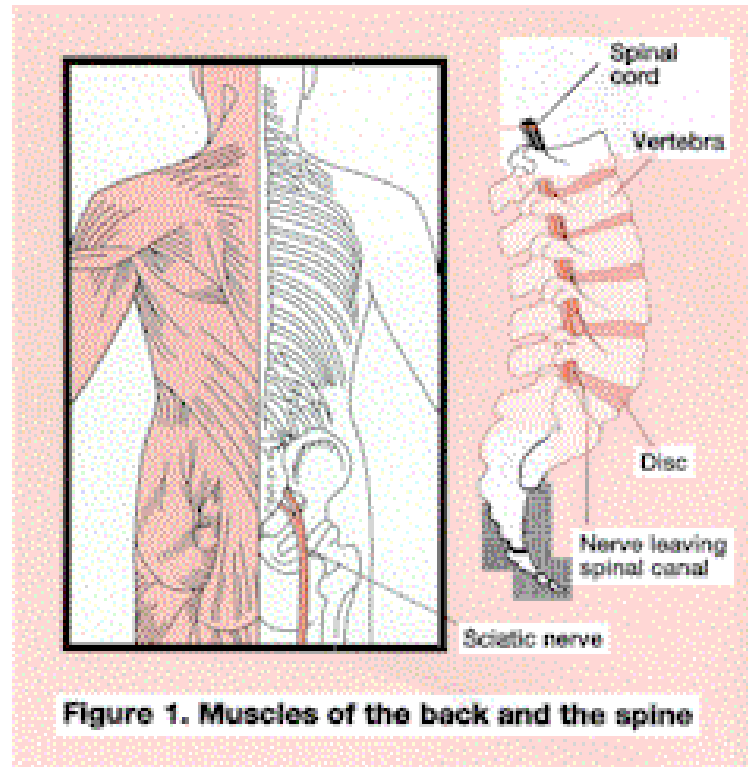


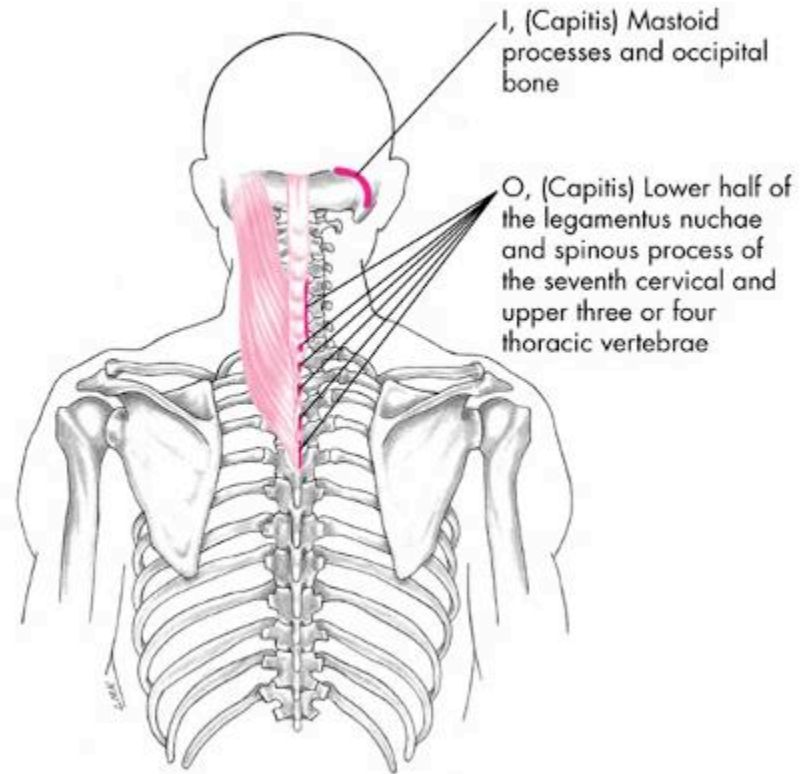
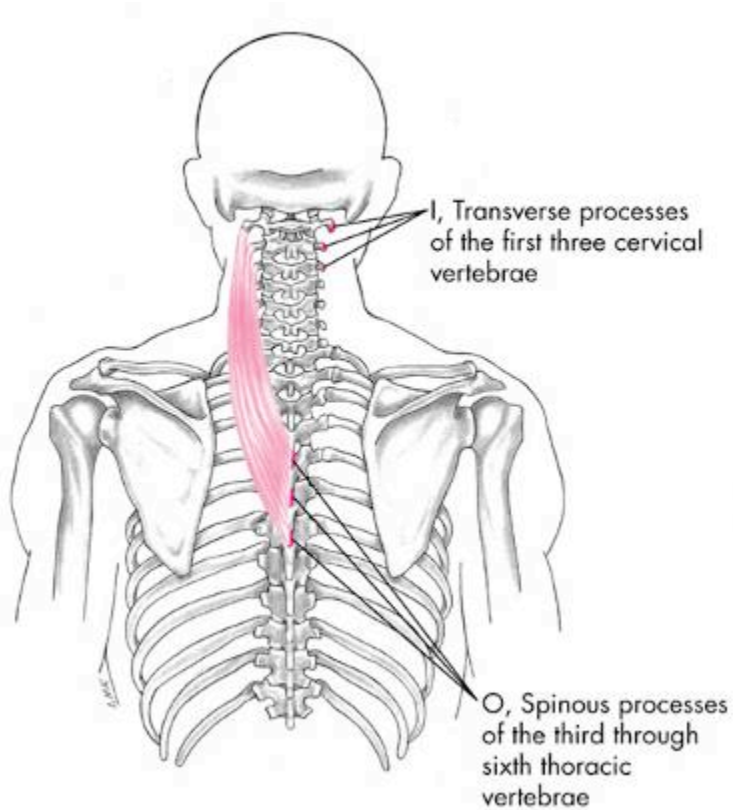
# Muscles of the Spinal Column



# Cervical Muscles

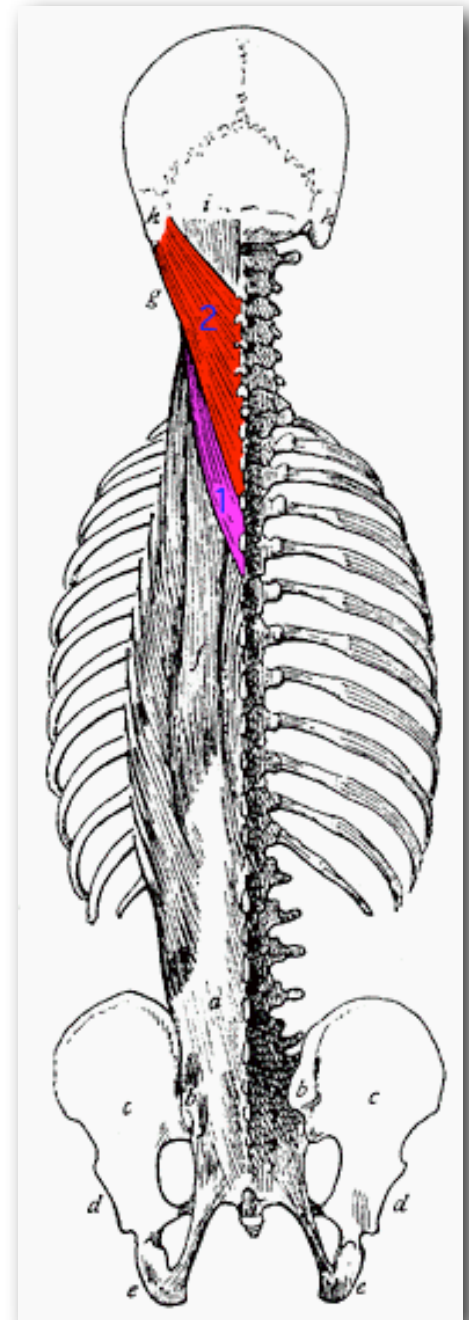


# Splenius

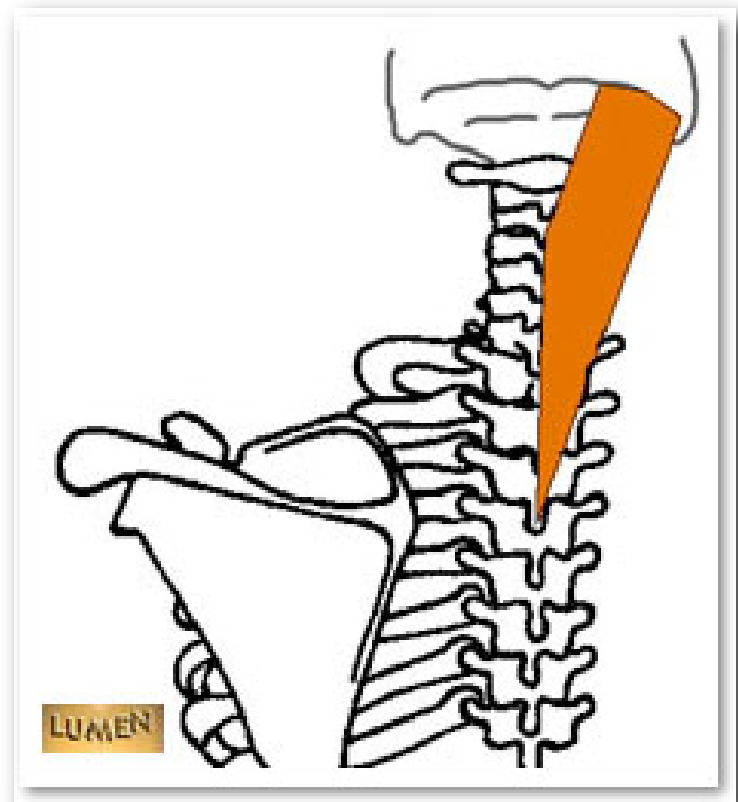
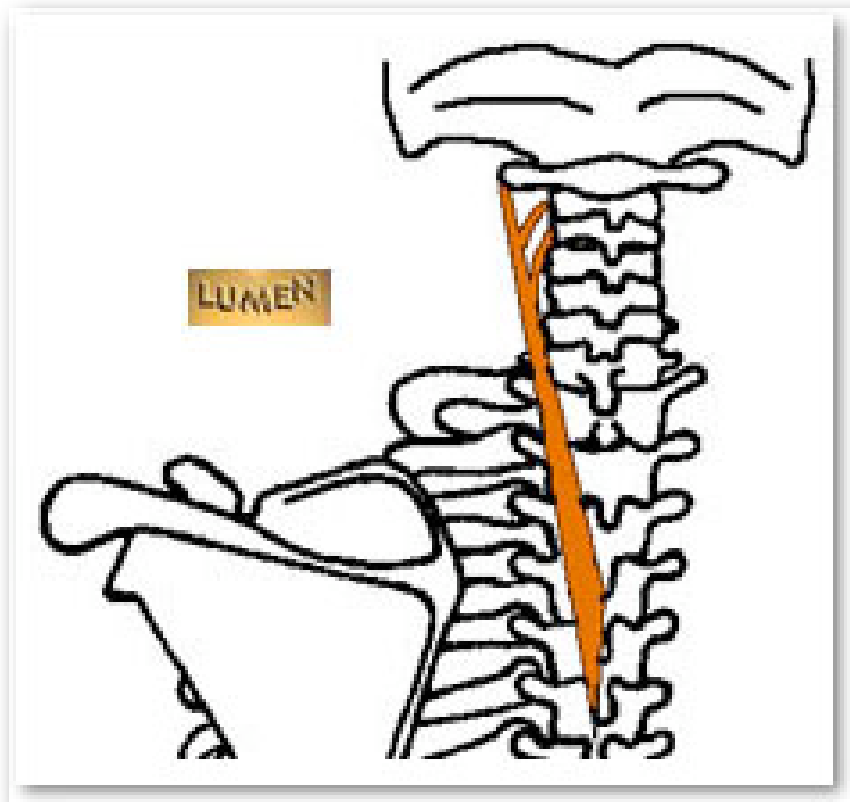


# Splenius (capitis and cervicis)

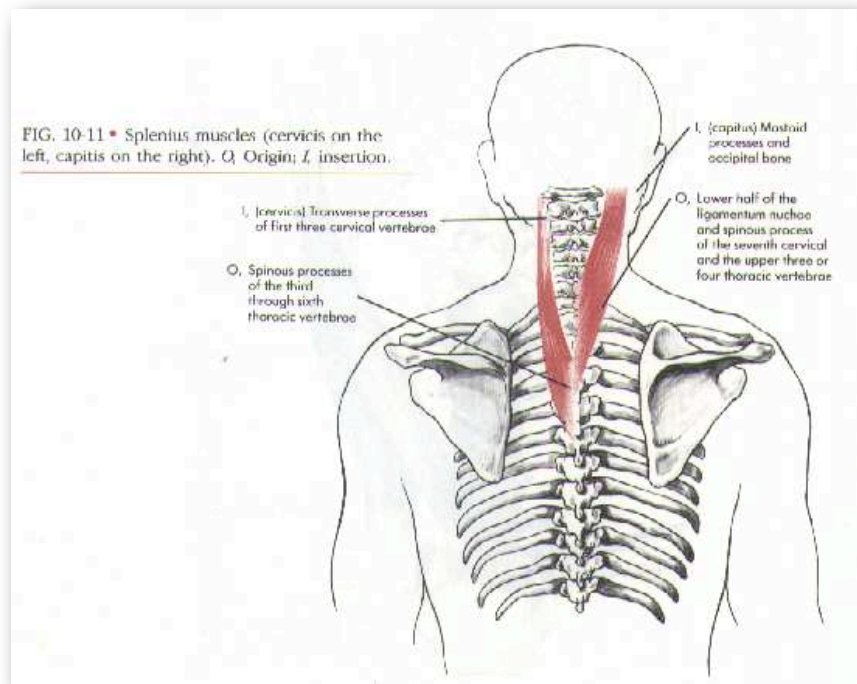
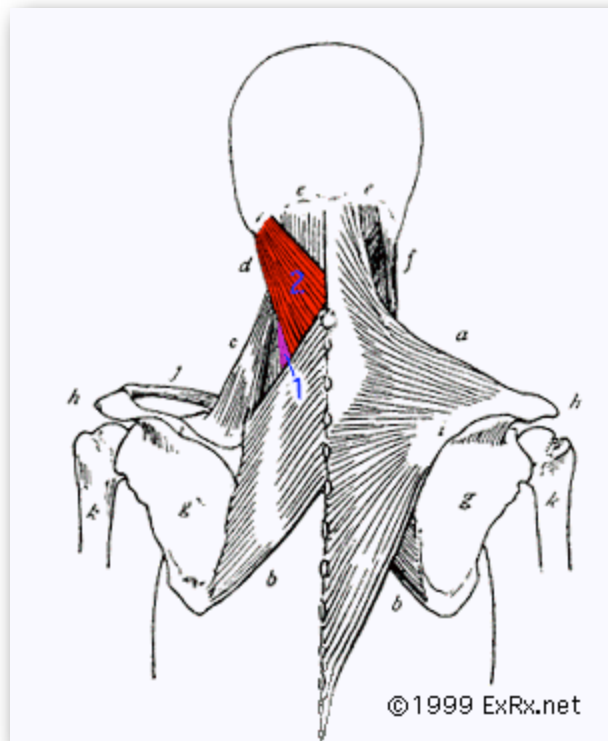
- Origin:
  - Cervicis – spinous process of T3-T6
  - Capitis - lower half of ligmentum nuchea & spinous process of C7 and T1-3.
- Insertion:
  - Cervicis - transverse process of C1-C3.
  - Capitis – mastoid process and occipital bone
- Actions:
  - **Whole**
    - Neck Extension
  - **Half**
    - Neck Rotation to the same side.
    - Lateral flexion of the neck



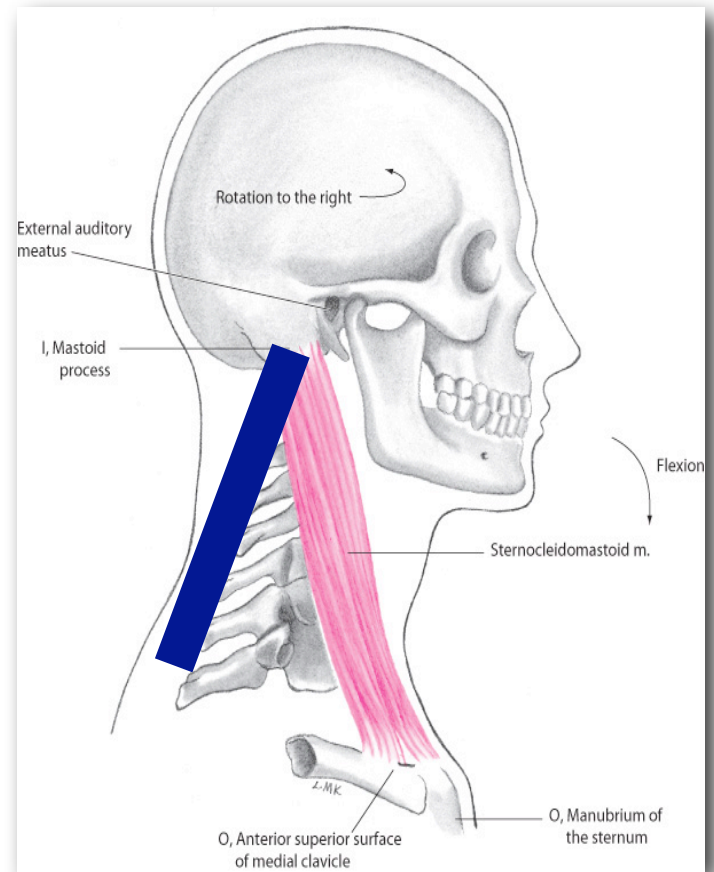
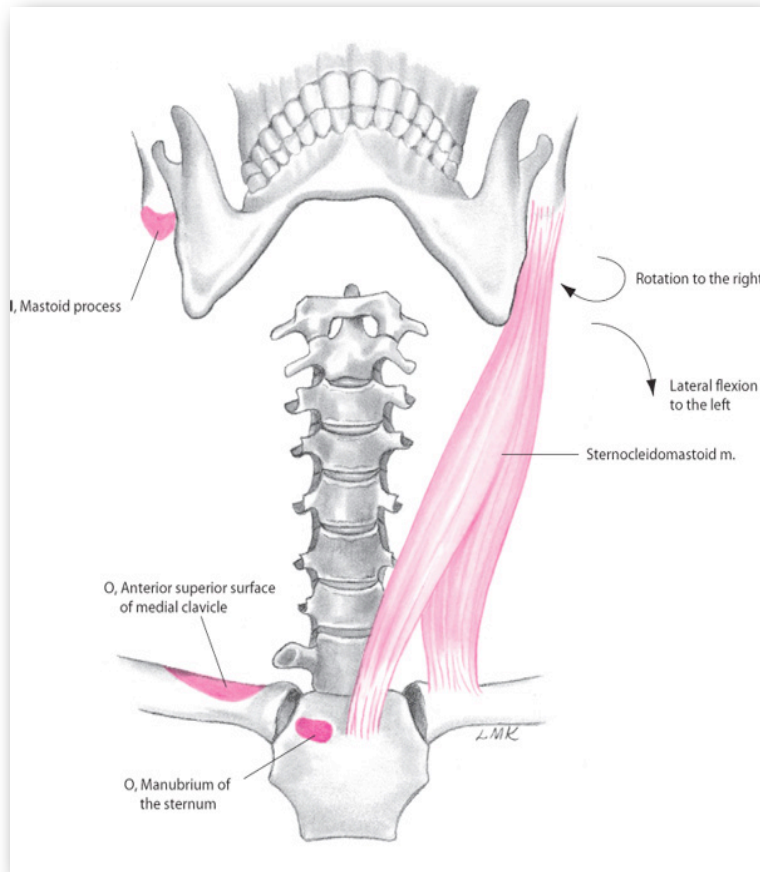
# Splenius (cervicis & capitis)



