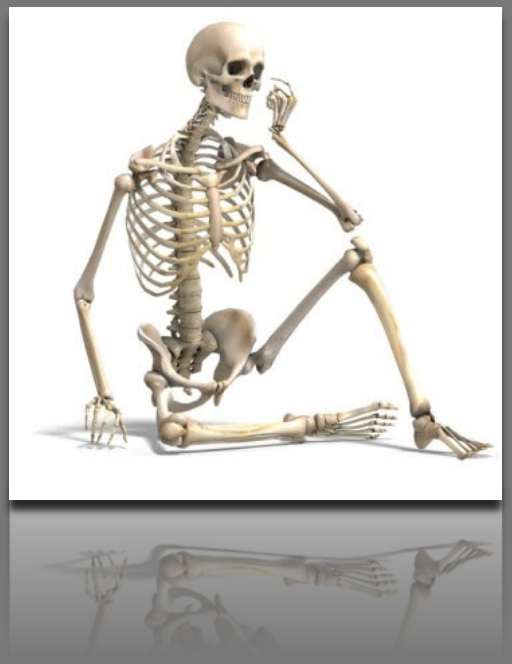
BALANCED BODY
ANATOMY IN THREE DIMENSIONS™



An Introduction to Anatomy for Movers and Movement Educators

Torso to Upper Body

balanced body

Lets Build! Muscles of the Spine and Thorax

Erector Spinae

- Spinalis
- Longissimus
- Iliocostalis

Deep Muscles and Fascia of the Back

- Serratus Posterior Superior
- Serratus Posterior Inferior
- Thoracolumbar Fascia

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Spinalis

Spinalis Cervicis

Origin:

- Spinous processes of C5 to T2.

Insertion:

- Spinous process of C2 to C5.

Spinalis Thoracis

Origin:

- Spinous processes of T10 to L3.

Insertion:

- Spinous process of T2 to T8.

Actions:

- Bilaterally creates spinal extension.
- Unilaterally creates spinal lateral flexion to same side.

Longissimus

Longissimus Capitis

Origin:

- Transverse processes of upper thoracic and lower cervical vertebra.

Insertion:

- Mastoid process of temporal bone.

Longissimus Cervicis

Origin:

- Transverse processes of upper thoracic vertebra.

Insertion:

- Transverse processes of C2-C6.

Longissimus Thoracis

Origin:

- Lumbar transverse processes.

Insertion:

- Thoracic transverse processes and ribs 9 and 10.

Actions:

- Bilaterally: Spinal extension
- Unilaterally: Spinal lateral flexion and spinal rotation to same side

Iliocostalis

Iliocostalis Cervicis

Origin:

- Ribs 3 – 7.

Insertion:

- Transverse processes of C5 – 7.

Iliocostalis Thoracis

Origin

- Ribs 7 – 12.

Insertion

- Ribs 1 – 6.

Iliocostalis Lumborum

Origin:

- Iliac crest via lumbar fascia. Iliac crest via lumbar fascia.

Insertion:

- Ribs 6 – 12, thoracolumbar fascia, transverse processes of upper lumbar vertebrae.

Actions:

- Bilaterally: Spinal extension.
- Unilaterally: Spinal lateral flexion and spinal rotation to same side.

Erector Spinae Muscles

Muscle Group	Extension	Lateral Flexion	Ipsilateral Rotation	Contralateral Rotation
Spinalis	X	X	X	
Longissimus	X	X	X	
Iliocostalis	X	X	X	

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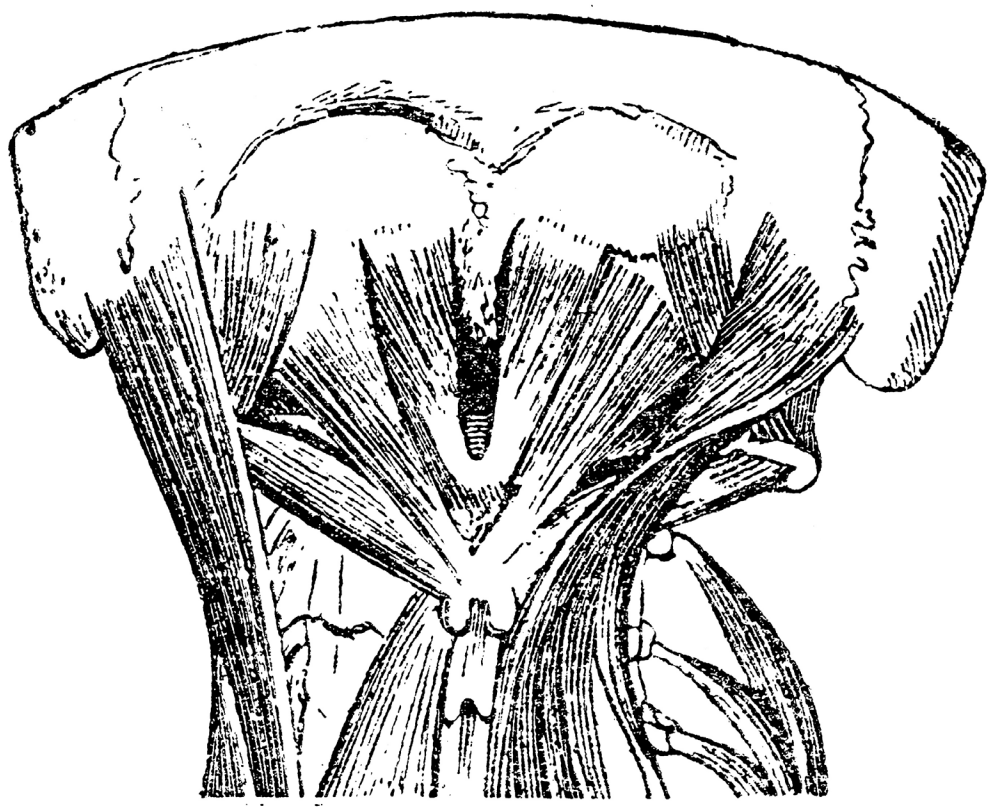
Sub-Occipitals (Optional)

- Rectus Capitis Major
- Rectus Capitis Minor
- Obliquus Capitis Superior
- Obliquus Capitis Inferior



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Rectus Capitis Posterior Major and Minor

Origin and Insertion

Rectus Capitis Posterior Major

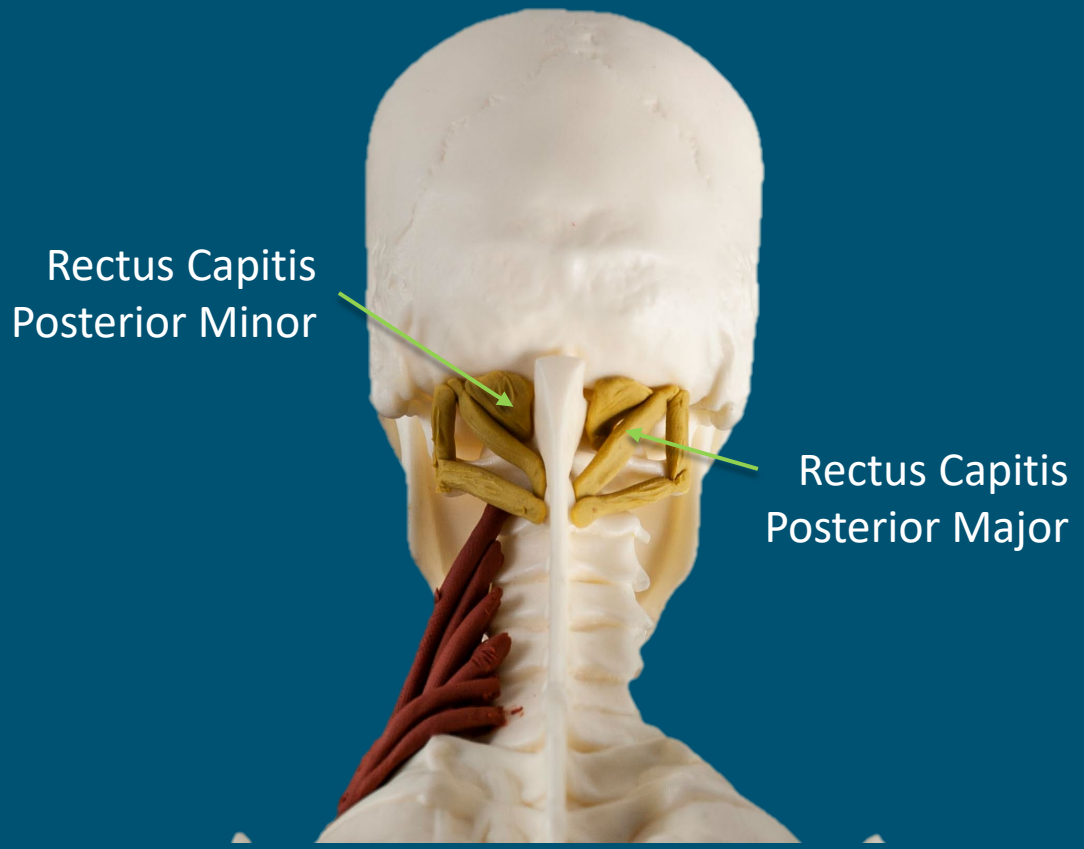
- Spinous process of C2 to middle third of inferior nuchal line of the occiput.

Rectus Capitis Posterior Minor

- Spinous process (posterior tubercle) of C1 to medial third of inferior nuchal line of occiput.

