

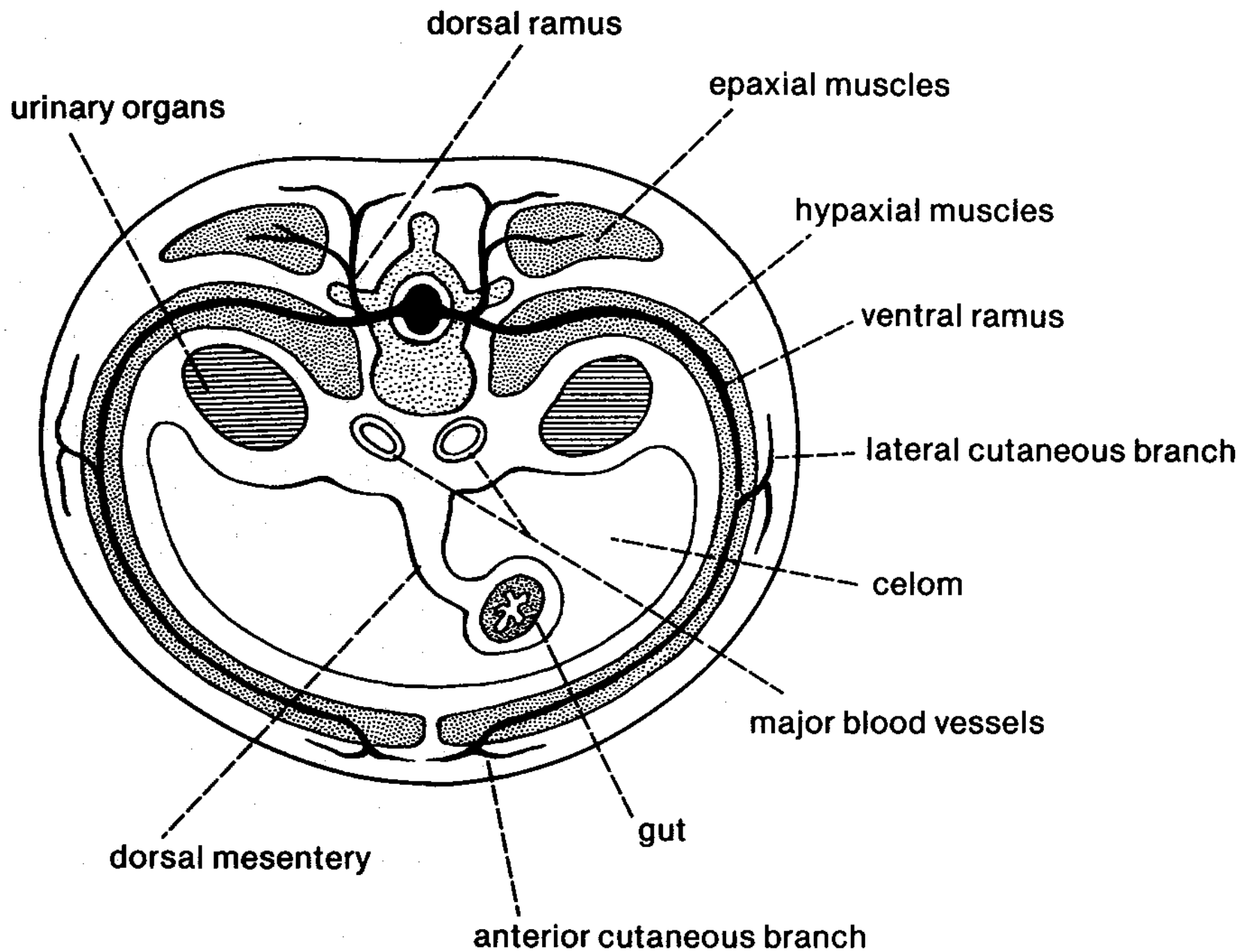
Biology 323

Human Anatomy for Biology Majors

Lecture 6

Dr. Stuart S. Sumida

Axial Musculature



EPAXIAL MUSCLES (AXIAL MUSCLES)

The “Erector Spinae” Muscles

Iliocostalis – lateral-most group

Iliocostalis lumborum

Iliocostalis thoracis

Iliocostalis cervicis

Longissimus Dorsi – middle of superficial epaxial group

Longissimus thoracis

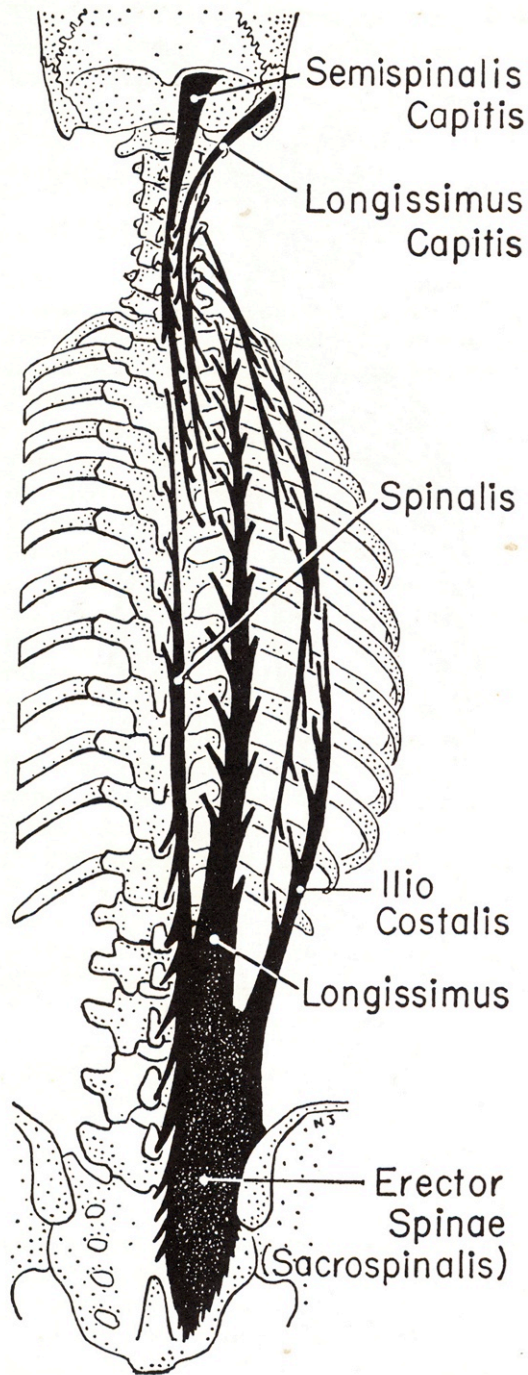
Longissimus cervicis

Longissimus capitus

Transversospinalis – medial-most group

Spinalis thoracis

Spinalis cervicis



Diagrammatic plan of organization of major components of the erector spinae.

Iliocostalis Group – lateralmost of erector spinae

Iliocostalis cervicis

Origin: Ribs 3-7

Insertion: Transverse processes of C4-C6

Innervation: Spinal nerves C8-T1

Iliocostalis thoracis

Origin: Rib 7-12

Insertion: Ribs 1-6

Innervation: Spinal nerves C8-T1

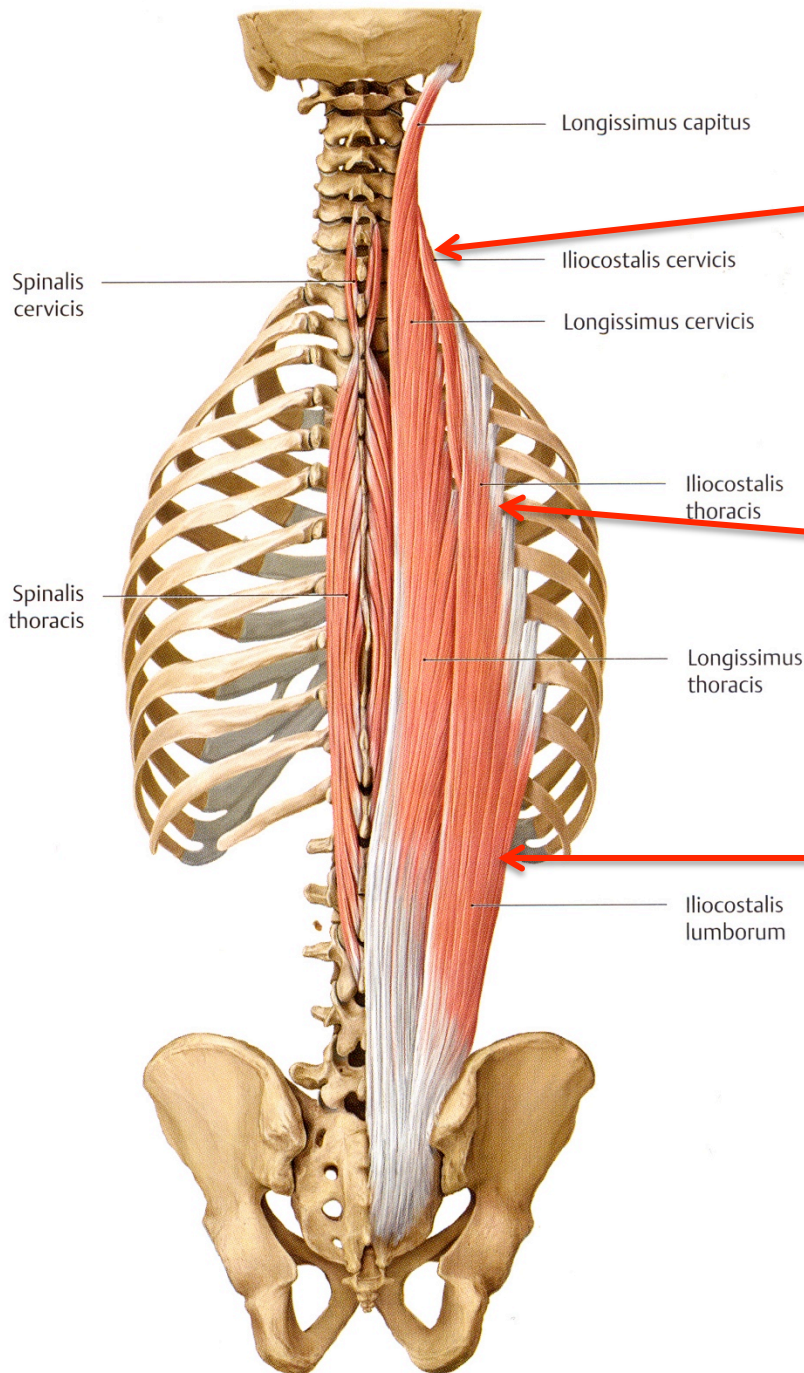
Iliocostalis lumborum

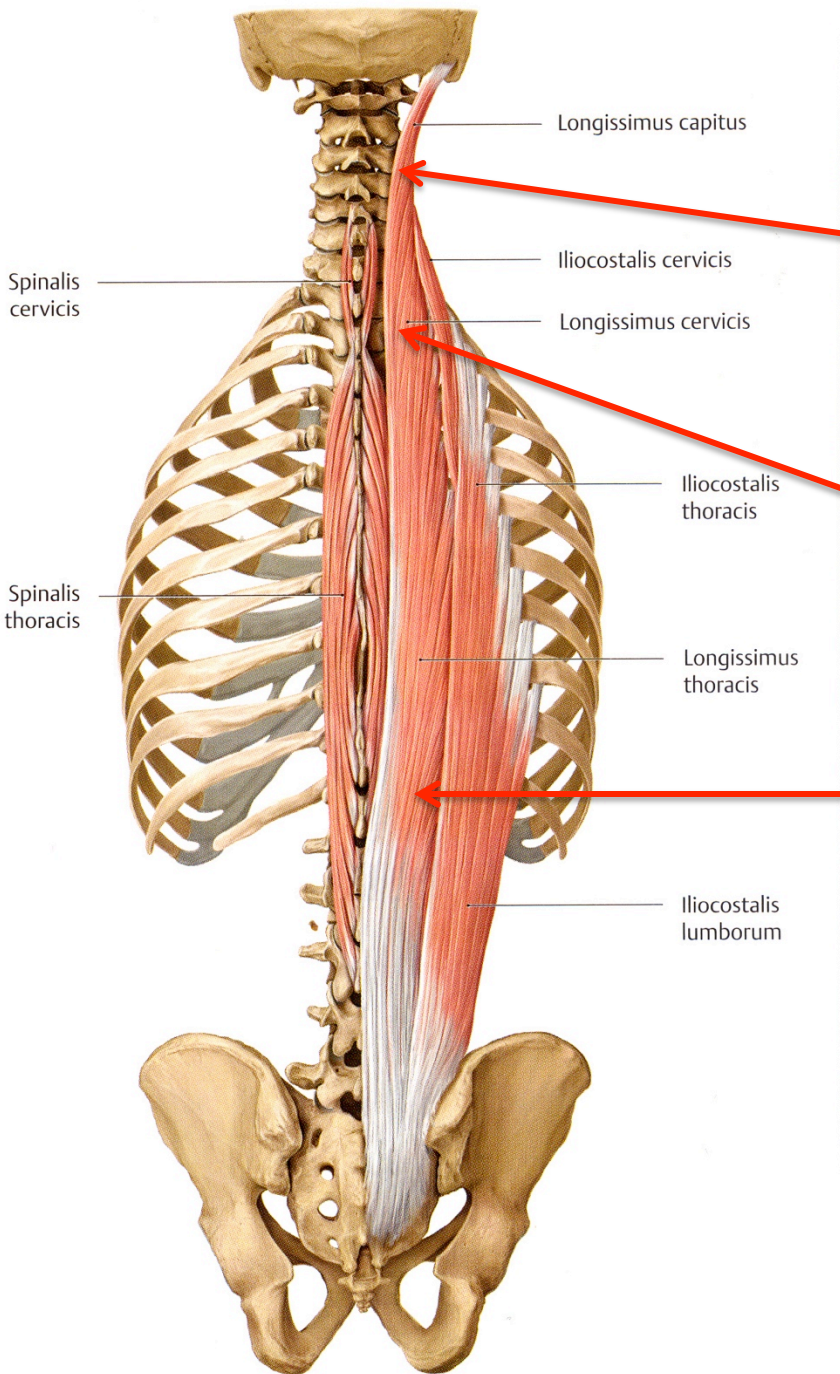
Origin: Sacrum, Iliac crest, thoracolumbar fascia

Insertion: Transverse processes of upper lumbar vertebrae, ribs 6-12.

Innervation: Spinal nerves C8-T1

Function: Bilateral – extend spine; Unilateral – bend spine laterally to same side.





Longissimus Dorsi Group

(The only group of erector spinae muscles to actually reach the skull.)

Longissimus capitus

Origin: Transverse processes of C4-T3

Insertion: Mastoid process of temporal bone

Innervation: Spinal nerves C1-T5

Longissimus cervicis

Origin: Transverse processes of T1-T6.

Insertion: Transverse processes of C2-C5.

Innervation: Spinal nerves C1-T5

Longissimus thoracis

Origin: Sacrum, iliac crest, spinous processes of lumbar vertebrae, transverse processes of lower thoracic vertebrae

Insertion: Ribs 2-12, costal processes of lumbar vertebrae, transverse processes of thoracic vertebrae.

Innervation: Spinal nerves C1-T5

Function: Bilateral – extend head and spine;
Unilateral – bend spine laterally to same side.

Transversospinalis Group

Spinalis cervicis

Origin: Spinous processes of C5-T2

Insertion: Spinous processes of C2-C5

Innervation: Segmental spinal nerves

Function: Bilateral – extend spine;
Unilateral – bend spine laterally to same side

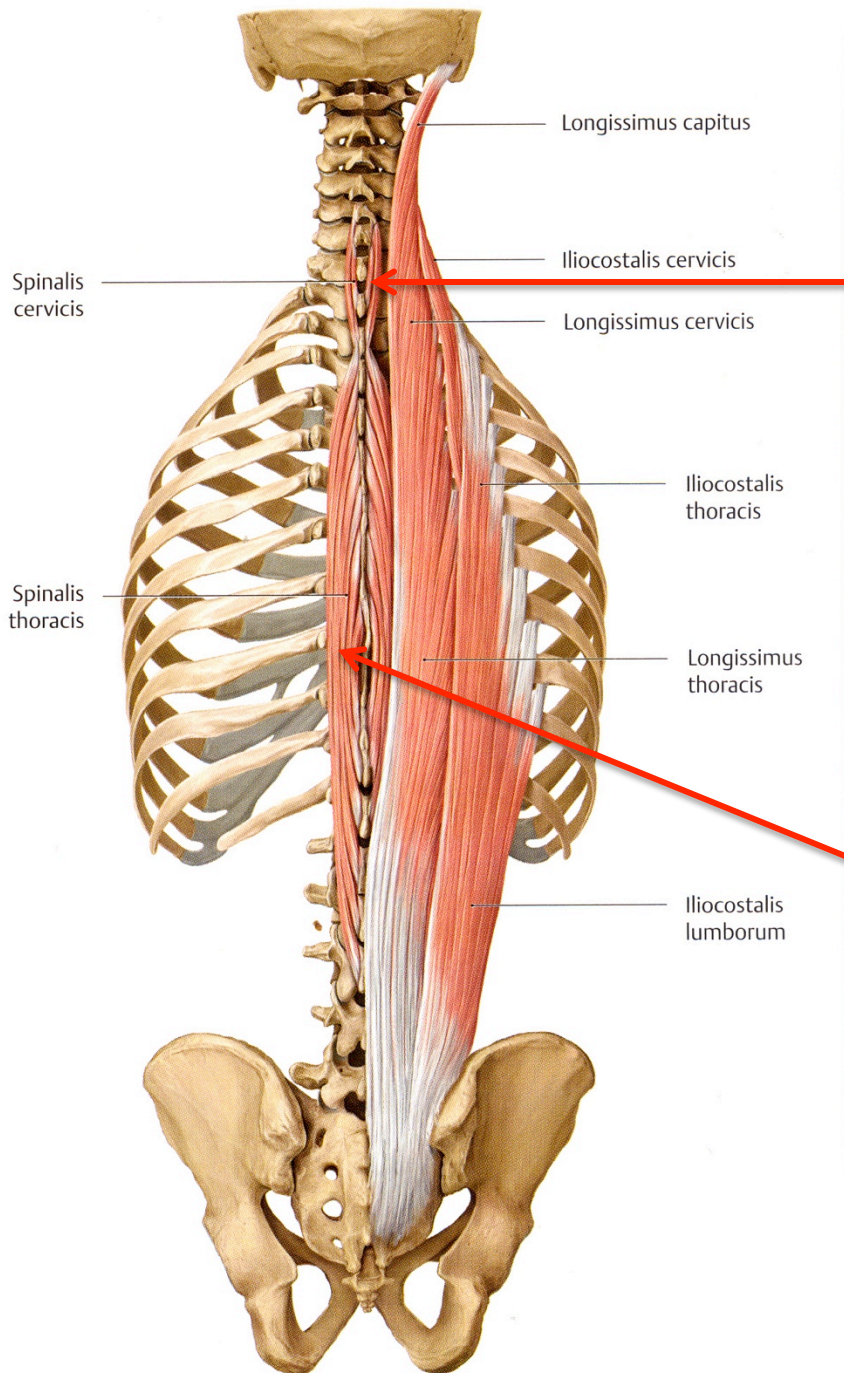
Spinalis thoracis

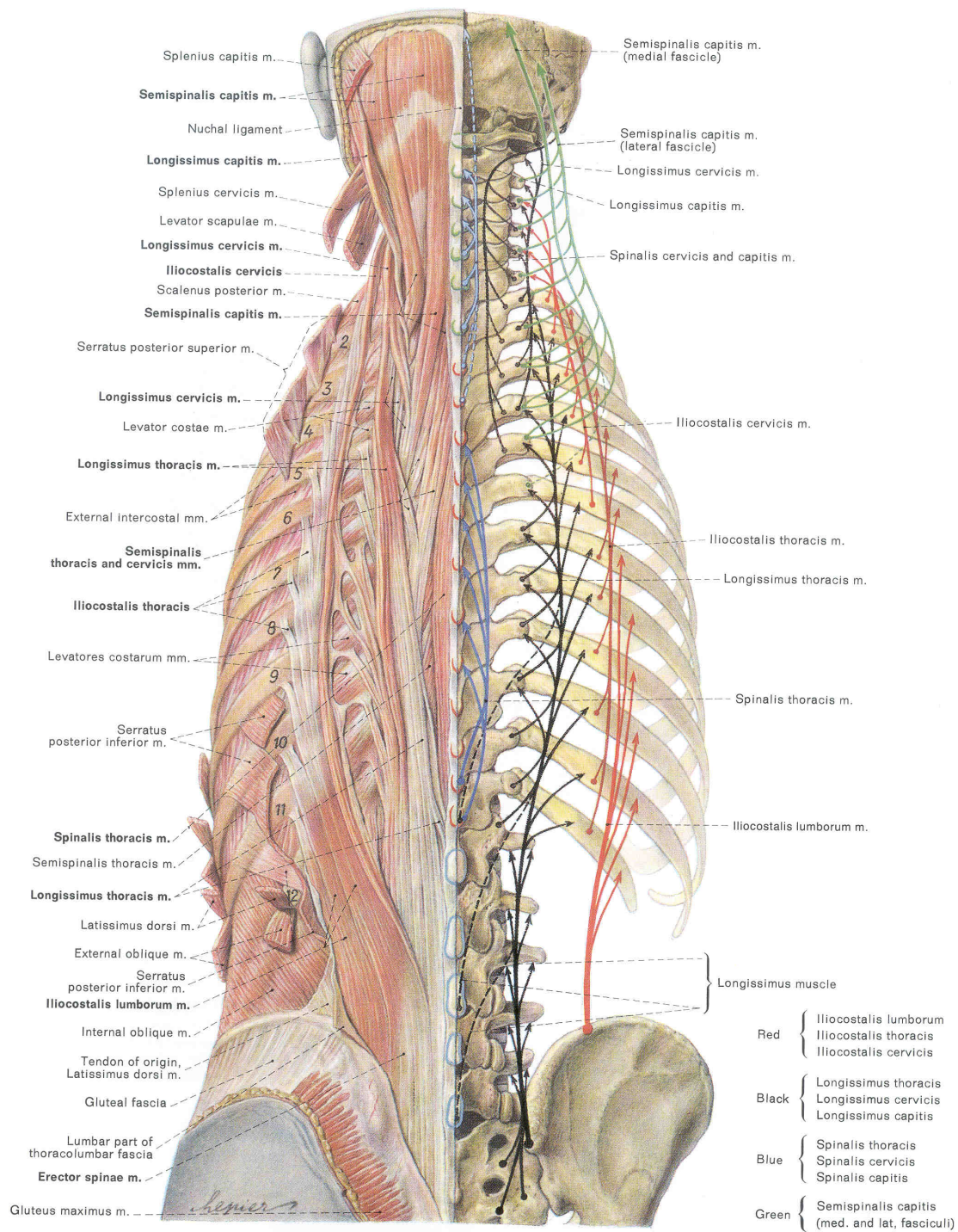
Origin: Spinous processes of T10-L3

Insertion: Spinous processes of T2-T8

Innervation: Segmental spinal nerves

Function: Bilateral – extend spine;
Unilateral – bend spine laterally to same side.