# Splenius

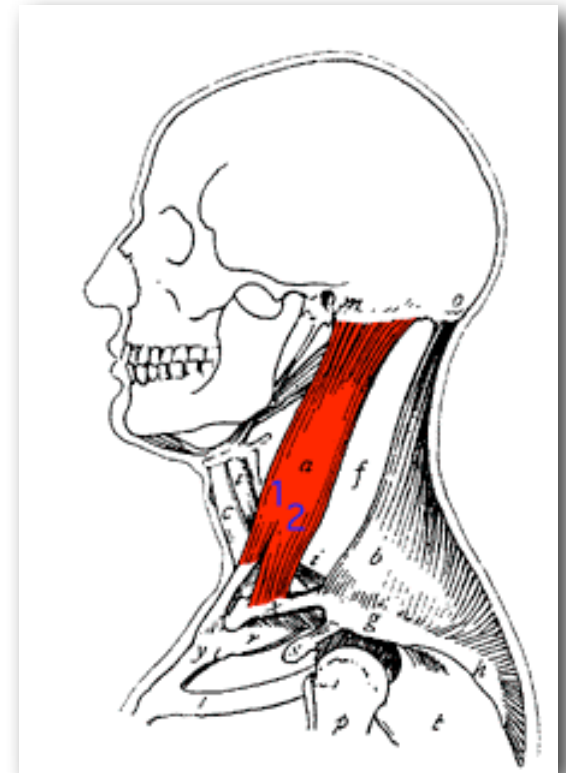


# Sternocleidomastoid



# Sternocleidomastoid

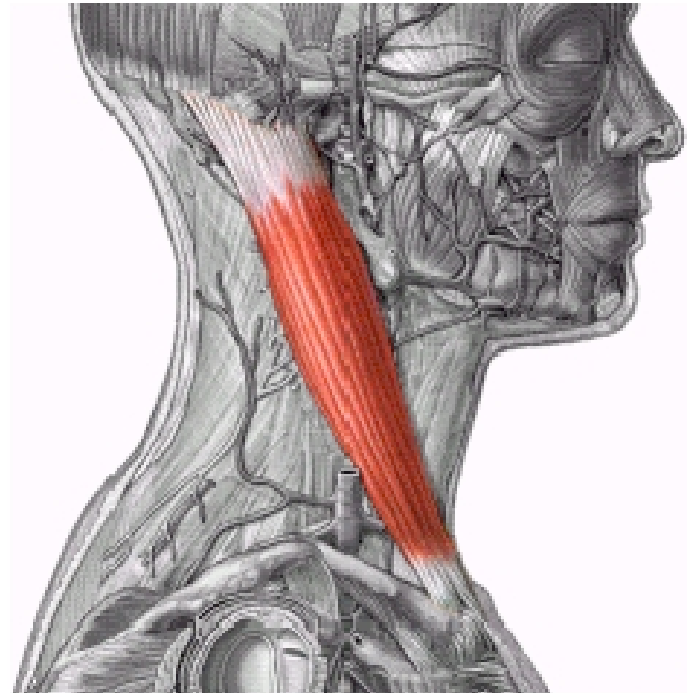
- O: Top of the sternum and medial third of the clavical
- I: Mastoid process
- Action:
- **Whole**
  - **Neck Flexion**
- **Half**
  - **Lateral Flexion of the neck**
  - **Neck Rotation to the opposite side.**



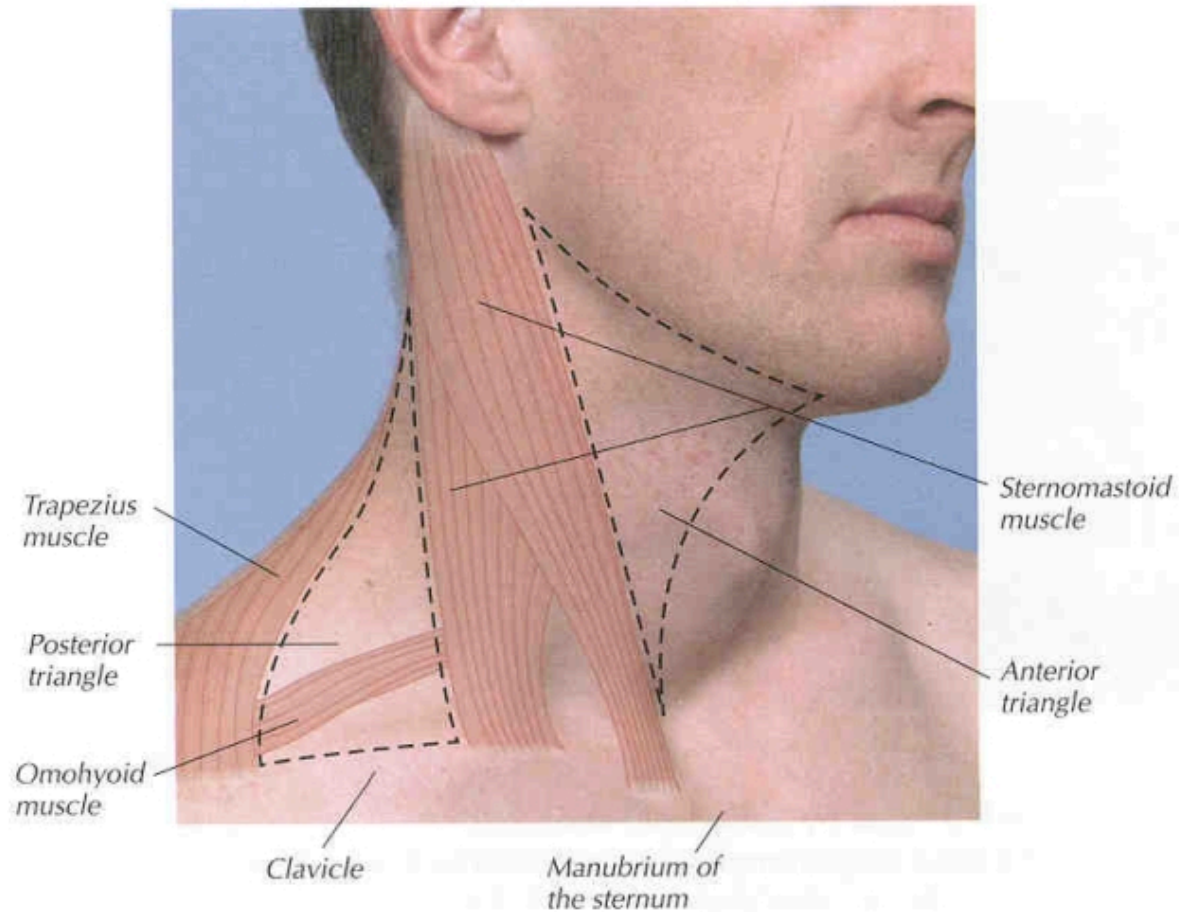


# STERNOCLEIDOMASTOID

Located on the anteriolateral surface of the neck. It extends from the manubrium and clavicle (origins) to the mastoid process. Contraction of both muscles produces flexion of neck. Acting separately, they produce rotation of the head.



# Sternocleidomastoid



# Sternocleidomastoid

FIG. 10-12 • Sternocleidomastoid muscle, anterior view. O, Origin; I, Insertion.

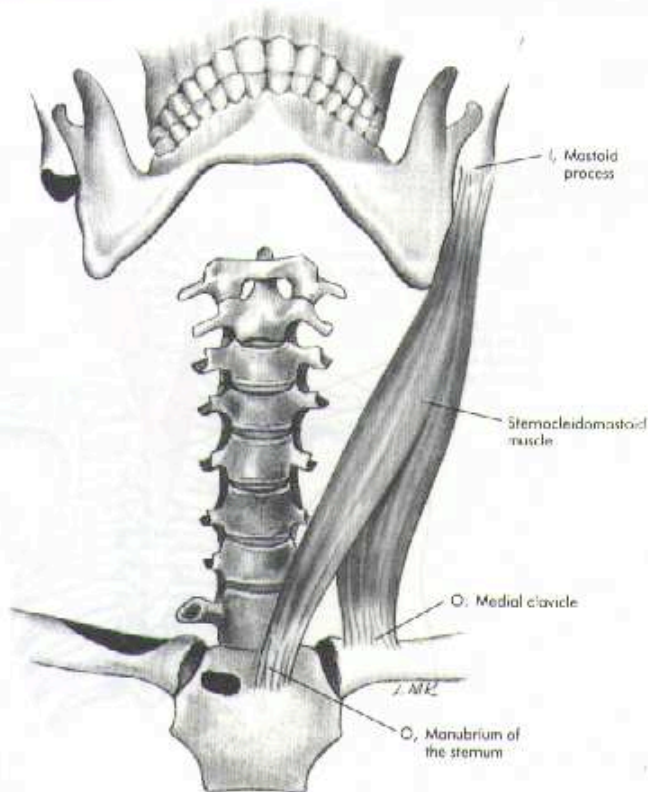
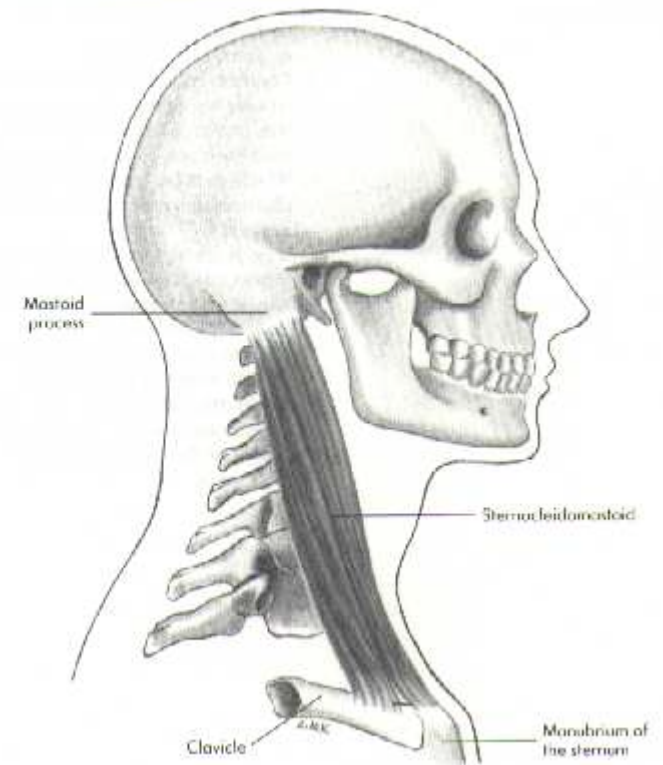
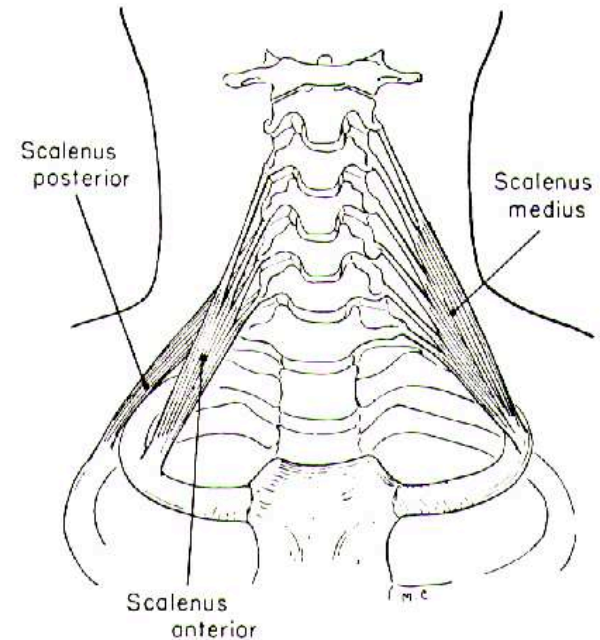


FIG. 10-12 cont'd • Sternocleidomastoid muscle, lateral view.



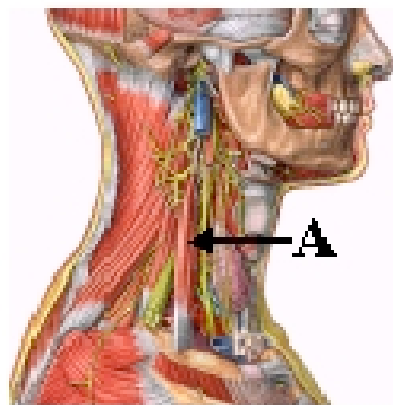
# Scalenus (or scalenes)

- O: First two ribs
- I: Transverse processes of cervical vertebrae.
- **Actions:**
  - **Whole – Neck Flexion**
  - **Half - Lateral Flexion of the neck**

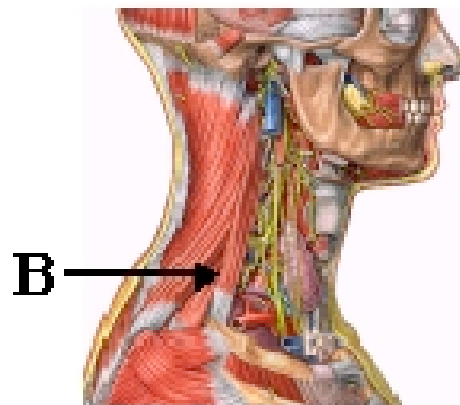


# SCALENES MUSCLES

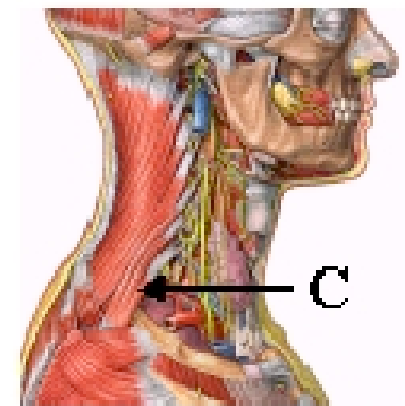
A group of three muscles located on the lateral surfaces of the neck. They all have origins on the transverse processes of cervical vertebrae. They insert on the first two ribs. They act to flex and slightly rotate the neck.



**ANTERIOR  
SCALENES**

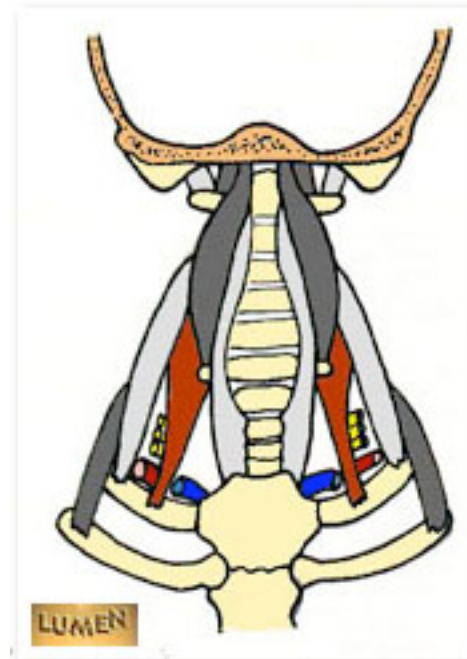
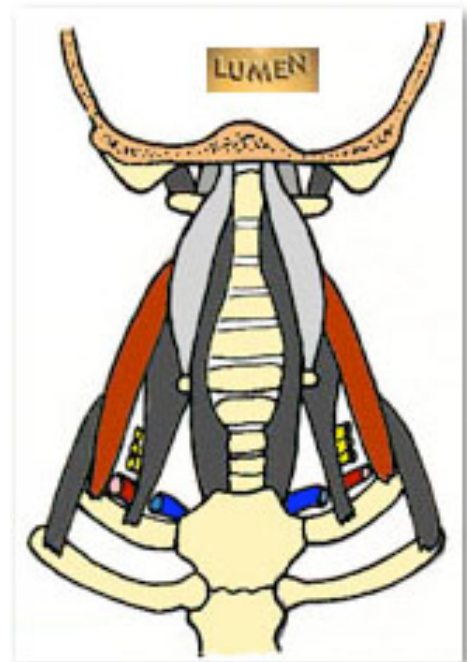
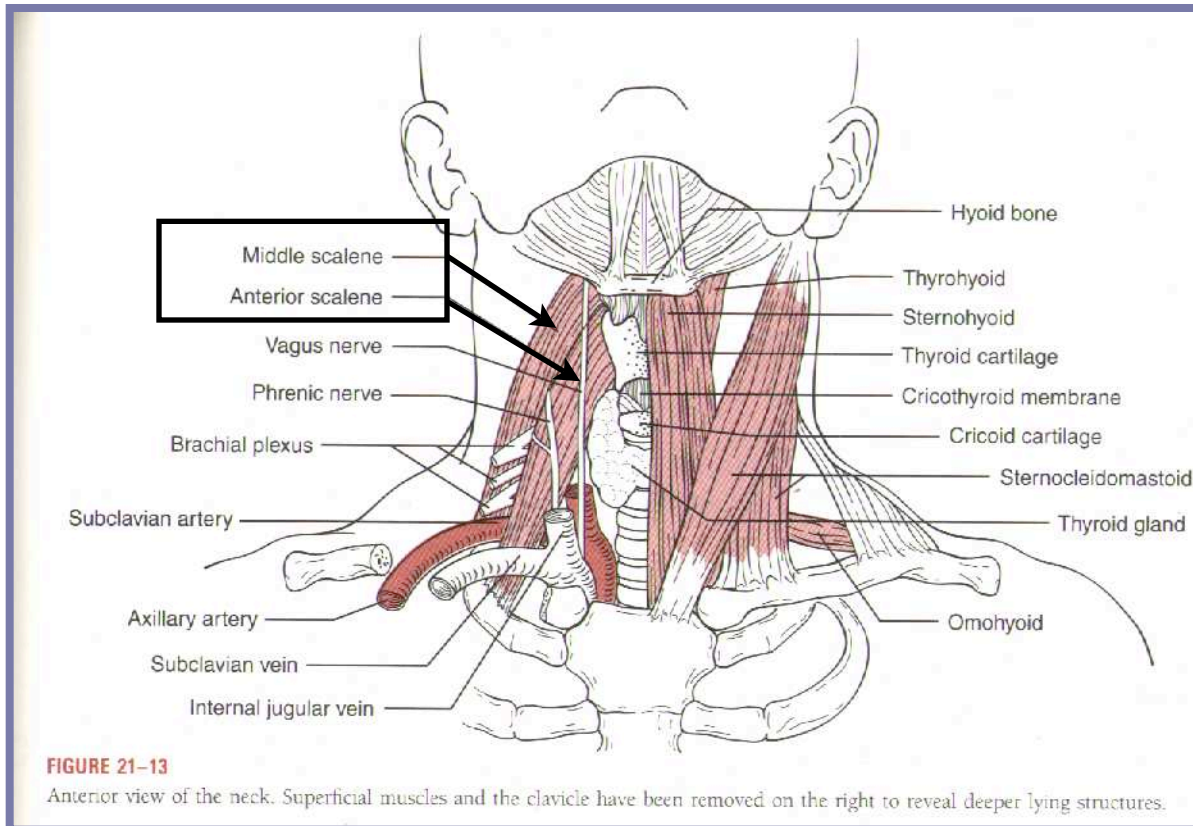


