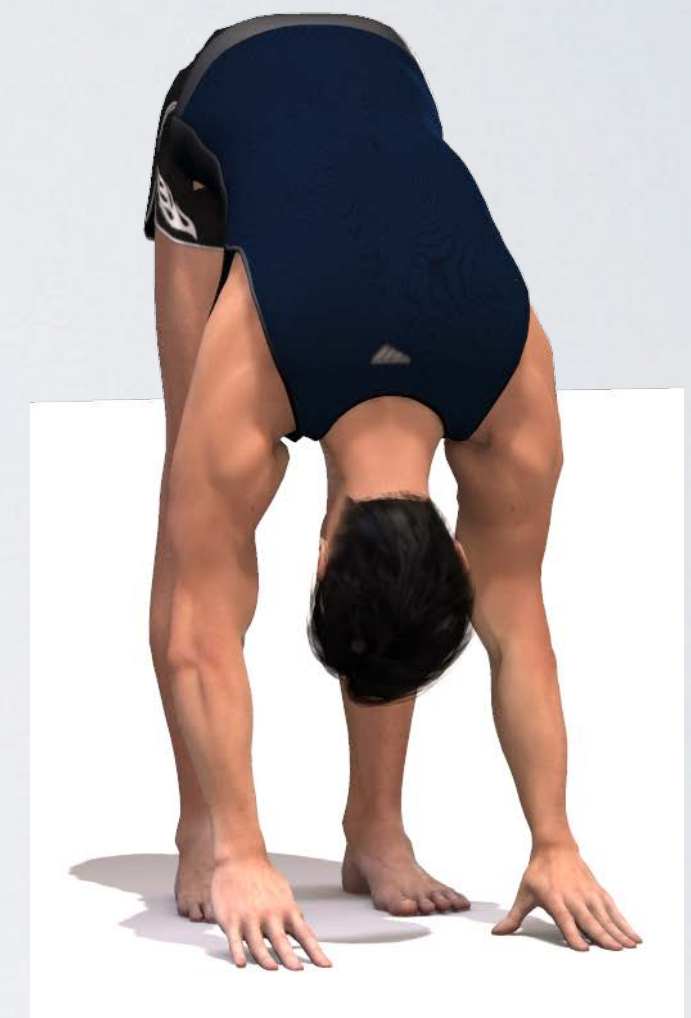


Feel how this abduction of the thighs makes space across your sacrum, allowing you to tip your pelvis forward with less strain in the area of your low back and sacrum. To maintain space between your sit bones, releasing the adductors, isometrically draw your inner heels away from each other.

As you tip forward into the forward bend, continue to abduct the thighs, and let your outer thighs and outer hips do the work of the forward bend, rather than your lower back.



As you touch the floor (or a set of blocks), continue to abduct your thighs and begin to straighten your legs — spreading your toes and grounding your outer heels as you draw your inner heels isometrically apart. Draw energy up through the hamstrings as you ground down through the heels. If your torso pops up away from your thighs and rounds, or you feel excessive pulling in your lower back or sit bones, bend your knees once again, releasing your torso closer to your thighs, and repeat these actions to progressively lengthen the hamstrings.



When you're ready to come out of the pose, repeat the same actions: bend your knees, and — with hands to your hips — abduct your thighs. Let your legs and hips rather than your lower back do the work of bringing yourself back to standing.

# The Full Set Of Actions:

Hip Points In, Lower Belly Lifts  
Thighs Out, Outer Heels Down

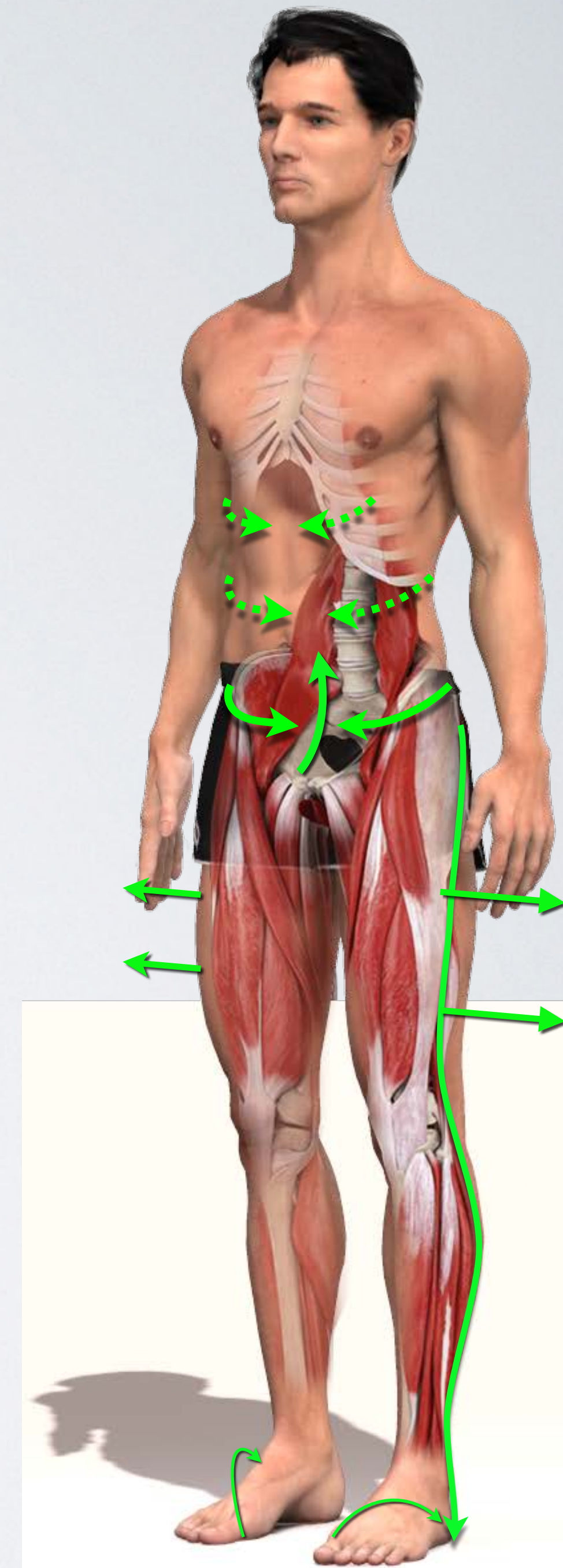
“Expansion” = Thighs ‘Out’ — Thighs Abduct

- Grounding your feet (outer heels down) ensures the stability of your low back and sacrum, as well as balancing the actions of your legs.