Actions:

- Bilaterally: Extends the head.
- Unilaterally: Rotates the head to the same side



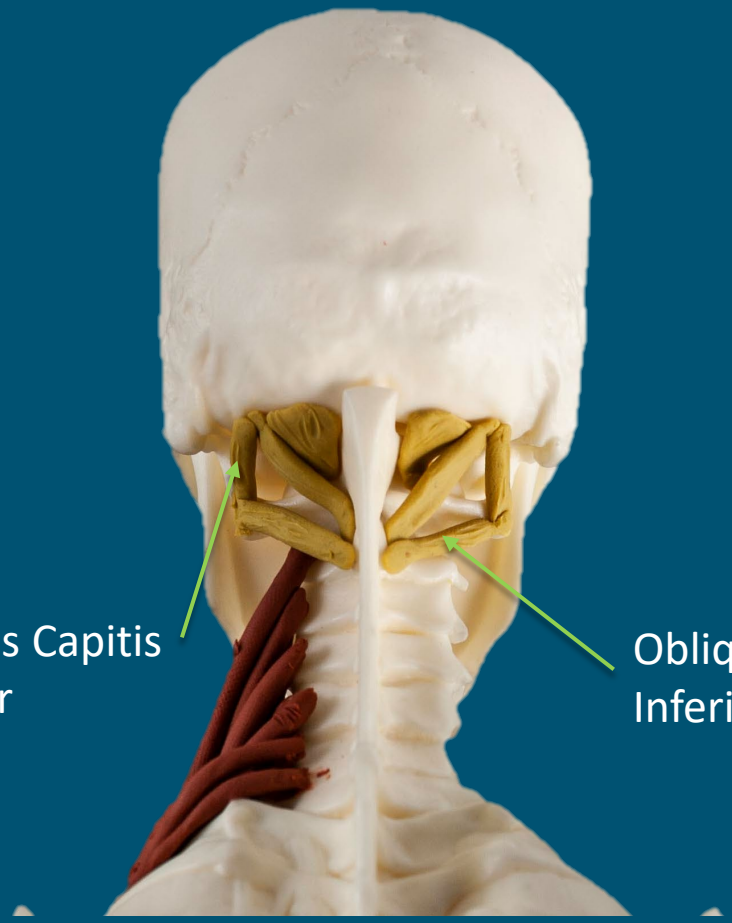
Obliquus Capitis Superior and Inferior

Obliquus Capitis Superior

- Transverse process of C1 to middle third of inferior nuchal line of occiput.

Actions:

- Bilaterally: Extends the head.
- Unilaterally: Flexes the head to the same side and rotates to the opposite side.



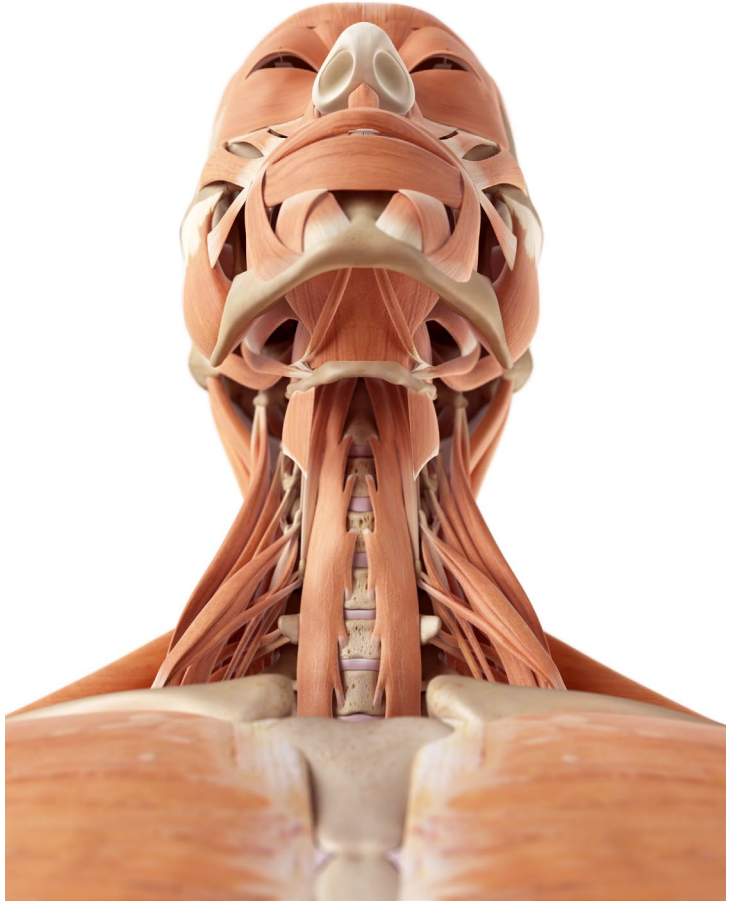
Obliquus Capitis Inferior

- Spinous process of C2 to transverse process of C1.

Actions:

- Bilaterally: Extends the head.
- Unilaterally: Rotates the head and neck to the same side.

Muscles of the Neck



- Splenius (optional)
- Longus Capitis (optional)
- Longus Colli (optional)
- Sternocleidomastoid

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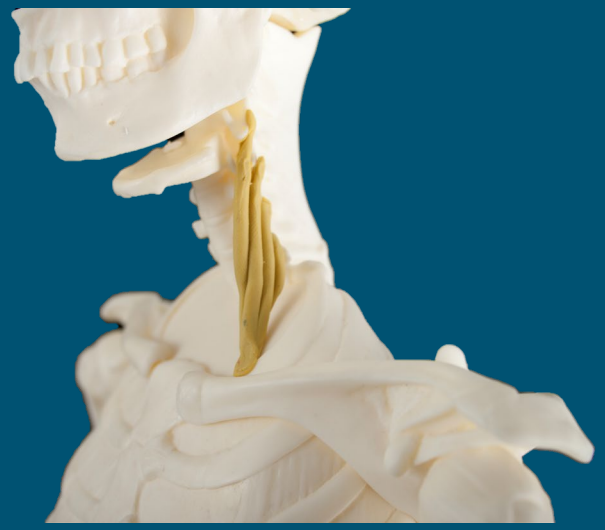
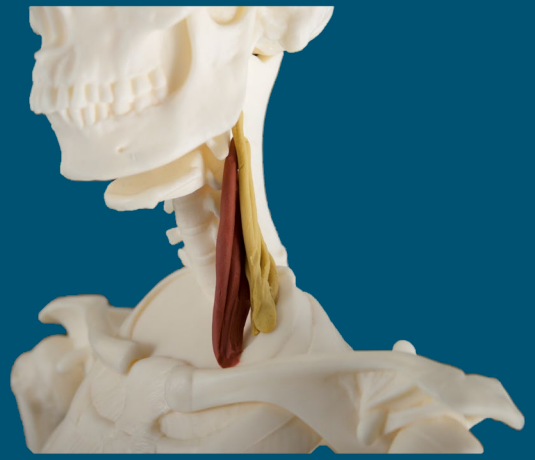
Scalenes



Anterior Fibers



Middle Fibers

Origin and Insertion:

Anterior

- Origin: Transverse processes of C3 – C6.
- Insertion: Anterior superior border of rib 1.

Middle

- Origin: Transverse processes of C2 –C7.
- Insertion: Mid superior border of rib 1.

Posterior

- Origin: Transverse processes of C6 –C7.
- Insertion: Posterior superior border of rib 2.

Posterior Fibers

Actions:

- Bilaterally: Elevate the ribs during inhalation, flexes the neck and head.
- Unilaterally: Laterally flex head and neck to same side and rotate head and neck to opposite side.

Splenius

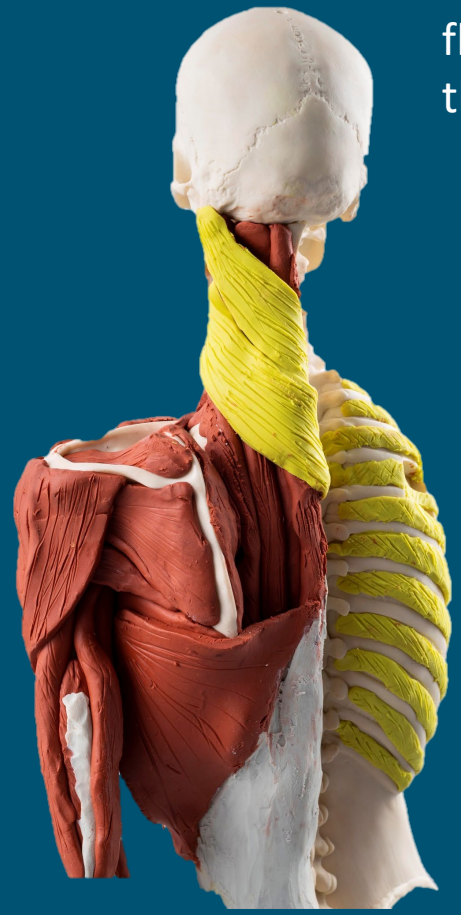
Splenius Capitis

Origin:

- Spinous processes of C7-T3 (or longer) and nuchal ligament.

Insertion:

- Mastoid process of temporal bone.



Actions:

- Bilaterally: Cervical spinal extension.
- Unilaterally: Spinal lateral flexion and spinal rotation to the same side.

Splenius Cervicis

Origin:

- Spinous processes of T3-T6.

Insertion:

- Transverse processes of C2-C6.