**MIDDLE  
SCALENES**



**POSTERIOR  
SCALENES**

# Scalenus

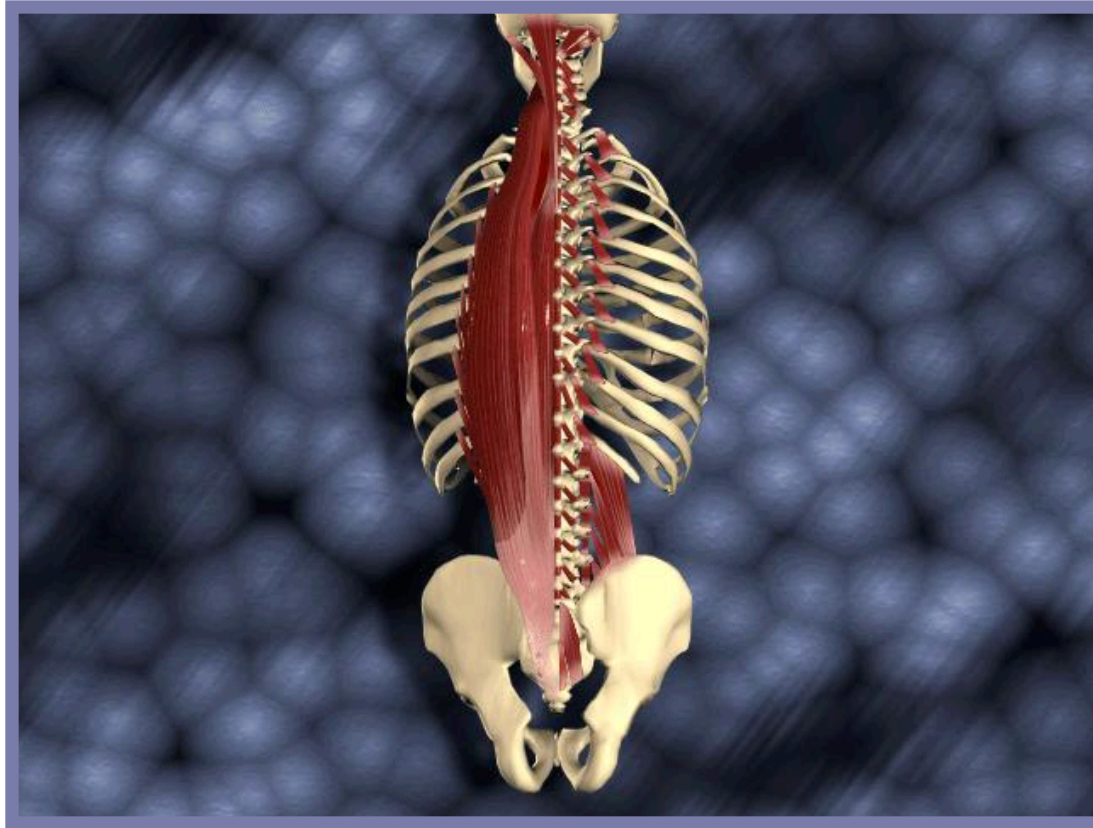


# Other Cervical Muscles

## - FYI

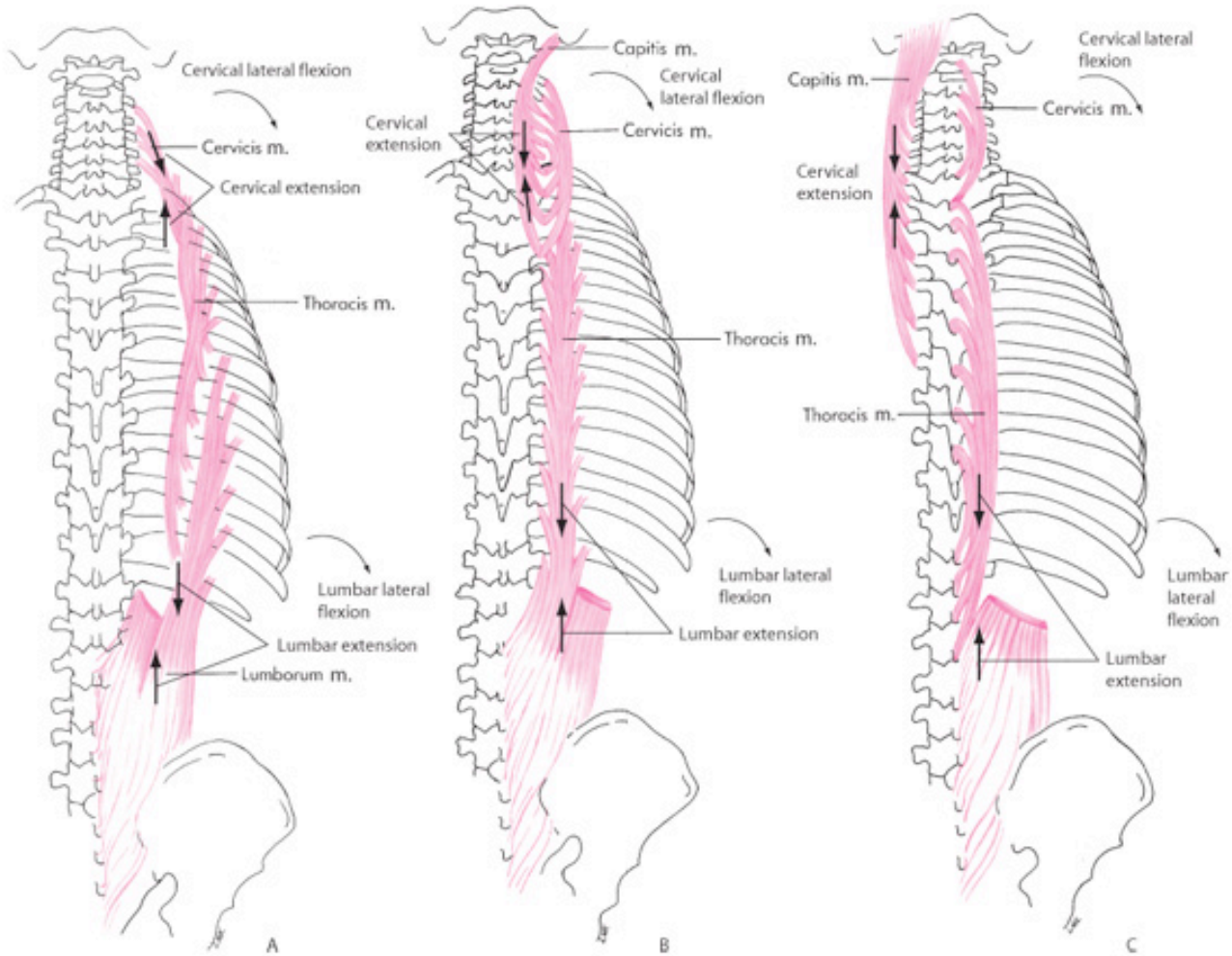
- Levator scapulae
- Upper fibers of the trapezius
- Upper fibers of the rhomboids

# Lumbar Muscles



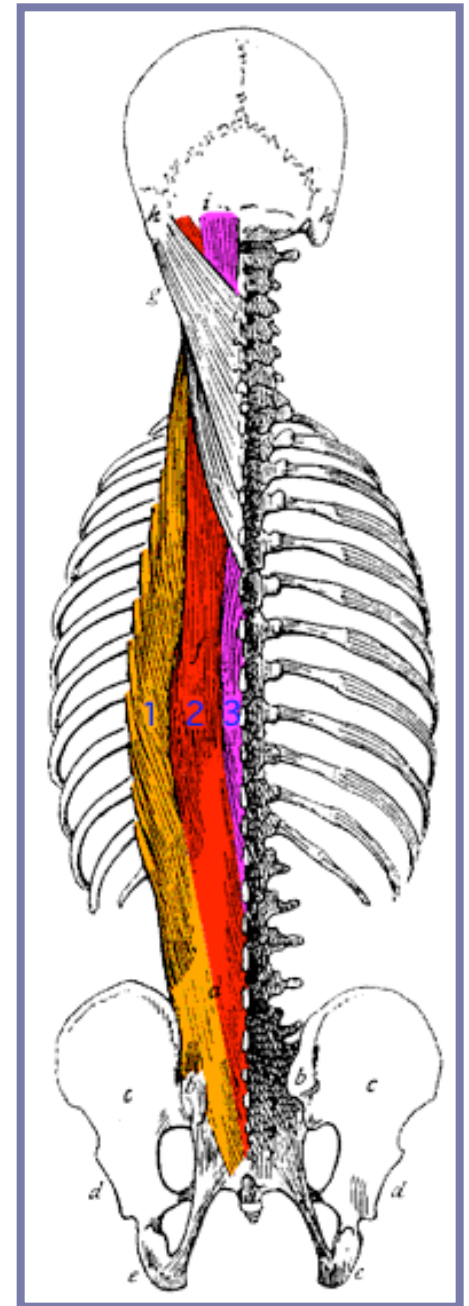


# Erector Spinae

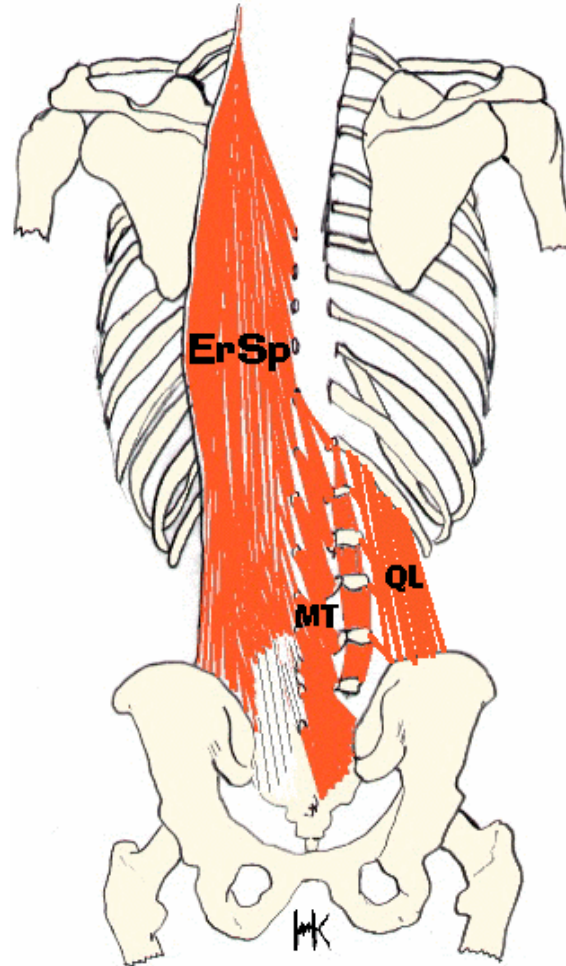


# Erector spinae muscles

- O: Fascia of lower back, posterior L, T and lower C vertebrae, and angles of ribs.
- Insetions
  - **Spinalis branch** - spinous process of T and C and occipital bone
  - **Longissimus branch** - transverse process of T and C, mastoid process.
  - **Iliocostalis branch** - angles of the ribs and cervical transverse processes
- **Actions:**
  - **Whole – Extension of the spine**
  - **Half - Lateral flexion of the spine**