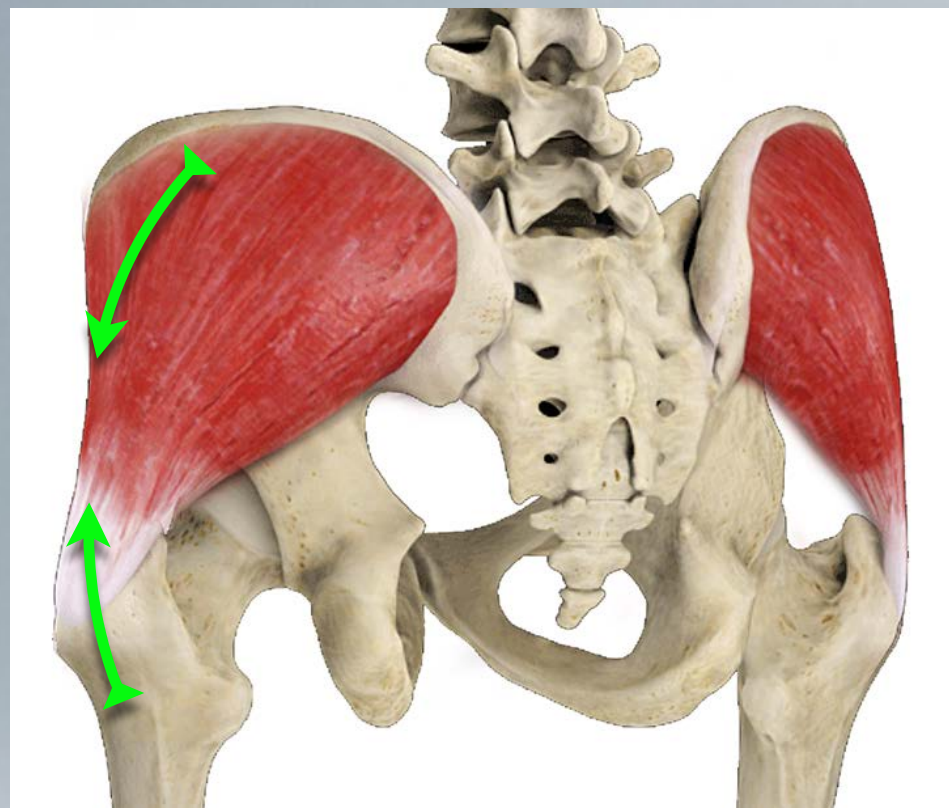
These **first two actions** (hip points in, lower belly/hip points lift) align and stabilize the **pelvic girdle** — also aligning the hip sockets

The **third action** — **thighs out** — creates **space** in the hips for movement — for freedom in flexion, extension and ‘opening’ or abduction of the hips.

And the **fourth action** — **outer heels down** — **stabilizes** the hips and sacroiliac joints, protecting against hypermobility.



A Sagittal Balance works the standing leg more clearly, forcing gluteus medius to keep the hips level and stable



The action of gluteus medius, which keeps the pelvis level when balancing on one leg. Here the contraction is an abduction: the foot of the standing leg is 'fixed' (cannot move), so it is the pelvis that moves with the abduction, bringing the pelvis to level.



Keep the lifted knee higher than the hip point to keep the iliopsoas from gripping. If balance is good, raise your arms overhead to increase the challenge to the gluteals



Controlled descent as you extend the lifted leg back and slowly drop to a Lunge Pose forces gluteus medius to continue to work to keep the hips level and stable



Lean forward while beginning to bend the standing leg knee, grounding through the outer heel, as you 'shoot' the lifted leg back straight, descending to a lunge.



Posture

# An Important Feature of Our Postural Patterns: the Reality of Asymmetry

## Zink's Common Compensatory Pattern: Rotations



When testing rotation from the cervical cranial to the lumbosacral regions, Zink discovered that approximately **80% of subjects who consider themselves healthy had rotational patterns of left/right/left/right**, while the other 20% had a fascial preference or the sequence of right/left/right/left.

Subjects with these alternating patterns reported very few health problems, were generally pain-free, and considered themselves to be healthy. Zink labeled the healthy **80% group** as possessing a “**Common Compensatory Pattern**,” and the healthy 20% group as having an “Uncommon Compensatory Pattern.”

He concluded that in **both** groups presenting with counterbalanced rotational patterns, the subjects were **more adaptive, healthier and better able to ward off stress and disease**.

Thus it's **not unusual** — and it is **not always a problem** — to find this compensated pattern:

- **the goal is not necessarily to achieve absolute symmetry or “sameness” between the left and right side of the body, assuming the compensations and rotations are balanced.**

# A Possible Explanation for the Compensatory Patterns



## The 'Left Fetal Lie' and Posture

80% of babies assume a left fetal lie posture during the third trimester: they turn out to be **left vestibular** and **right motor dominant**

1. **left vestibular** — uses the left leg for left-sided weight-bearing during right motor dominant activities to assist in balance, coordination and orientation
2. **Right motor dominance** emphasizes using the right leg for activities such as kicking a ball, while balancing on the left leg. Motor dominance “crosses over” from the left brain to the right side of the body.