MIDDLE LAYER OF EPAXIAL MUSCLES ***(AXIAL MUSCLES)***

A largely oblique layer, mostly concealed by the erector spinae group.

Semispinalis Group

Multifidus

Rotatores

Semispinalis Group

Semispinalis capitis

Origin: Transverse processes of C4-T7

Insertion: Occipital bone between superior and inferior nuchal line.

Innervation: Segmental spinal nerves

Semispinalis cervicis

Origin: Transverse processes of T1-T6

Insertion: Spinous processes of C2-C5

Innervation: Segmental spinal nerves

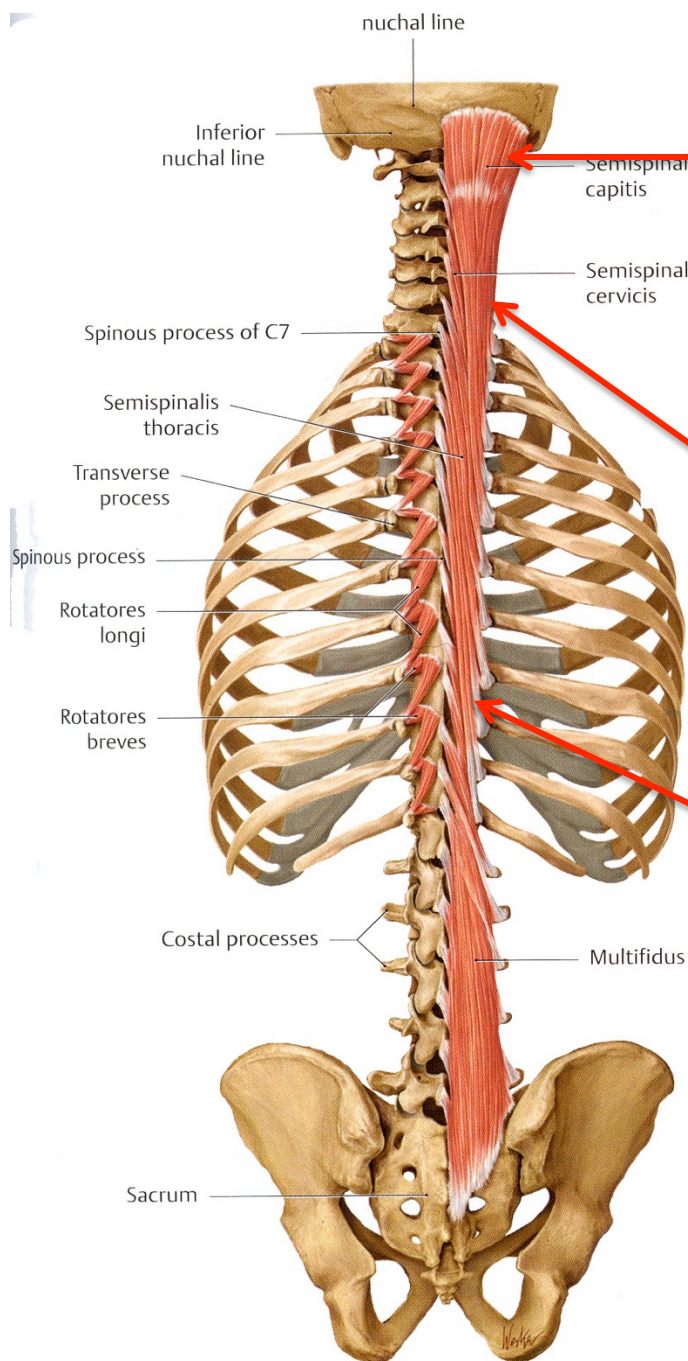
Semispinalis thoracis

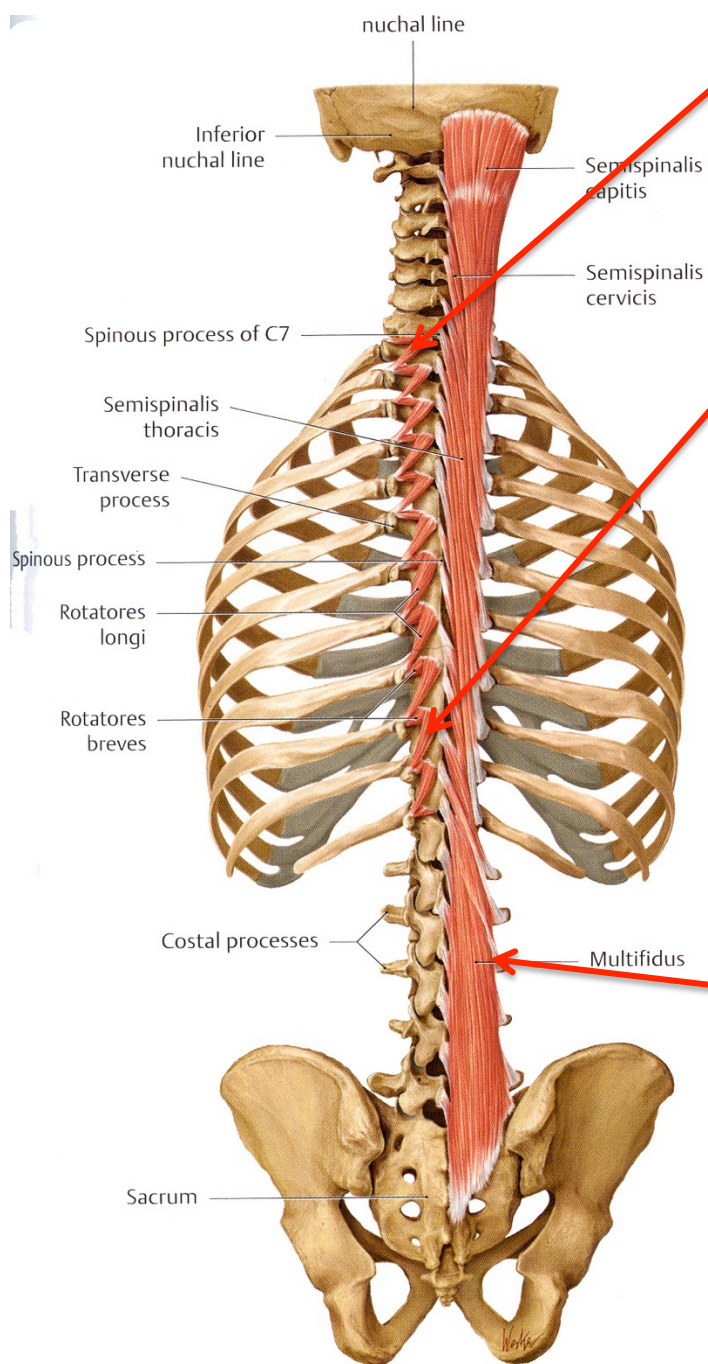
Origin: Transverse processes of T6-T12

Insertion: Spinous processes of C6-T4

Innervation: Segmental spinal nerves

Function: Bilateral – extend spine; Unilateral – bend spine to same side, rotate to opposite side





Rotatores brevis

Origin & Insertion: Between transverse and spinous processes of adjacent vertebrae) of T1-12.

Innervation: Segmental spinal nerves

Rotatores longi

Origin & Insertion: Between transverse and spinous processes skipping one vertebrae) of T1-12.

Innervation: Segmental spinal nerves

Function: Bilateral – extend thoracic spine;
Unilateral – bend spine to same side, rotate to opposite side

Multifidus

Origin & Insertion: Between transverse and spinous processes (skipping two to four vertebrae) of C2-sacrum.

Innervation: Segmental spinal nerves

Function: Bilateral – extend spine; Unilateral – bend spine to same side, rotate to opposite side

DEEPEST LAYER OF EPAXIAL MUSCLES (AXIAL MUSCLES)

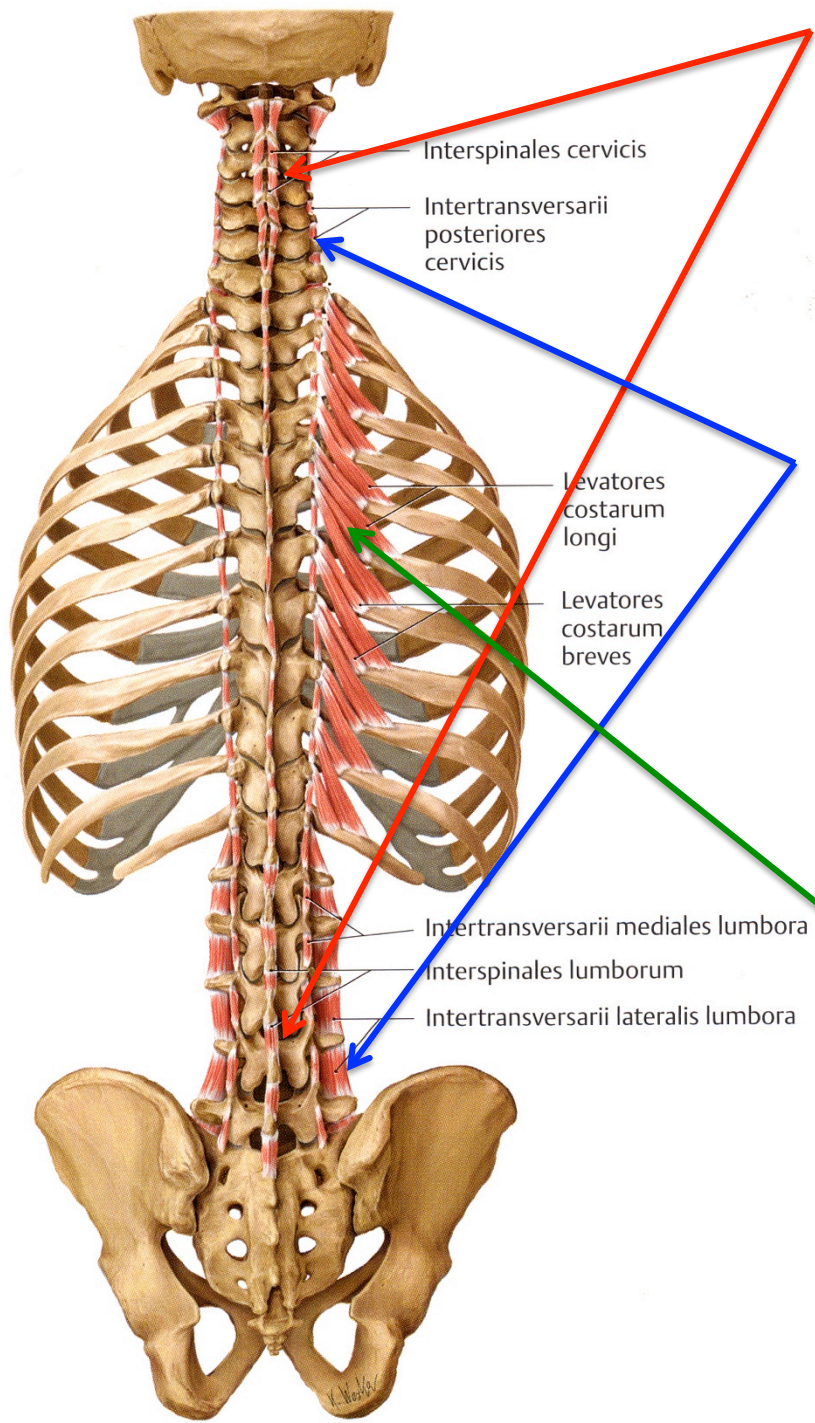
Interspinales group

Intertransversarii

Levatores costarum group

“Interspinalis Group” – short epaxial muscles that span single vertebral segments.

They are best developed in the cervical and lumbar region; and are largely absent in the thoracic region.



Interspinales

Origin & Insertion: Between spinous processes of adjacent vertebrae from C1-L5

Innervation: Segmental spinal nerves

Function: Extend cervical and lumbar regions of spine.

Intertransversarii

Origin & Insertion: Between transverse processes of adjacent vertebrae from C2-C7 and L1-L5

Innervation: Segmental spinal nerves

Function: Bilateral - stabilize and extend cervical and lumbar regions of spine; Unilateral – bend spine to that side.

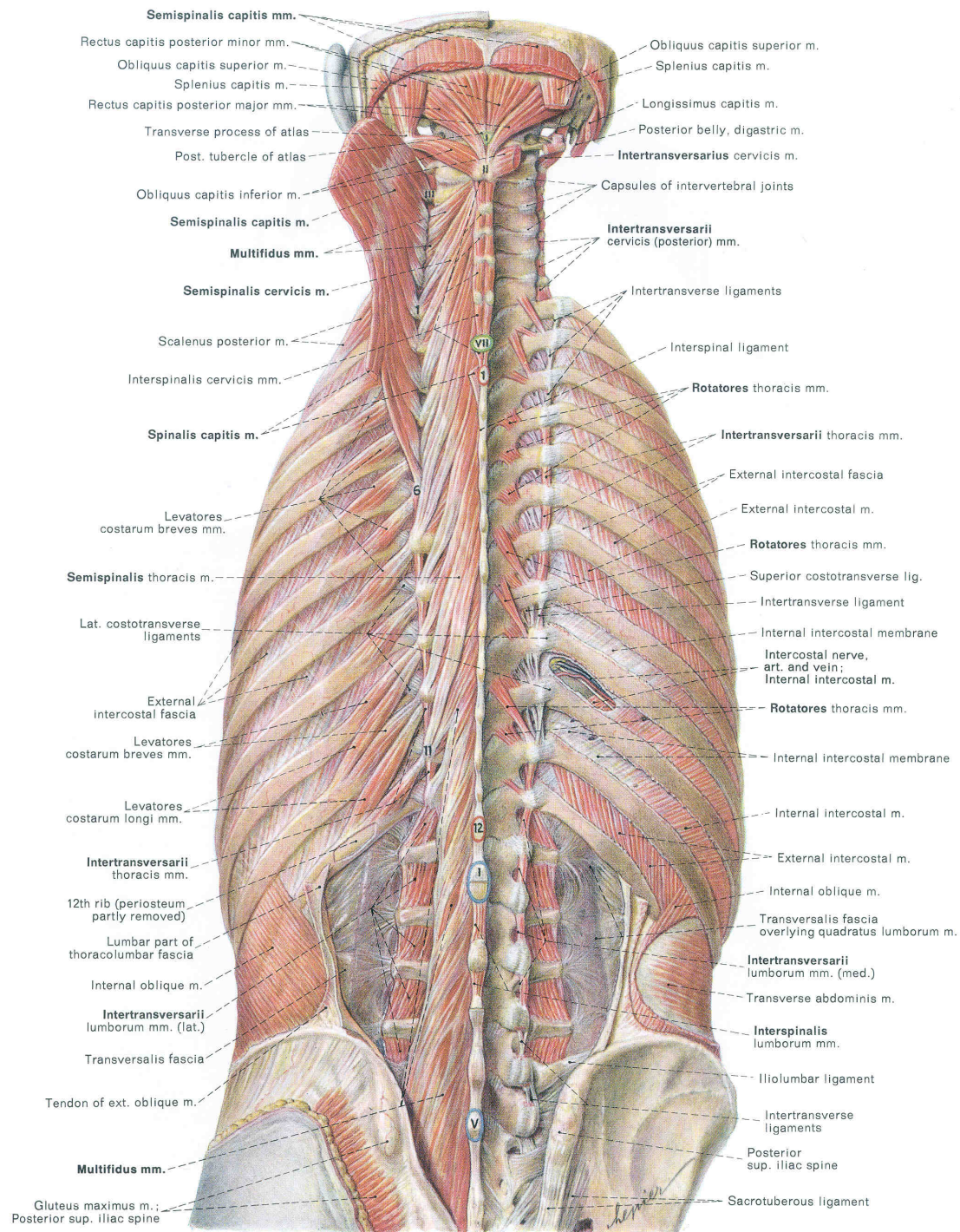
Levatores Costorum

Origin: Transverse processes of C7-T11

Insertion: costal angle of next lower rib or rib two segments distal.

Innervation: Segmental spinal nerves

Function: Bilateral - extend thoracic spine; Unilateral – bend thoracic spine to that side, rotate to opposite side.