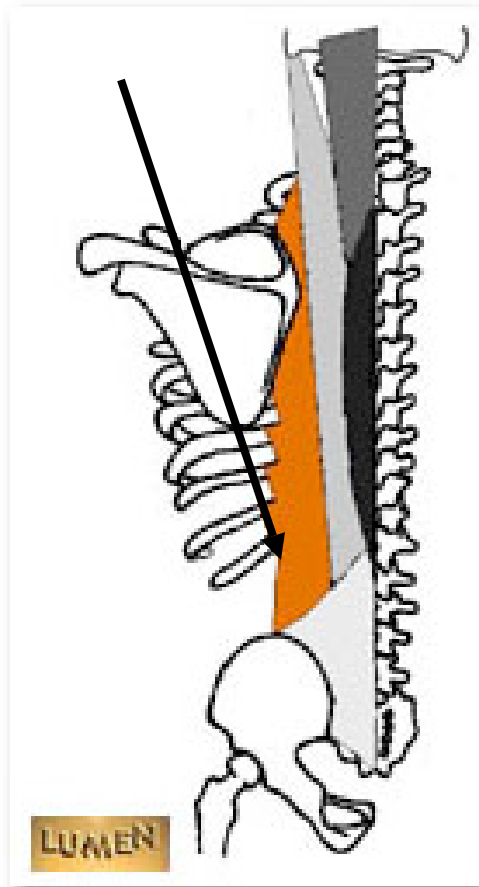


# Erector spinae muscles

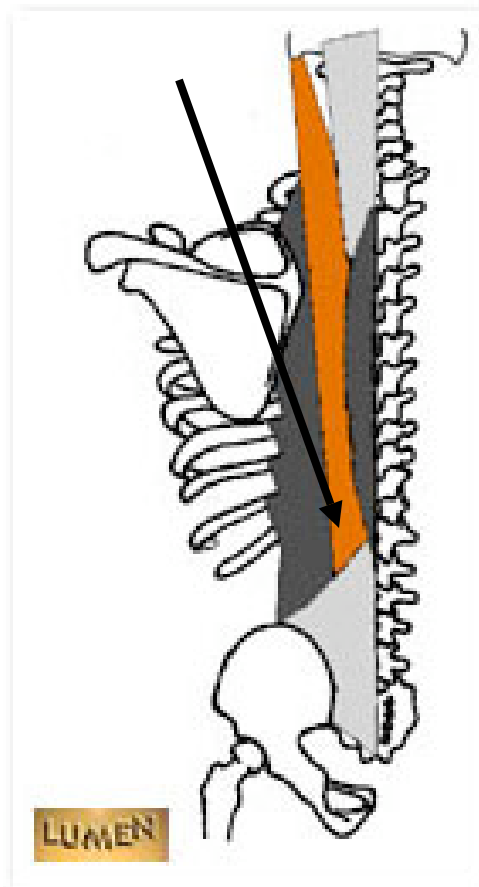


# Erector spinae muscles

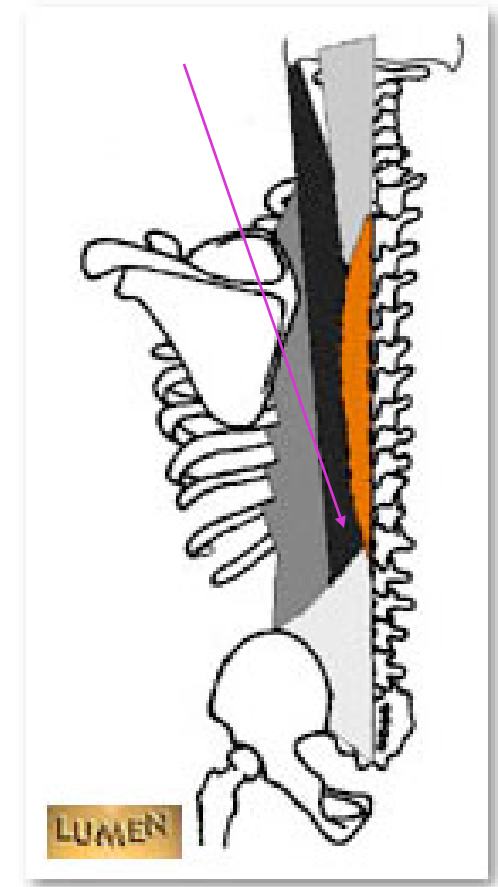
Iliocostalis branch

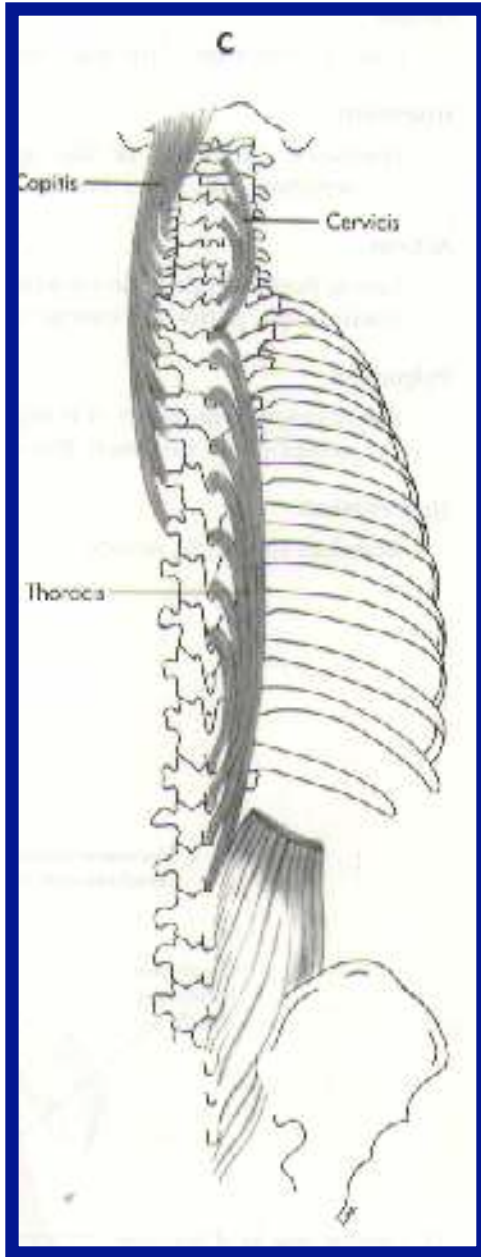


Longissimus branch

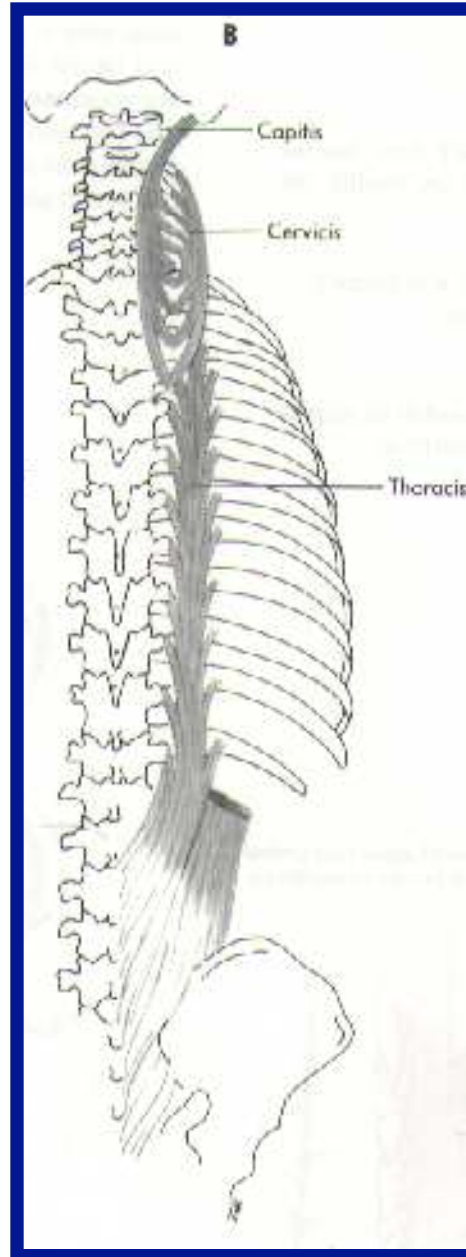


Spinalis branch

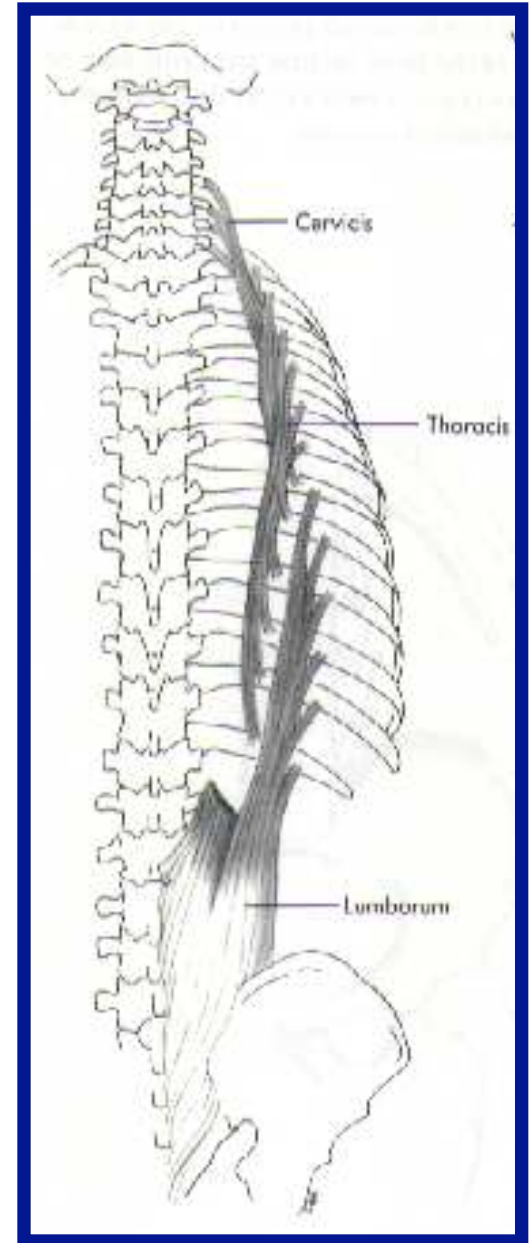




**Spinalis branch**



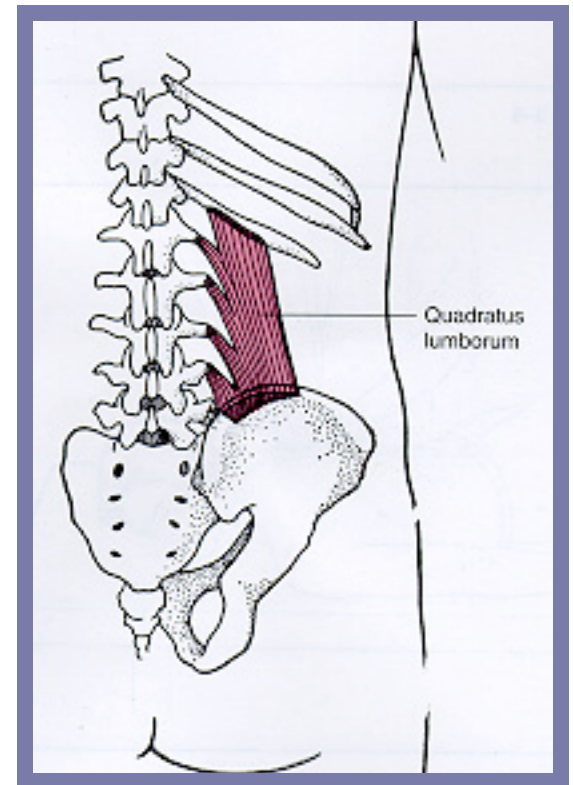
**Longissimus branch**



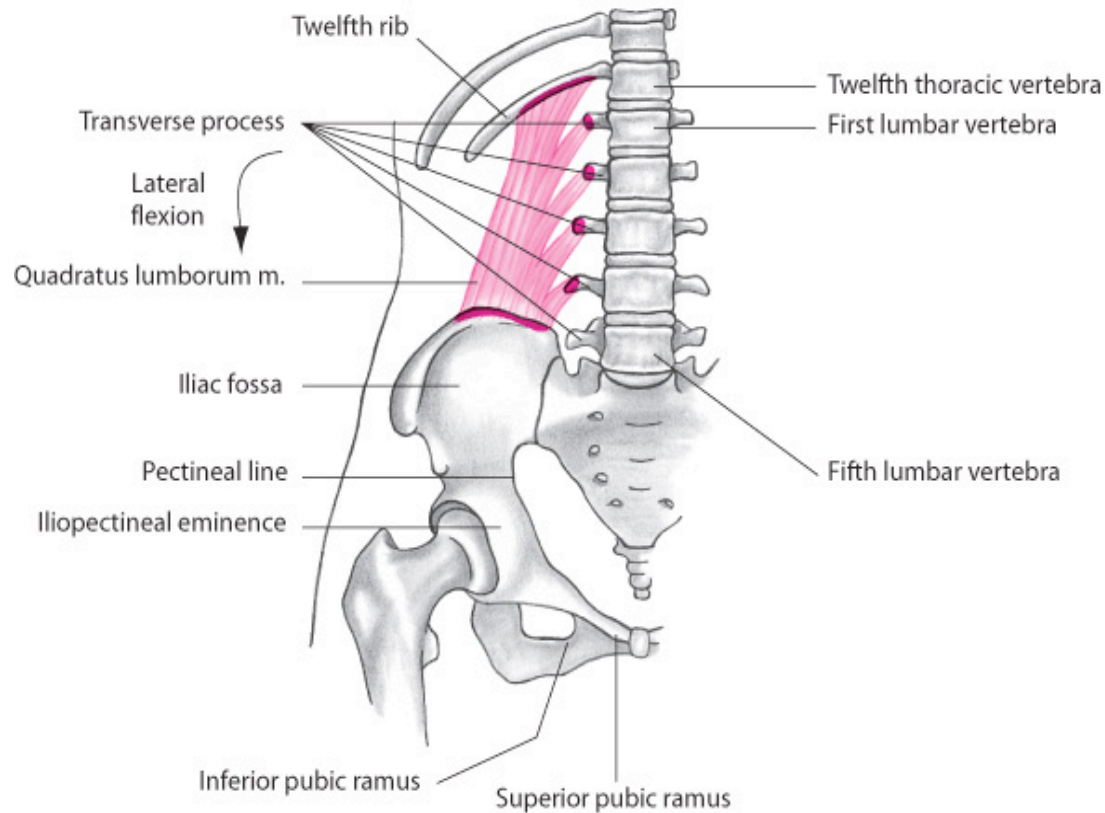
**Iliocostalis branch**

# Quadratus lumborum

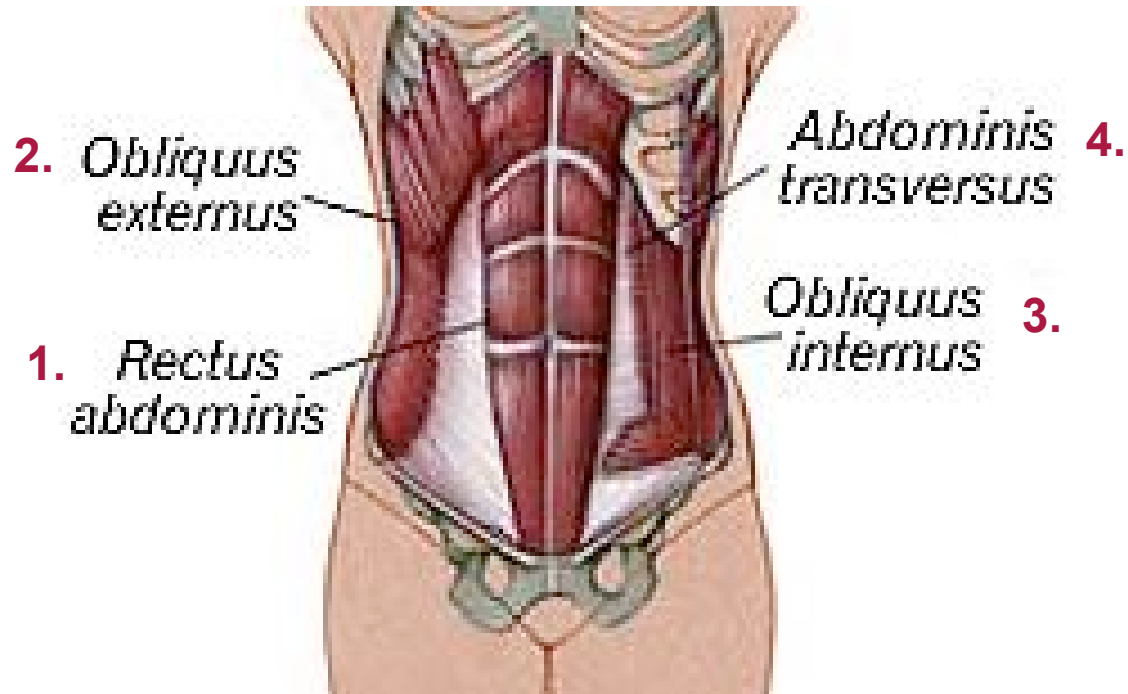
- O: Posterior lip of iliac crest
- I: Lower border of 12th rib and transverse process of L1-4
- **Actions:**
  - **Half - Lumbar lateral flexion**



# Quadratus lumborum



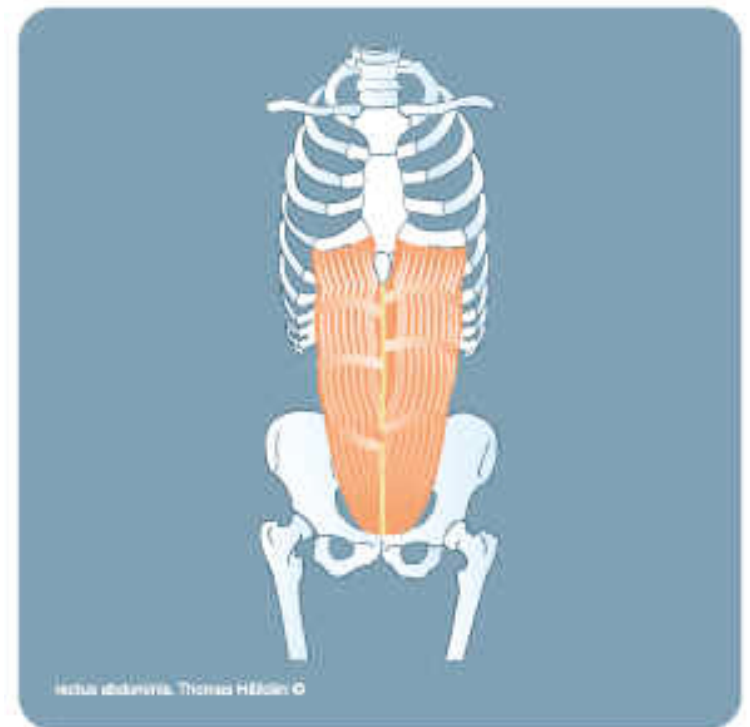
# The Abdominal Muscles



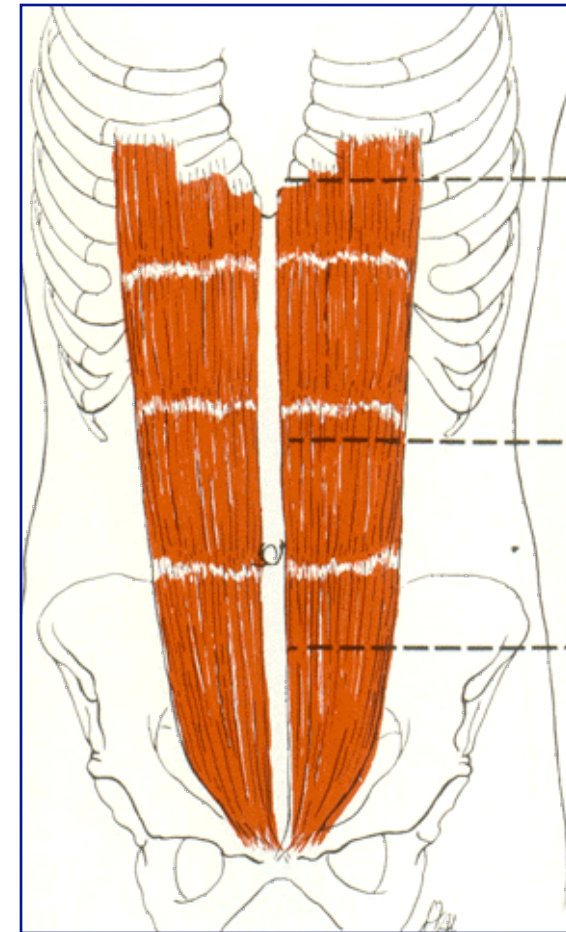
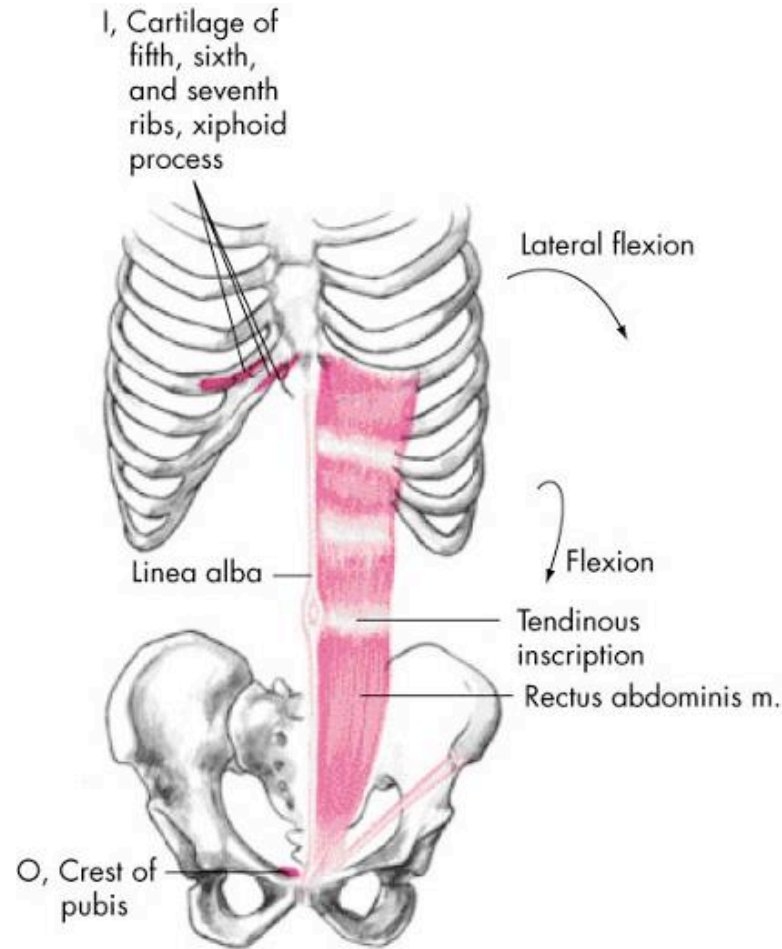
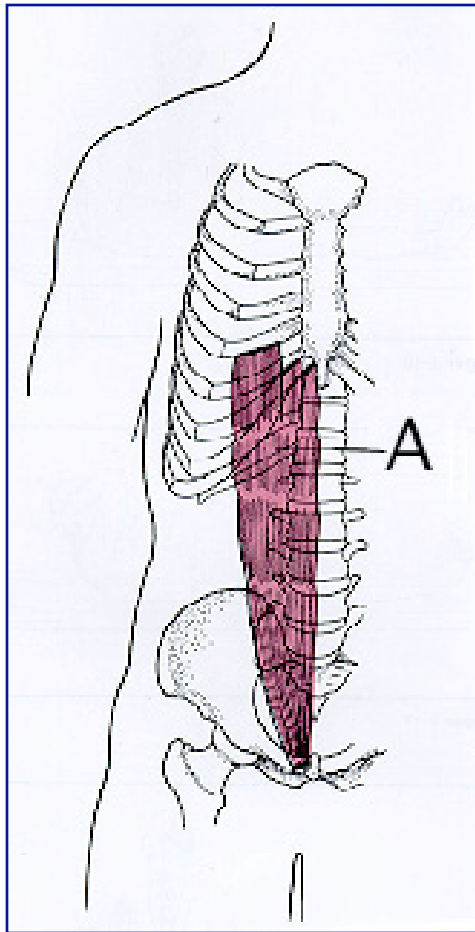


# Rectus abdominis

- O: Crest of the pubis
- I: Xyphoid process and 5th - 7th ribs
- Action:
- **Whole**
  - **lumbar flexion**
- **Half**
  - **lumbar lateral flexion**