Longus Capitis and Longus Colli

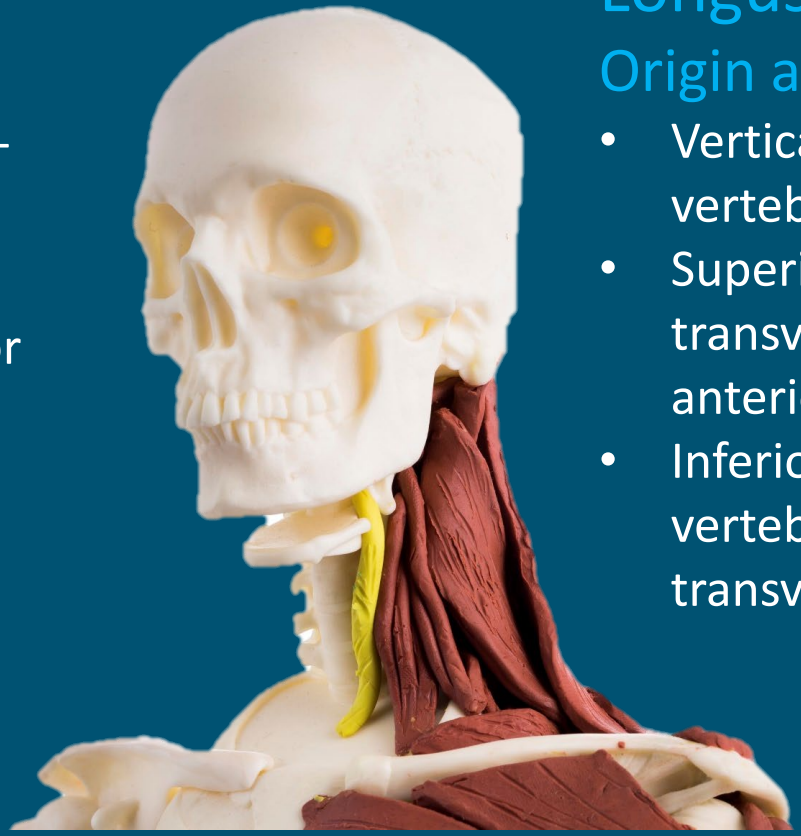
Longus Capitis

Origin:

- Anterior transverse process of C3-C6.

Insertion:

- Base of the occipital bone anterior to vertebral column.



Longus Colli

Origin and Insertion:

- Vertical section: Anterior face of vertebral bodies of C5-T3.
- Superior section: Anterior surfaces of transverse processes of C3-C5 to anterior surface of C1.
- Inferior section: Anterior face of vertebral bodies of T1-T3 to anterior transverse processes of C5-C6.

Actions:.

- Bilaterally: Cervical flexion.
- Unilaterally: Cervical lateral flexion and rotation to opposite side.

Muscles of the Head and Neck

Muscle Group	Extension	Flexion	Lateral Flexion	Ipsilateral Rotation	Contralateral Rotation	Stabilizes Head and Cervical Spine
Scalenes		X	X		X	X
Rectus Capitis Posterior Major and Minor	X			X		X
Obliquus Capitis Inferior	X		X	X		
Obliquus Capitis Superior	X		X		X	
Semispinalis	X		X		X	X
Splenius	X		X	X		
Longus Capitis and Colli		X	X		X	
Sternocleidomastoid	X	X	X		X	

Deep Muscles and Fascia of the Back

Serratus Posterior Superior (optional)

Serratus Posterior Inferior (optional)

Thoracolumbar Fascia

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Serratus Posterior Superior

Origin

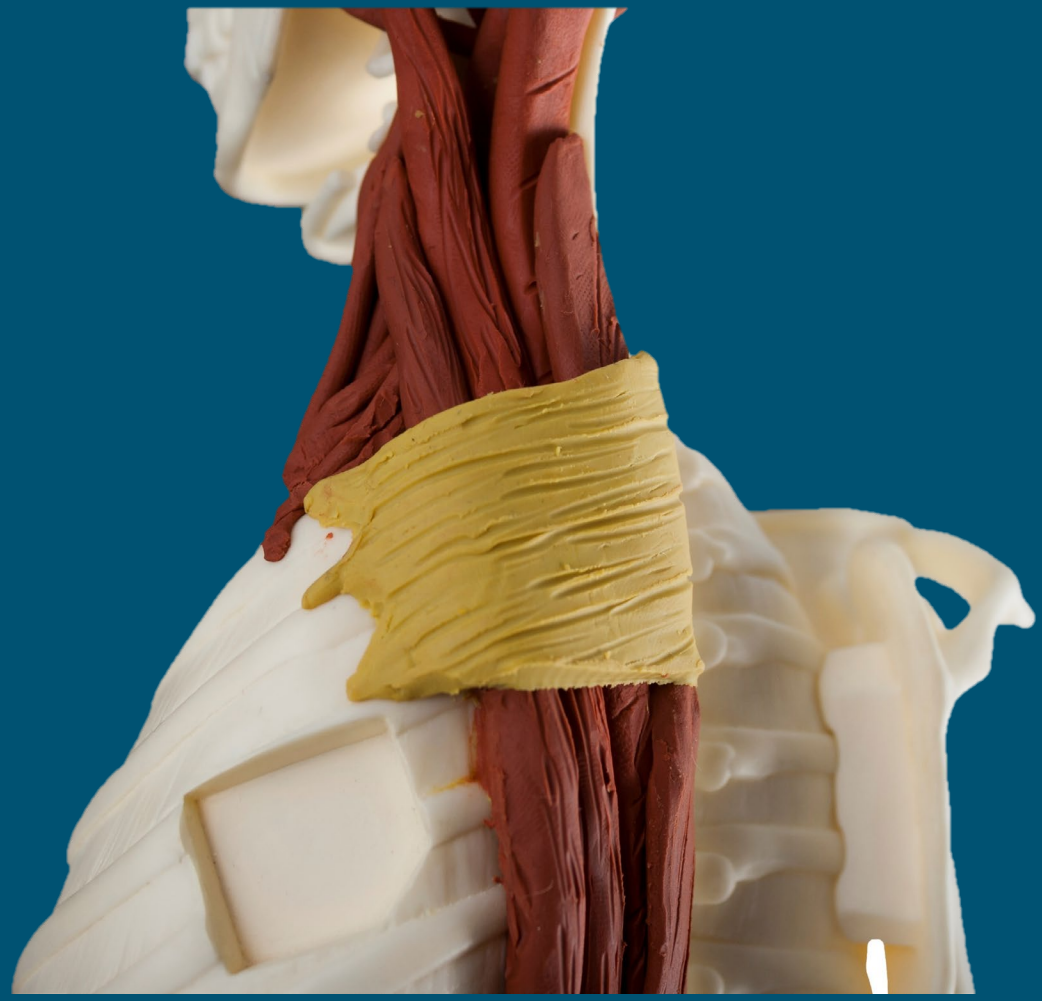
- Spinous processes of C7 – T3.

Insertion

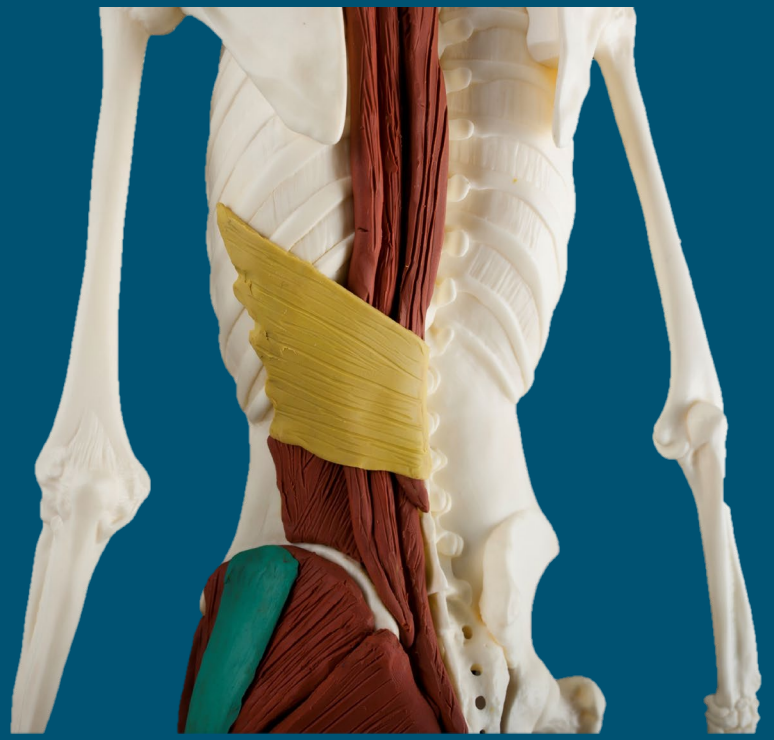
- Posterior surface of 2nd – 5th ribs.

Actions

- Elevate ribs during inhalation.



Serratus Posterior Inferior



Origin:

- Spinous processes of T12 – L3

Insertion:

- Posterior surface of 9th – 12th ribs

Actions:

- Depress ribs during exhalation.
- Assists in rotation and extension of the trunk

Thoracolumbar Fascia

The thoracolumbar fascia is a deep fascial membrane of the mid to lower back.

It is three layers thick. The layers of fascia attach to the transverse processes and spinal processes of the spine.