The 'Left Fetal Lie' *can* account for the **rotations** of the Common Compensatory Pattern



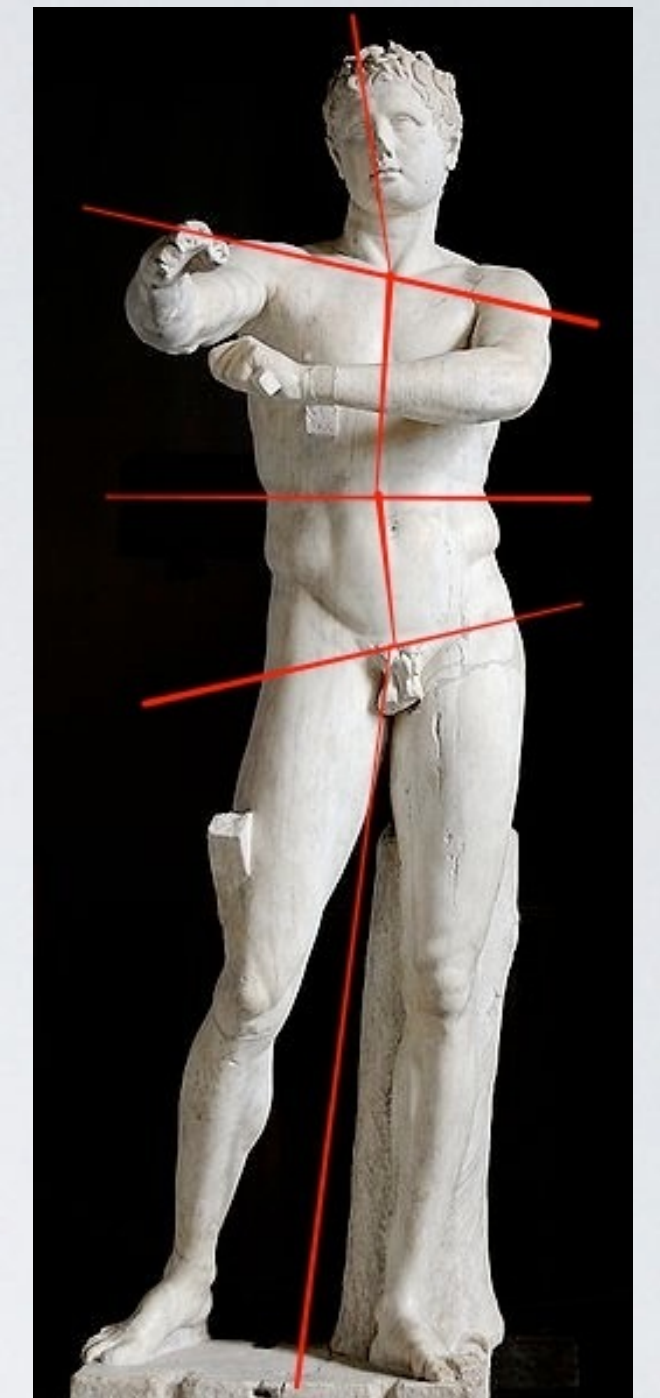
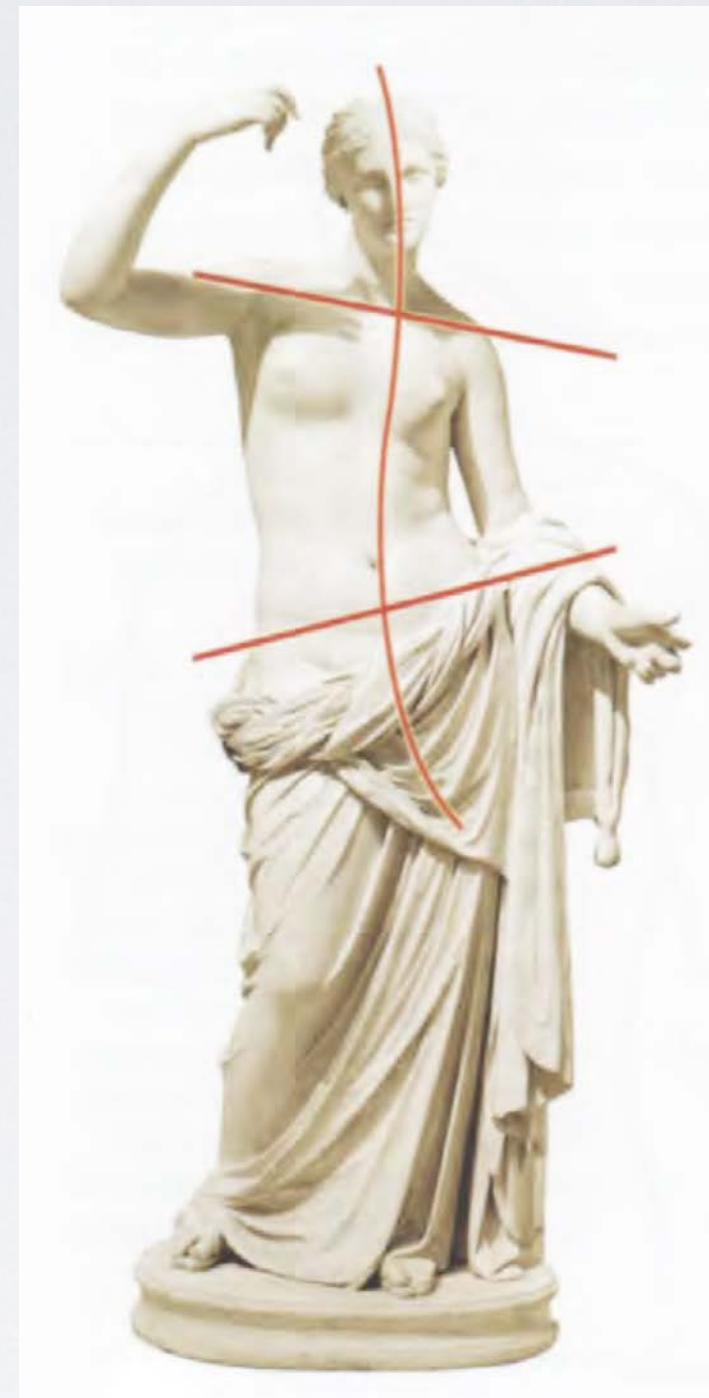
# The Problem of **Decompensation** Arises with **Postural Shifts**

The *combination* of these rotations often **results in a left side-shifting** when standing.

The classic 'Contrapposto' stance shows artists' recognition of the side-shift of the hips — usually representing a relaxed state.

Definition of '**Contrapposto**': an Italian term that means counterpose.

- It is used in the visual arts to describe a human figure standing with **most of its weight on one foot** so that its shoulders and arms twist off-axis from the hips and legs;
- i.e. the hips and legs are turned in a different direction from the shoulders and head.