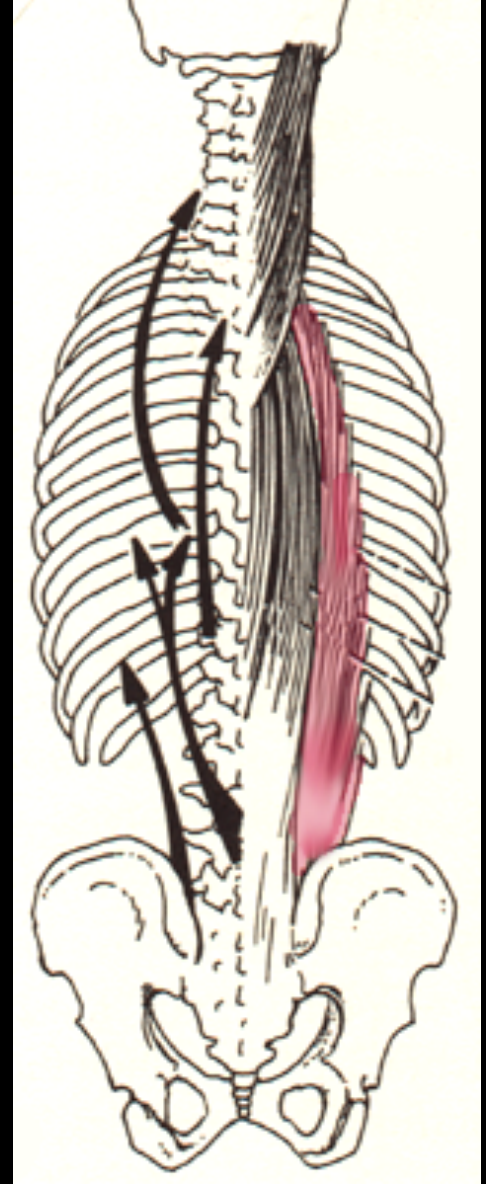
Superficial Layer

Erector Spinae

Origin = sacrum/iliac crest

Iliocostalis

Insertion = ribs



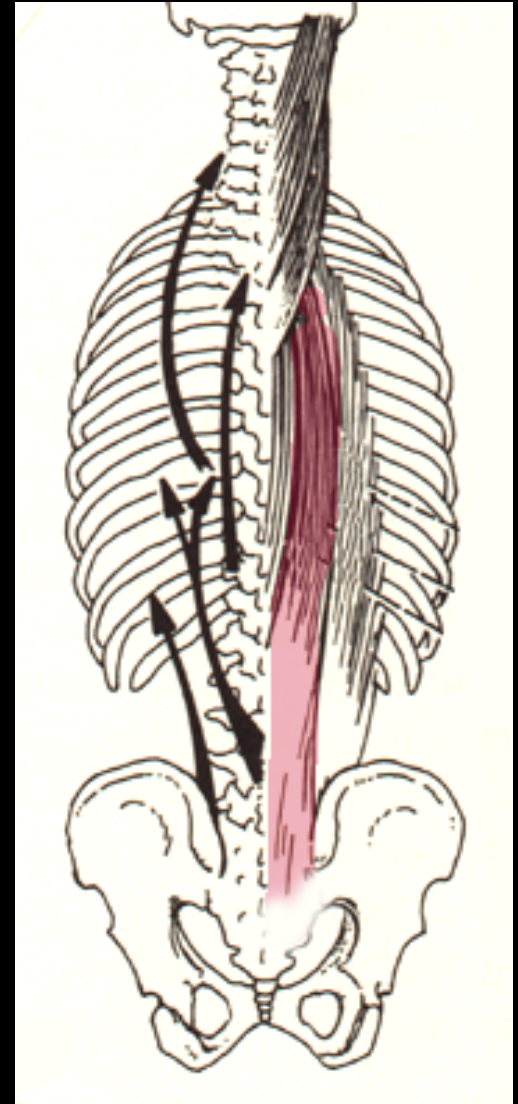
Superficial Layer

Erector Spinae

Origin = sacrum/iliac crest

Longissimus

Insertion = transverse processes



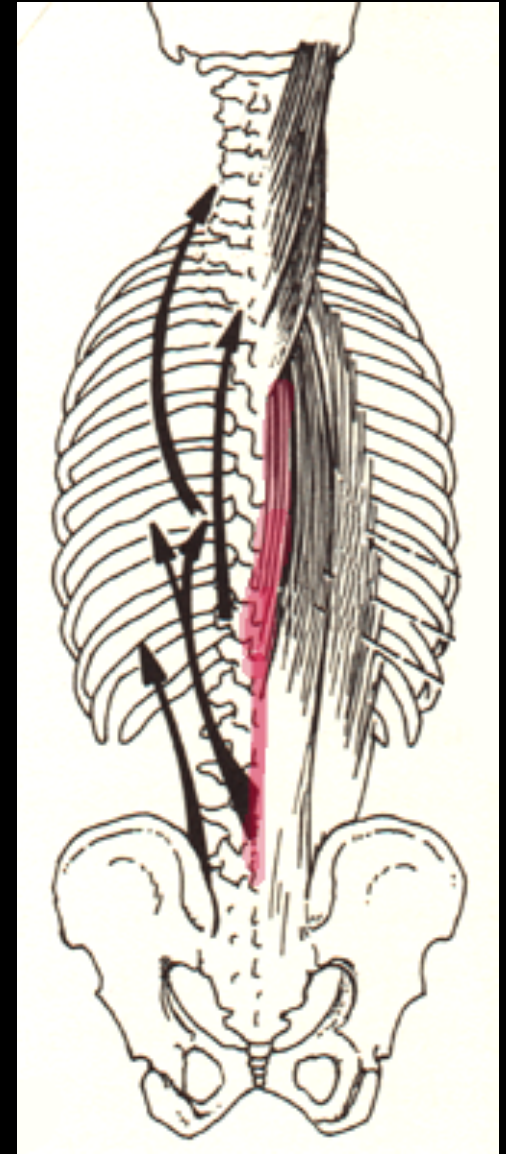
Superficial Layer

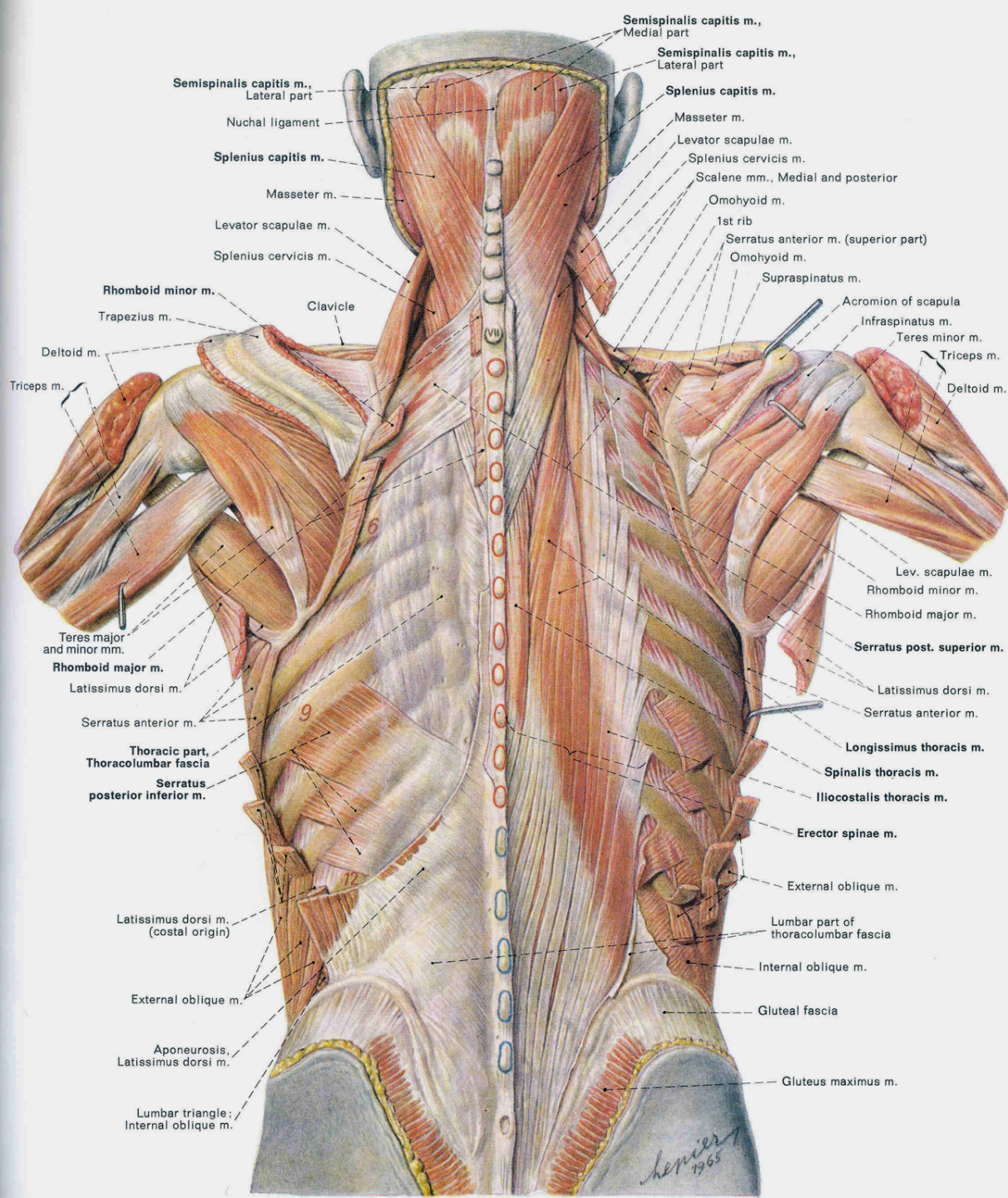
Erector Spinae

Origin = sacrum/iliac crest

Spinalis

Insertion = spinous processes



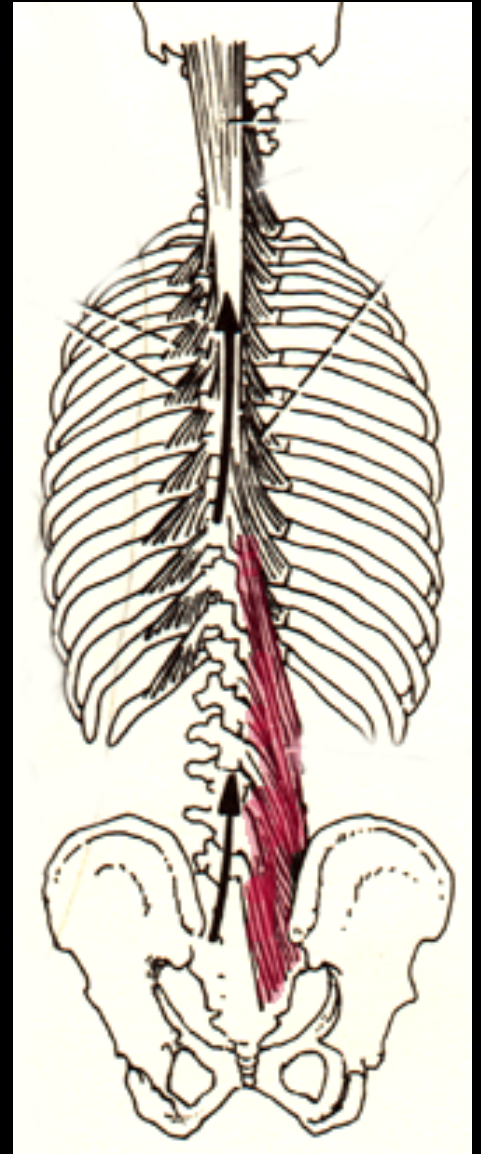


Intermediate Layer

Multifidus

Origin = sacrum/iliac crest

Insertion = spinous processes

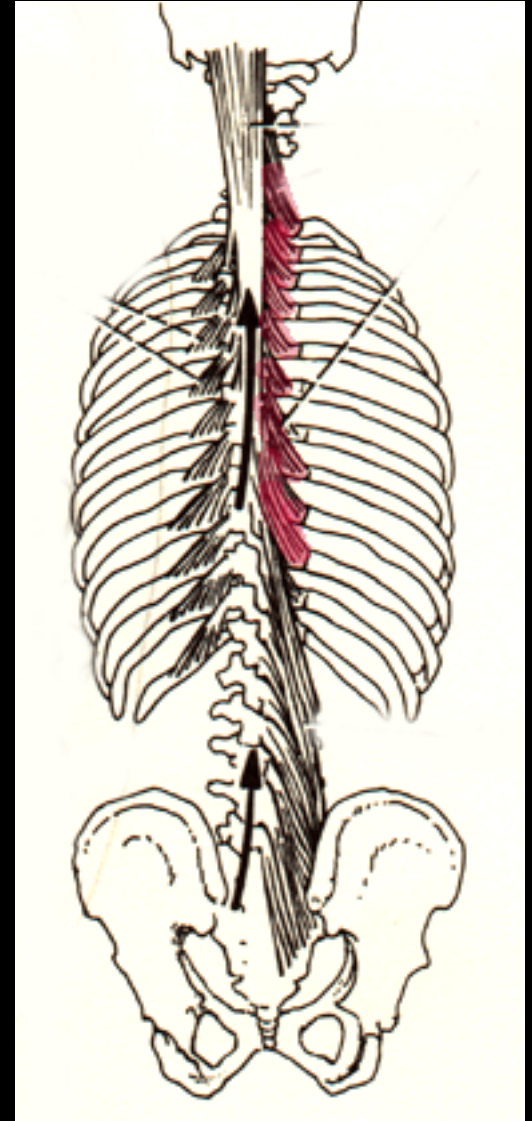


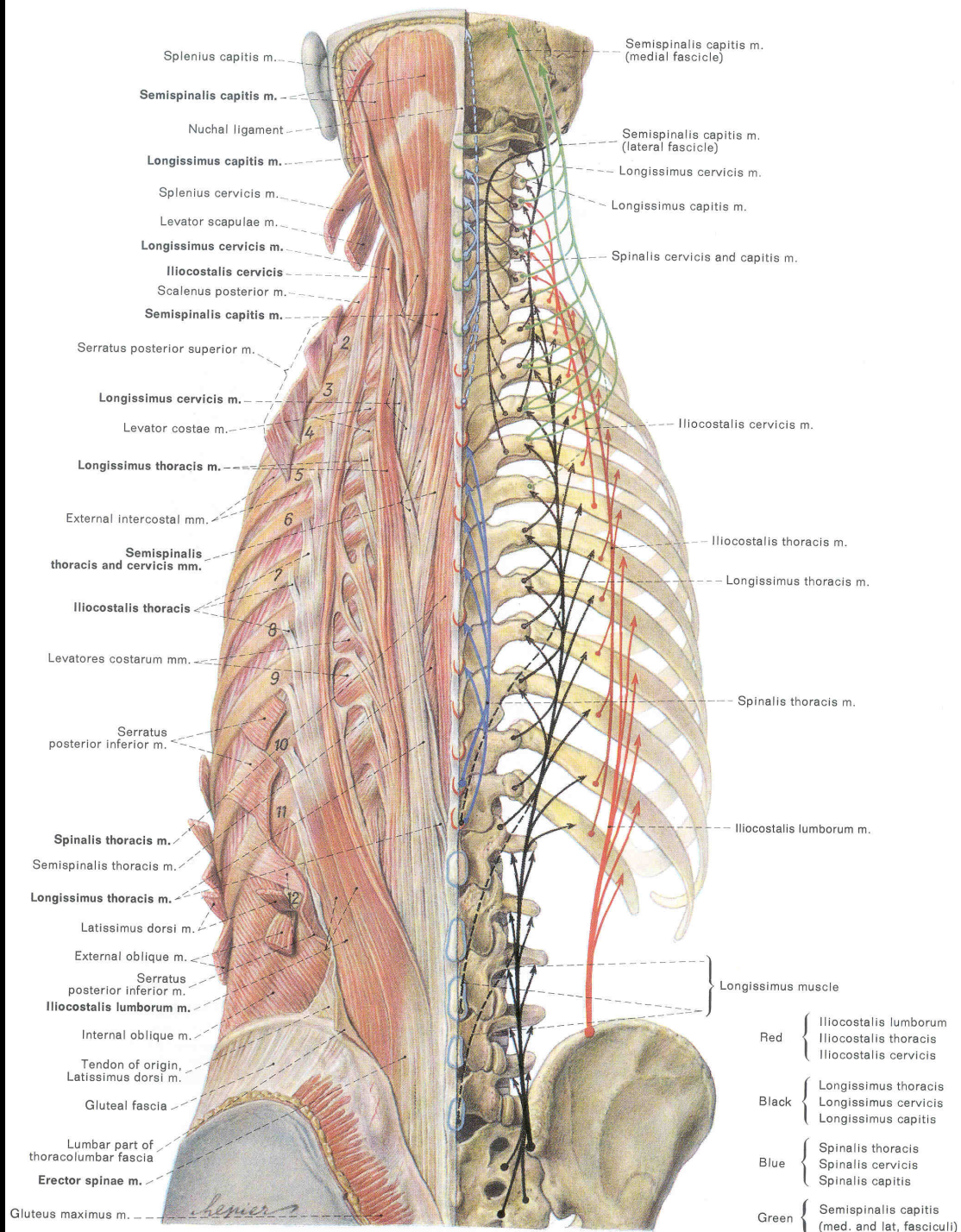
Intermediate Layer

Semispinalis

Origin = transverse
processes

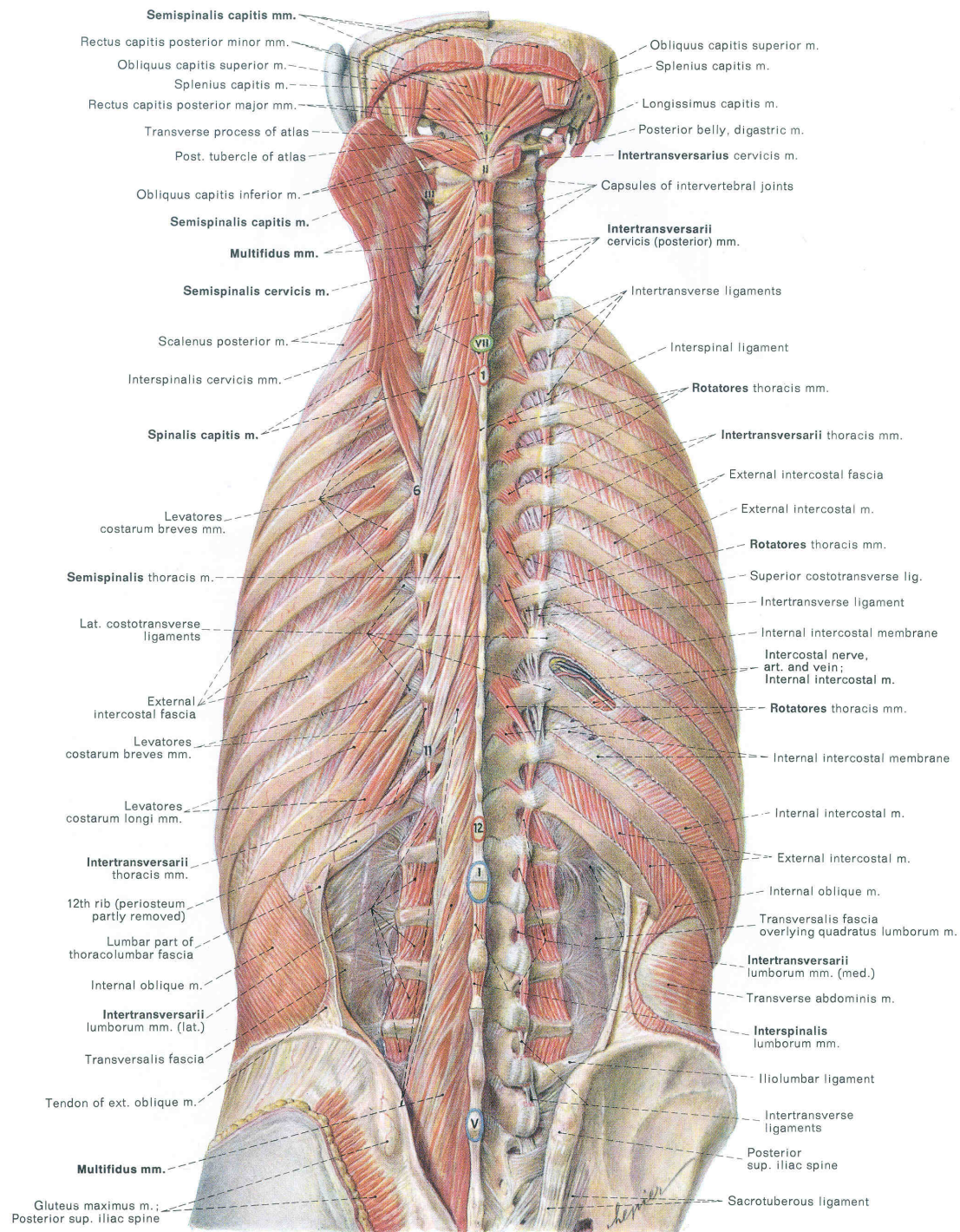
Insertion = spinous
processes

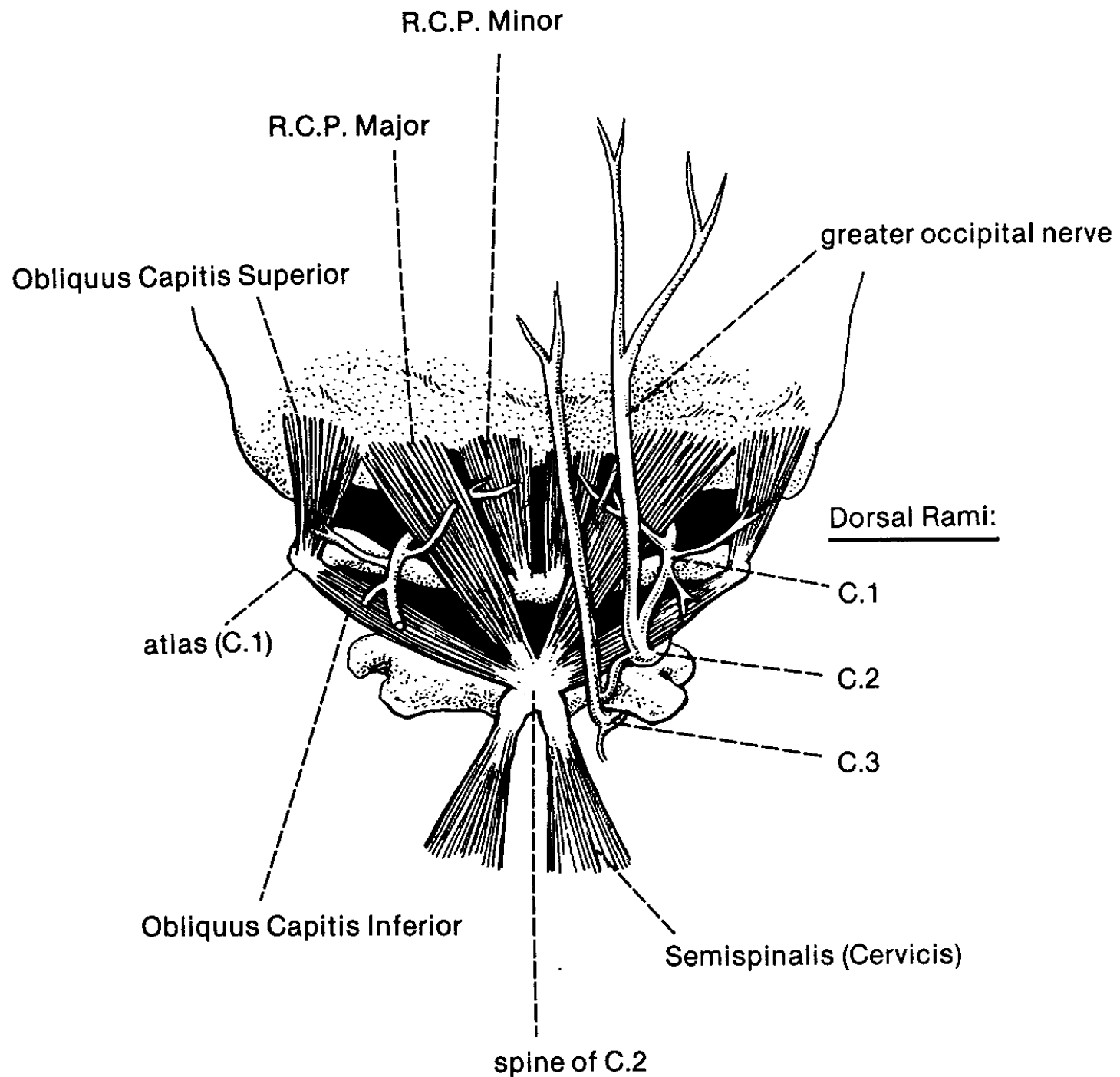




Deep Layer

Short slips of muscle, connecting adjacent vertebrae





Three Divisions

Body Wall

Limbs

Prevertebral

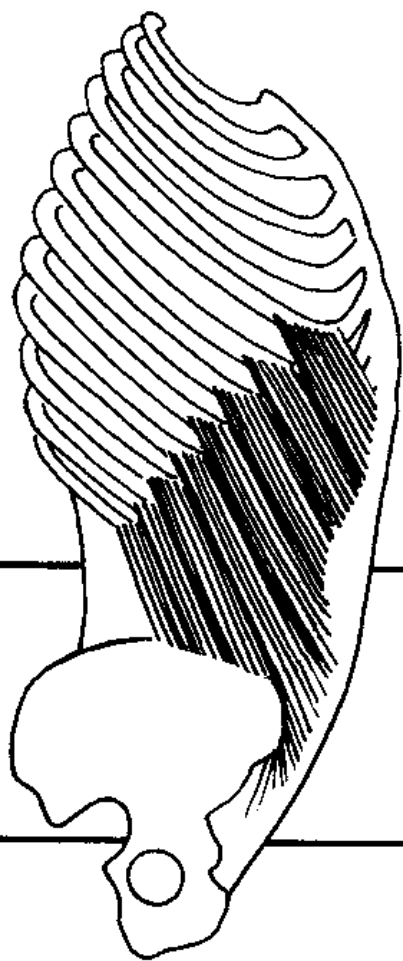
Subdivision of Body Wall Group

Abdominal

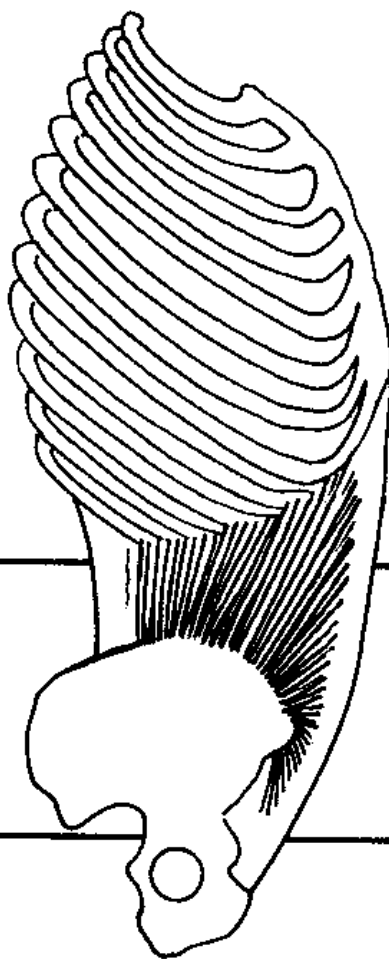
Thoracic

Perineal