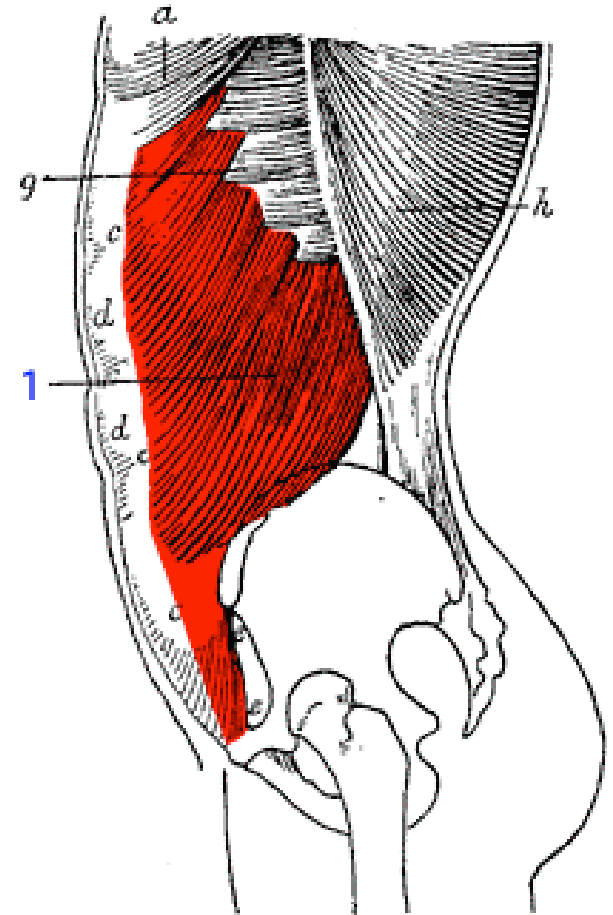


# Rectus abdominis

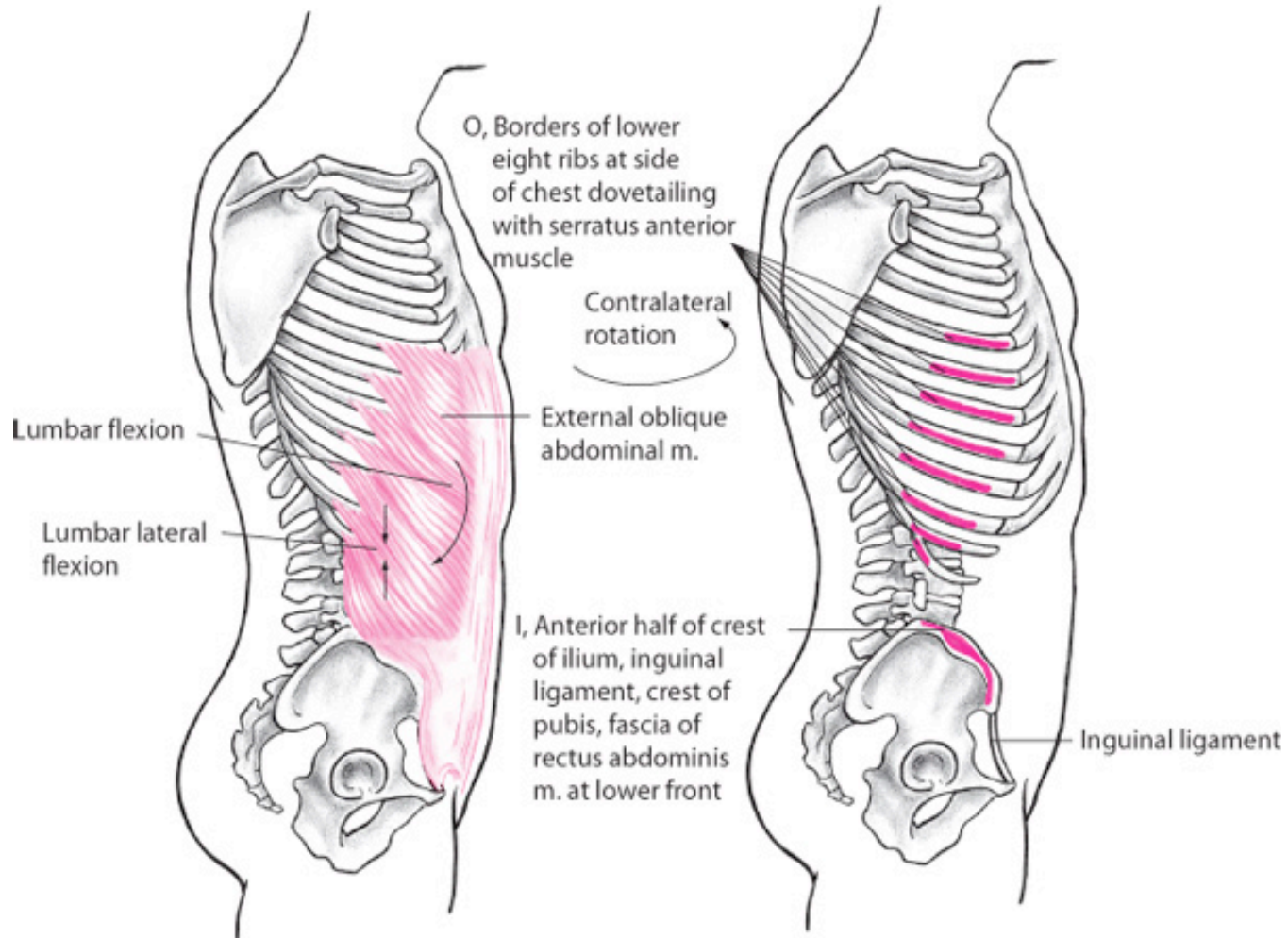


# External oblique

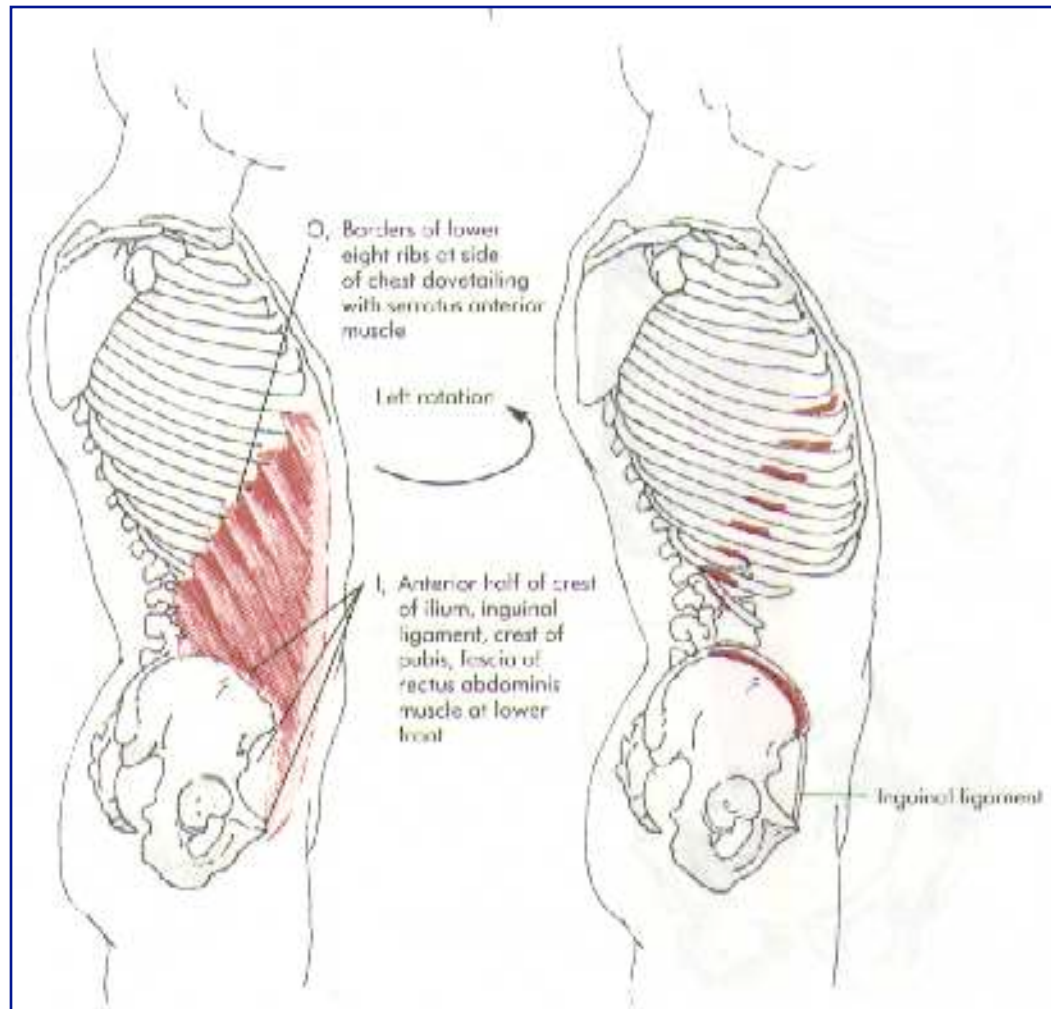
- O: Lower 8 ribs.
- I: Anterior iliac crest; inguinal ligament, crest of pubis, fascia of the rectus abdominus
- **Action:**
  - **Whole – lumbar flexion**
  - **Half**
    - **lumbar rotation to opposite side**
    - **lumbar lateral flexion**



# External oblique

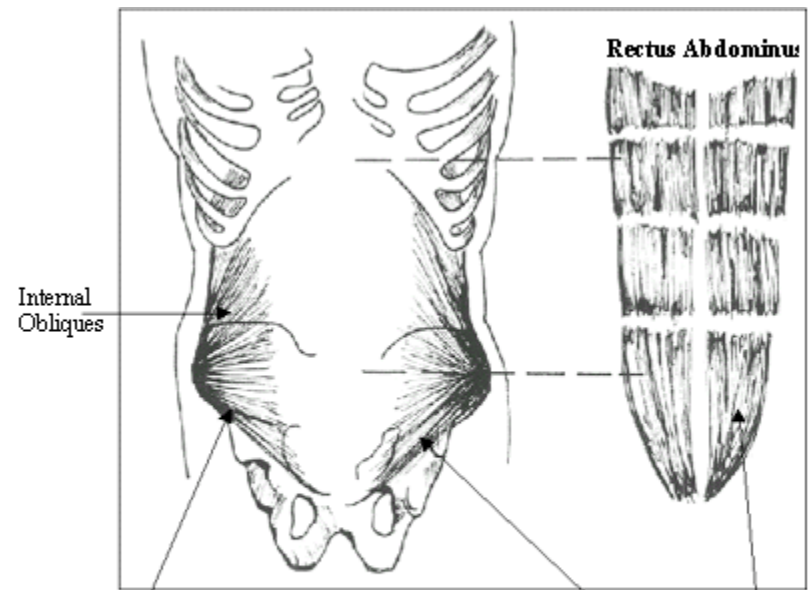


# External oblique



# Internal oblique

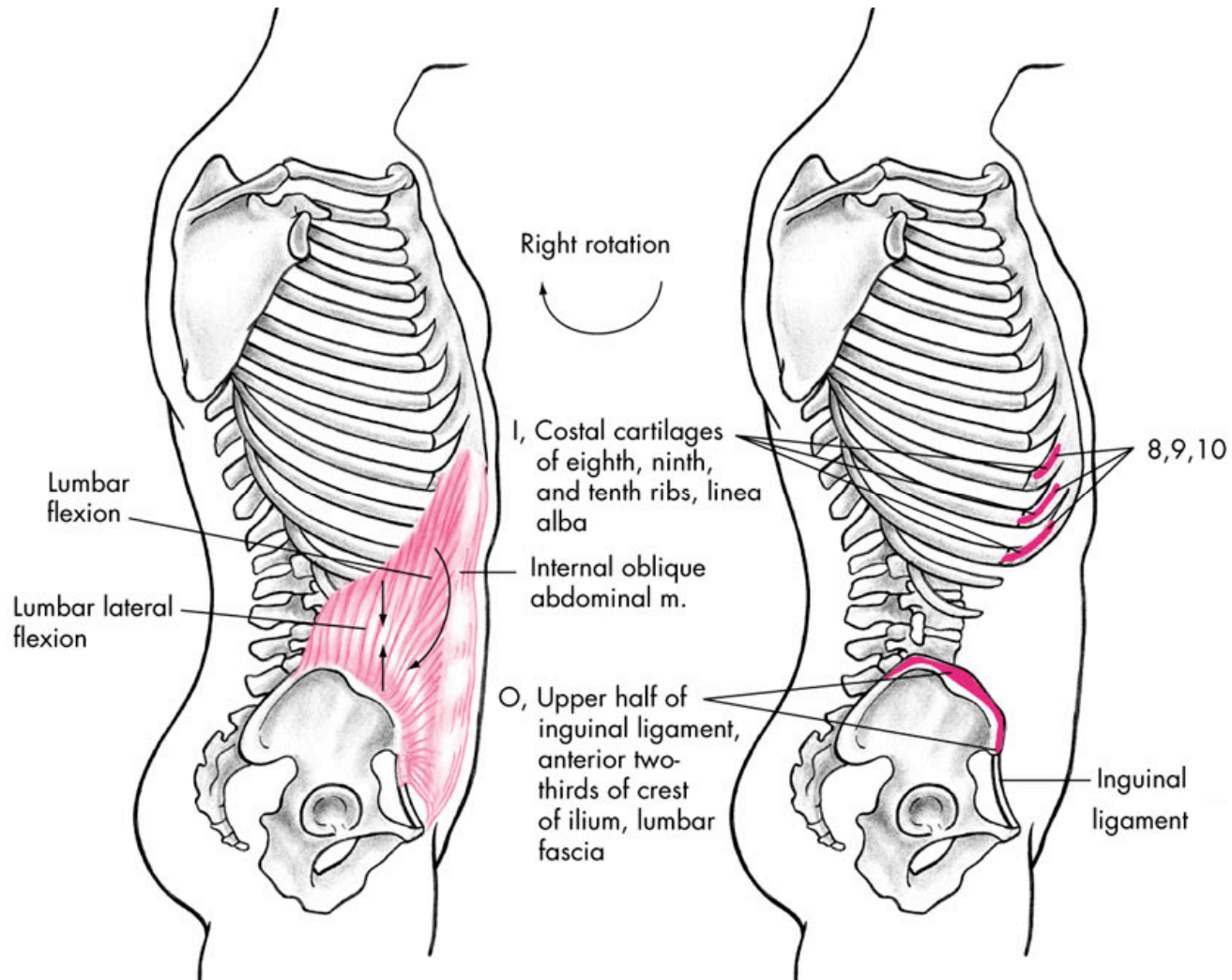
- O: Inguinal ligament (from anterior iliac crest to pubis) and iliac crest
- I: Costal cartilages of the lower ribs.
- **Actions:**
  - **Whole – lumbar flexion**
  - **Half**
    - **lumbar rotation to the same side**
    - **lumbar lateral flexion**

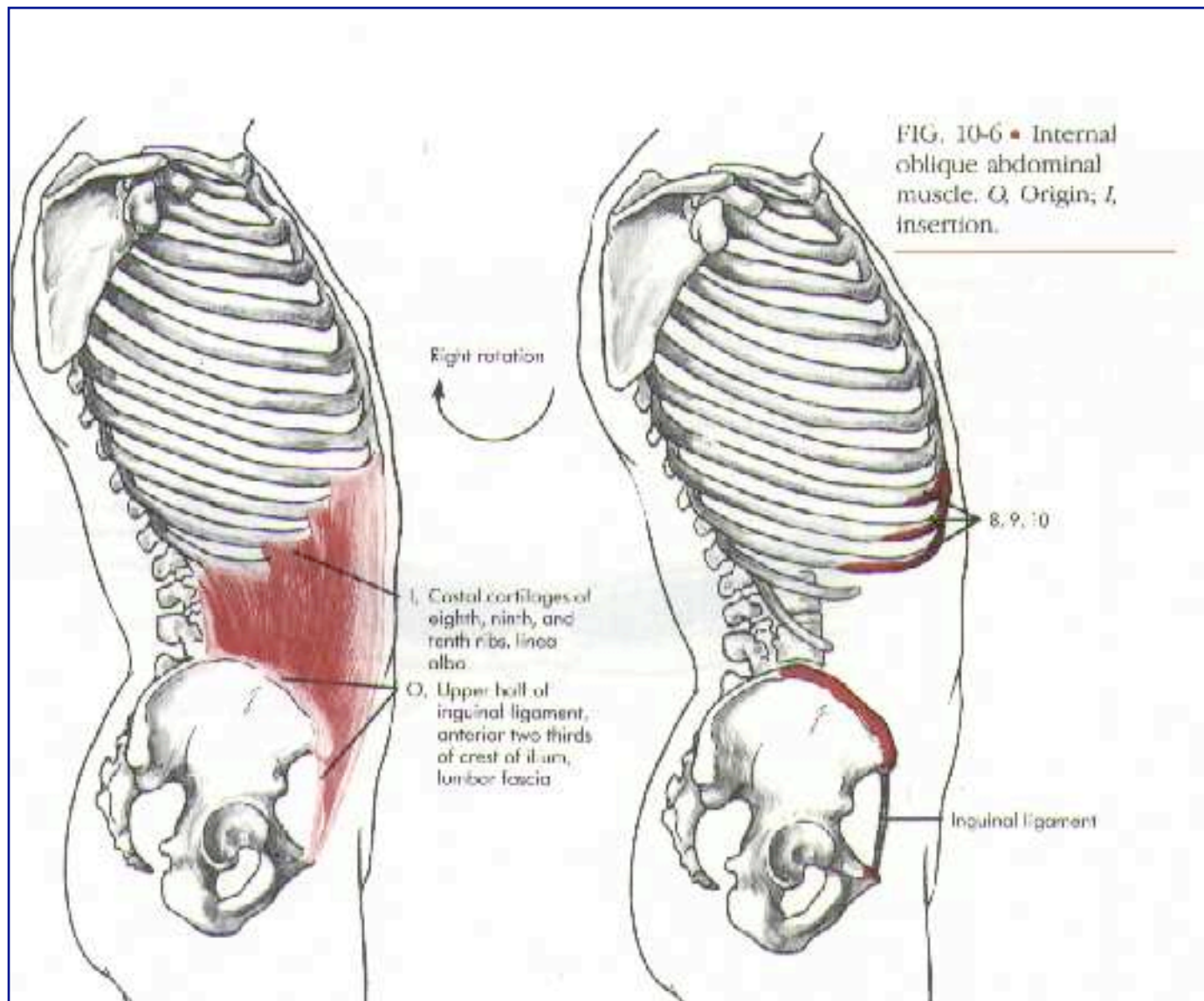


The Lower Internal Obliques can have a girdle effect on the lower part of the midsection when worked properly.

The Lower Internal Obliques assist the Rectus Abdominus with the final part of the Sit-up

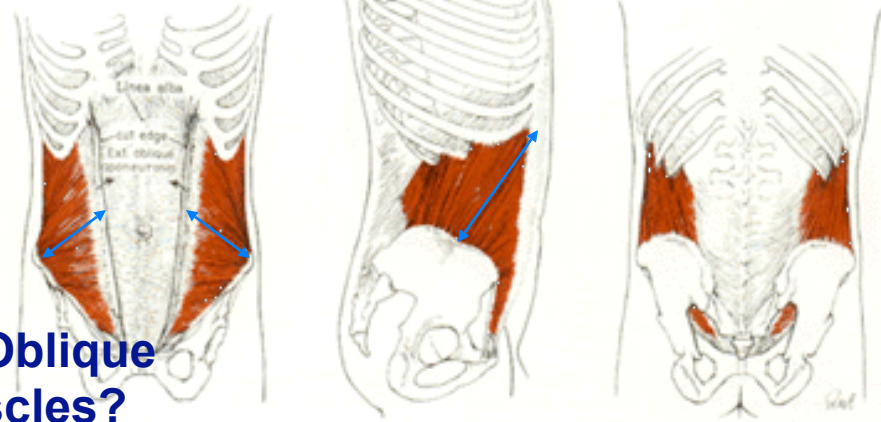
# Internal oblique







Internal



The Oblique  
Muscles?

Which is Internal and which is External?

External



# Transverse abdominis

- I: Inguinal ligament, iliac crest, and lower 6 ribs
- O: Linea alba ("white line") and pubis crest
- Functions:
  - Exhalation (during exercise)