The 'Left Fetal Lie' might also account for the tendency to **shift** the hips to the **left** for balance — left vestibular

# Awareness — Hip Shifts

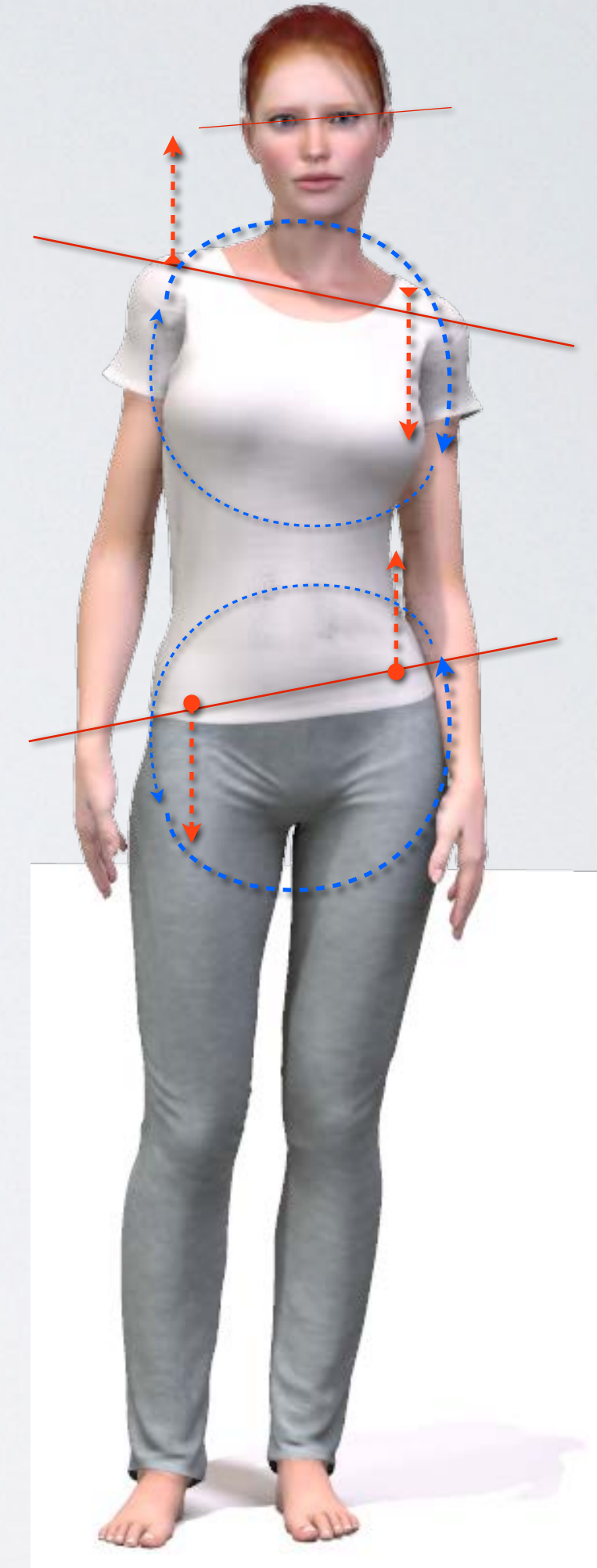
Our Basic Thesis: While compensatory rotations are normal, 'Decompensation' Begins When **Side-Shifts** Take Place



Side Shift of Hips and Chest



Change of Elevation



Side-Tilts of Hips and Chest (and Head)

# Testing For Your Own Pattern

During prolonged standing, the weight usually shifts over the **dominant left leg**, eventually creating **stretch weakness** in the **left gluteus medias/minimus**.

This pattern can be tested in your own body to offer **clues** as to **your own Compensatory Pattern**.

Stand with **all your weight on the left leg** while using your fingers to **feel your left hip** (outer corner of the greater trochanter), and relax your body. (You may have to hold onto something for balance)

Do you feel the hip **'pop out' laterally** against your fingers? If so, it shows weakness in the primary abductor muscles, and you likely follow the **Common Compensatory Pattern**.

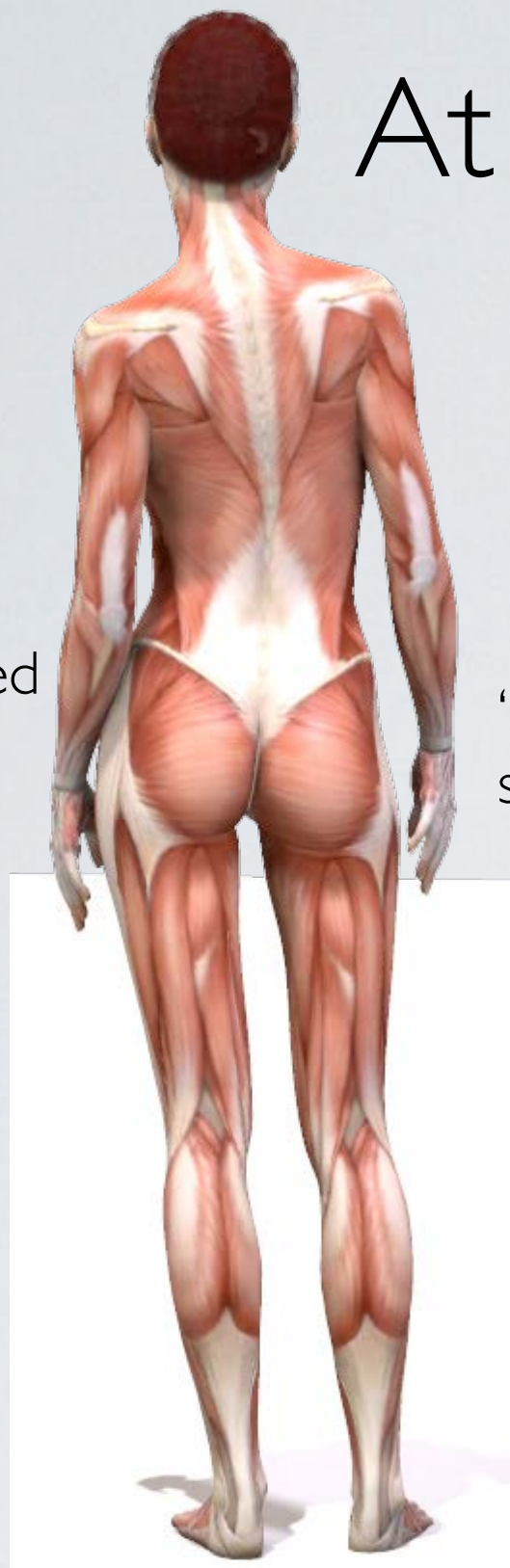
Now test the **right** side to see if it pops out more during weight bearing.