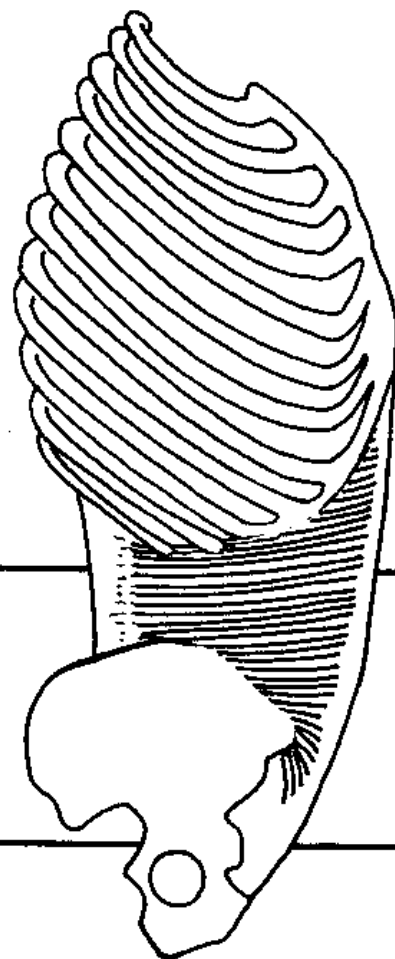
Neck



External Oblique



Internal Oblique



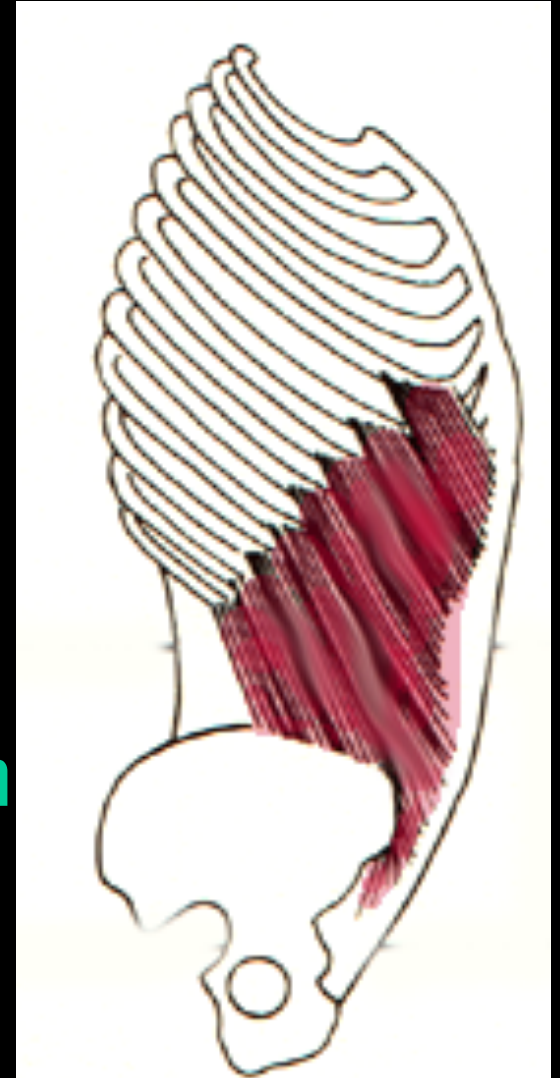
Transversus

Subdivision of the Abdominal Group

Superficial =
external Oblique

Origin: Lower 8 ribs

Insertion: top of rectus sheath



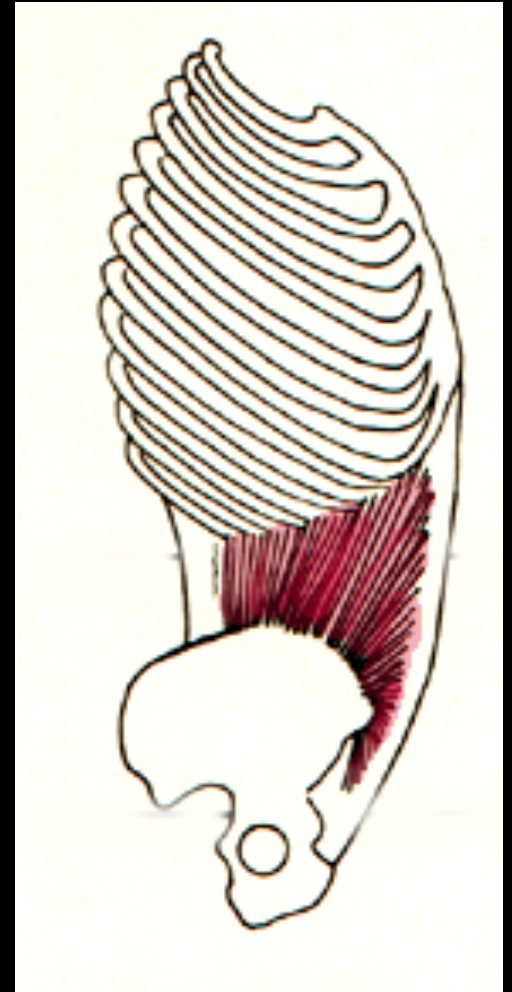
Subdivision of the Abdominal Group

Intermediate =

Internal Oblique

Origin: Iliac crest

Insertion: Rectus sheath

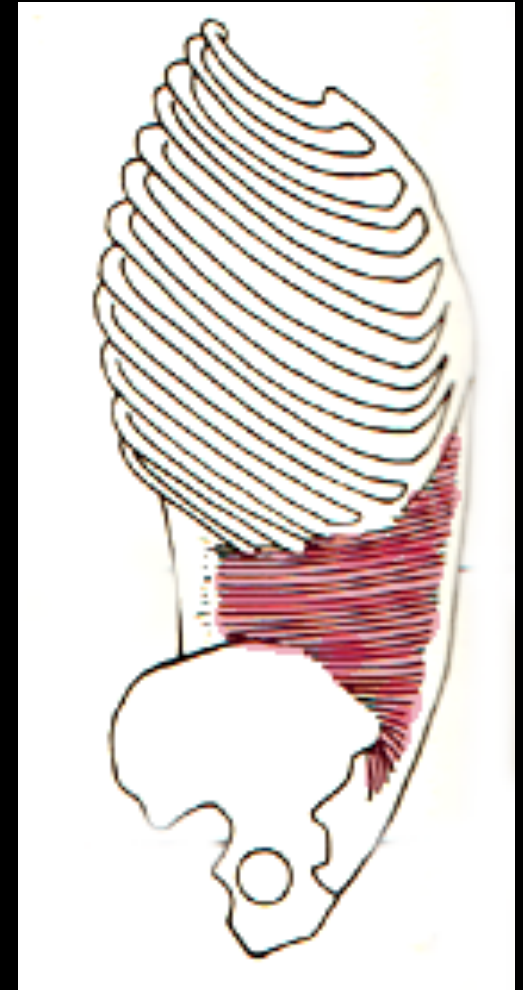


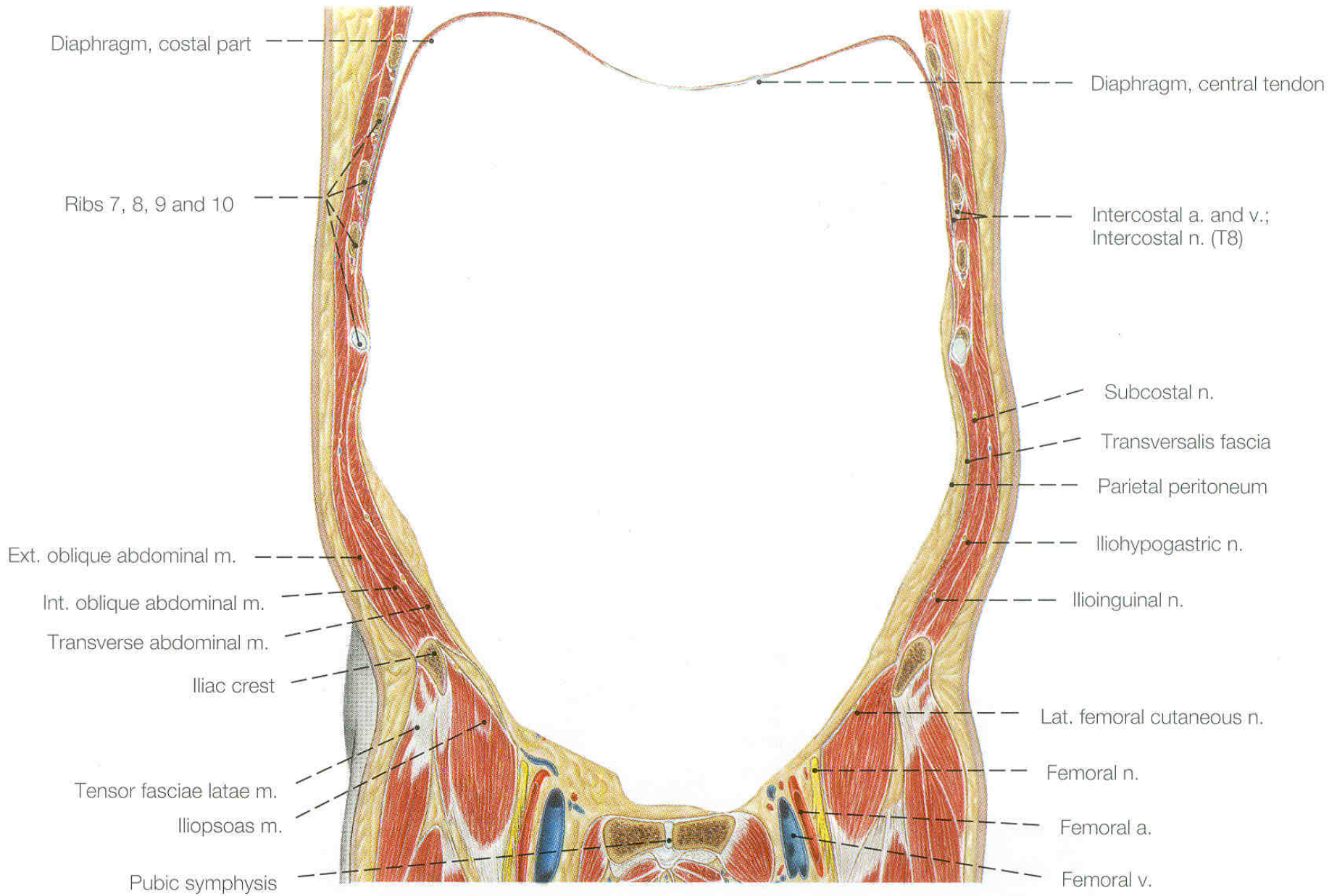
Subdivision of the Abdominal Group

Deep = Transversus

**Origin: Thoracolumbar
fascia**

**Insertion: Sheath below
abdominus rectus**





Subdivision of the Thoracic Group

External intercostal

Internal Intercostal

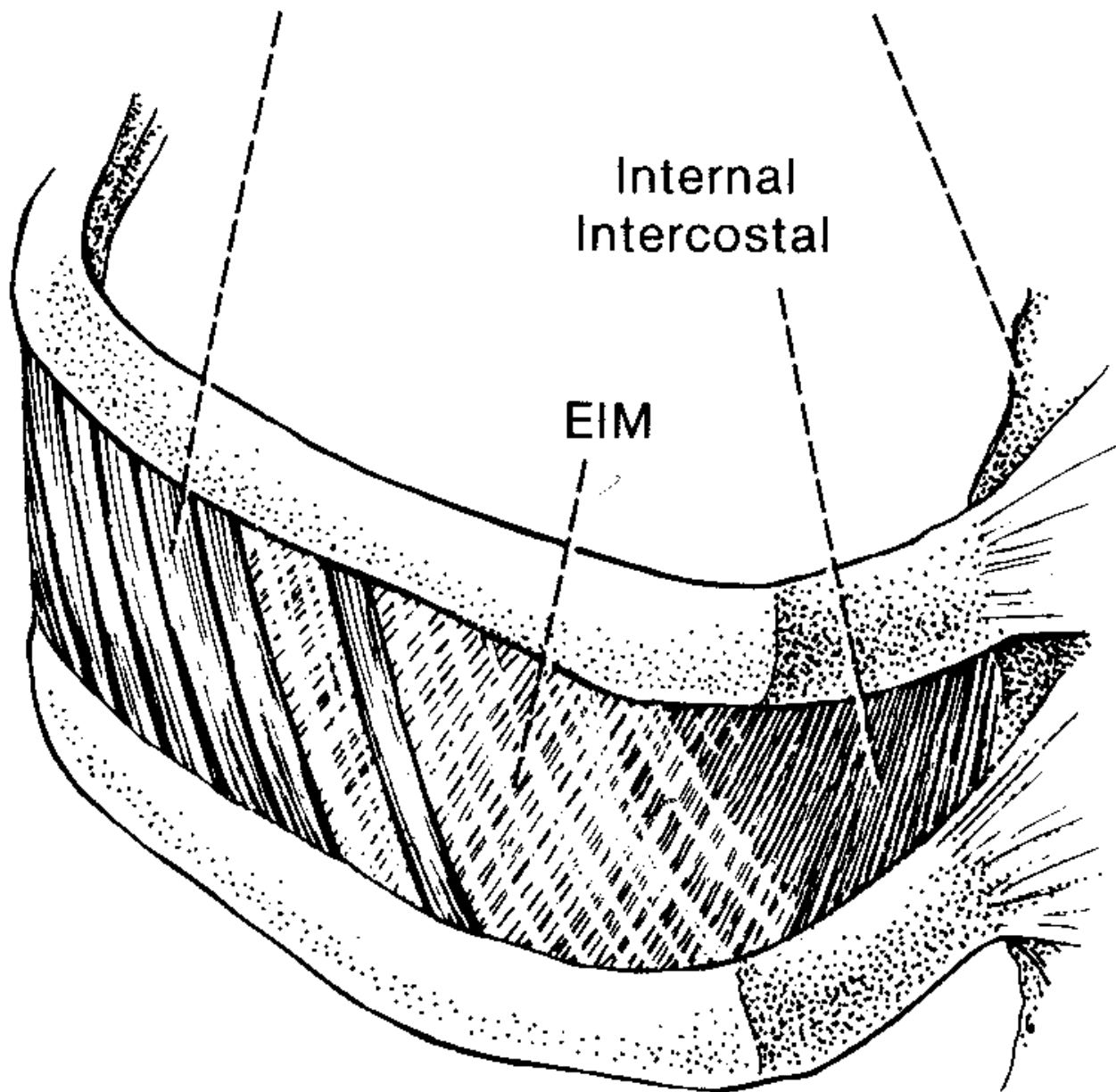
Transversus thoracis

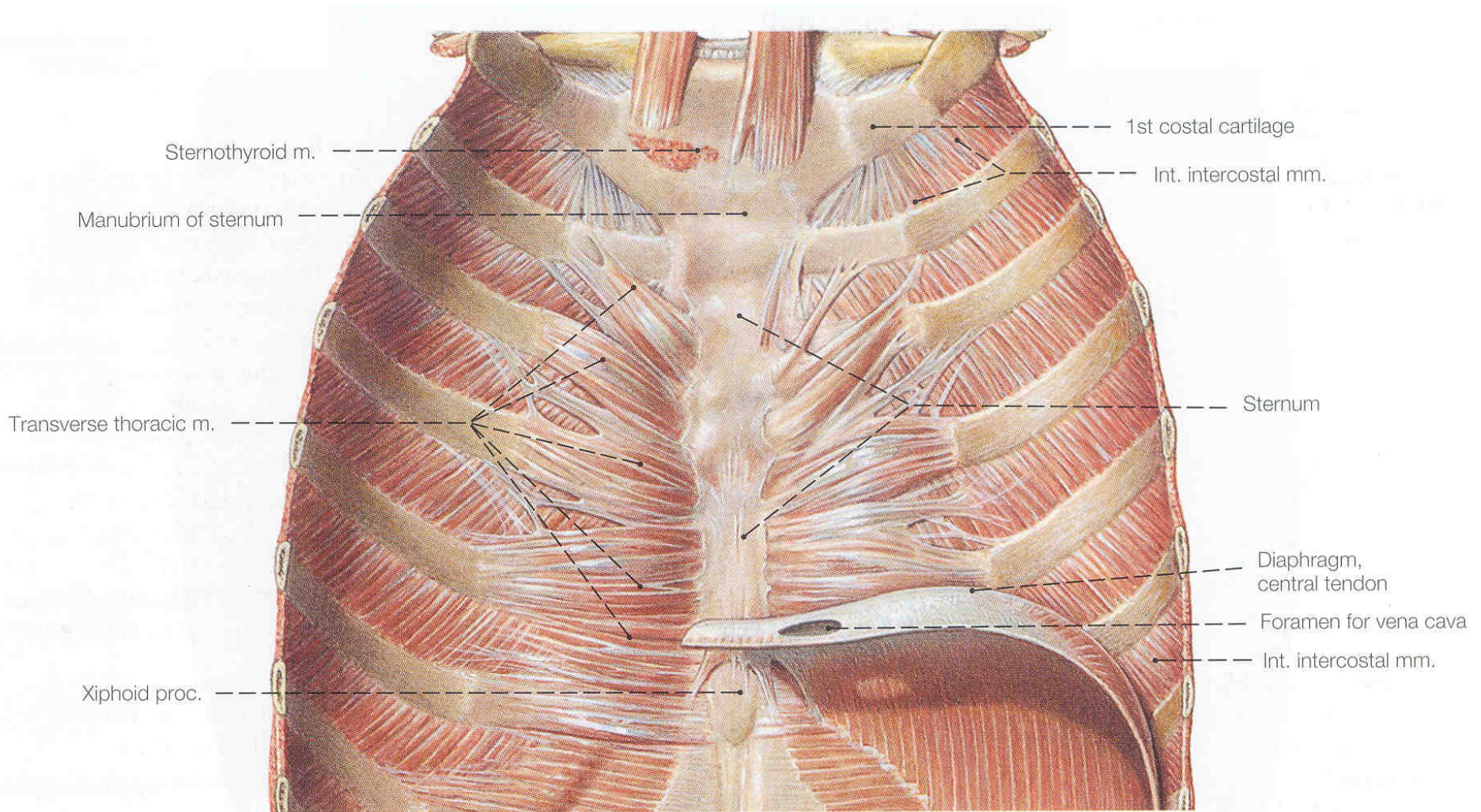
External Intercostal

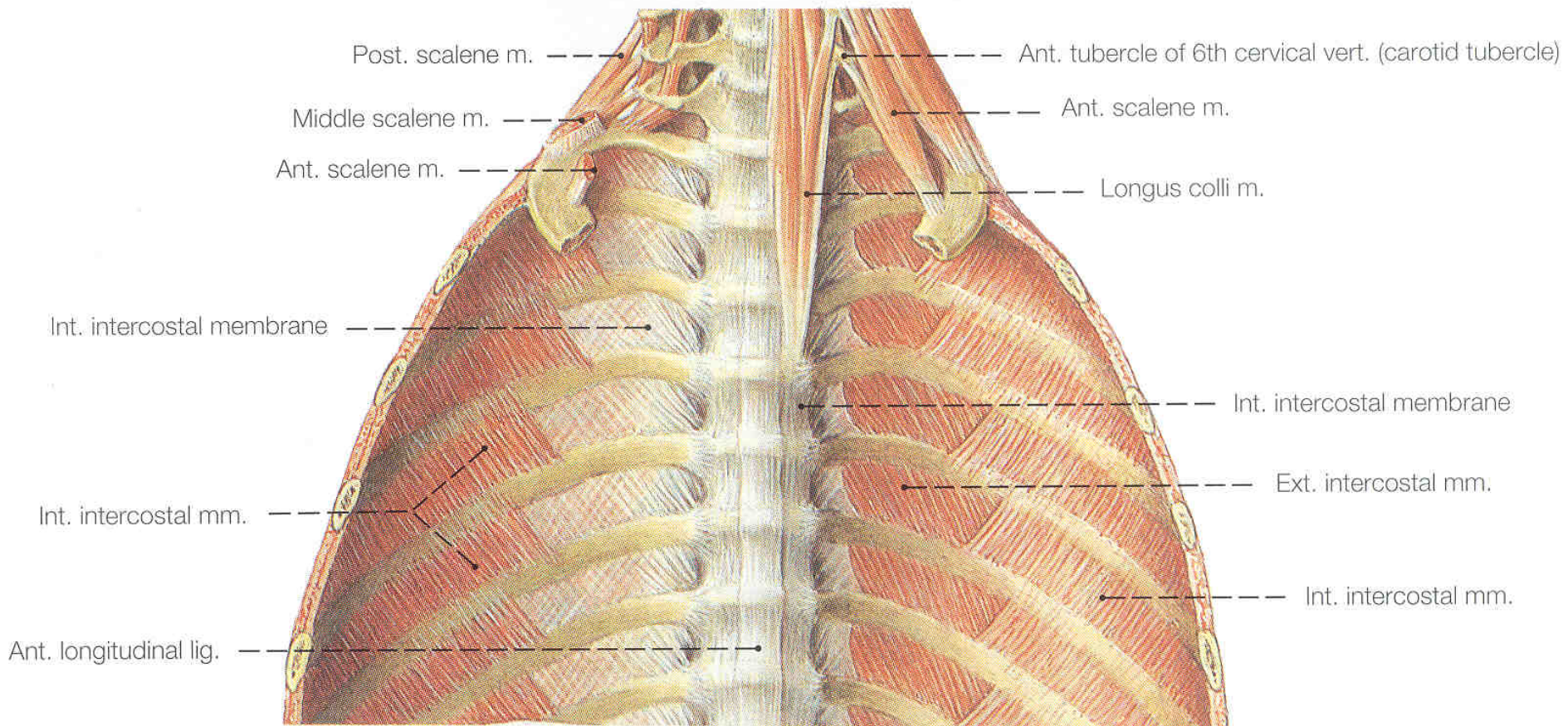
sternum

Internal
Intercostal

EIM







Subdivision of the Perineal Group

Superficial =

Urogenital/anal

-external anal

sphincter

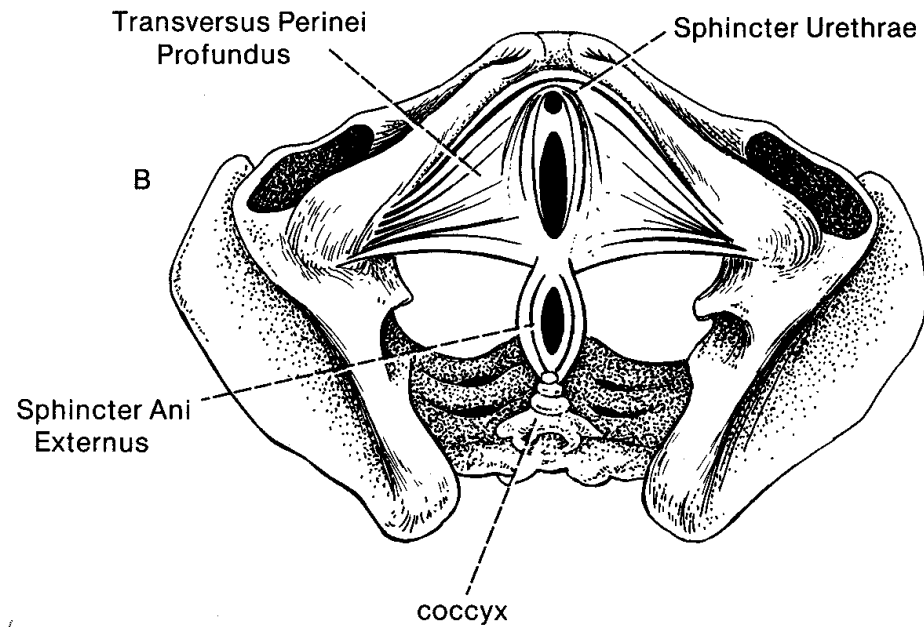
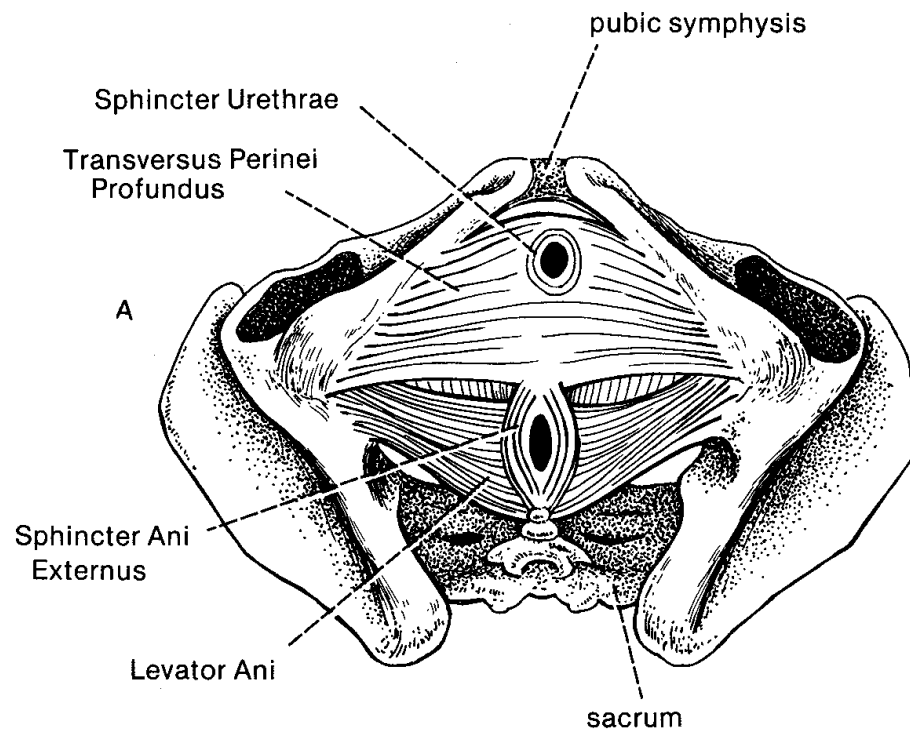
Subdivision of the Perineal Group