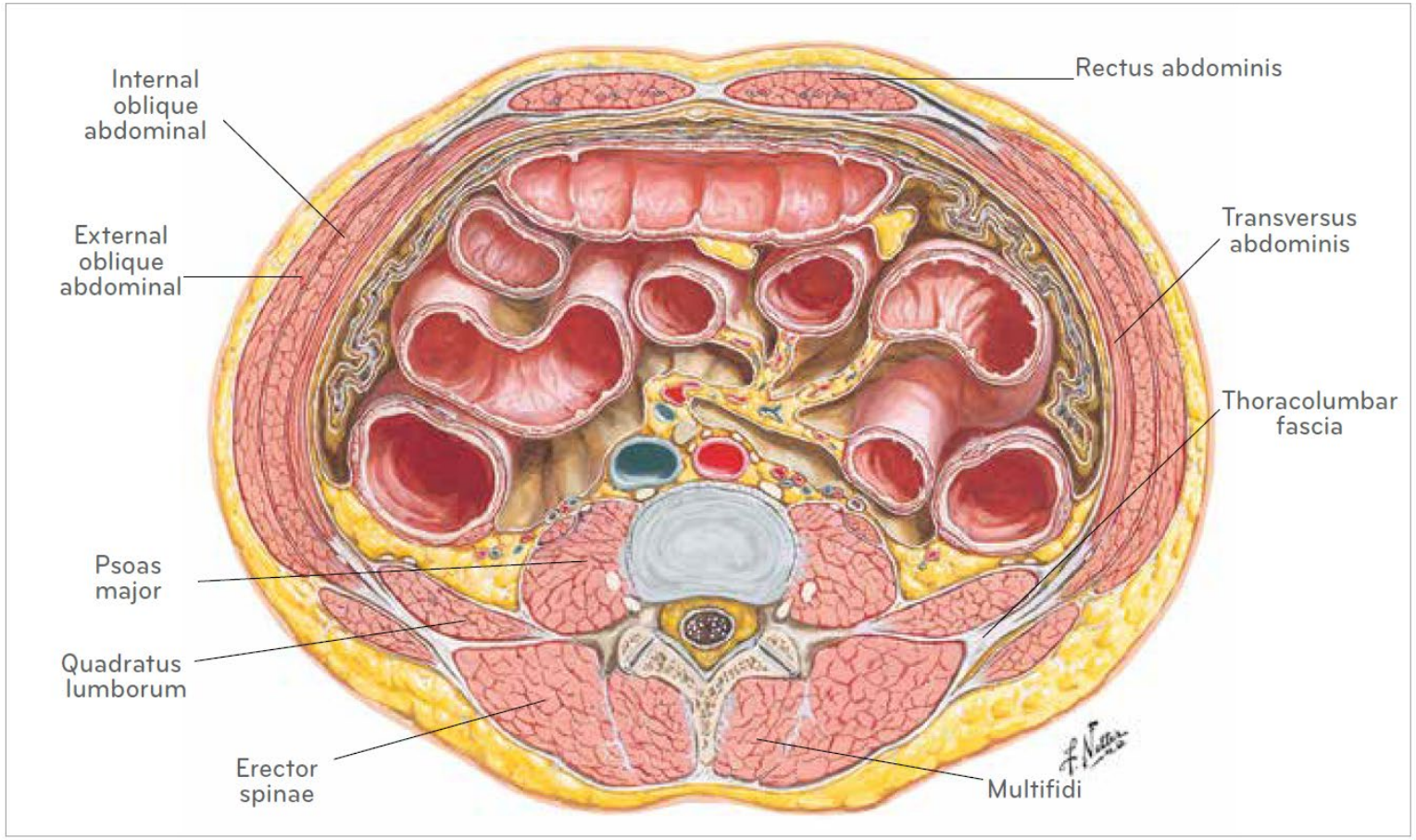
Layers form envelopes which invest and surround muscles including erector spinae, serratus posterior inferior, quadratus lumborum and lower fibers of the latissimus dorsi.

Thoracolumbar Fascia

Origin and Insertion

- Arises medially from T7 along the spinous processes to the sacrum
- Laterally it follows the high point of the iliac crest
- Fibers are continuous with the fascia of the glutes and the IT band

Cross section at L3



Cross section through the torso at the level of L3 showing the relationships and fascial connections of the torso.

balanced body

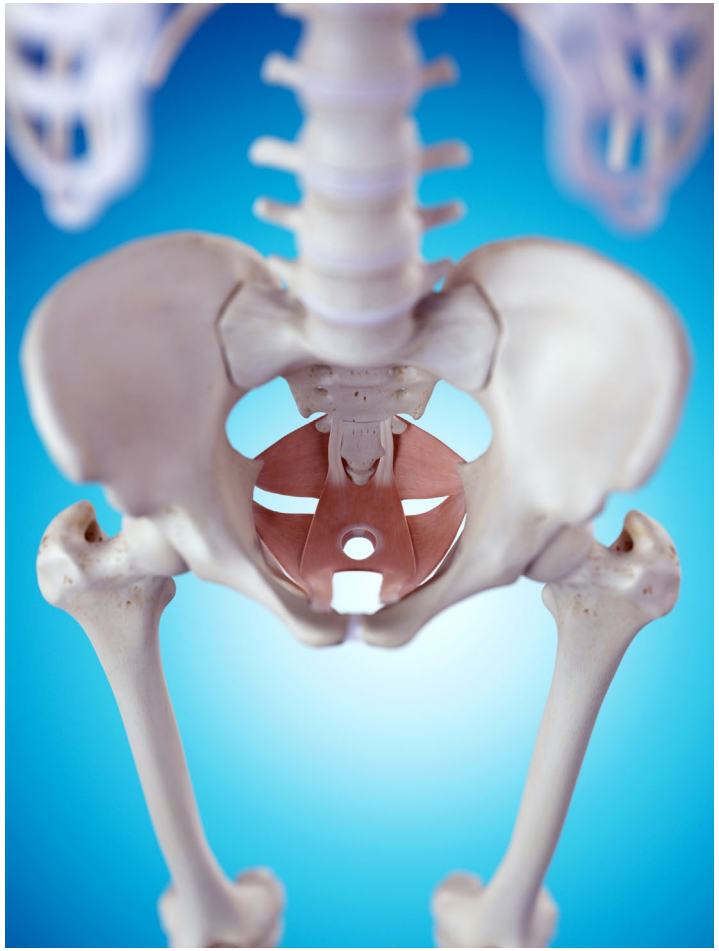
Lets Build! Muscles of the Pelvic Floor

Superficial muscles

- Ischiocavernosus
- Bulbospongiosus
- Urethral Sphincter
- Superficial Transverse Perineal
- Deep Transverse Perineal
- Anal Sphincter

Deep muscles

- Levator Ani
  - Puborectalis
  - Pubococcygeus
  - Ischiococcygeus
- Coccygeus



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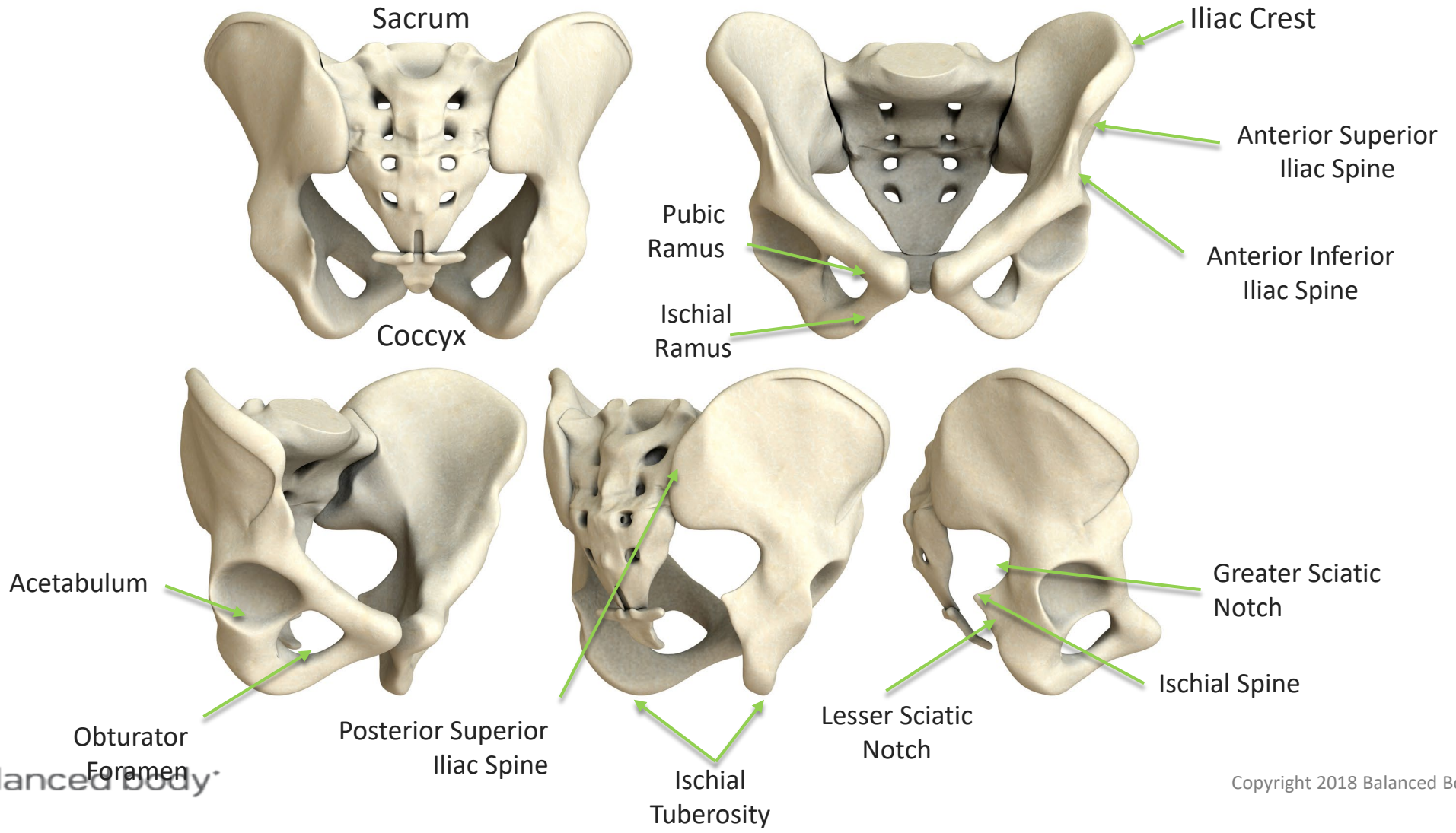
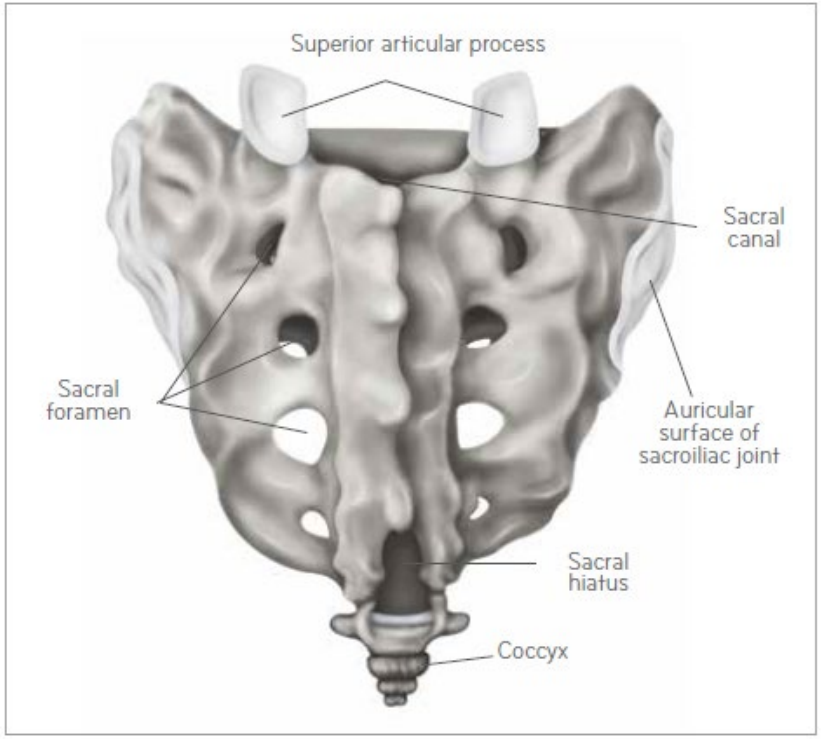
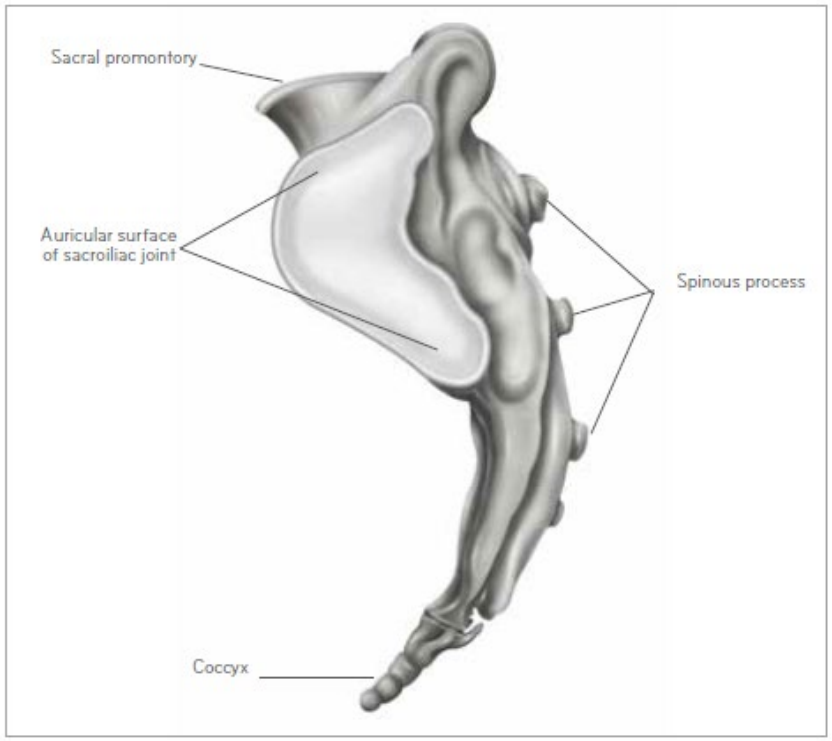
Pelvis – Bony Landmarks