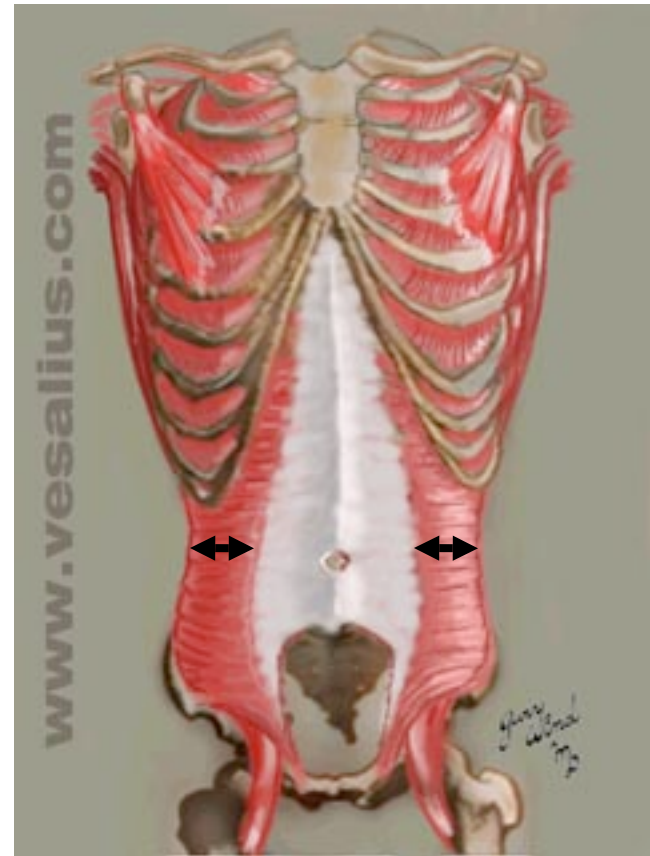
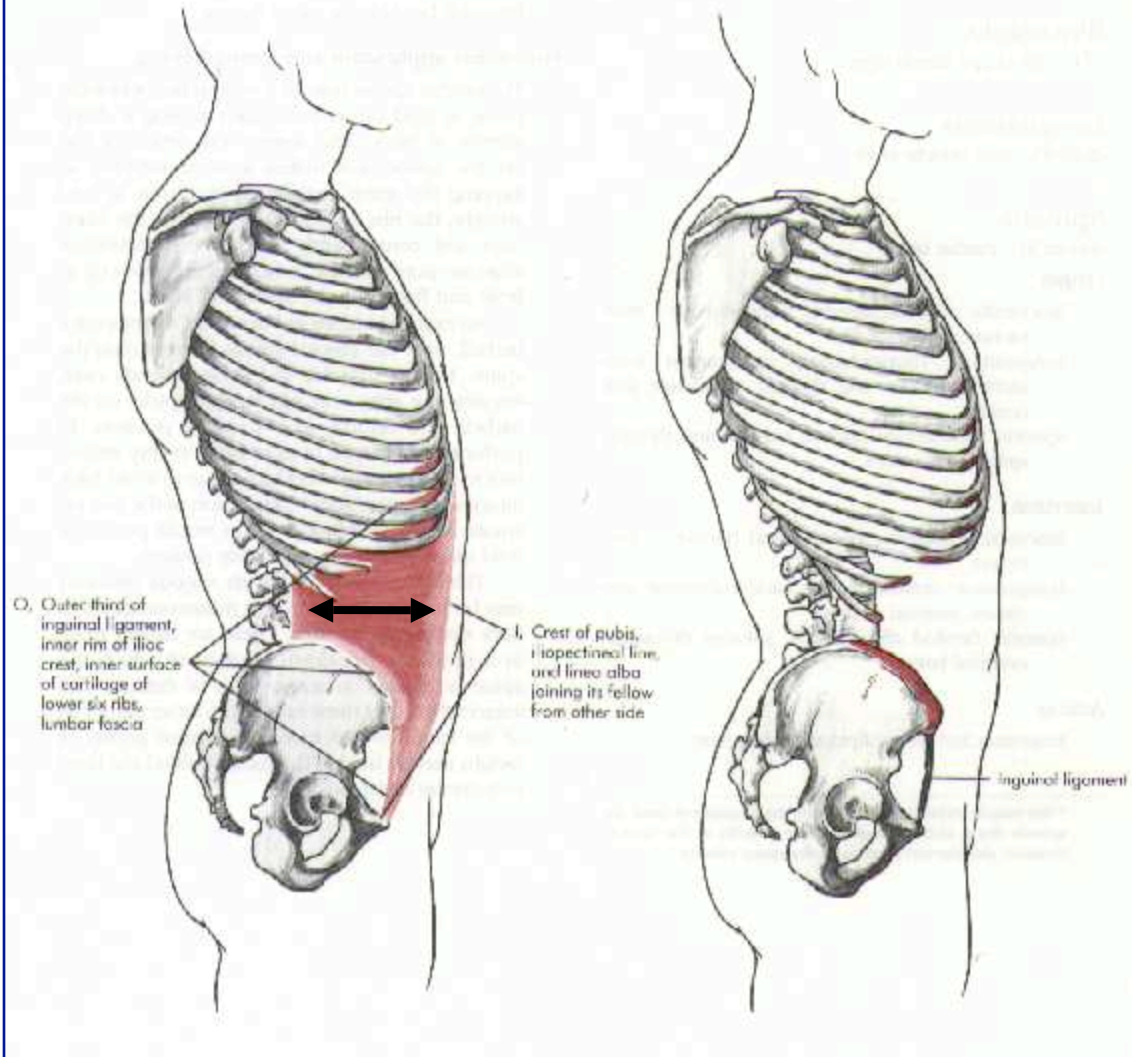
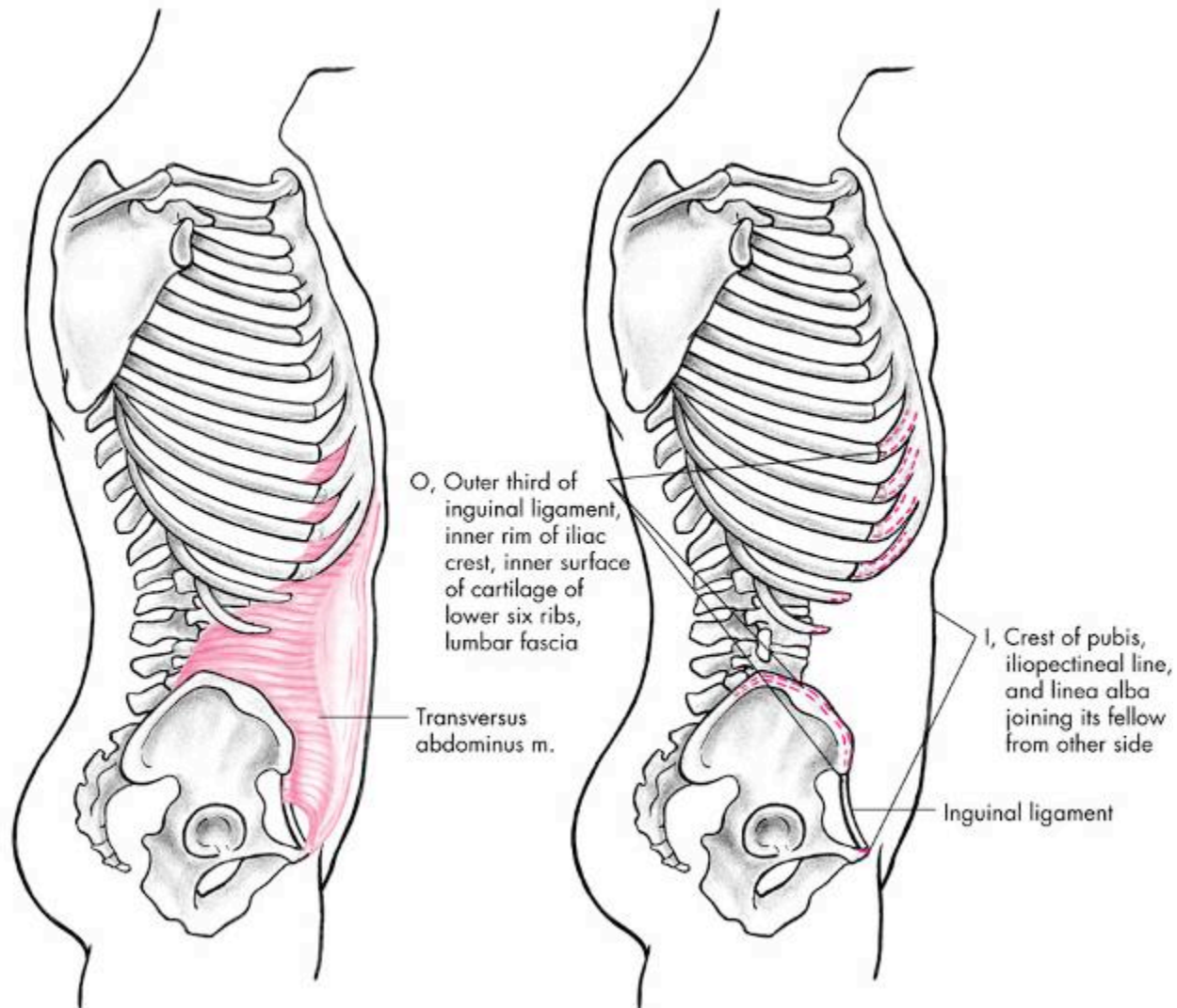


FIG. 10-8 • Transversus abdominis muscle. *O*, Origin; *I*, insertion.



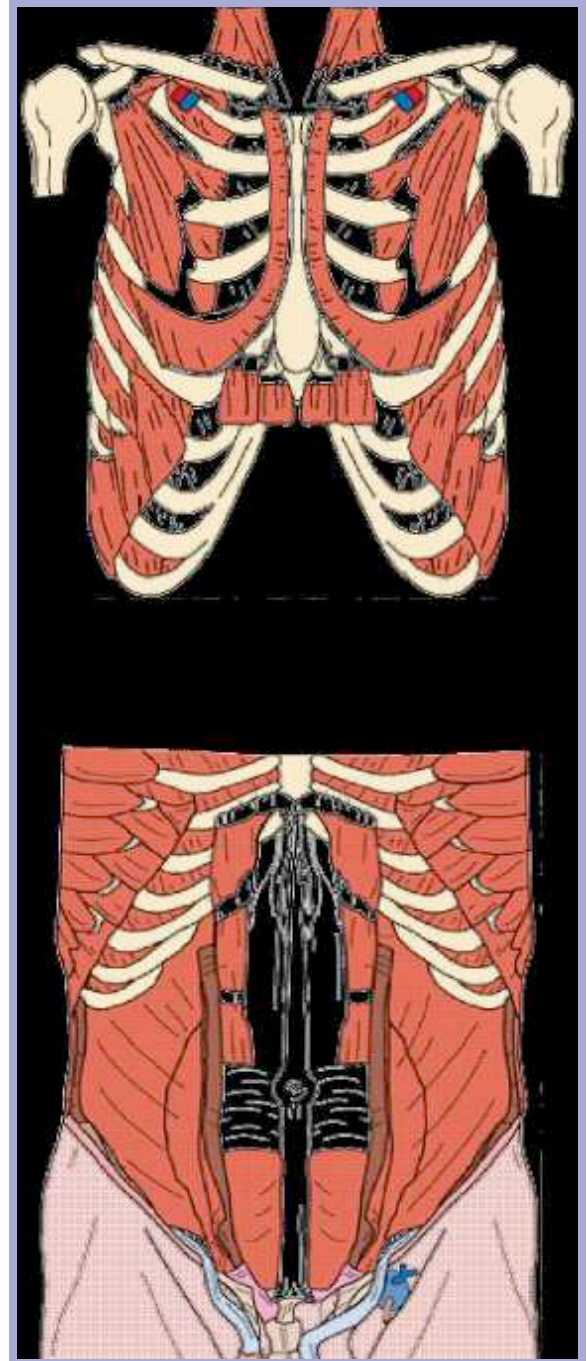
# Transverse abdominis



# MUSCLES OF RESPIRATION

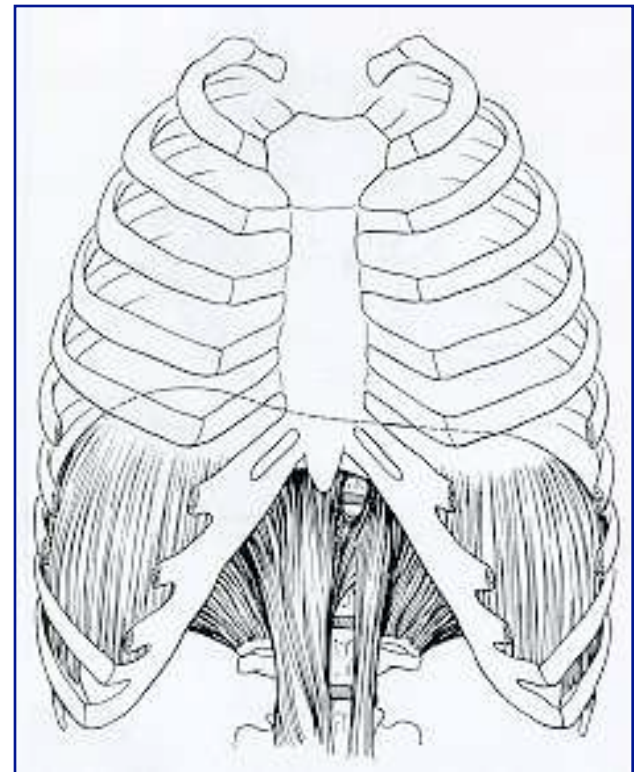
- Rib actions
- Respiration

# III. ANATOMY of the RESPIRATORY MUSCLES



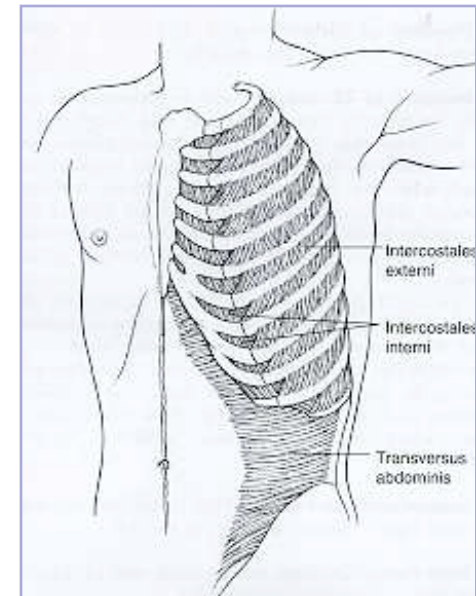
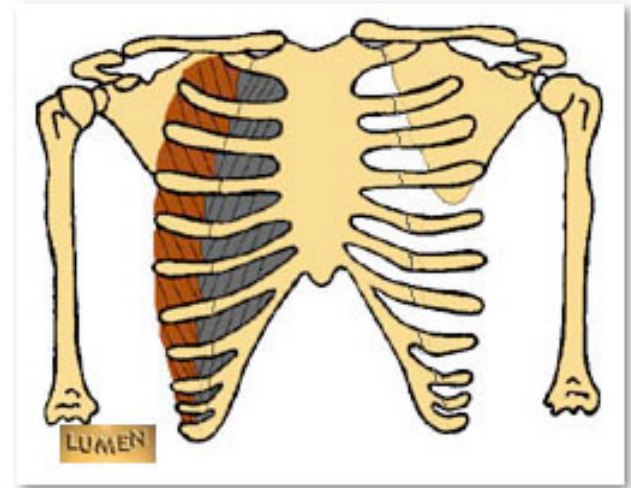
# Diaphragm

- O: Xiphoid process, costal cartilages, lumbar vertebrae
- I: Central tendon
- **A: Flattens, pulls central tendon downward**



# External Intercostals

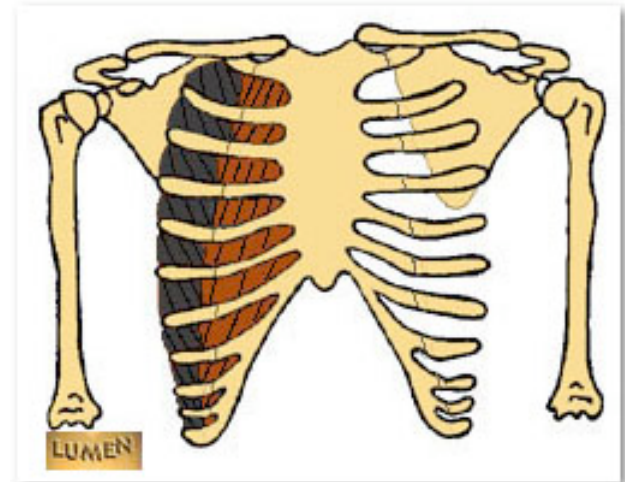
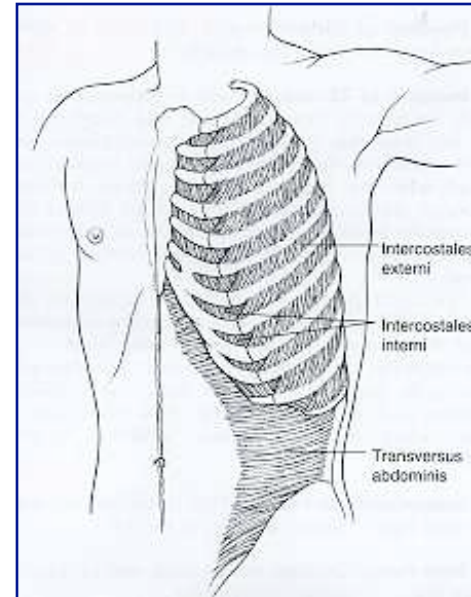
- Draws ribs together and **elevates the ribs; move up and out**



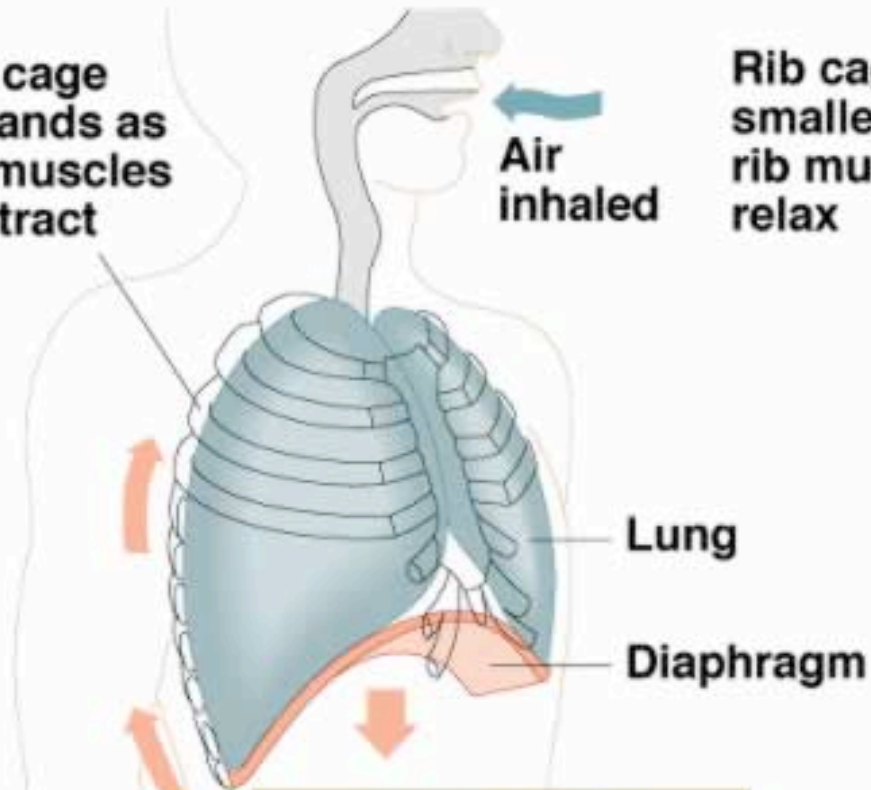


# Internal Intercostals

- Draws ribs together and **lowers ribs; move down and in**

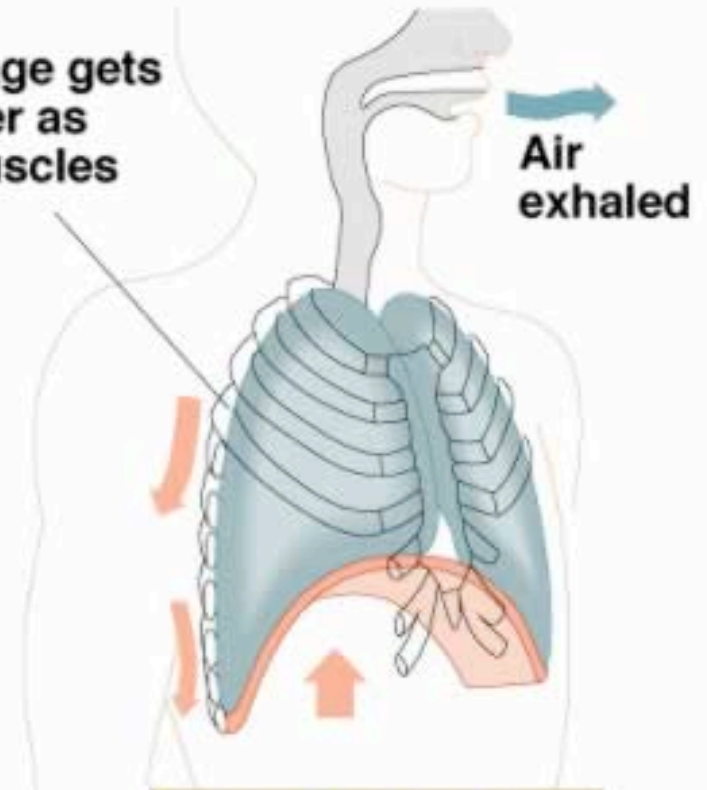


Rib cage expands as rib muscles contract



Air inhaled

Rib cage gets smaller as rib muscles relax



Air exhaled

**INHALATION**  
Diaphragm contracts  
(moves down)

**EXHALATION**  
Diaphragm relaxes  
(moves up)

	INSPIRATION	EXPIRATION
REST	Diaphragm & External Intercostals	none
EXERCISE	Sternocleido mastoid & Scalenes	Internal Intercostals & Abdominals