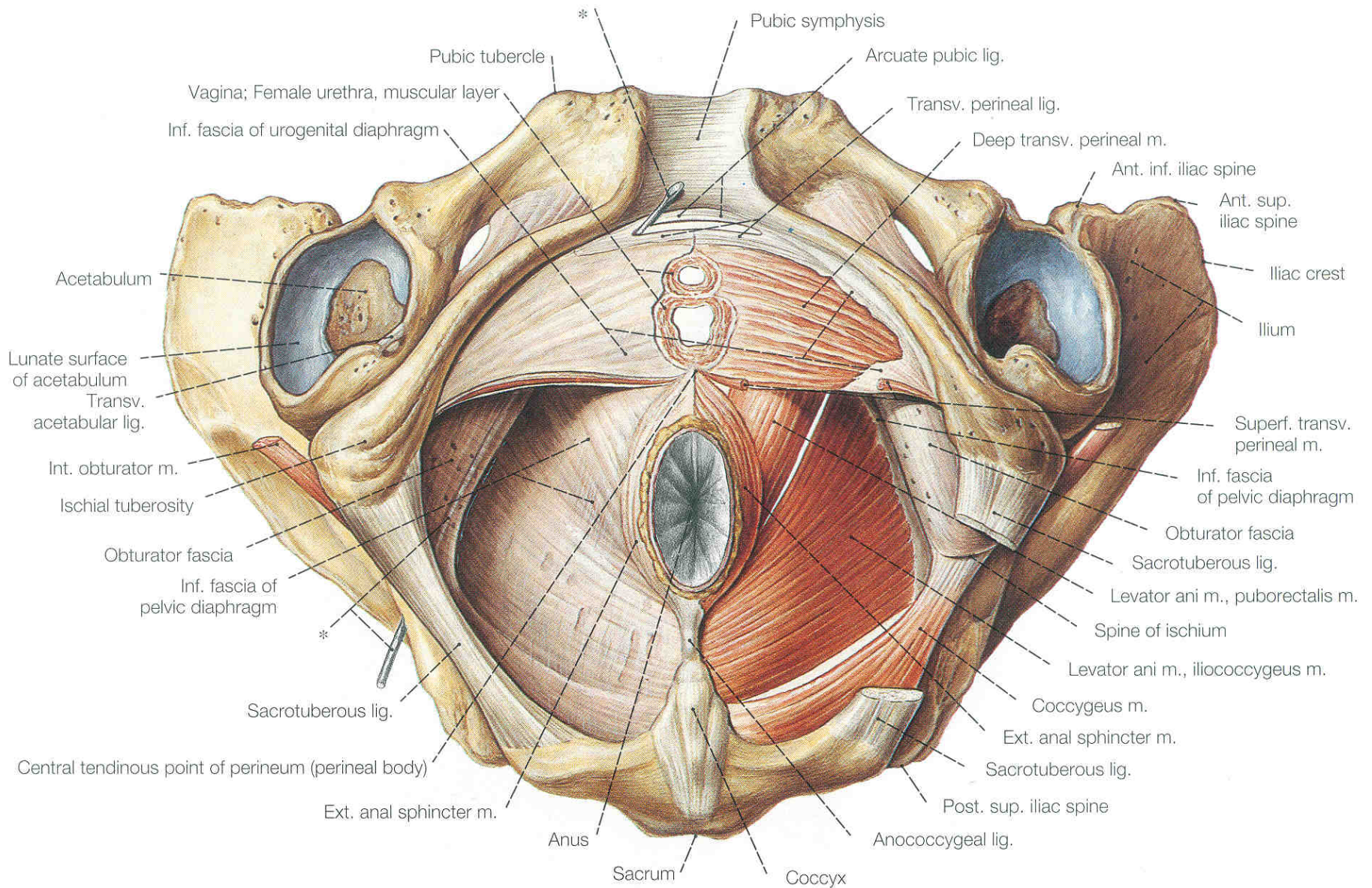
Intermediate = Pelvic Diaphragm:

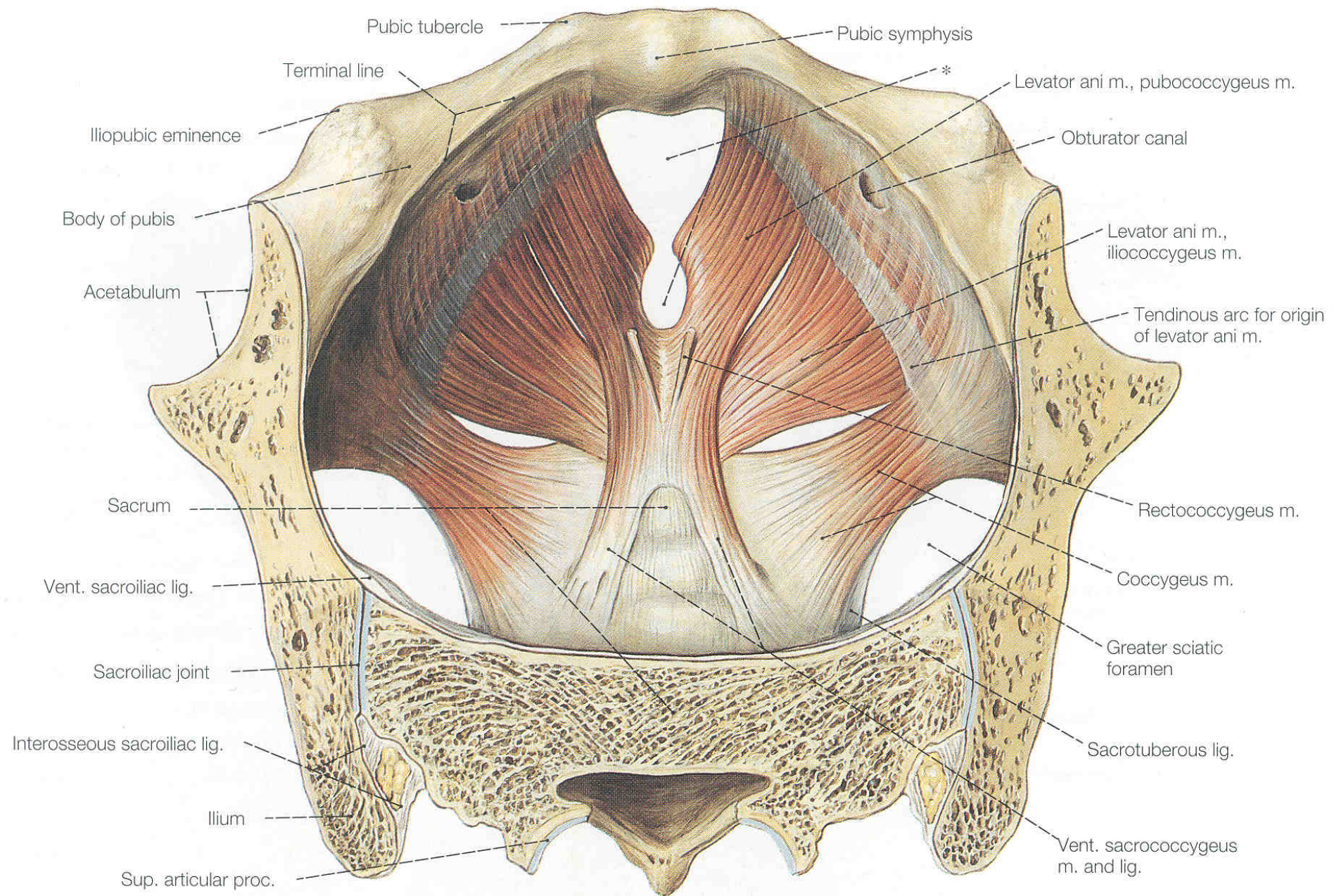
- Coccygeus
- Levator ani

Subdivision of the Perineal Group

Deep = Transversalis Fascia







Subdivision of the Neck Region

**Diaphragm ripped out early in
development**

Scalenes are what are left.

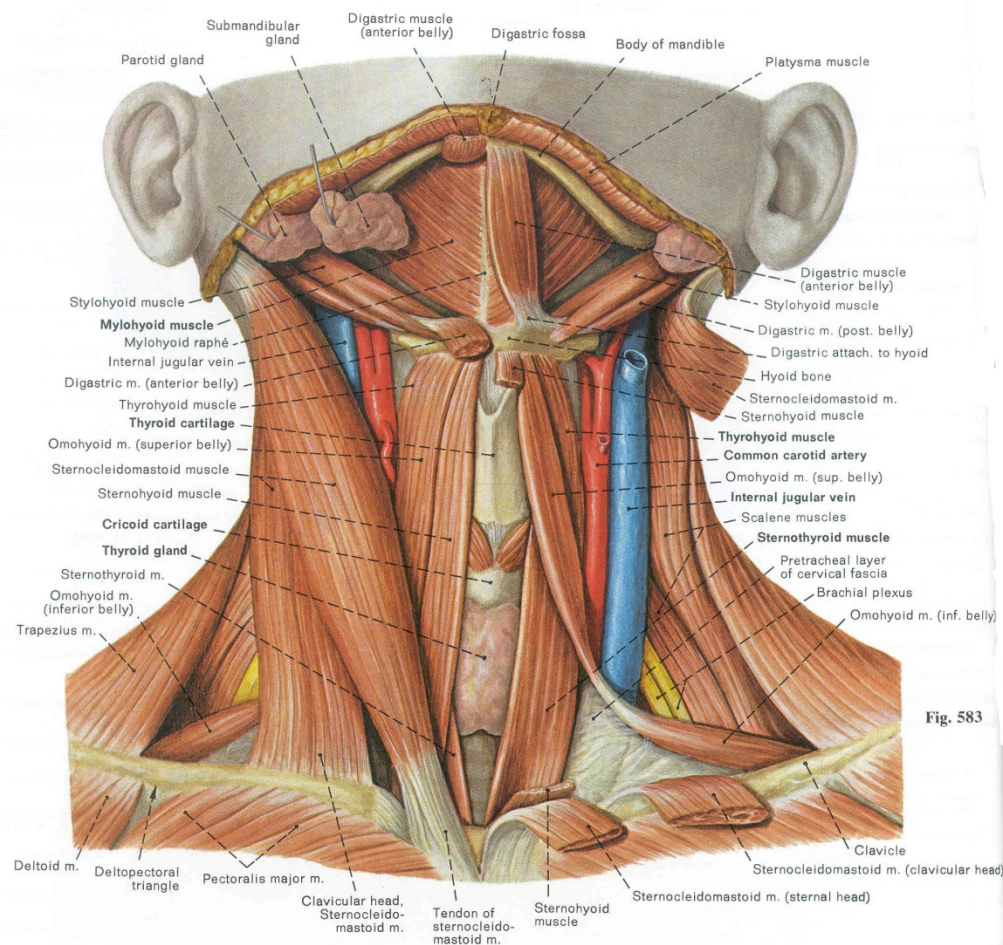
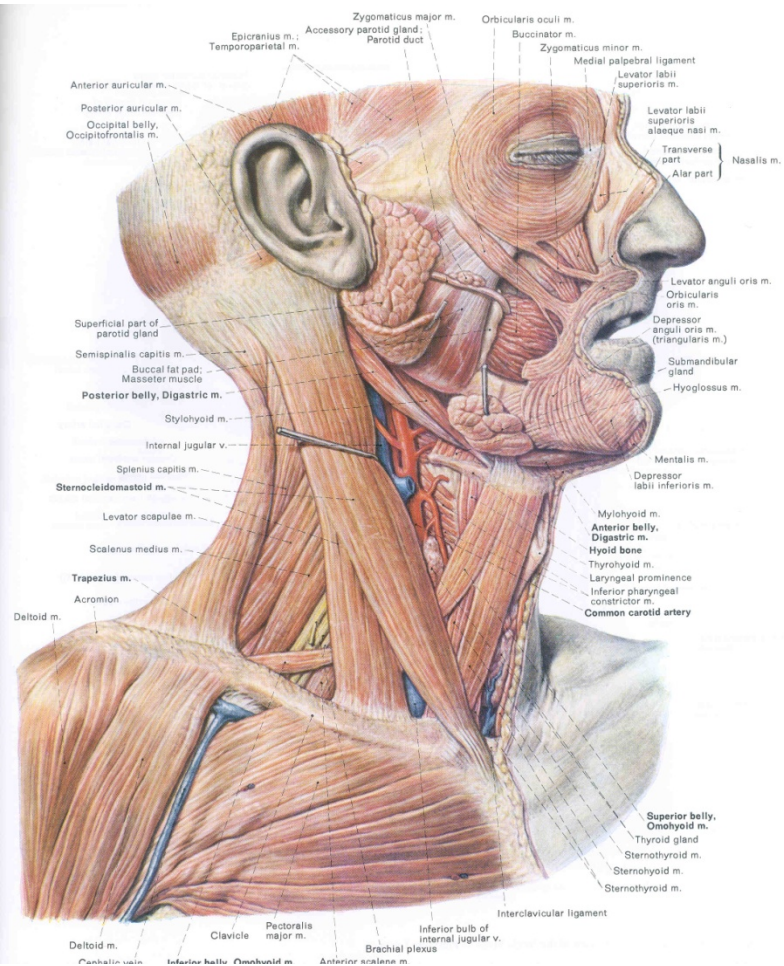
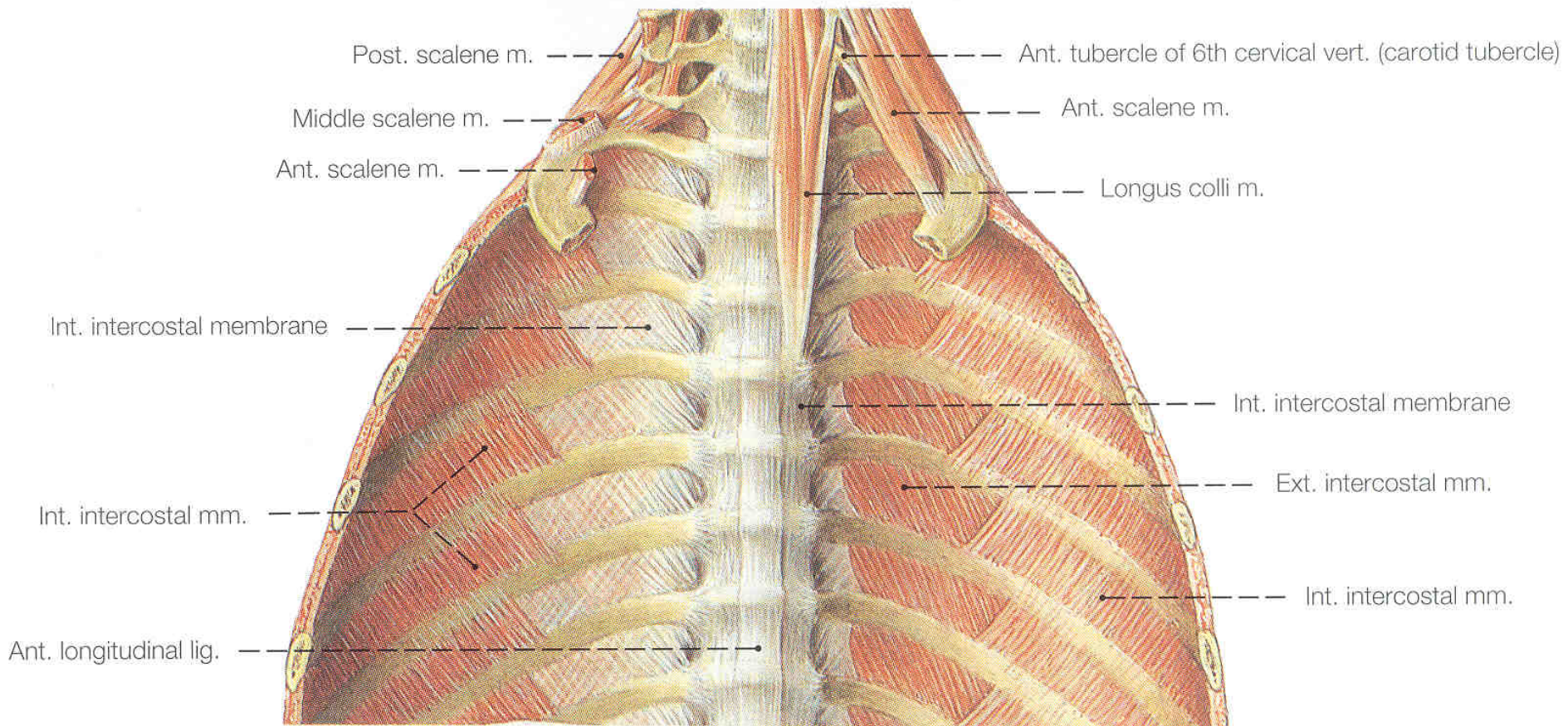
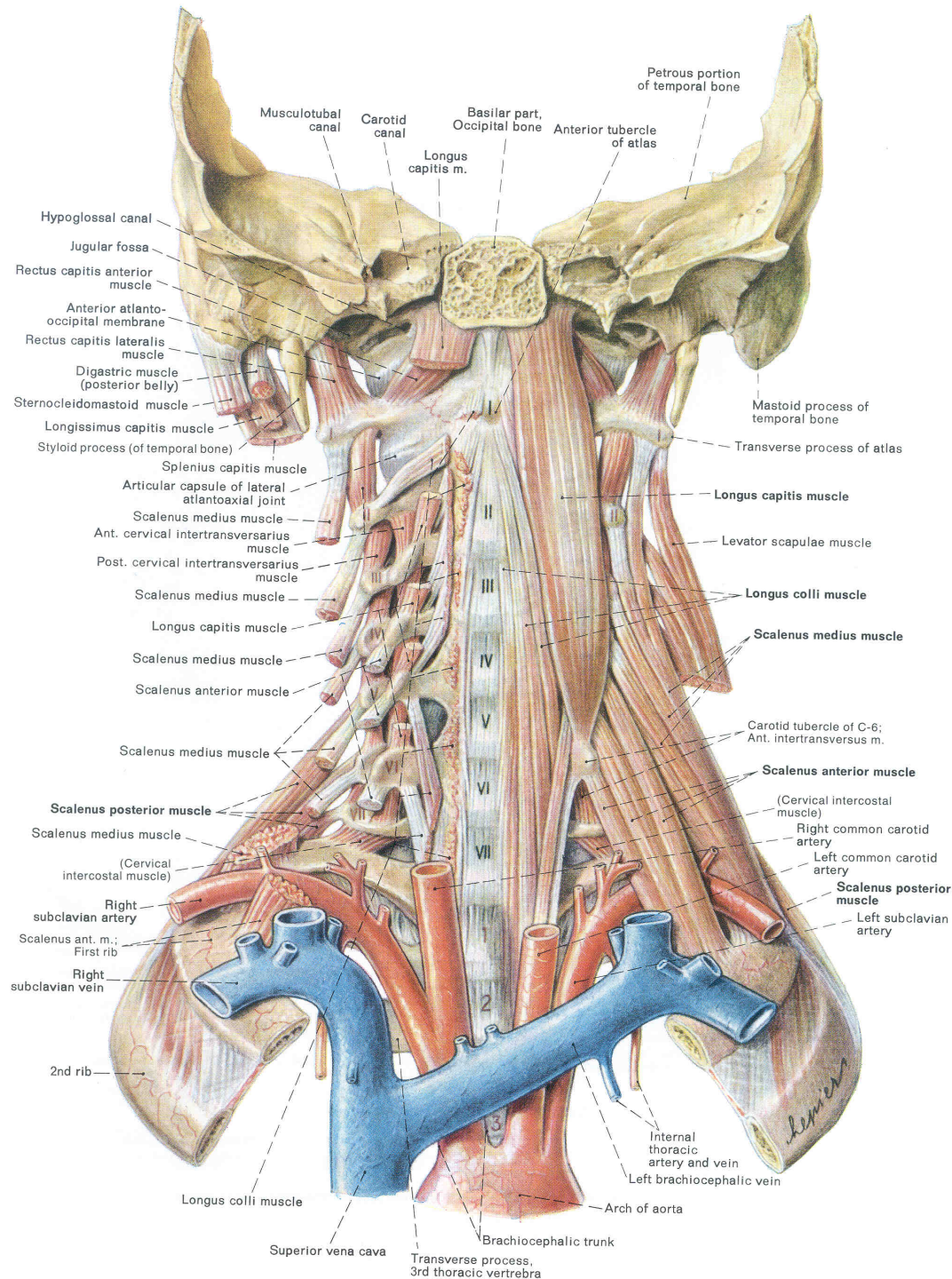