Sacrum – Bony Landmarks



Sacrum, Back View



Sacrum, Side view

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Obturator Internus

Origin:

- Fills lesser pelvis covering inferior surface of obturator membrane

Insertion:

- Medial surface of greater trochanter of femur
- Proximal and superior to trochanteric fossa.

Actions:

- Laterally rotates
- Abducts and laterally rotates extended hip
- Abducts leg when hip is neutral, flexed or extended
- Stabilizes hip during walking
- Serves as attachment point for Levator Ani

Piriformis

Origin:

- Pelvic surface of sacrum between (and lateral to) pelvic sacral foramen 1-4
- Margin of greater sciatic foramen
- Pelvic surface of sacrotuberous ligament

Insertion:

- Superior border of the greater trochanter

Actions:

- Laterally rotates and abducts neutral or extended hip
- Medial rotation when hip flexed above 60^{o}
- Creates posterior wall of the pelvis and shares connective tissue with the Coccygeus of the pelvic floor

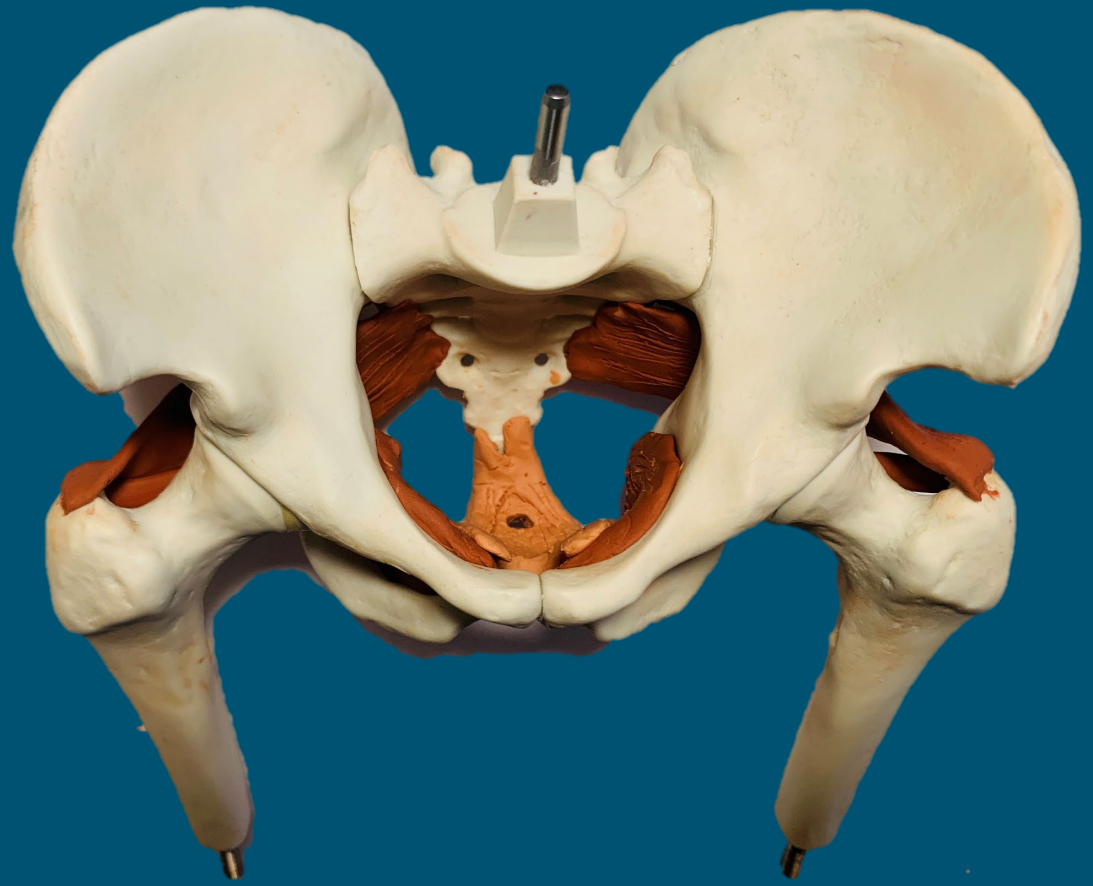
Levator Ani – Puborectalis and Pubococcygeus

Origin and Insertion:

- Puborectalis – Connects the pubic bone to the lateral sides of the anal sphincter.
- Pubococcygeus – Lateral to Puborectalis, connects the pubic bone to the coccyx.

Actions:

- Maintains the integrity of the pelvic floor.