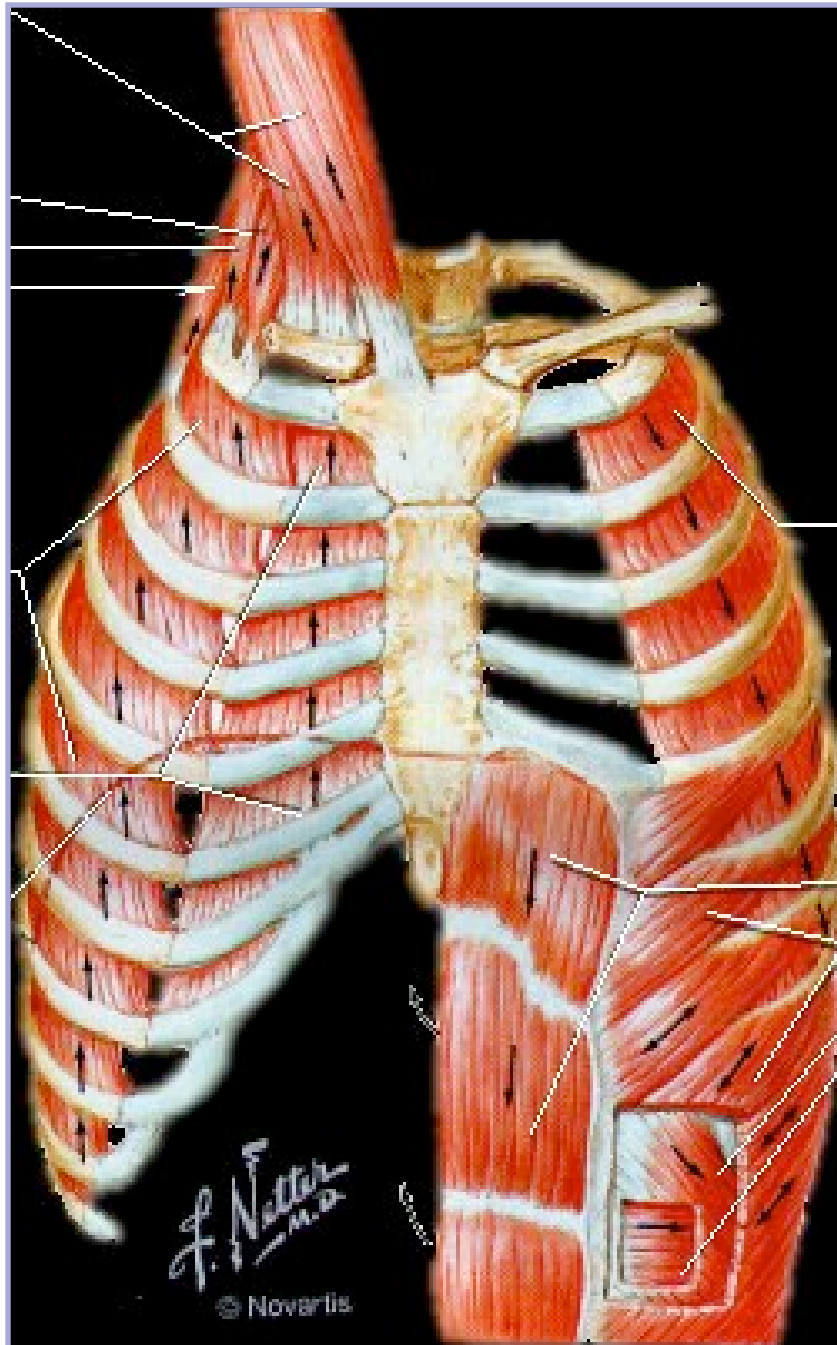
**\*Sternocleidomastoid**

**\*Scalenus**

**External Intercostals**

**Diaphragm**

**Muscles of  
Inspiration**



**Muscles of  
Expiration**



**\*Internal Intercostals**

**\*Rectus Abdominus**

**\*External Obliques**

**\*Internal Obliques**

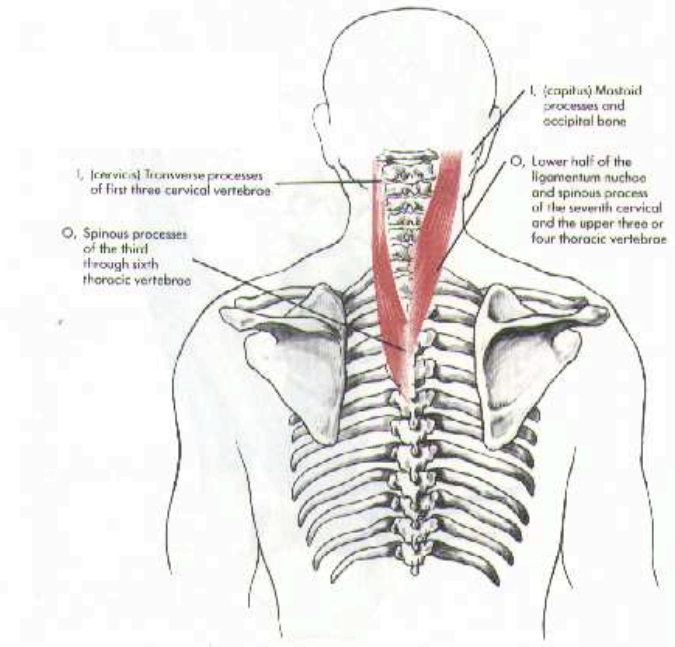
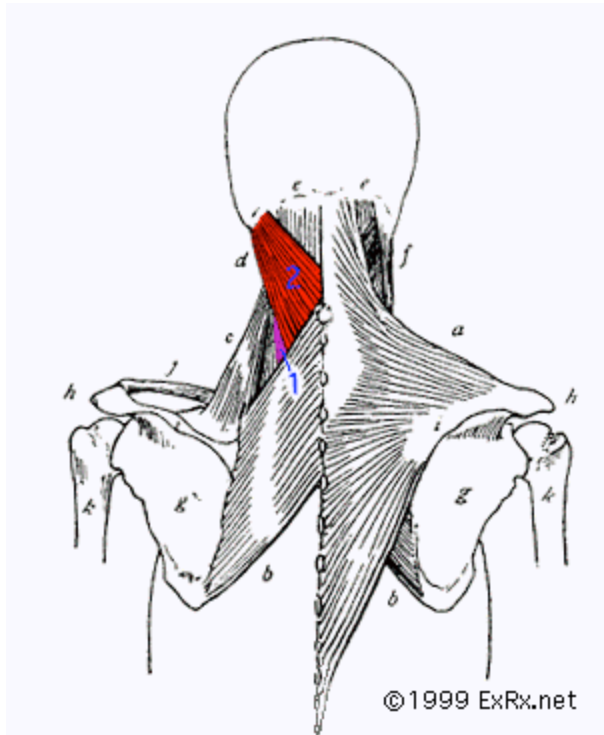
**\*Transverse Abdominus**

# Note:

- These muscles need to be trained with exercise as any other muscle does.
- Early limitations (side aches and breathlessness) felt during exercise may involve the untrained state of these muscles.

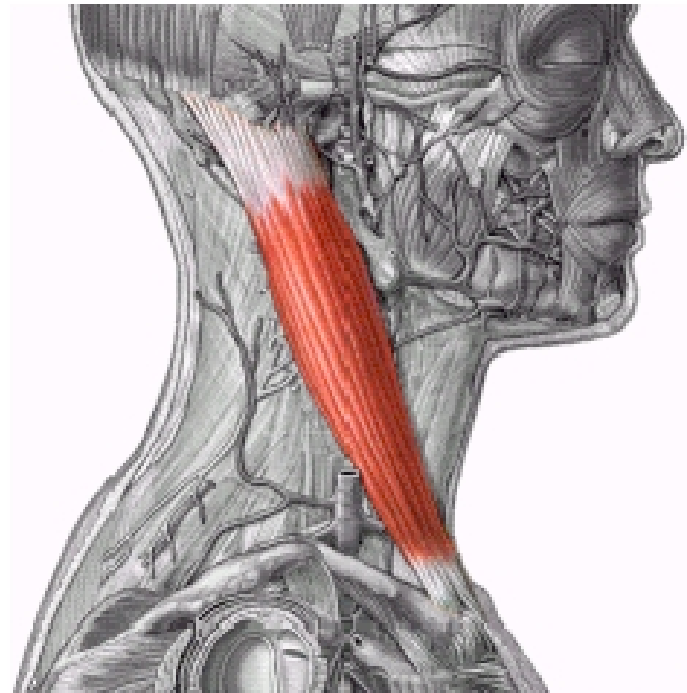


# Splenius



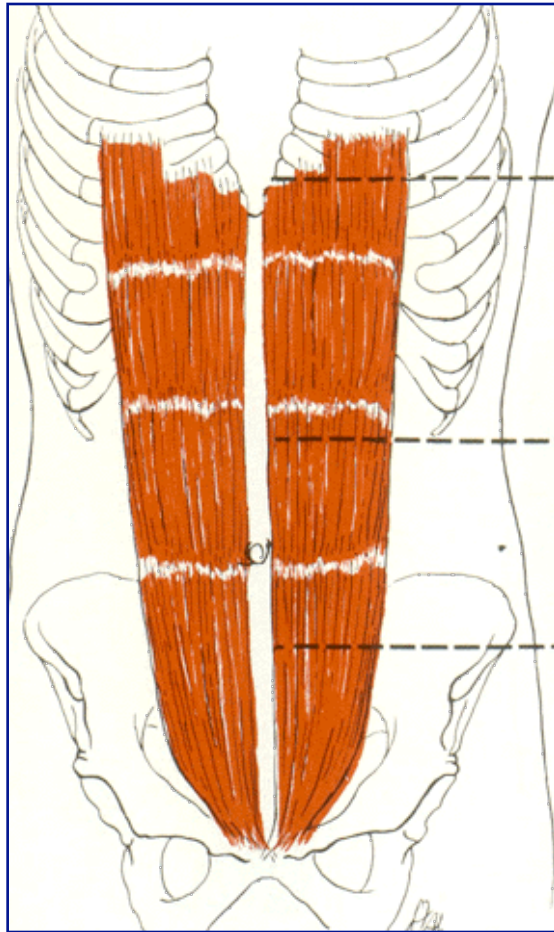


**Located on the anteriolateral surface of the neck. It extends from the manubrium and clavicle (origins) to the mastoid process. Contraction of both muscles produces flexion of neck. Acting separately, they produce rotation of the head.**

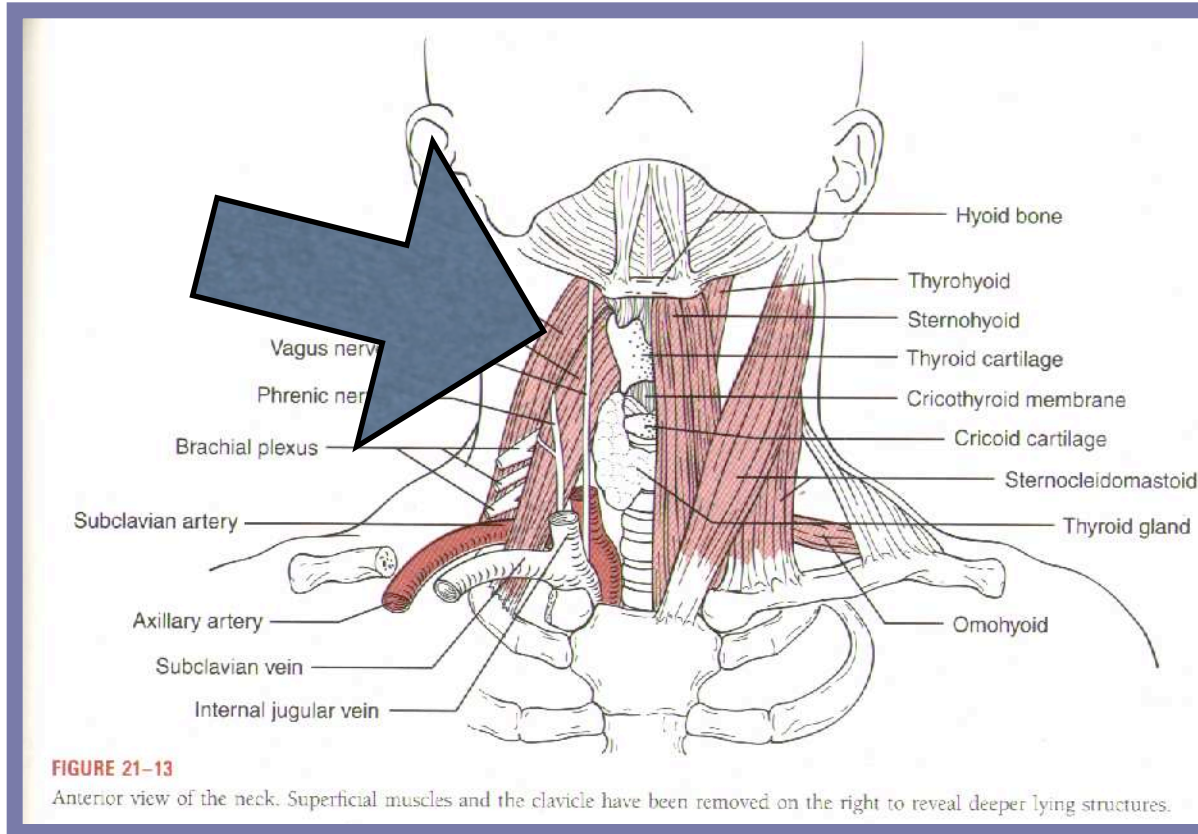


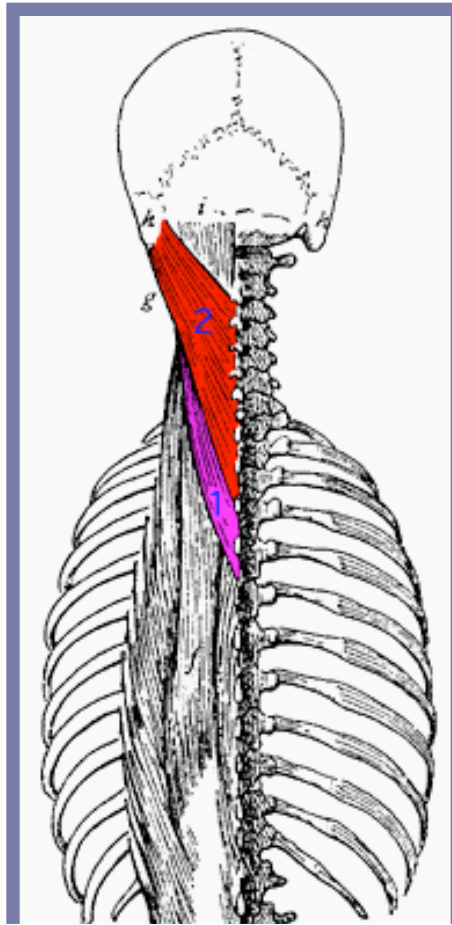


# Rectus abdominis



# Scalenes

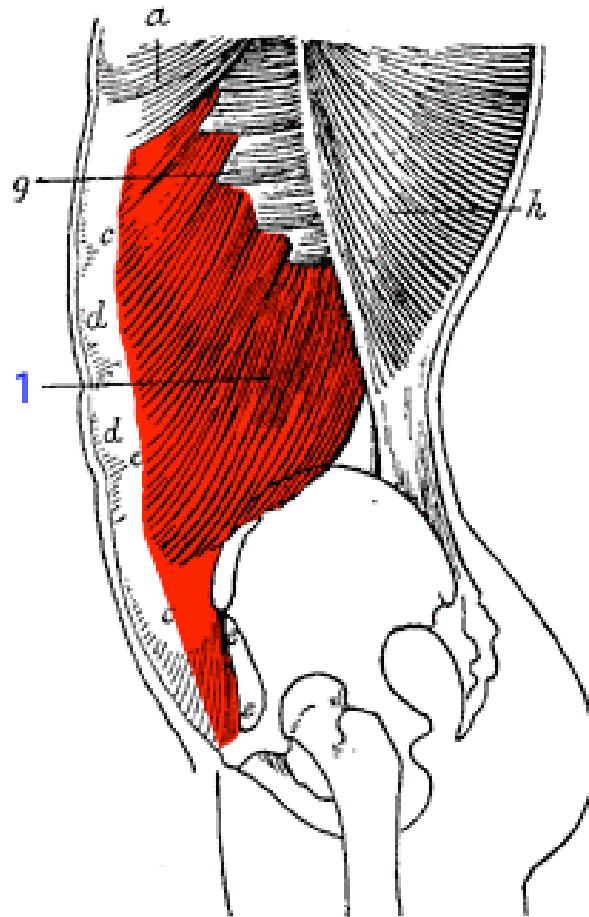




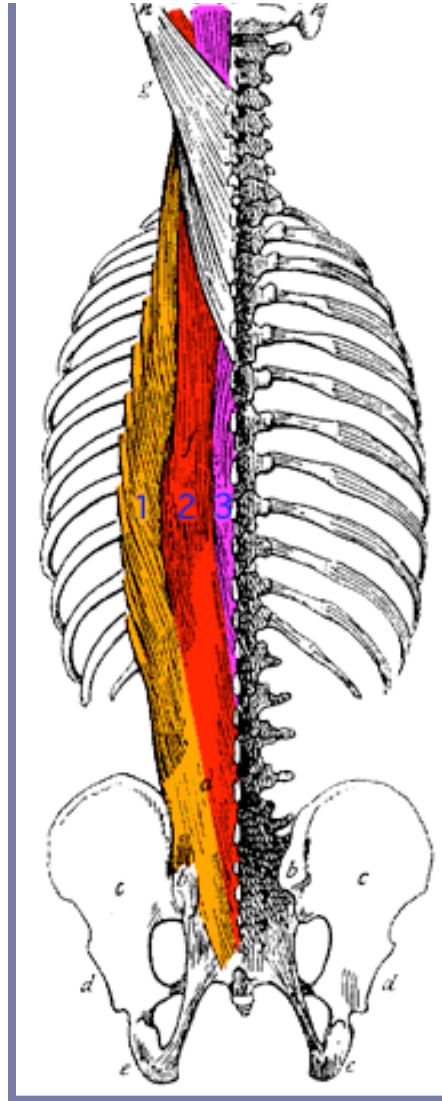
# Splenius



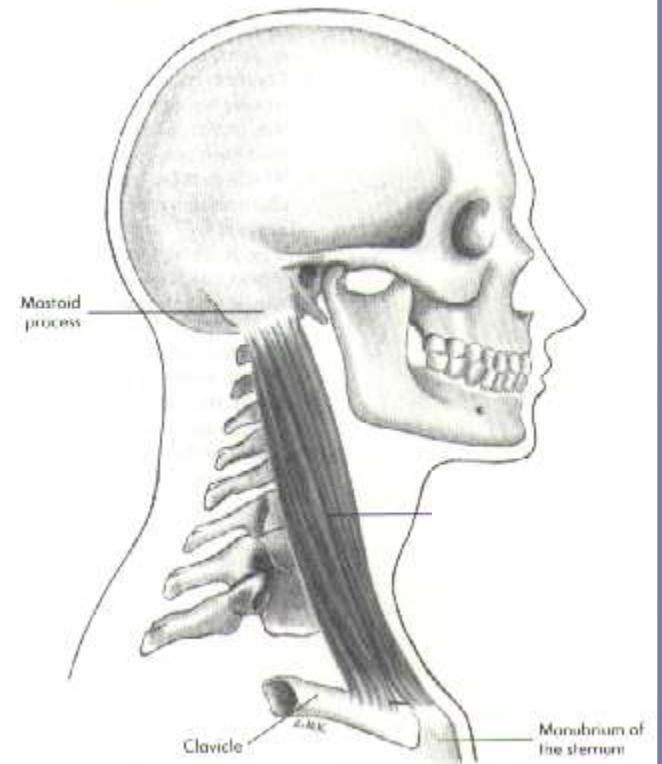
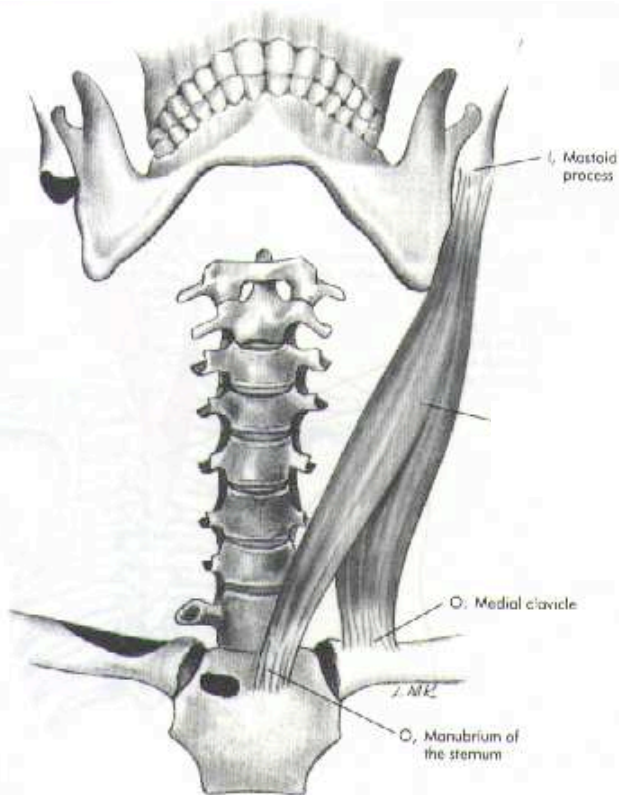
# External oblique