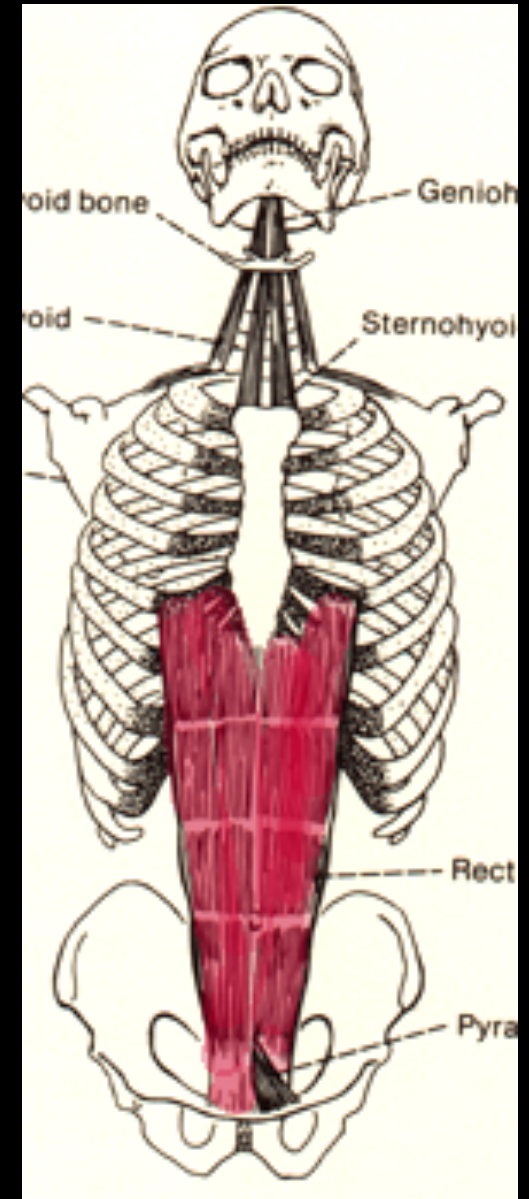
Fig. 583

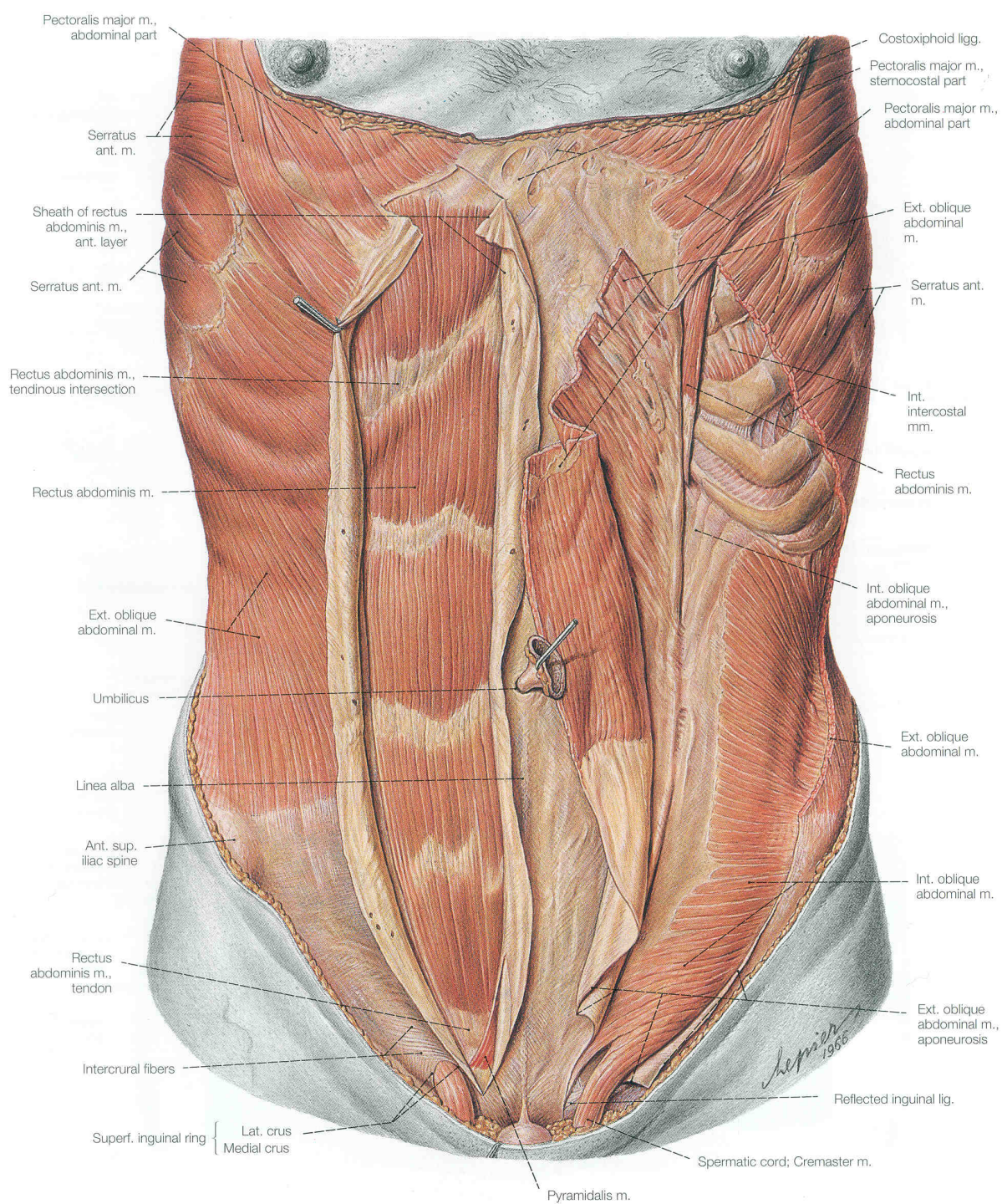




Strap muscles

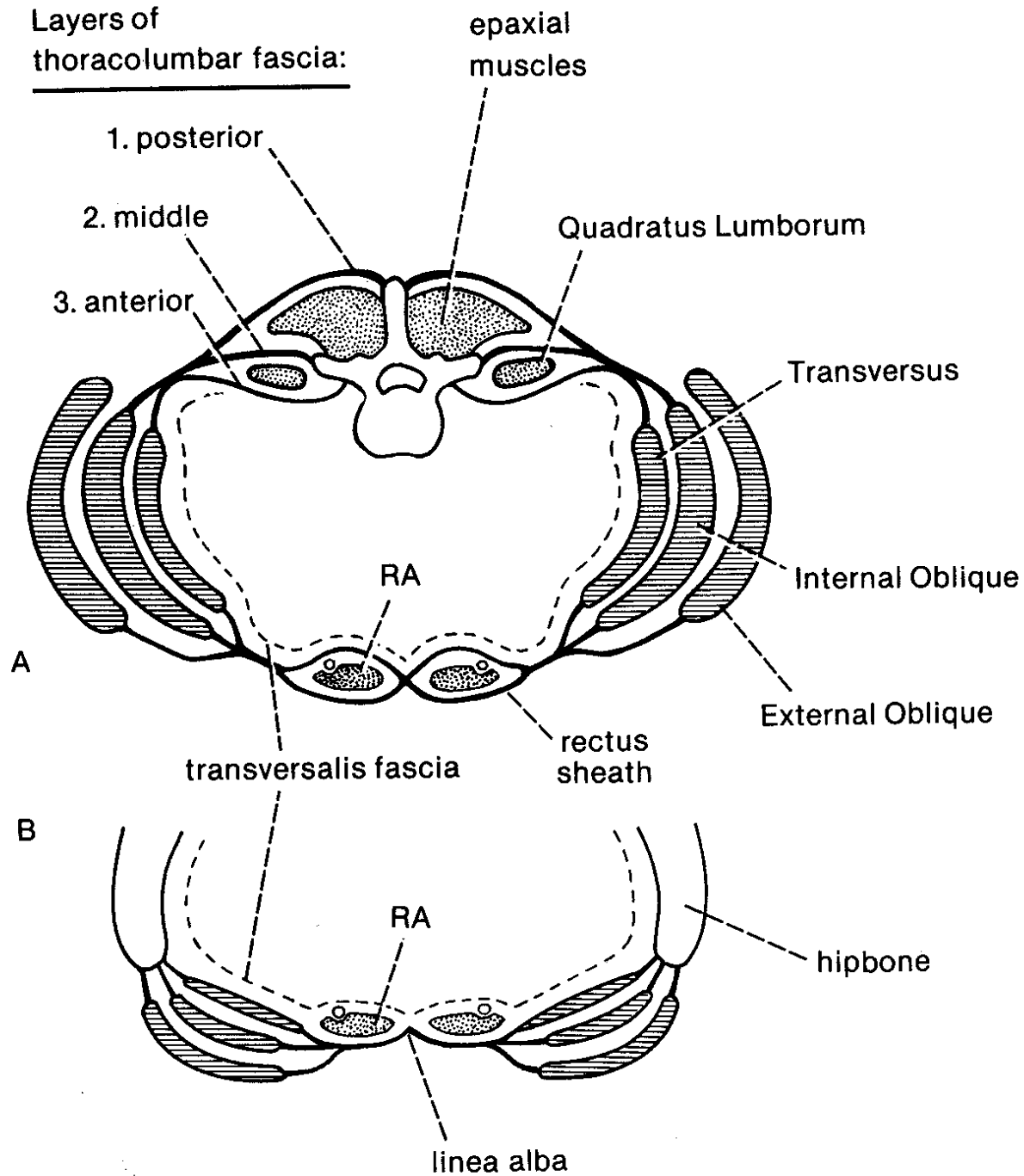
Rectus Abdominus

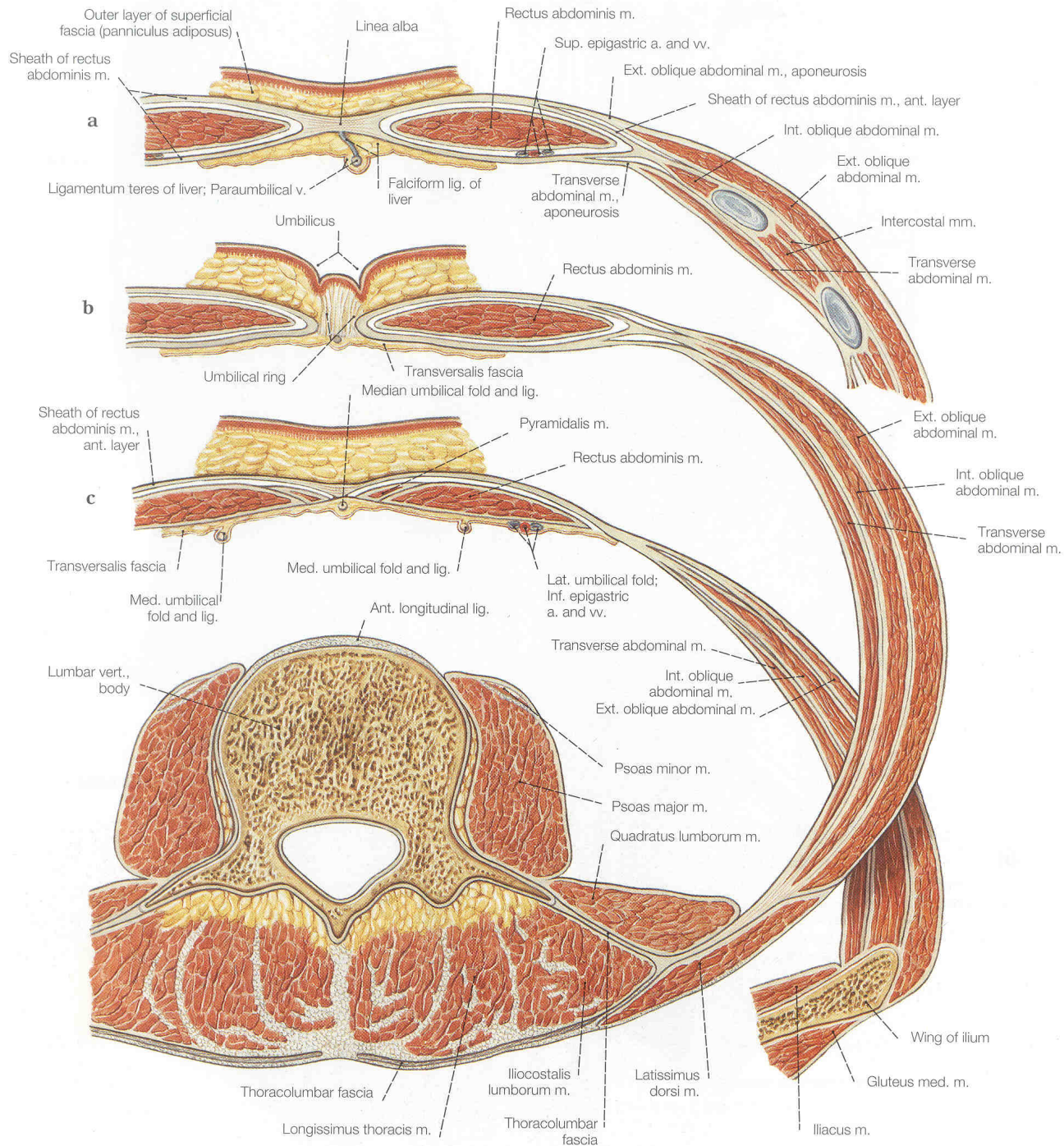


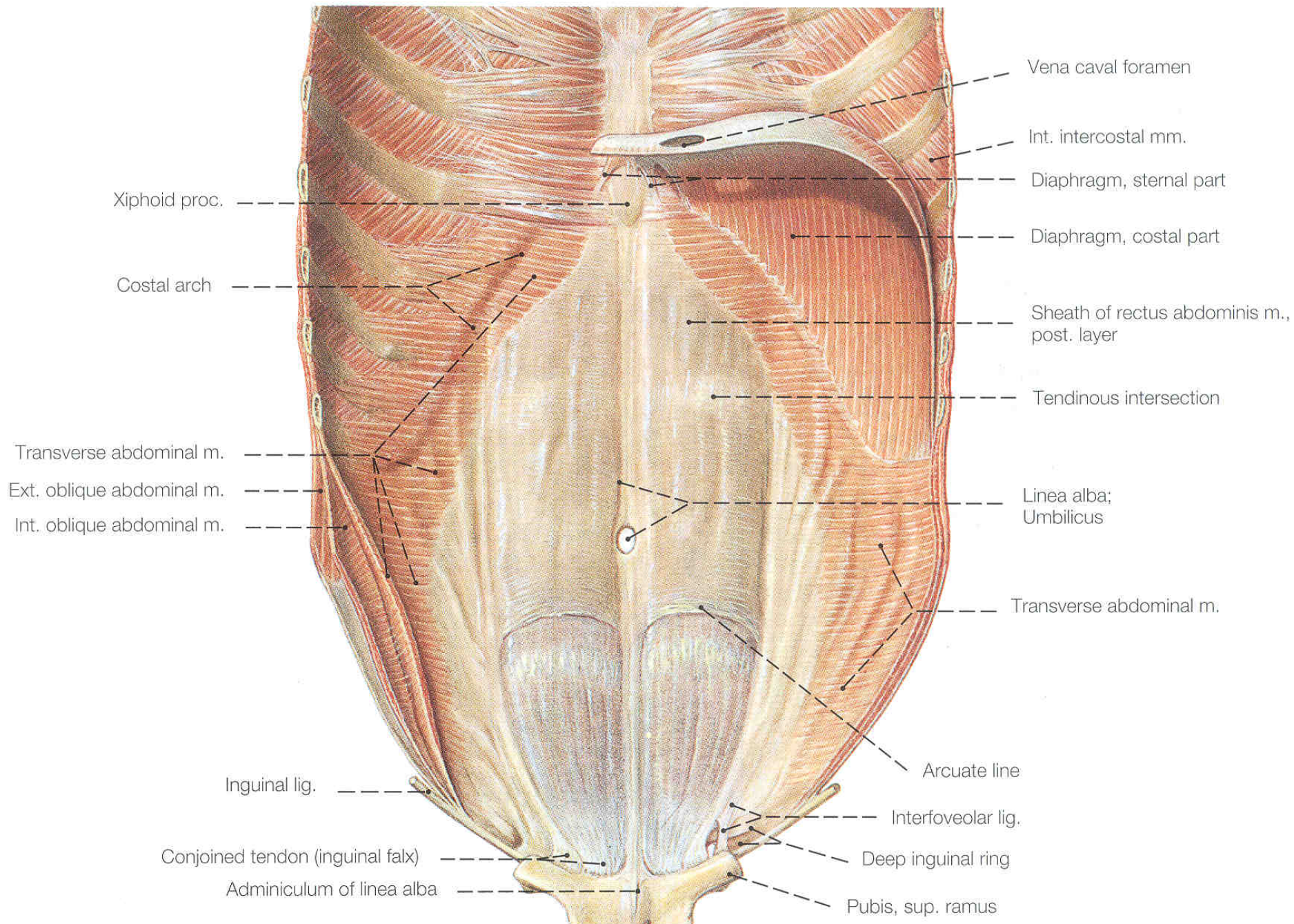




Layers of
thoracolumbar fascia:







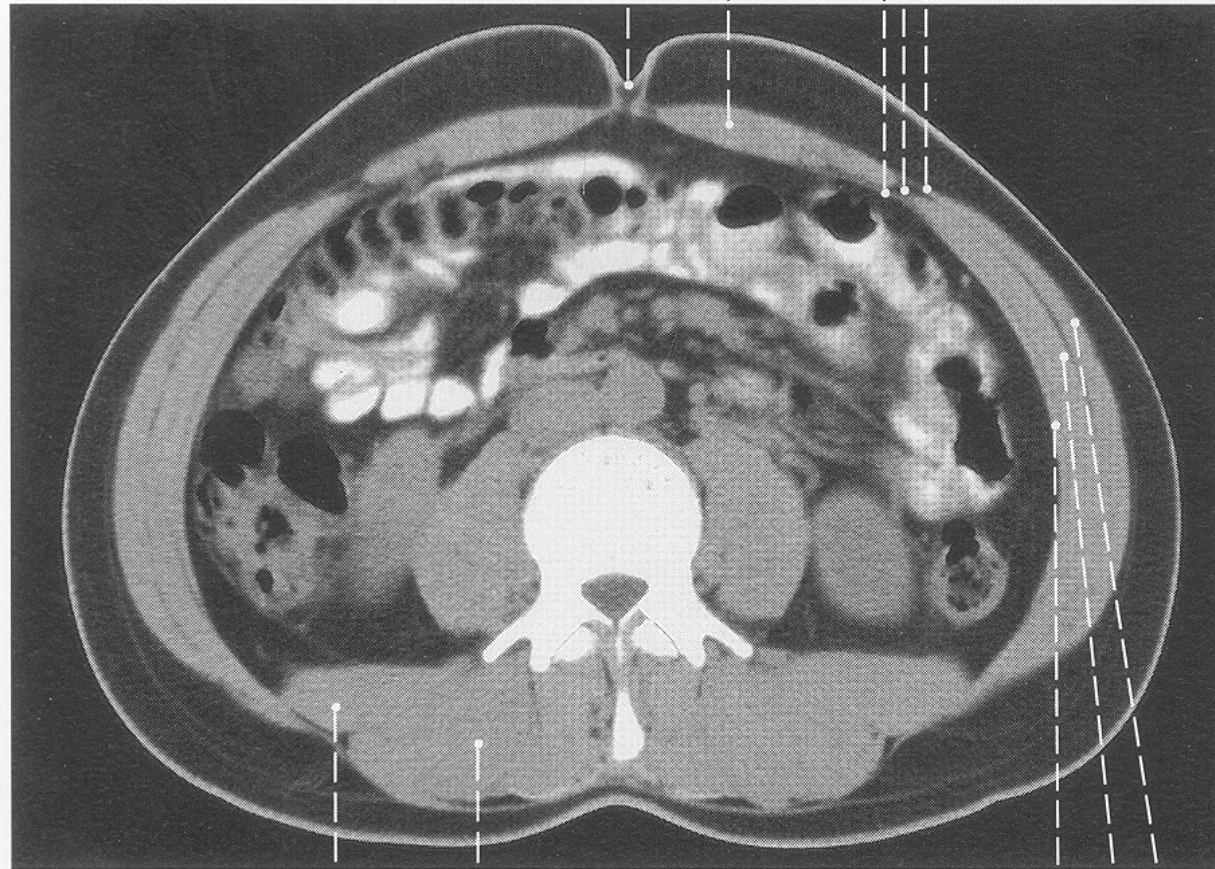
Ext. oblique abdominal m., aponeurosis

Int. oblique abdominal m., aponeurosis

Transverse abdominal m., aponeurosis

Rectus abdominis m.

Umbilicus



a

Quadratus
lumborum m.

Erector spinae m.

Transverse abdominal m.

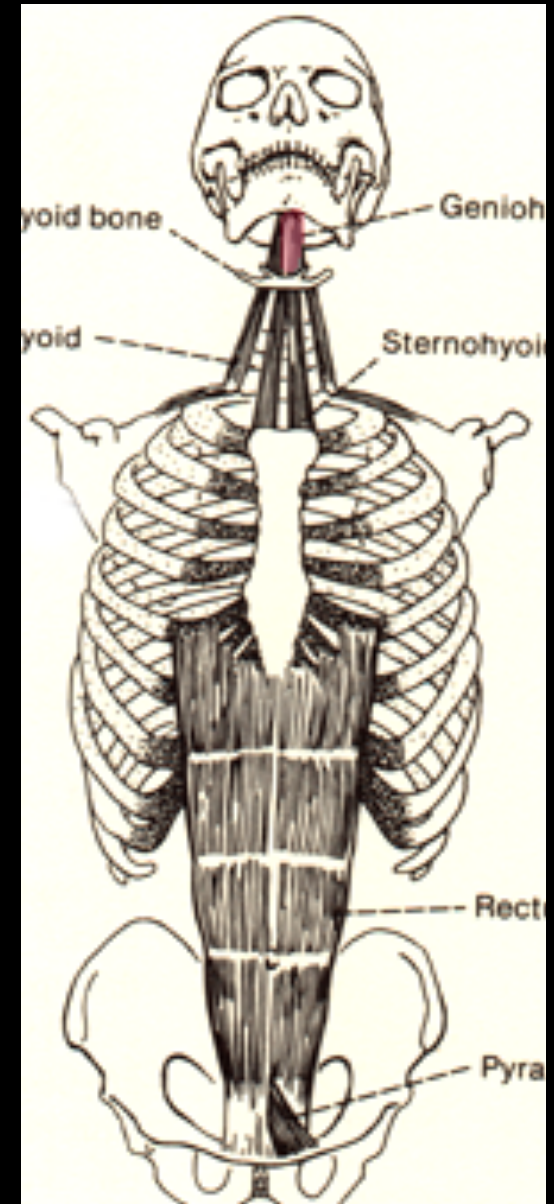
Int. oblique abdominal m.

Ext. oblique abdominal m.