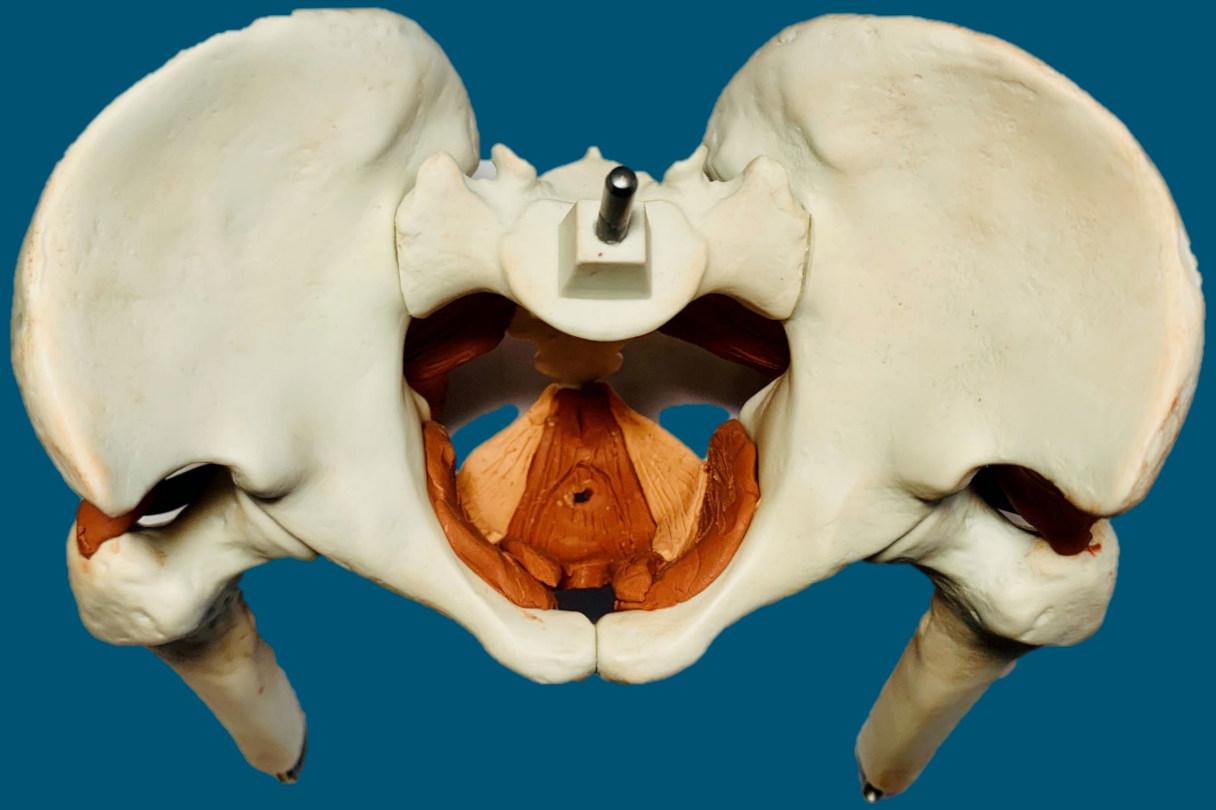
Levator Ani - Iliococcygeus

Origin and Insertion:

- Iliococcygeus – Lateral to Pubococcygeus attaches to the wall of the Obturator Internus and connects to the coccyx.

Actions:

- Maintains the integrity of the pelvic floor.



Levator Ani – The Pelvic Diaphragm

Puborectalis

- U shaped sling; thick muscle
- Bodies of pubic bone, past urogenital hiatus, around anal canal
- Main function is to maintain fecal continence and relax during defecation
- Some fibers flank the urethra in the male and vagina in the female. These fibers important for preserving urinary continence, especially with increase in intra-abdominal pressure (i.e. sneezing)

Pubococcygeus

- Main constituent of the levator ani
- Make their attachments from body of pubic bone to coccyx and anococcyegeal ligament

Iliococcygeus

- Has thin muscle fibers
- Start at ischial spines and posteriorly attaches to the coccyx and the anococcygeal ligament
- This muscle puts the “levator” in levator ani! Its action elevates the pelvic floor

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Coccygeus

Origin:

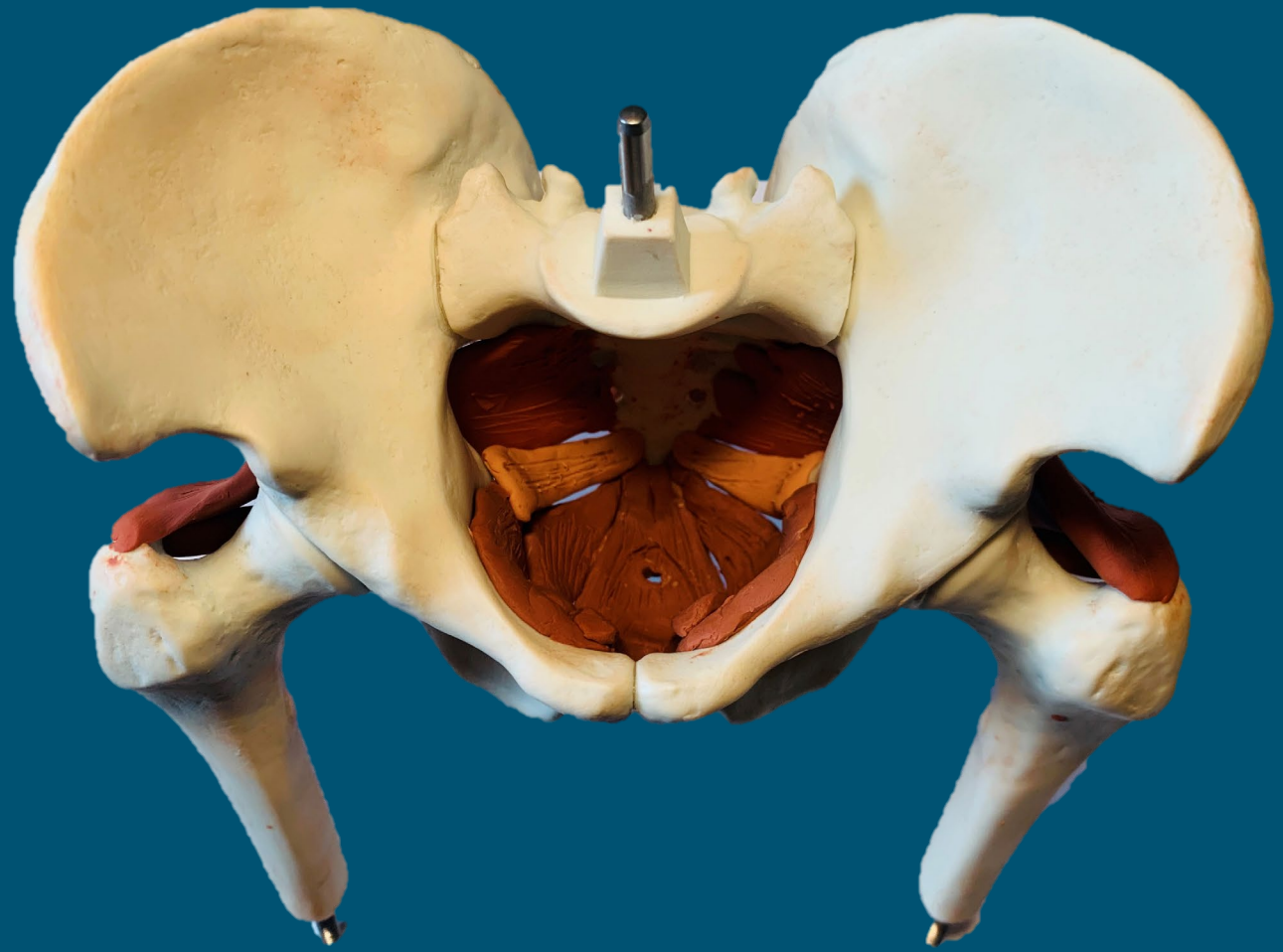
- Ischial tuberosity

Insertion:

- Coccyx.

Actions:

- Pulls coccyx forward to clos the posterior part of the pelvis.



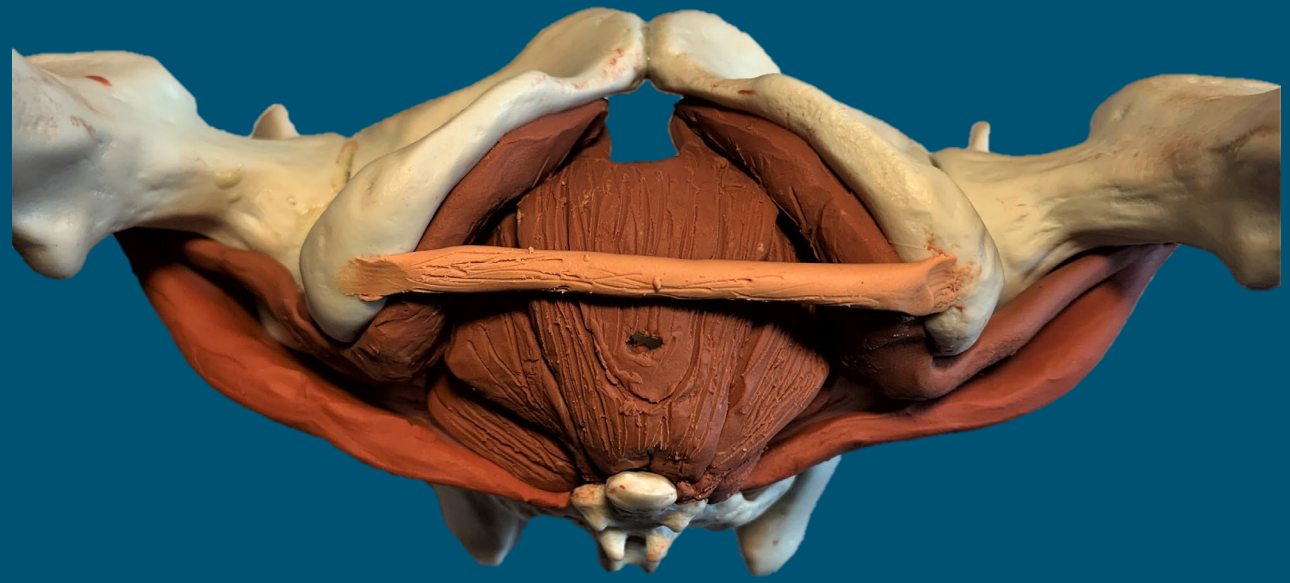
Superficial Transverse Perineal

Origin and Insertion:

- A thin slip of muscle between the ischial tuberosities.
- Attaches on either side of the perineal body.

Actions:

- Creates the transverse stability of the pelvis. Provides a fascial attachment for the perineal body where the bulbospongiosus, levator ani and external anal sphincter connect.