If the acetabulum on the right "gives" more, it is likely that your structure follows and **Uncommon Compensatory Pattern**.



# At The Center Of The Problem: The Hip Abductors

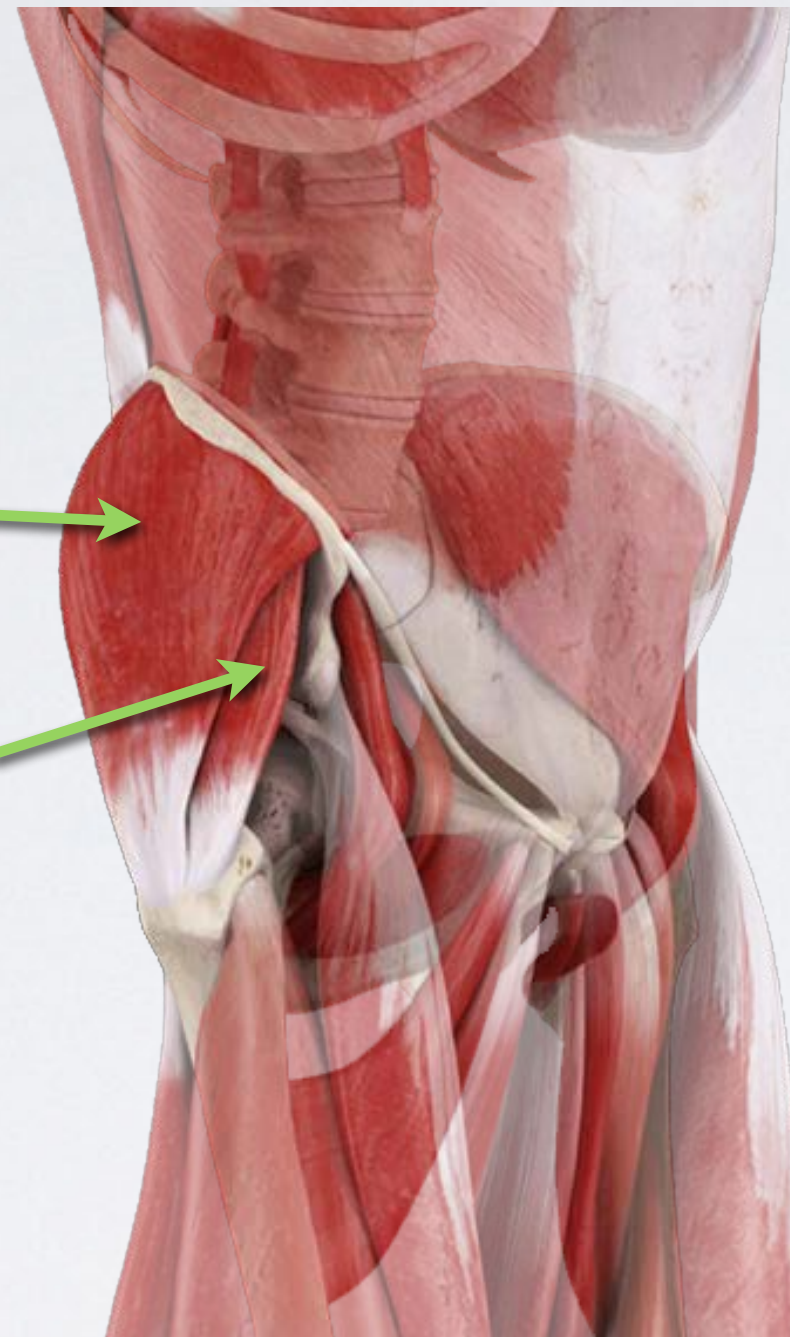
overstretched  
or 'locked  
long'



'locked  
short'

gluteus medius

gluteus minimus



The pelvic muscles most involved in **creating and perpetuating dysfunction** in left pelvic side shifting are:

- **gluteus medius and gluteus minimus.**

These get 'locked short' on the right side

- The lower (inferior) fibers of gluteus medius and minimus also function as the **internal rotators**. This contributes to the thigh rotating inward, and the pronation of the foot.

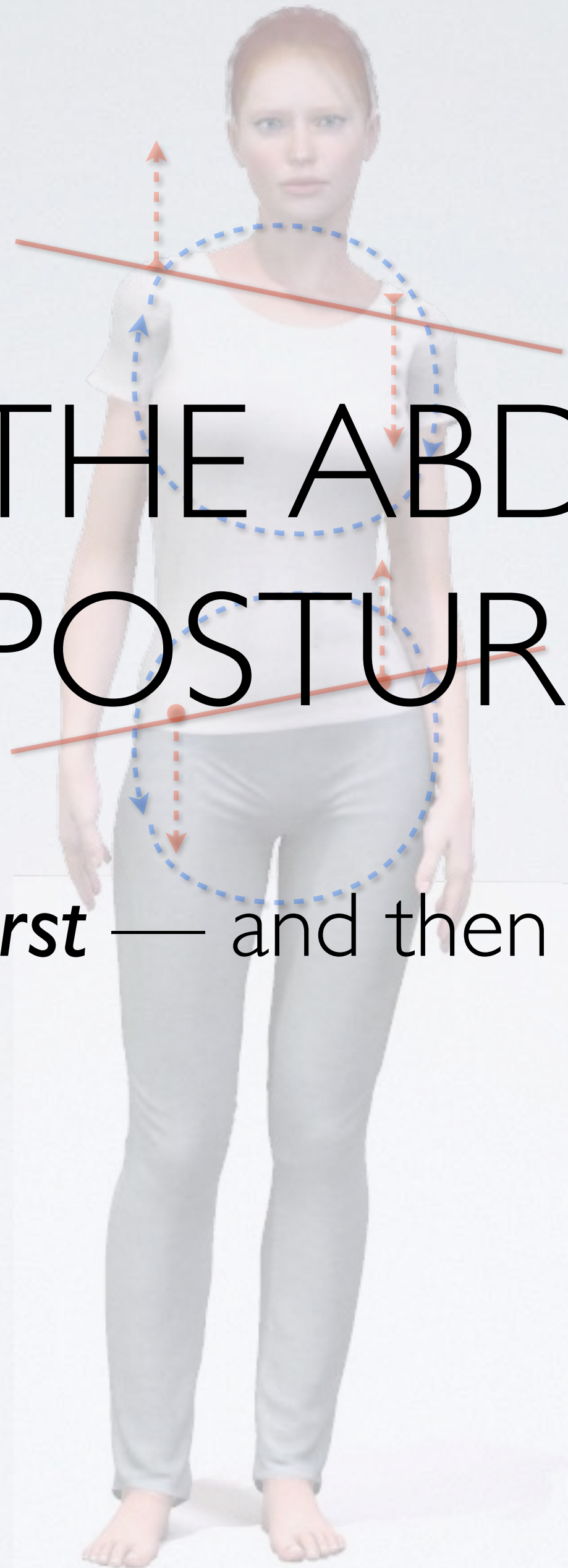
They also get overstretched and weakened or 'locked long' on the left side