Strap muscles

Rectus Series

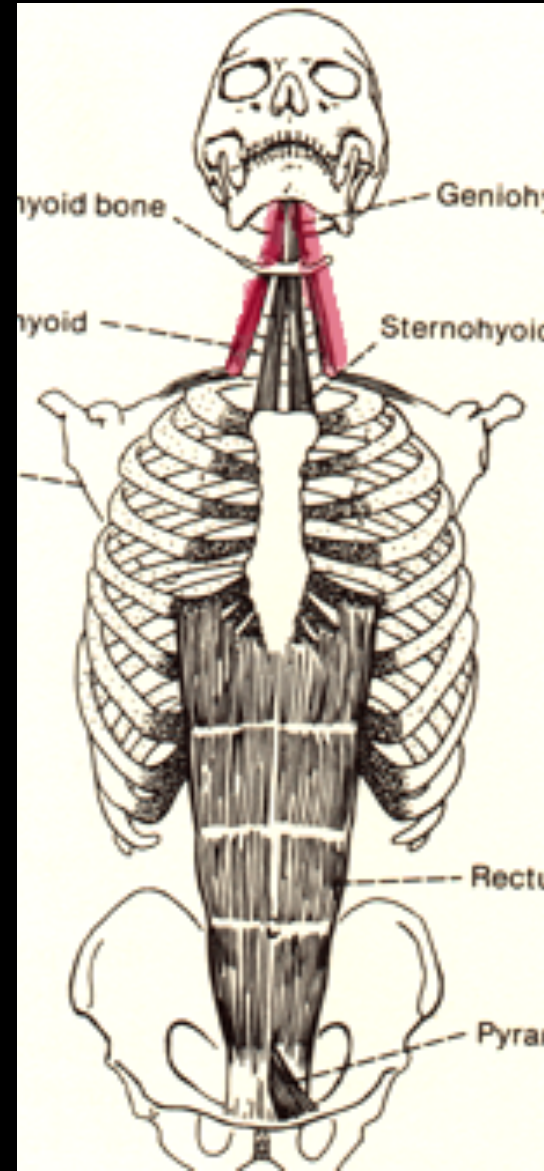
Geniohyoid



Strap muscles

Rectus Series

Omohyoid

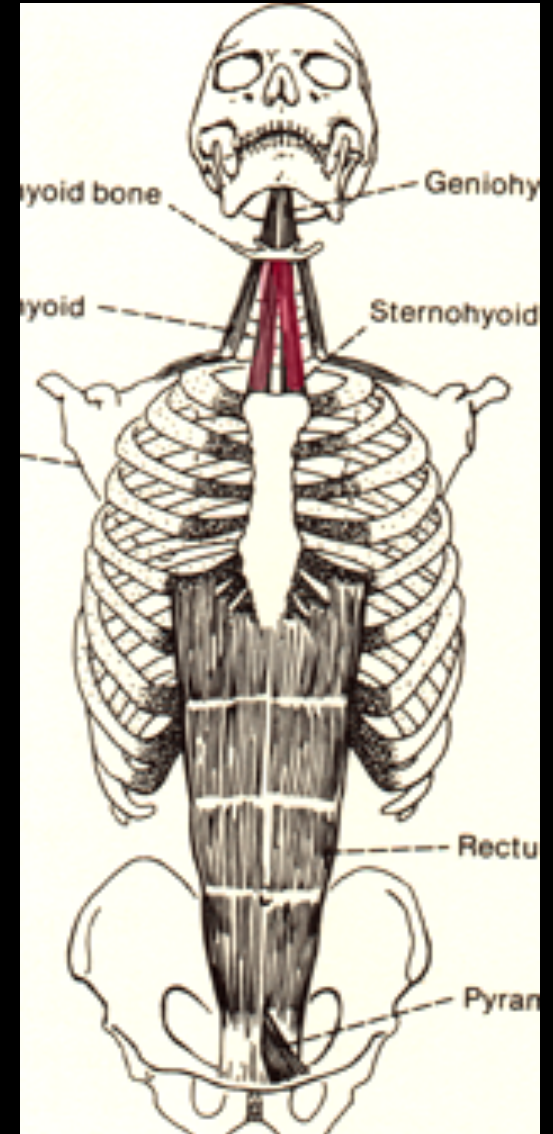


Strap muscles

Rectus Series

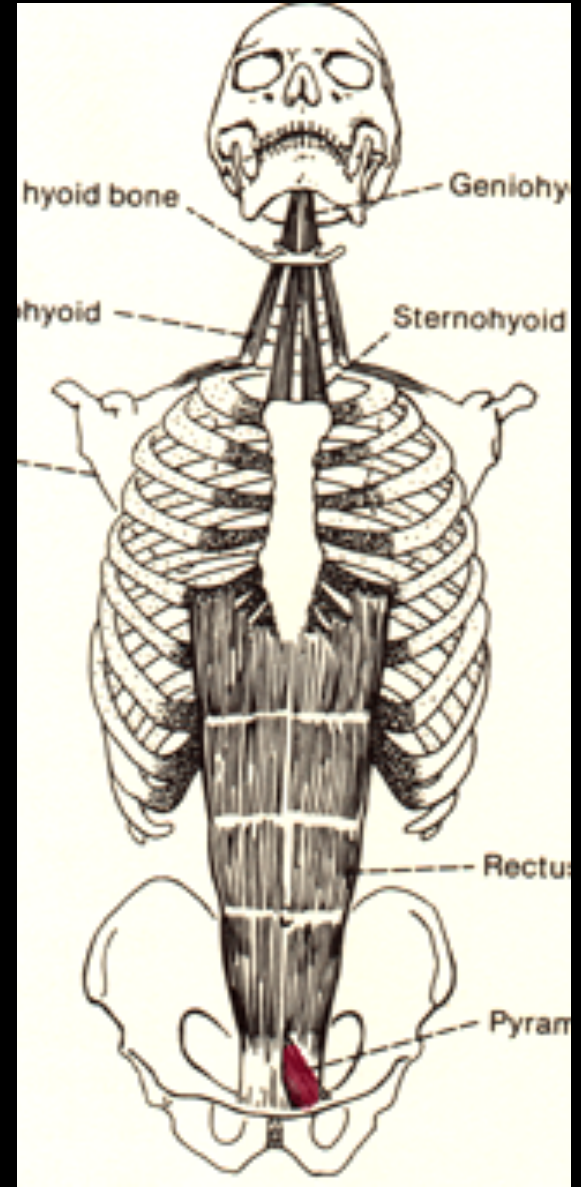
Sternohyoid

Sternothyroid



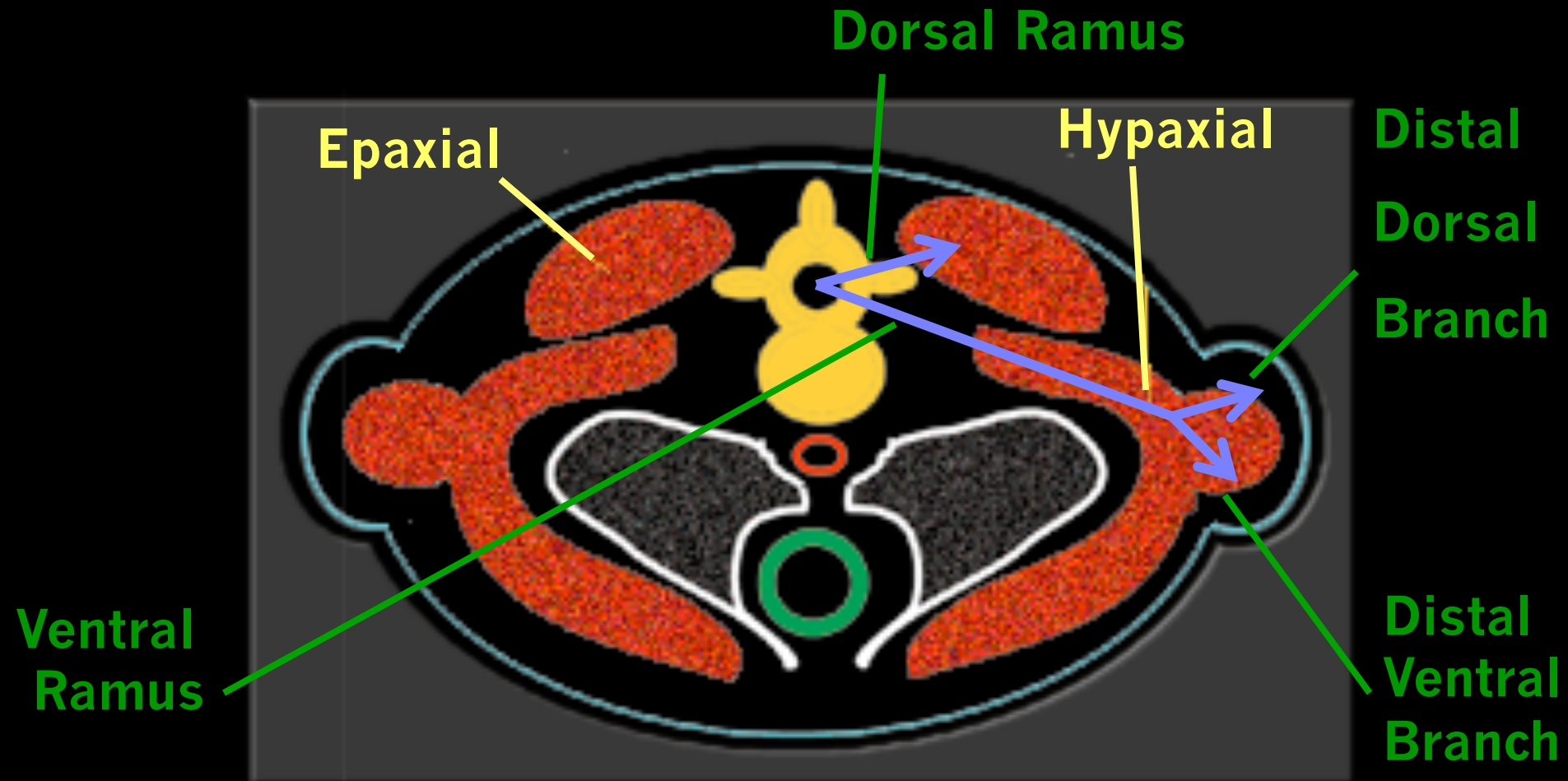
Strap muscles

Pyramidalis

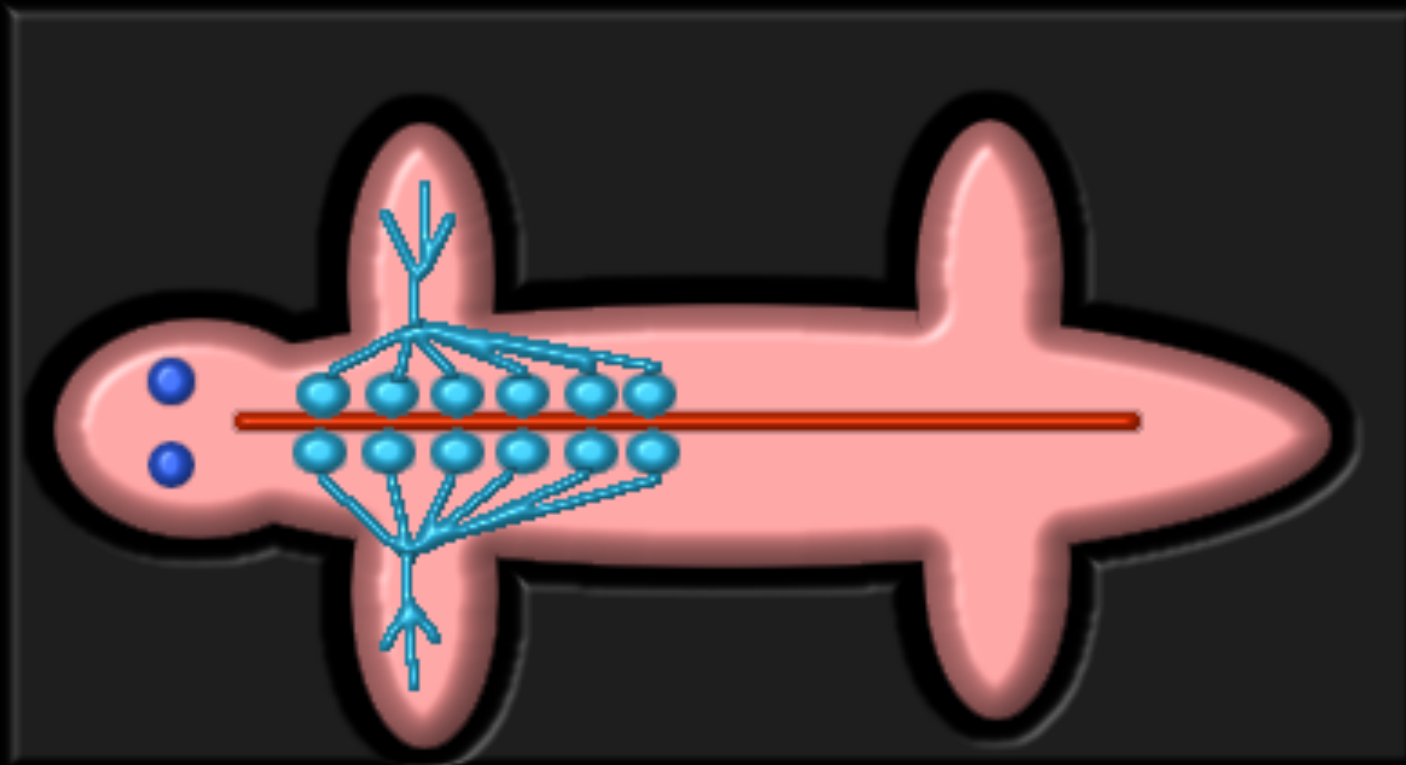


Appendicular Musculature

Innervation:



**Each limb receives more than 1 nerve:
Usually about 6**

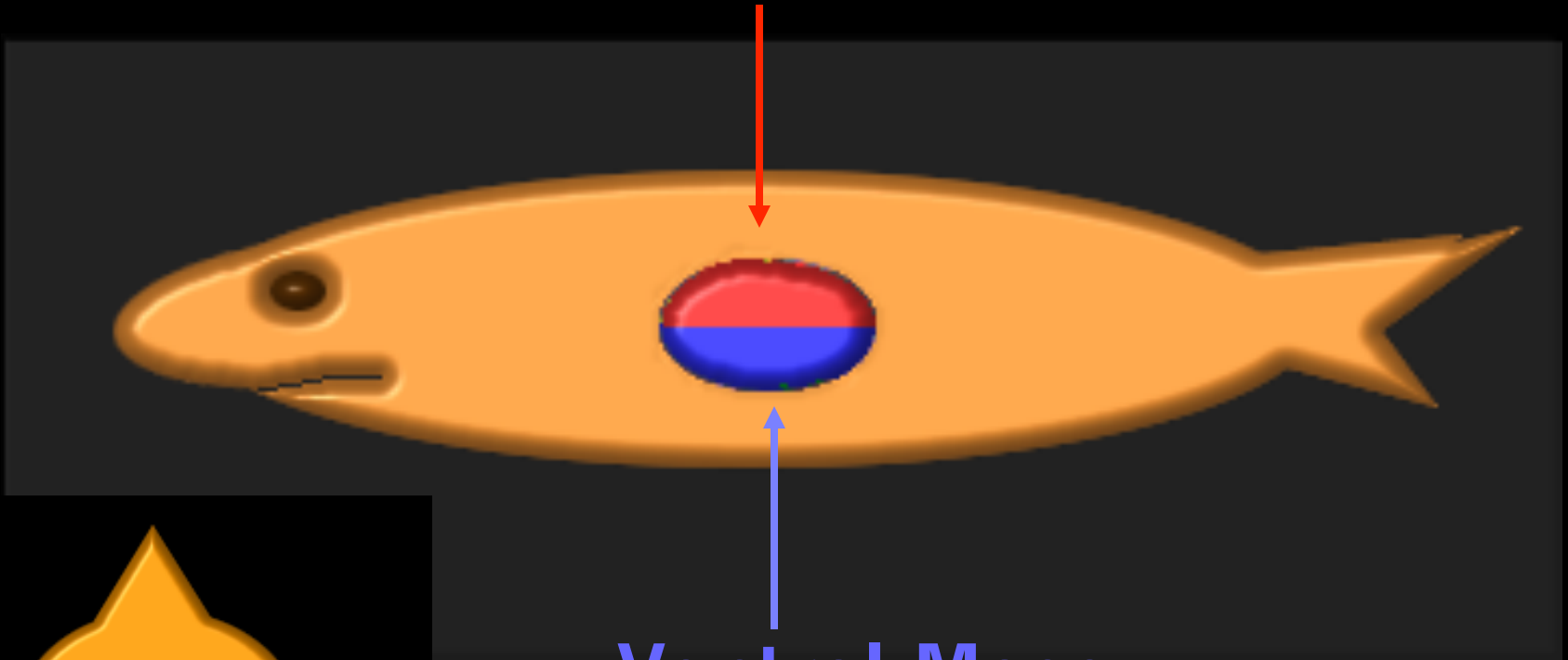


Posterior branches extend more distally



Limb Quadrants

Dorsal Mass
elevates (extends) limb



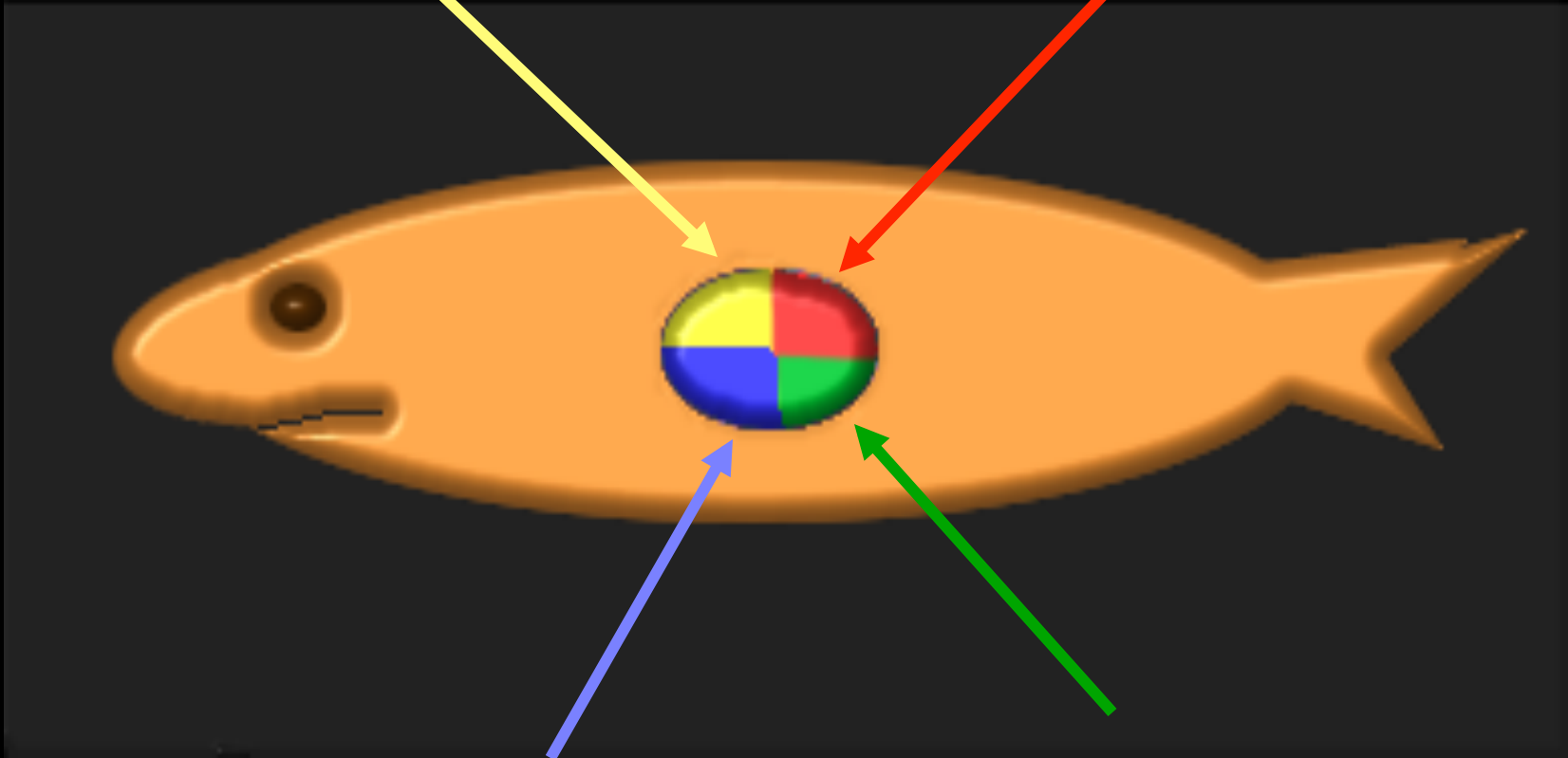
Ventral Mass

depresses (flexes) limb



**Cranial (Superior)
Dorsal (Posterior)**

**Caudal (Inferior)
Dorsal (Posterior)**



**Cranial (Superior)
Ventral (Anterior)**

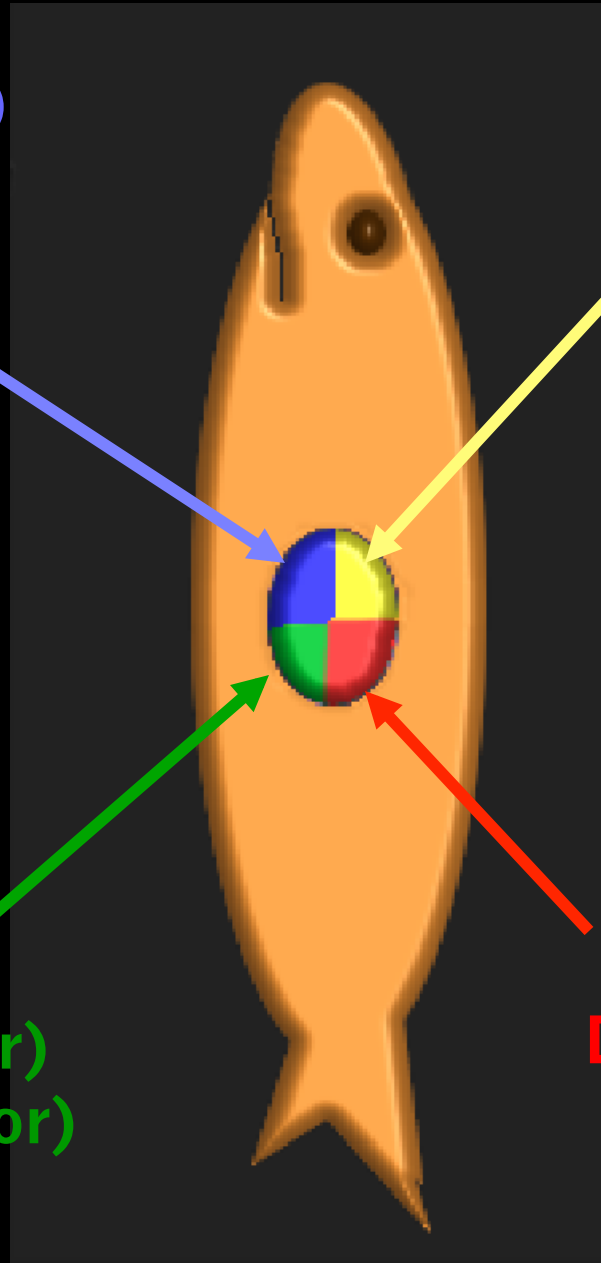
**Caudal (Inferior)
Ventral (Anterior)**