Ischiocavernosus

Origin:

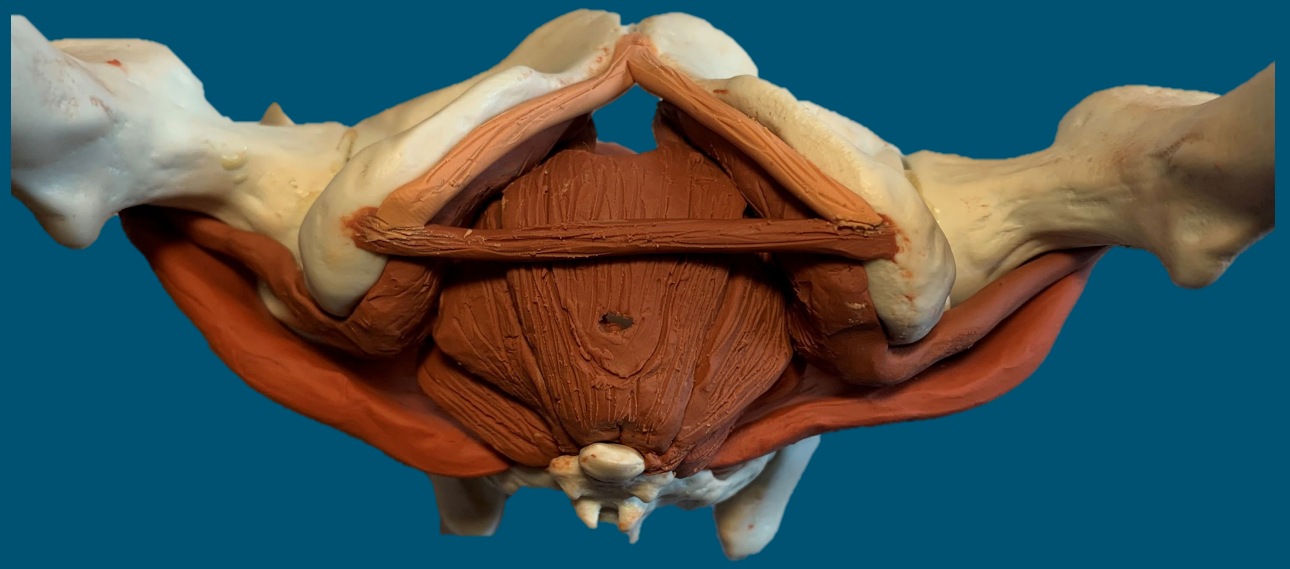
- Ischial tuberosity

Insertion:

- In men – Crus or base of the penis.
- In women – Crus or base the clitoris.

Actions:

- In men - Compresses the corpus cavernosum of the penis to maintain and stabilize erection.
- In women – Compresses the clitoridis to maintain an erection.



Deep Transverse Perineal

Origin:

- Creates the anterior pelvic floor by attaching to the inferior ischial rami on either side and connecting to the Bulbospongiosus and the Superficial Transverse Perineal muscle.

Actions:

- Maintains the integrity of the pelvic floor.
- Works with the Urethra to control urination.

Bulbospongiosus

Origin:

- In men - Surrounds the base of the penis.
- In women – Creates the walls of the vagina.
- In both sexes it arises from the central point of the perineum.

Insertion:

- Since it's essentially circular, there is no insertion point.

Actions:

- In men – Assists with erection, ejaculation and orgasm.
- In women – Contributes to clitoral erection, orgasm and closes the vagina.
- In both sexes it empties the urethra at the end of urination.

Anal Sphincter

Origin:

- Surrounds the external opening of the anus.

Insertion:

- The fibers connect to the center of the perineum with the Levator Ani and the Bulbospongiosus.
- And by a tendinous attachment to the coccyx.

Actions:

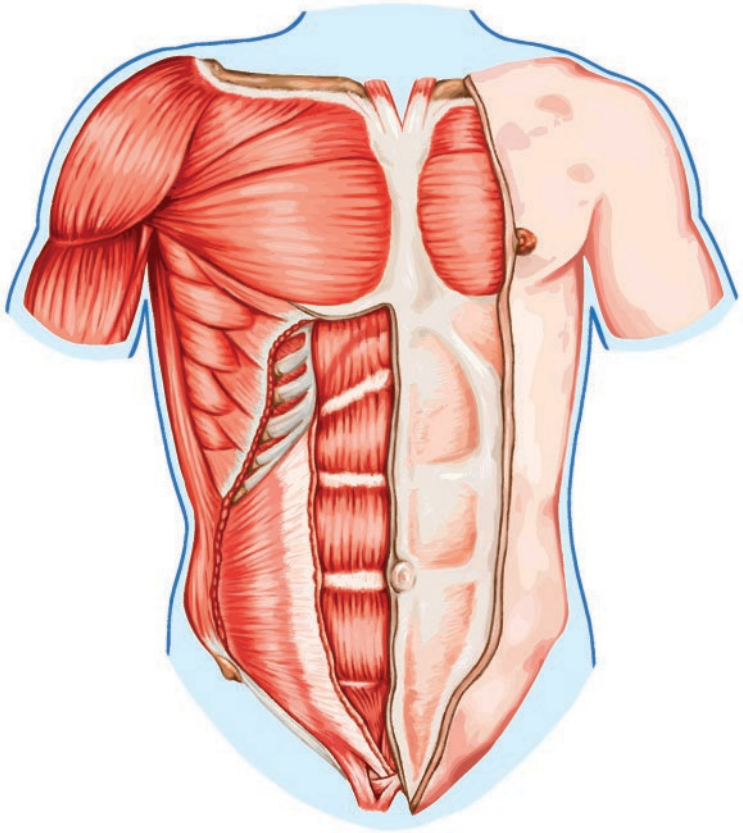
- Provides voluntary control of defecation.

The Abdominals

Including the muscles and actions of the abdominals

balanced body

Abdominals



- Transversus Abdominus
- Internal Oblique
- External Oblique
- Rectus Abdominus

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Transversus Abdominis

Origin:

- Lateral third of inguinal ligament.
- Along the iliac crest.
- Thoracolumbar fascia.
- Internal surfaces of lower 6 ribs.

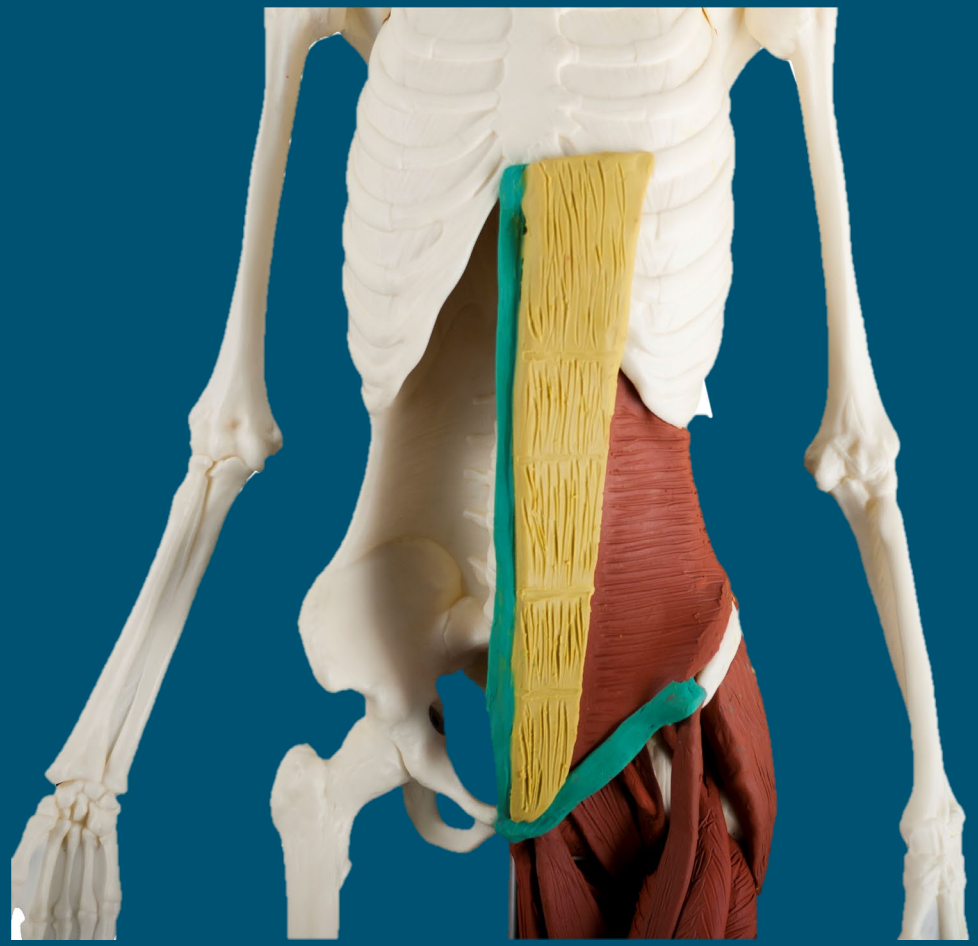
Insertion:

- Abdominal aponeurosis to linea alba.

Actions:

- Compresses contents of abdomen and stabilizes lumbar spine.

Rectus Abdominis



Origin:

- Superior surface of the pubic symphysis.

Insertion:

- External costal cartilage of ribs 5-7 and xiphoid process.

Actions:

- Spinal flexion.
- Lateral spinal flexion.
- Posterior pelvic tilt.

Internal Oblique

Origin:

Lateral third of inguinal ligament, iliac crest and thoracolumbar fascia.

Insertion:

Cartilage of ribs 10-12, abdominal aponeurosis to linea alba.

Actions:

- Bilaterally: Spinal flexion.
- Unilaterally: Lateral spinal flexion and spinal rotation to same side.

External Oblique

Origin:

- External surfaces of ribs 5-12 interdigitating with the Serratus anterior.