- This weakness can allow external rotation of the thigh, along with gripping in the lateral rotators, including the piriformis.

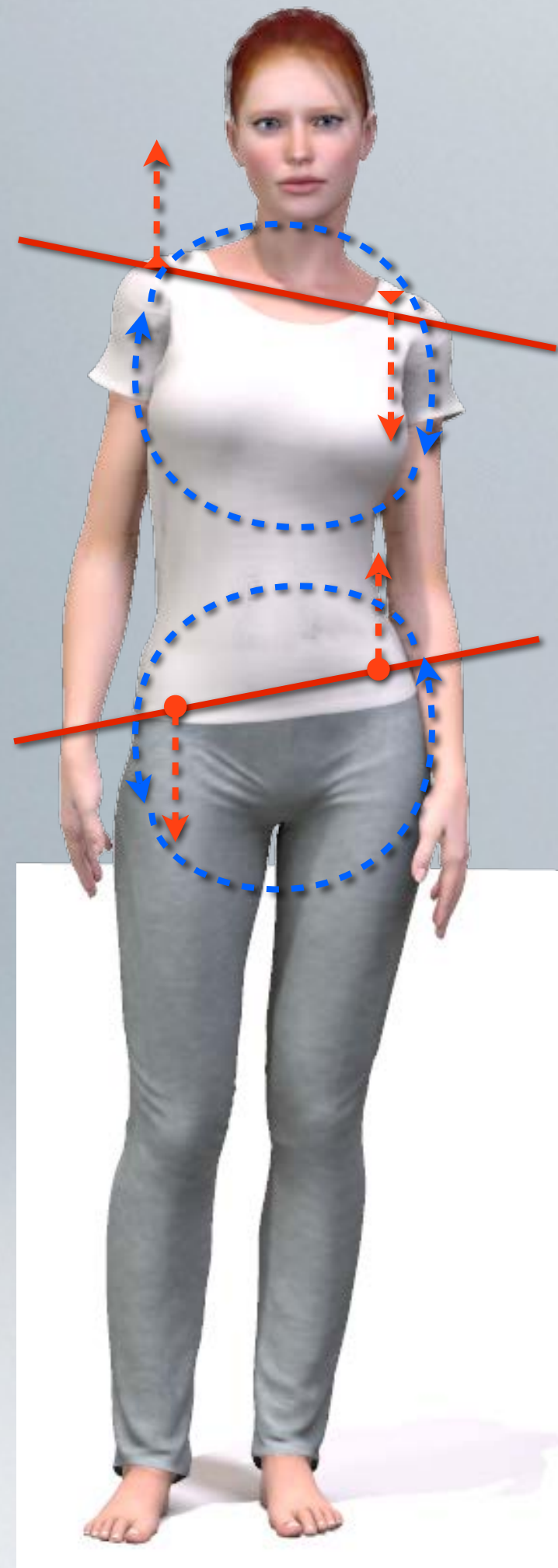


# WORKING THE ABDUCTORS IN POSTURE

**Addressing the Hip Shift *First*** — and then working with the Abductors



# First Correct the Shift!



To shift the hips, stand on a **block** while using a wall or partner for balance.

If the hips were shifted to the left, stand on the right foot;

If the hips were shifted to the right, stand on the left foot.

Place your hand on your hip to feel the hip point on the leg that is hanging free;

Extend through your standing leg to **level your hip points**, making them **parallel to the floor**.

This strongly works the **abductors on the standing leg**, while forcing the body to shift **toward** that leg in order to balance.

The abductors work **concentrically** to level the hips; at the same time, as the hips shift to that side, they must lengthen or work **eccentrically** to accommodate that shift.

The Principle: Our **Main and First Objective** is to **bring the hips back to center**.

Don't worry about which hip is 'stronger' or 'weaker,' or about rotations of the pelvic girdle

# Additional Effect upon the Psoas and Hip Flexors of the 'Free Leg'

While balancing on the block, gently swing the leg that is 'hanging' back and forth — **without and movement of the hip point or hip bone.**