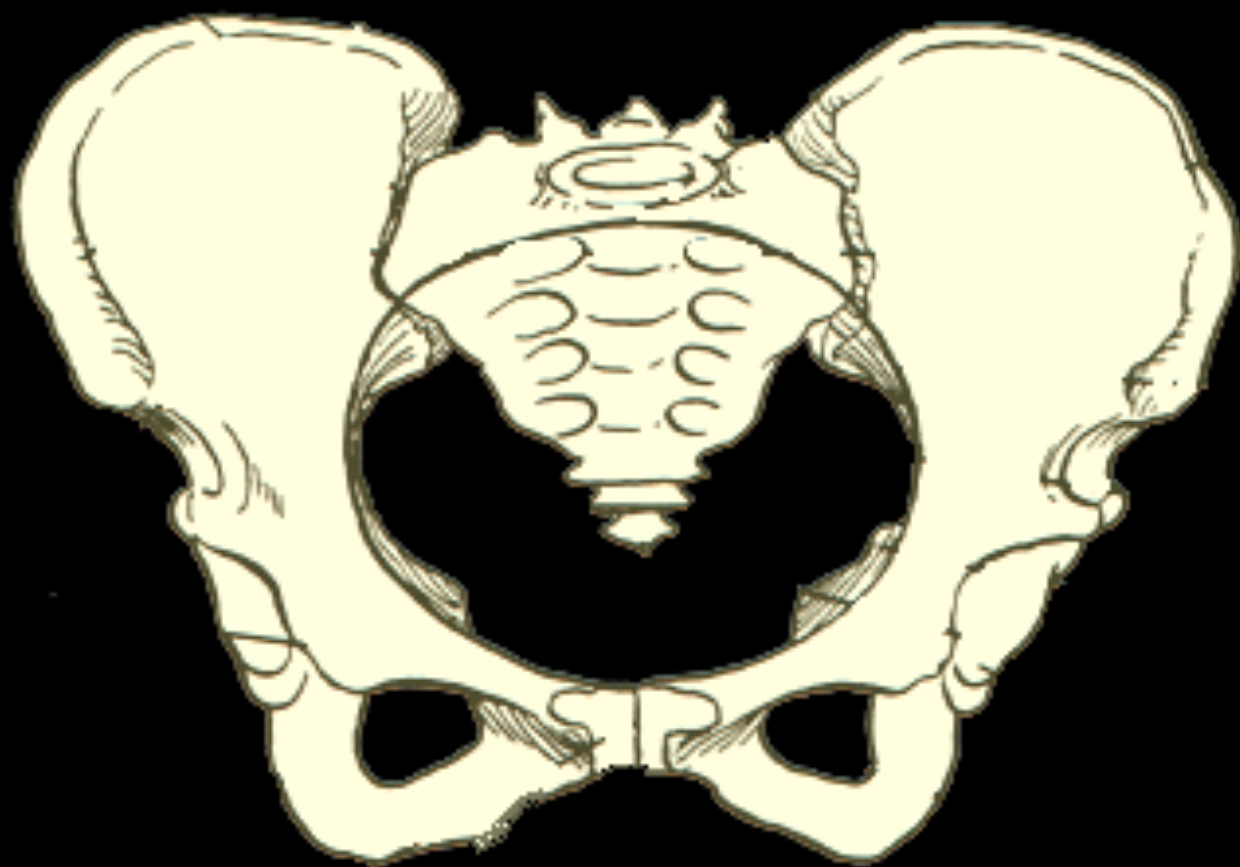
**Cranial (Superior)
Ventral (Anterior)**

**Cranial (Superior)
Dorsal (Posterior)**

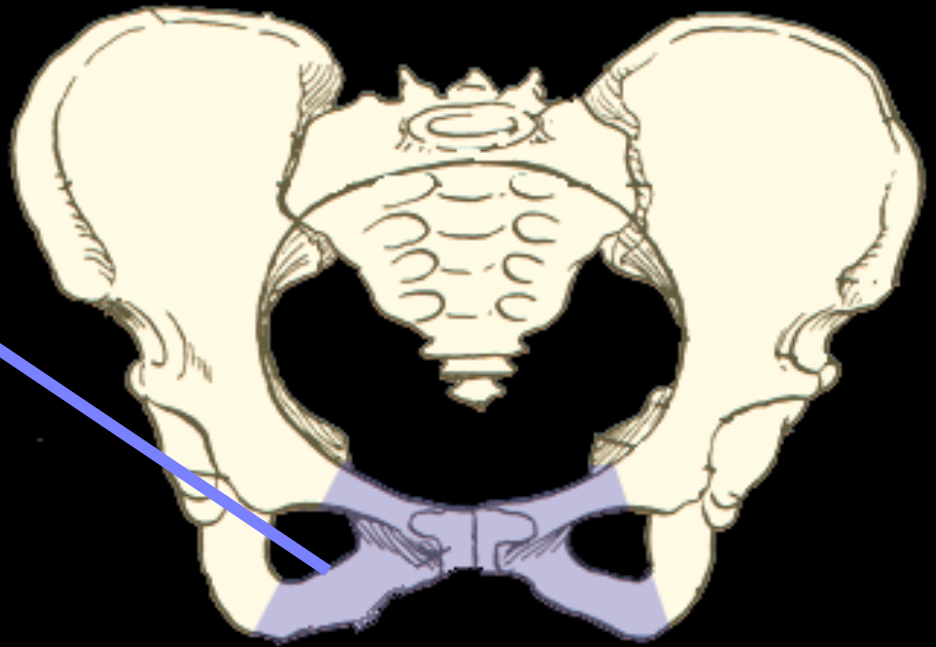
**Caudal (Inferior)
Ventral (Anterior)**

**Caudal (Inferior)
Dorsal (Posterior)**

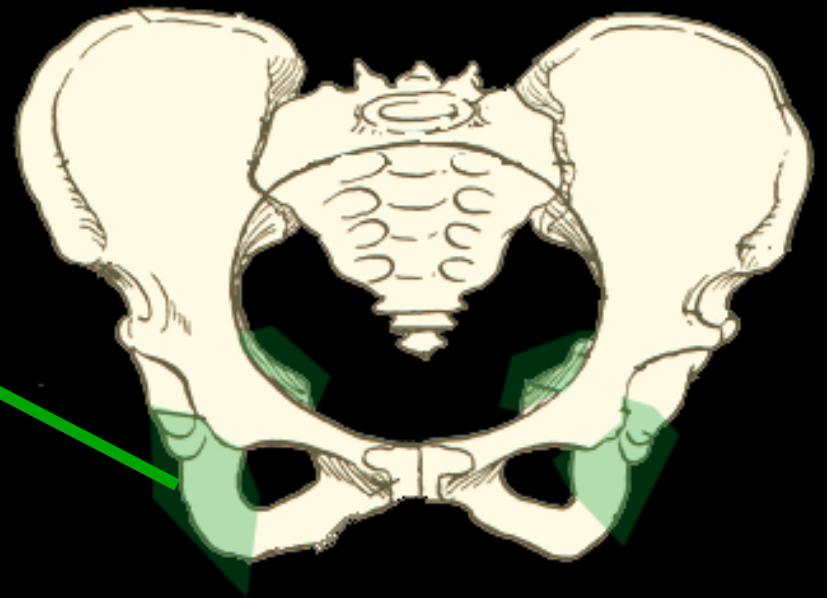




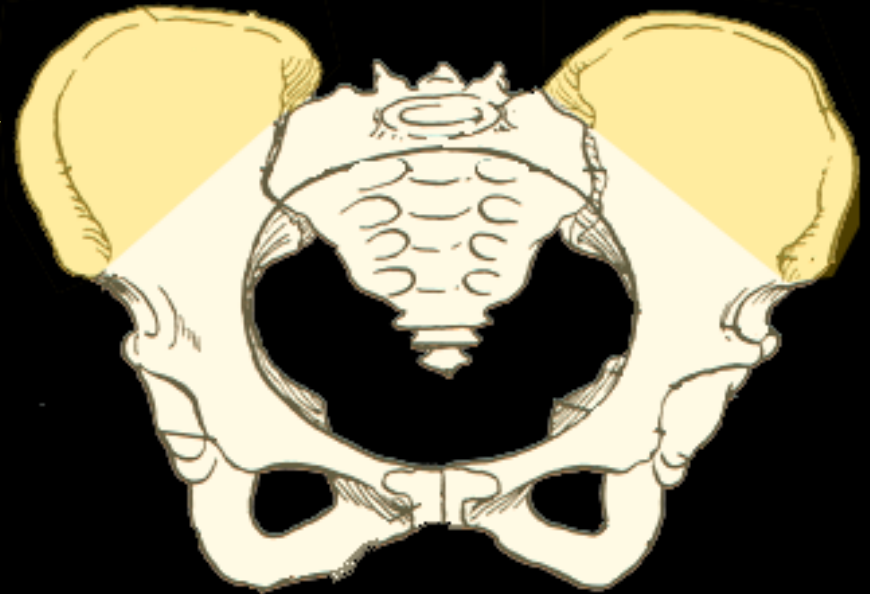
**Cranial/Ventral:
(Superior/Anterior)
Attaches to pubic bone**



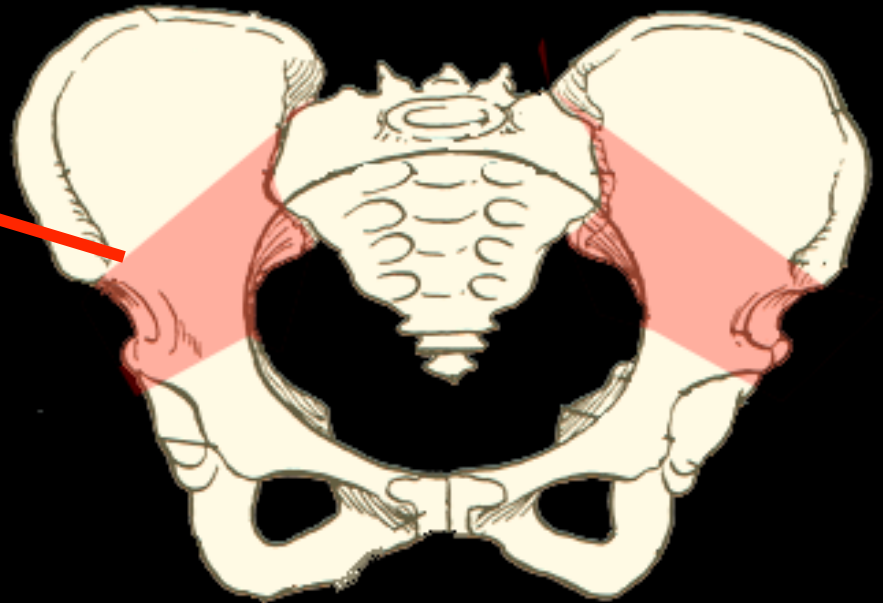
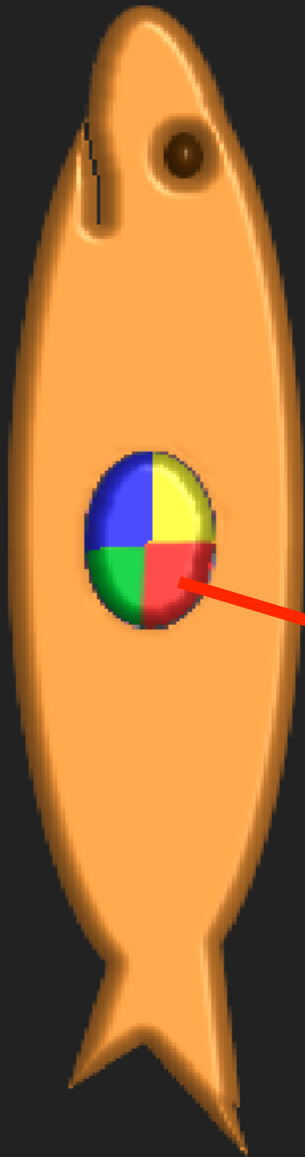
**Caudal/Ventral
Inferior/Anterior):
Attaches to
Ischium**



**Cranial/Dorsal
Superior/Posterior):
Attaches to upper part
of ilium**



**Caudal/Dorsal
Inferior/Posterior):
Attaches to lower part
of ilium**

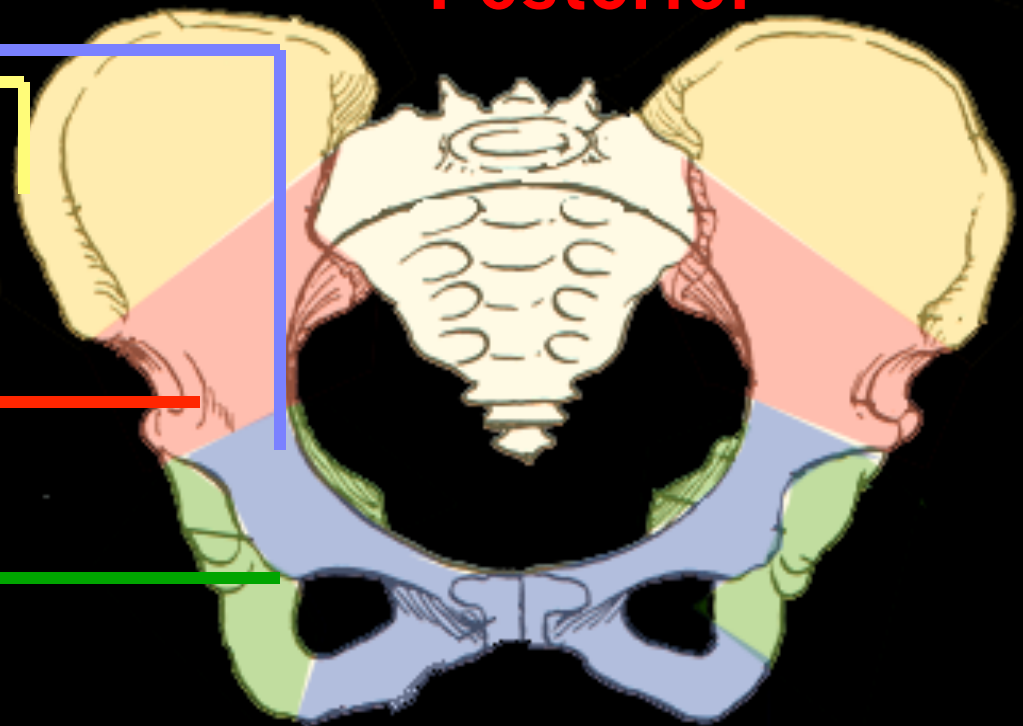
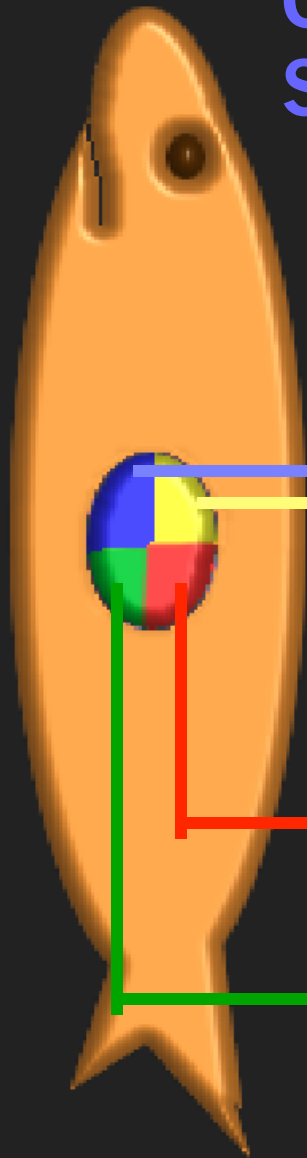


Cranial/Ventral
Superior/Anterior

Cranial/Dorsal
Superior/Posterior

Caudal/Ventral
Inferior/Anterior

Caudal/Dorsal
Inferior/Posterior



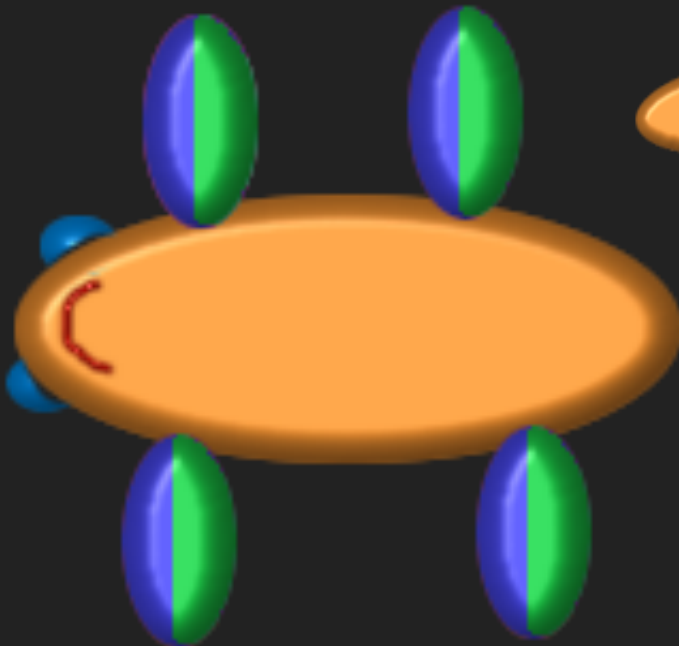
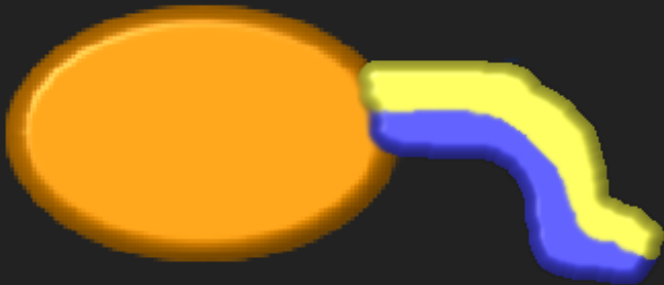
Cranial (Superior)
Ventral (Anterior)

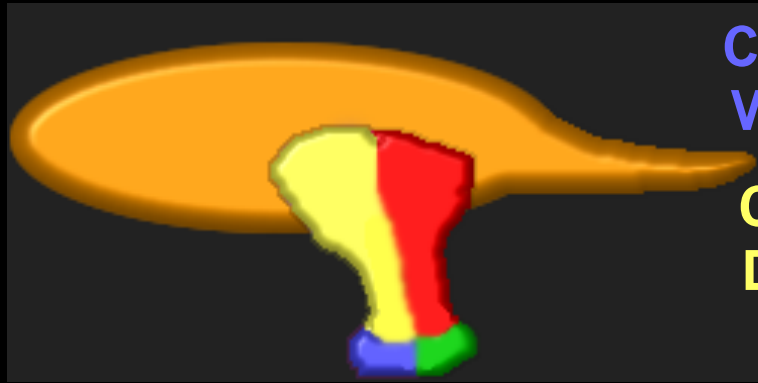
Cranial (Superior)
Dorsal (Posterior)

Caudal (Inferior)
Dorsal (Posterior)

Caudal (Inferior)
Ventral (Anterior)

Dorsal view



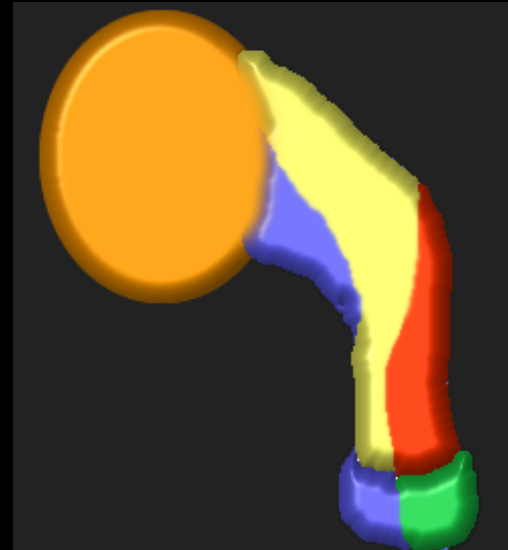
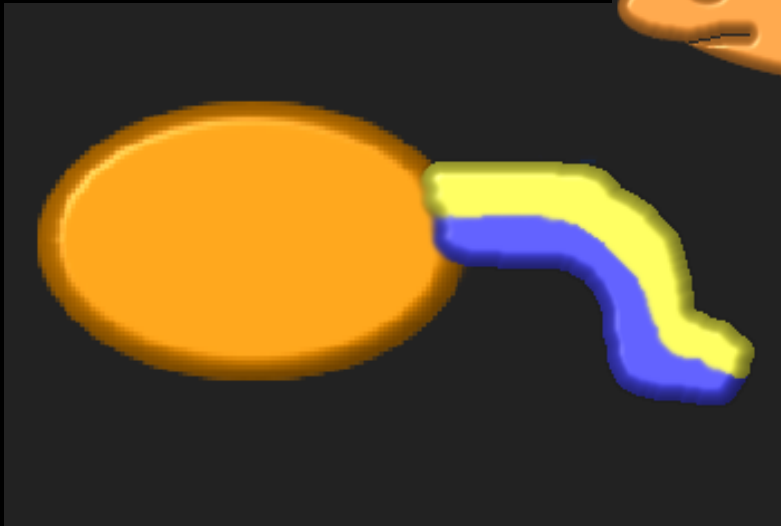


Cranial (Superior)
Ventral (Anterior)

Cranial (Superior)
Dorsal (Posterior)

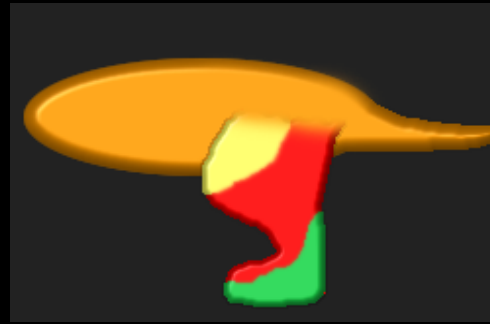
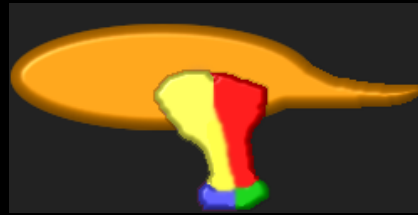
Caudal (Inferior)
Dorsal (Posterior)

Caudal (Inferior)
Ventral (Anterior)





Lateral view



Ventral
(Anterior)
view