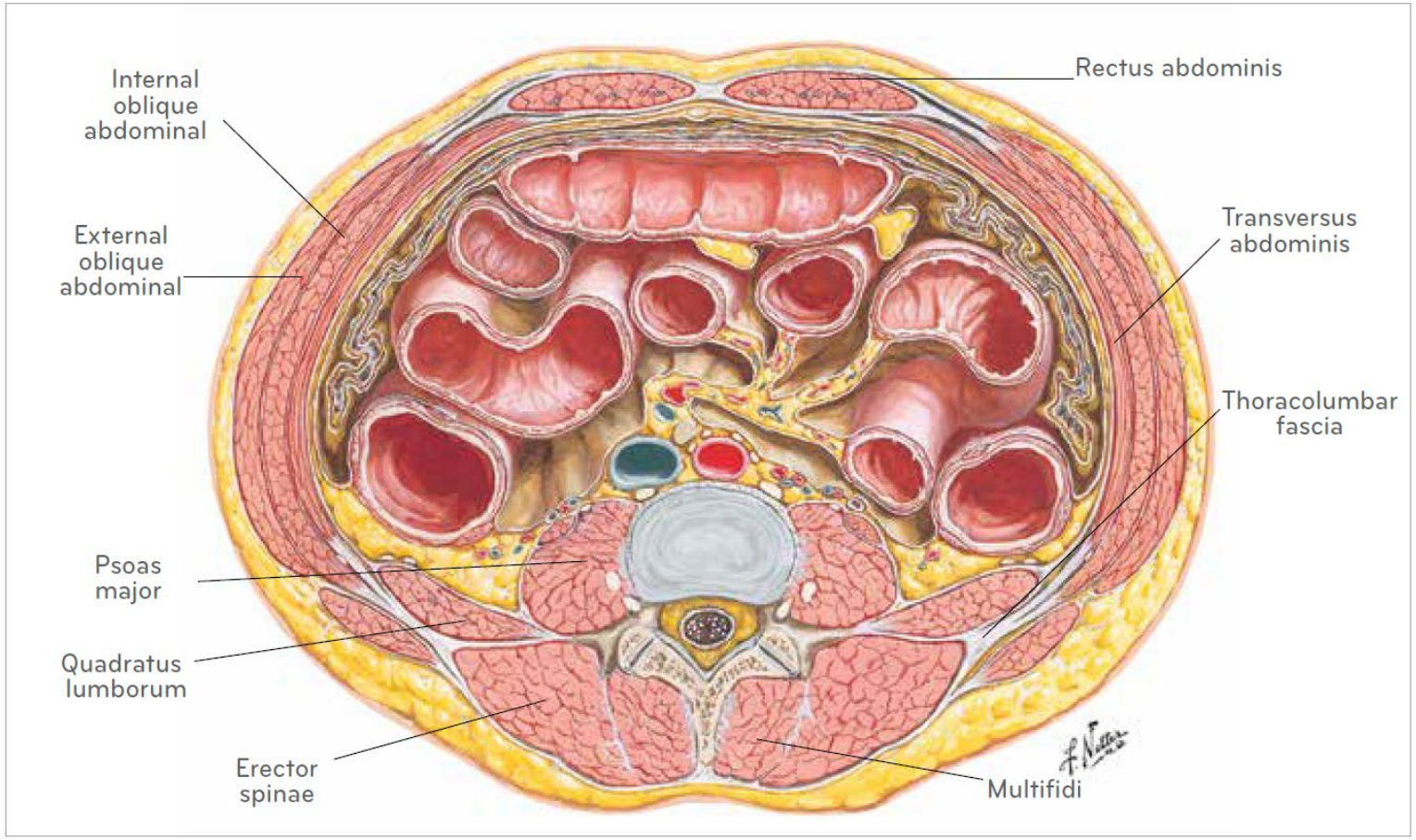
Insertion:

- Anterior iliac crest.
- Abdominal aponeurosis to linea alba.

Actions:

- Bilaterally: Spinal flexion.
- Unilaterally: Lateral spinal flexion and spinal rotation to opposite side.

Cross section at L3



Cross section through the torso at the level of L3 showing the relationships and fascial connections of the torso.

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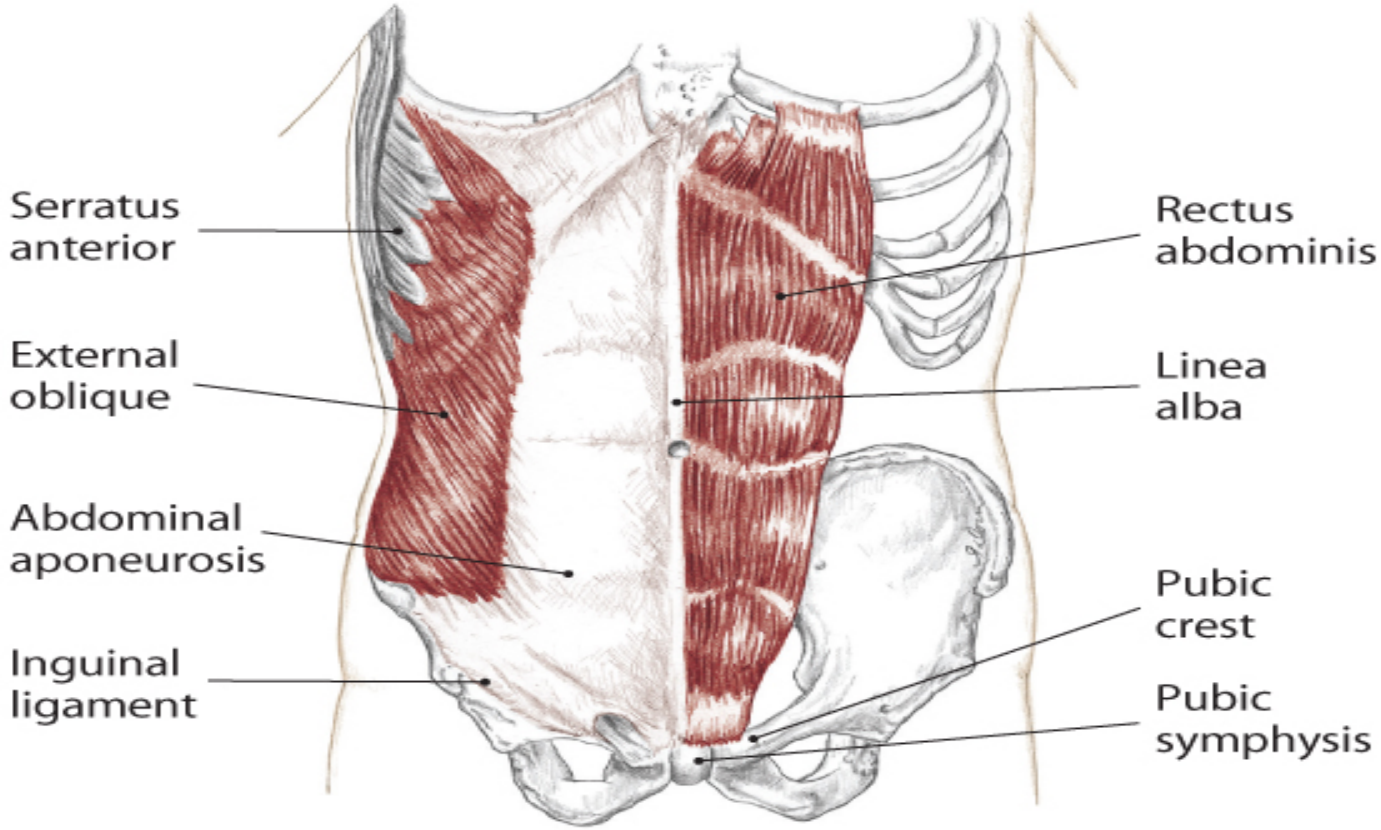
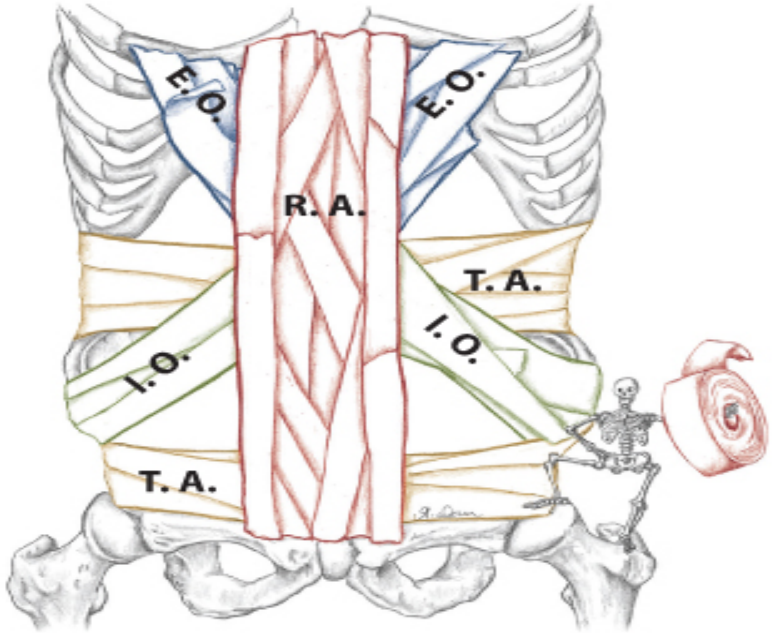
Abdominals

Rectus Abdominis
External Oblique
Internal Oblique
Transverse Abdominis



4.97 Anterior view



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Abdominal Muscles

Muscles	Flexion	Lateral Flexion	Contralateral Rotation	Ipsilateral Rotation	Spinal Stability
Transverse Abdominis					X
Internal Oblique	X	X		X	
External Oblique	X	X	X		
Rectus Abdominis	X	X			

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