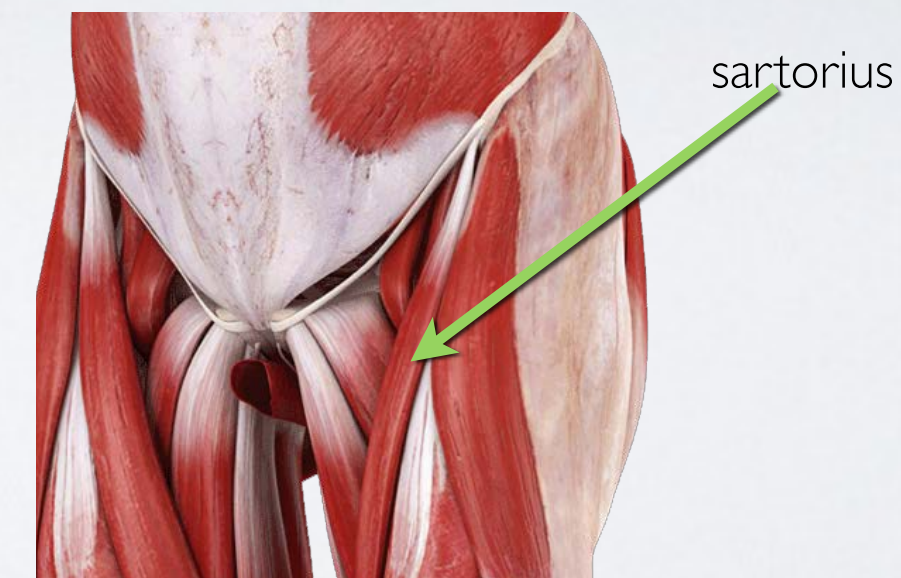
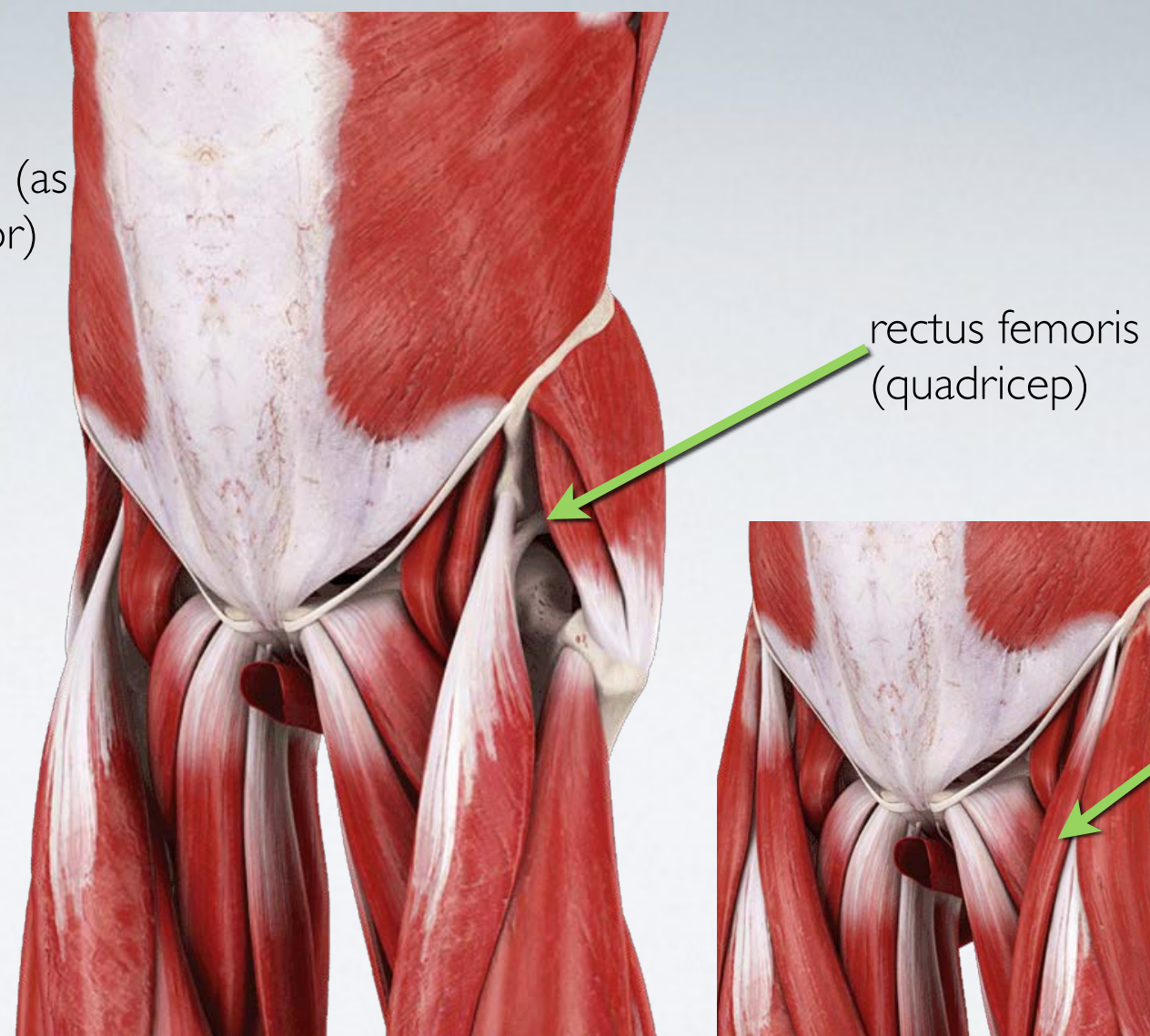
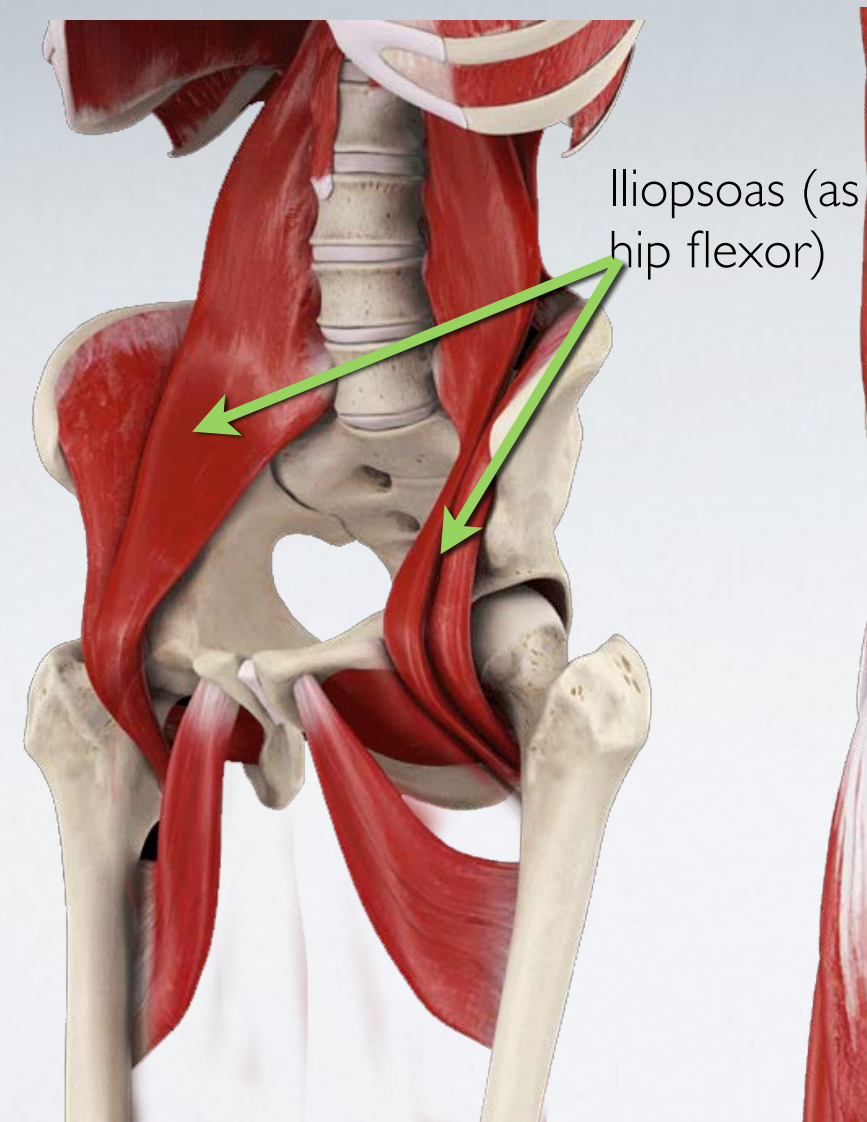
- This isolates the movement of the leg from the movement of the hip bone, beginning a passive release of the hip flexors — and overcoming the tendency to tighten the hip flexors.
- The weight of the leg brings a passive release to the psoas as the leg swings
- Relaxing the 'free' leg also overcomes the tendency to stiffen the free leg as a way to level the hips; relaxing the free leg forces the abductors of the standing leg to work harder.

You only need to do this exercise for **20-30 seconds** to wake up the abductors on the standing leg. **Overdoing** it can exhaust and tighten the piriformis for those dealing with piriformis issues!

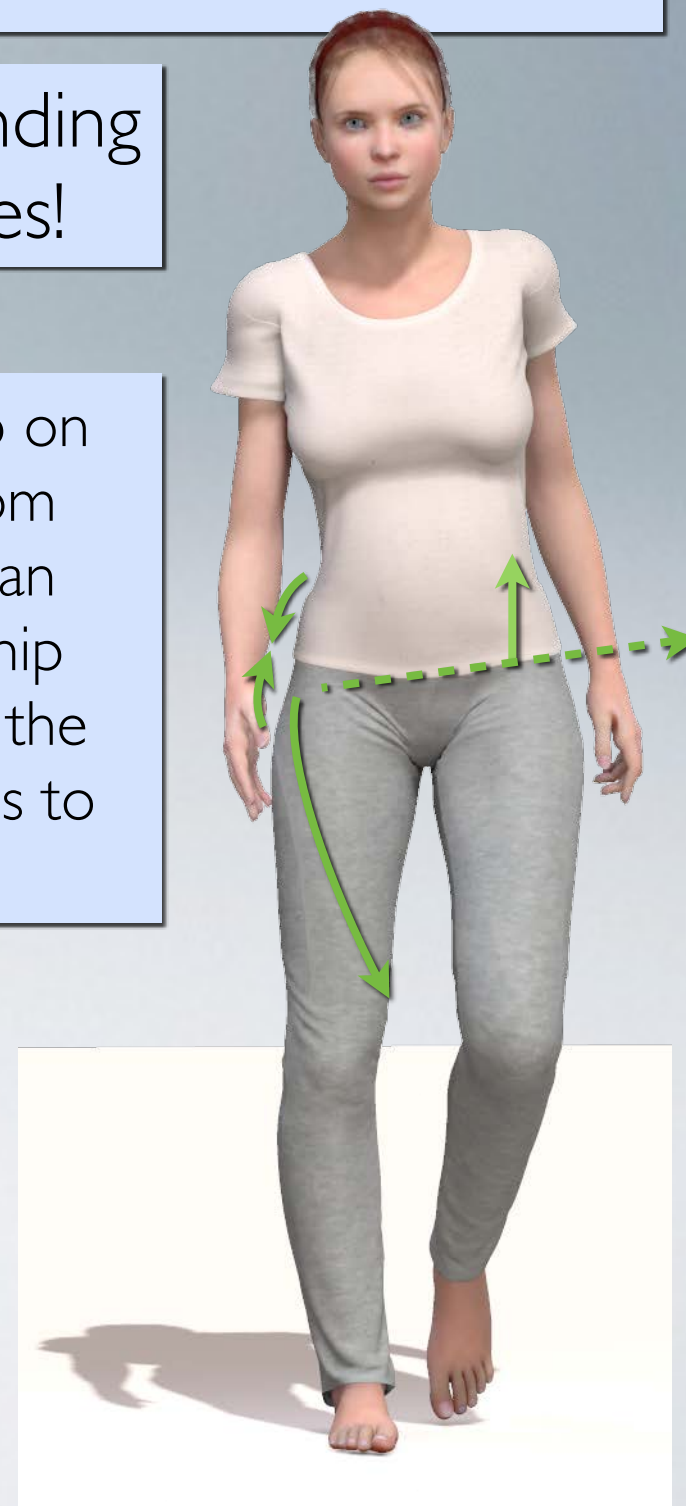


Balancing on a block has the effect of **shifting** the hips **back** toward the center, while making the gluteals work to balance the pelvis.

When you passively "swing" the other leg, it **releases the psoas** on that side.



The dropped hip on the side away from which you shift can have shortened hip flexors. Allowing the leg to swing helps to release them



**After** the Exercise, stand down from the block and observe the effects of the muscle activation  
it's helpful to look in the mirror

Notice where the shoulders and neck end up **after** the initial shift of the hips!



Previous Pattern



Corrective Shift

as the right hip is more weighted

low(er) shoulder

short waist

In the misaligned posture, the right waist is shortened because of the tilt of the hips and chest.

When the hips are corrected by grounding through the left leg, the right waist still remains short.

It can be lengthened by reaching up through the right arm, straightening the side-tilt of the chest as well.



Raise the Arm of the Low Shoulder  
focus on lengthening the short waist



Monitor your right ribs with your hand, maintaining an inhalation, to prevent collapsing or distorting the right chest.



Maintain the Adjusties

the left leg may feel lighter — lengthen through it while still grounding through the right

some slight overcorrections and asymmetries may still remain