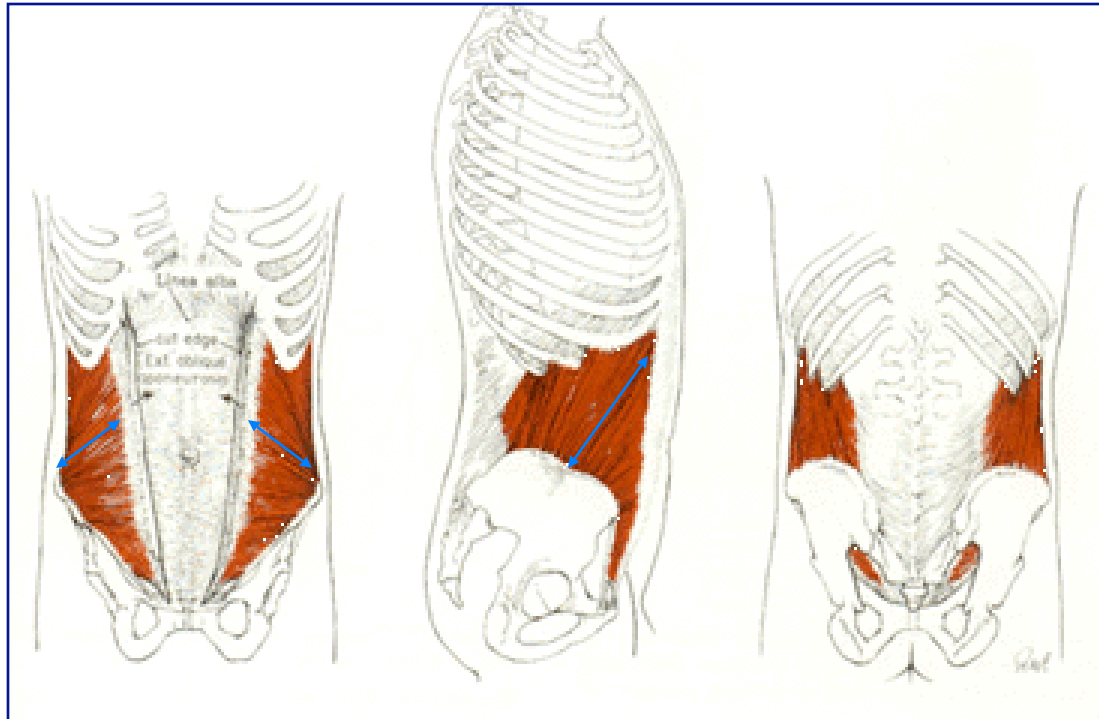
# Erector spinae muscles

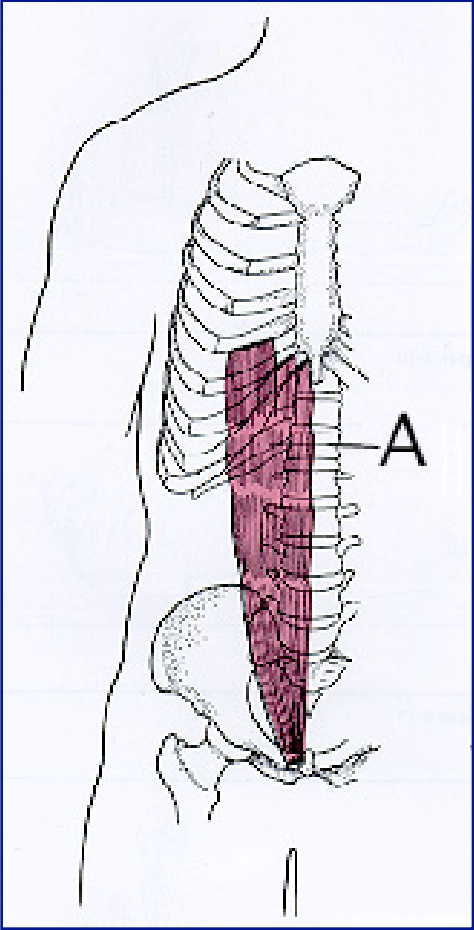


# Sternocleidomastoid

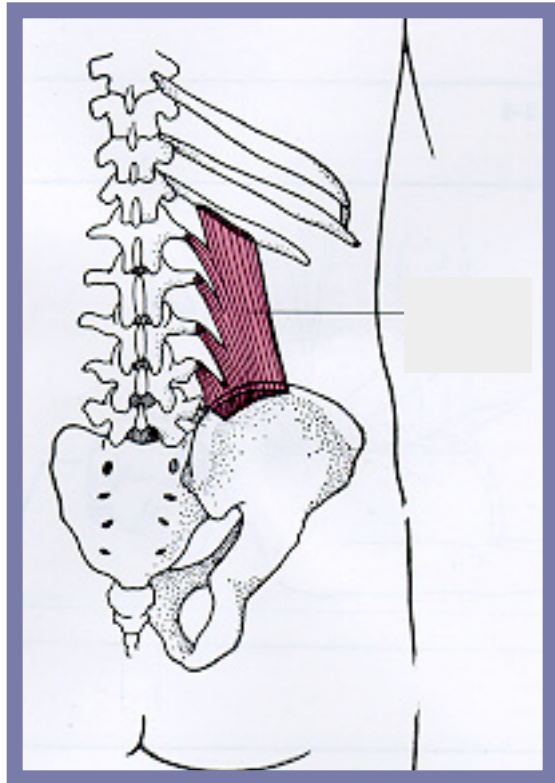


# Internal oblique



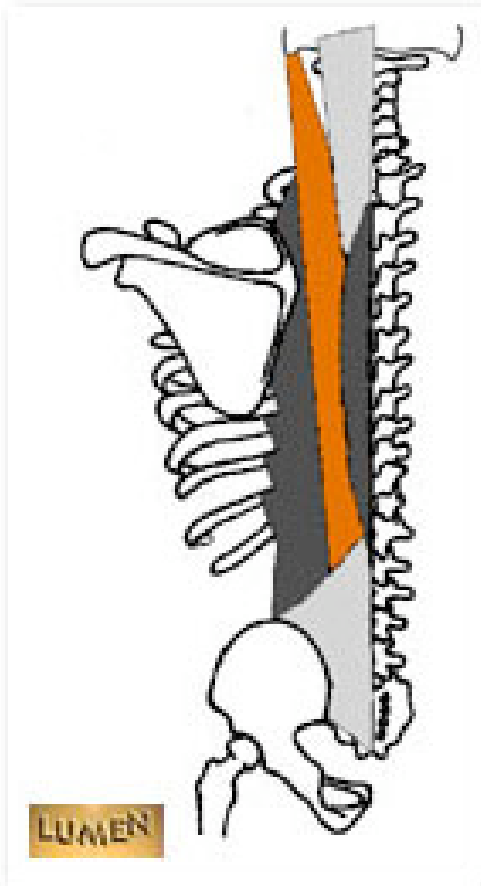




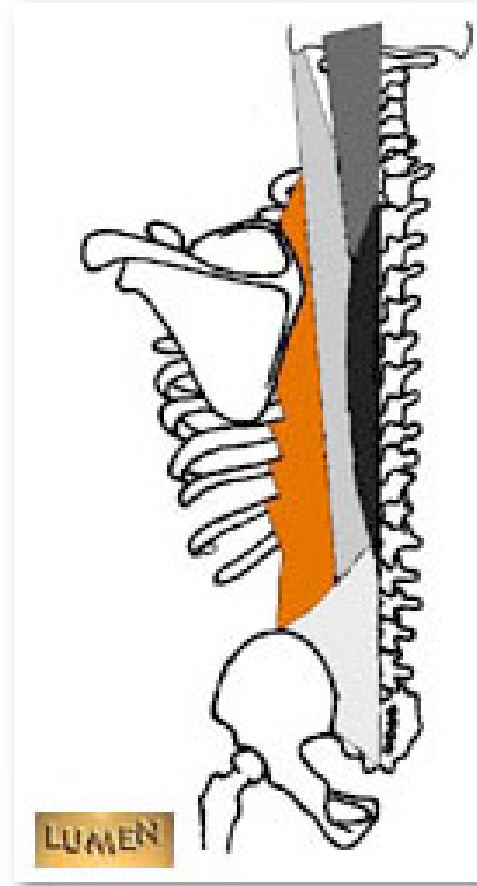


# Erector spinae

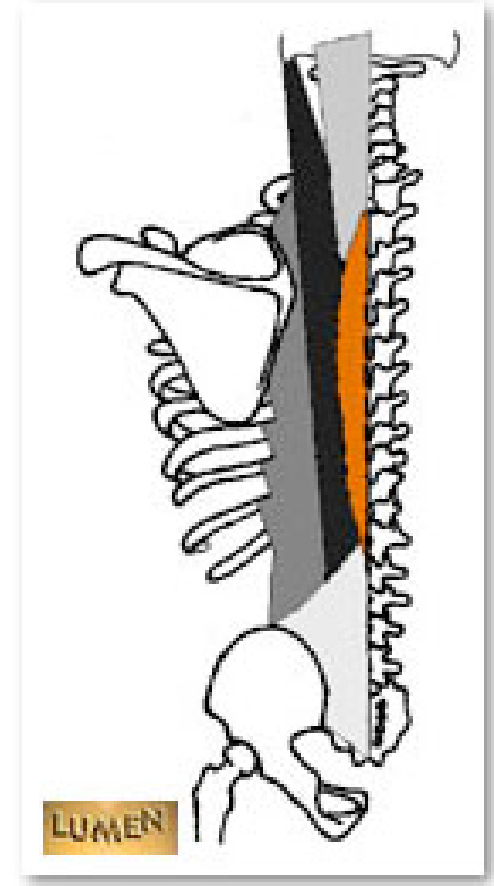
Longissimus branch



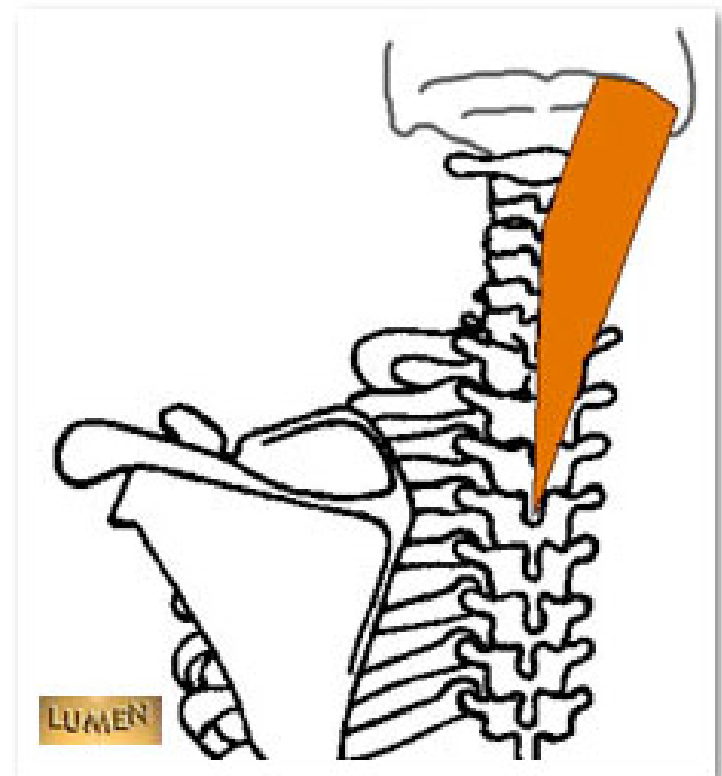
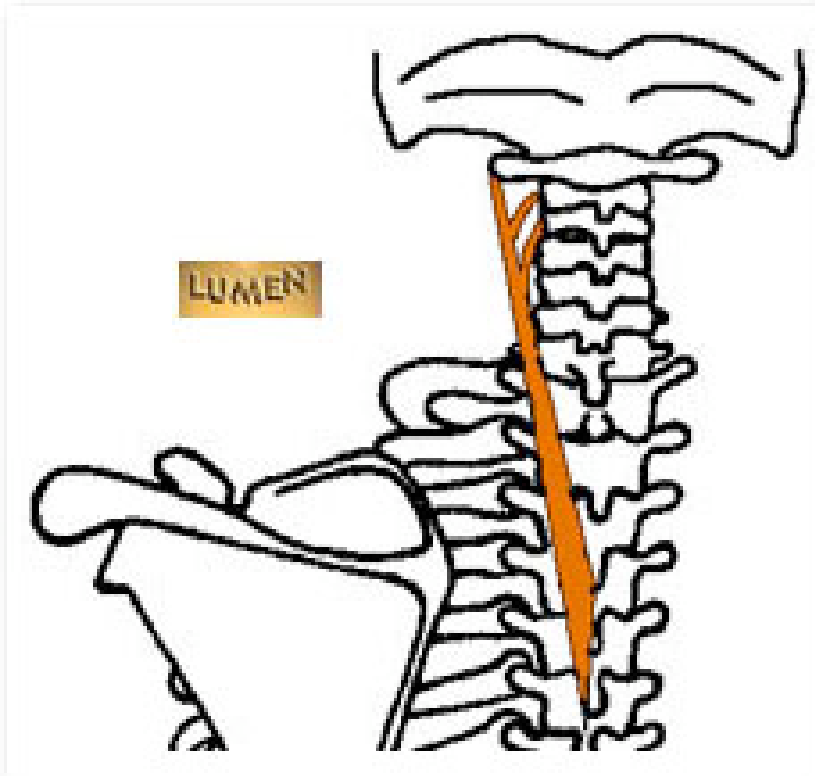
Iliocostalis branch



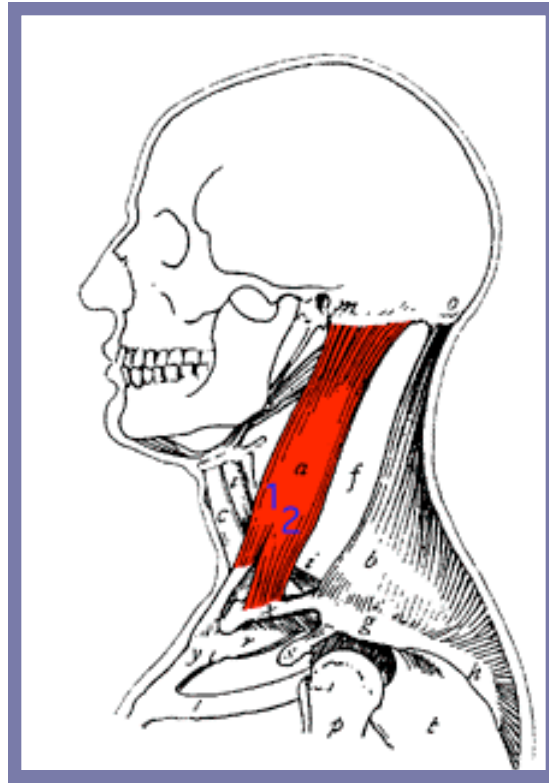
Spinalis branch



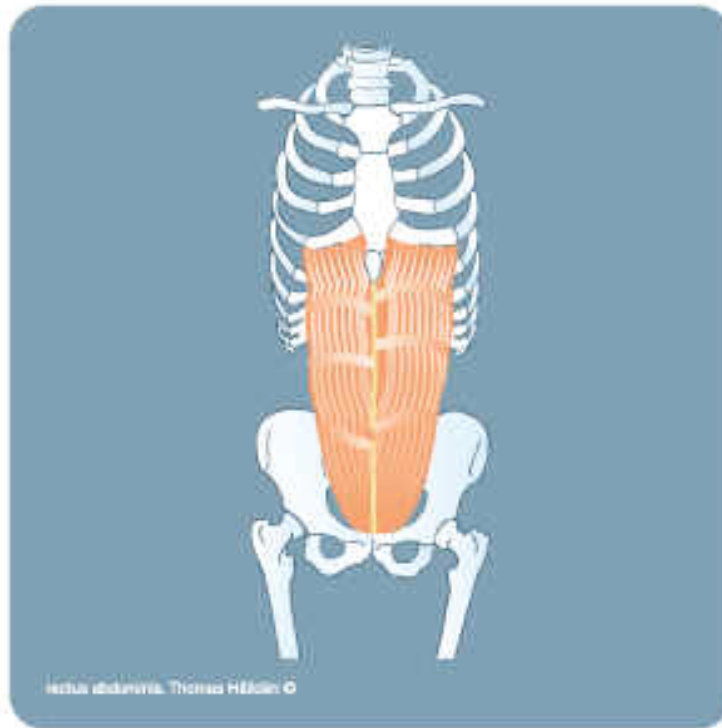
# Splenius



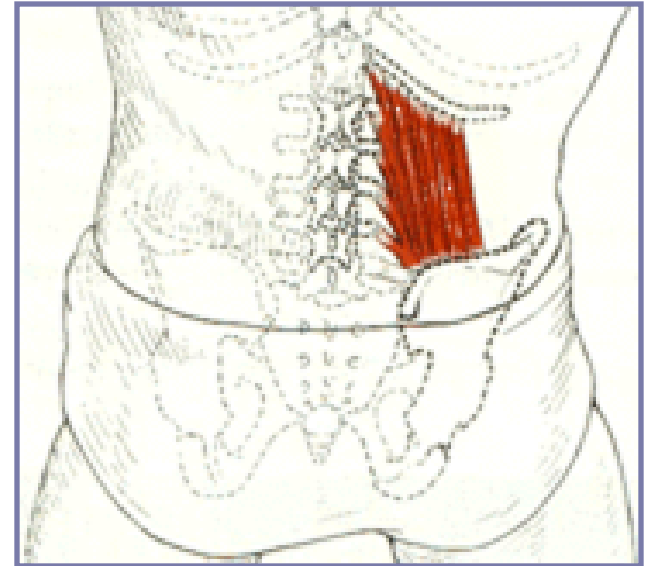
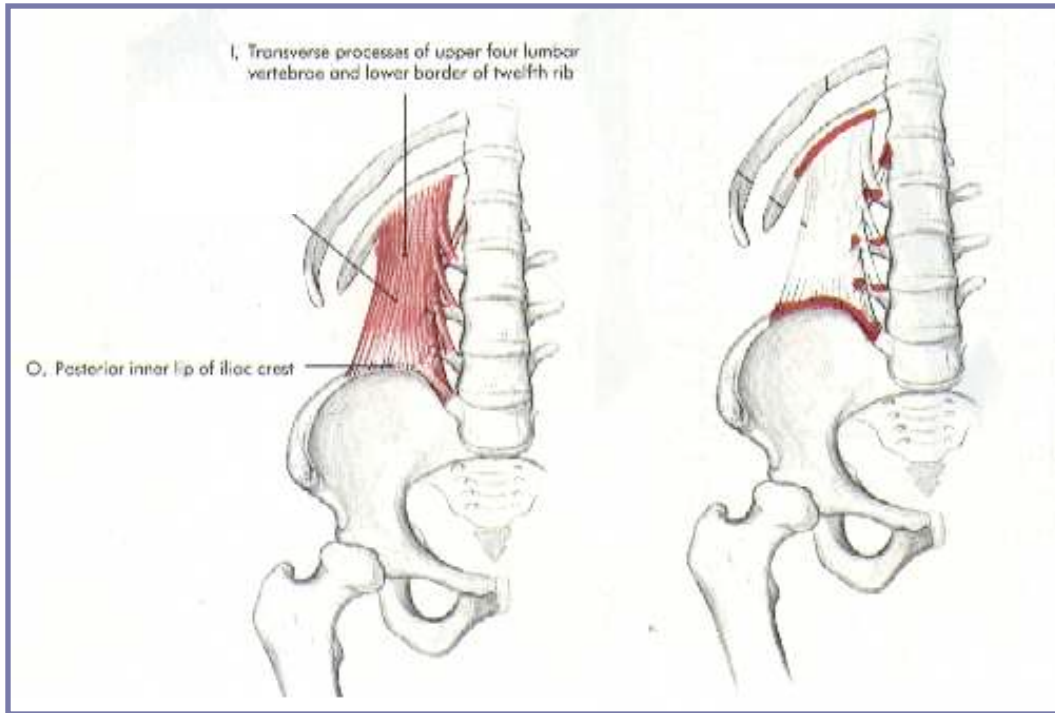
# Sternocleidomastoid

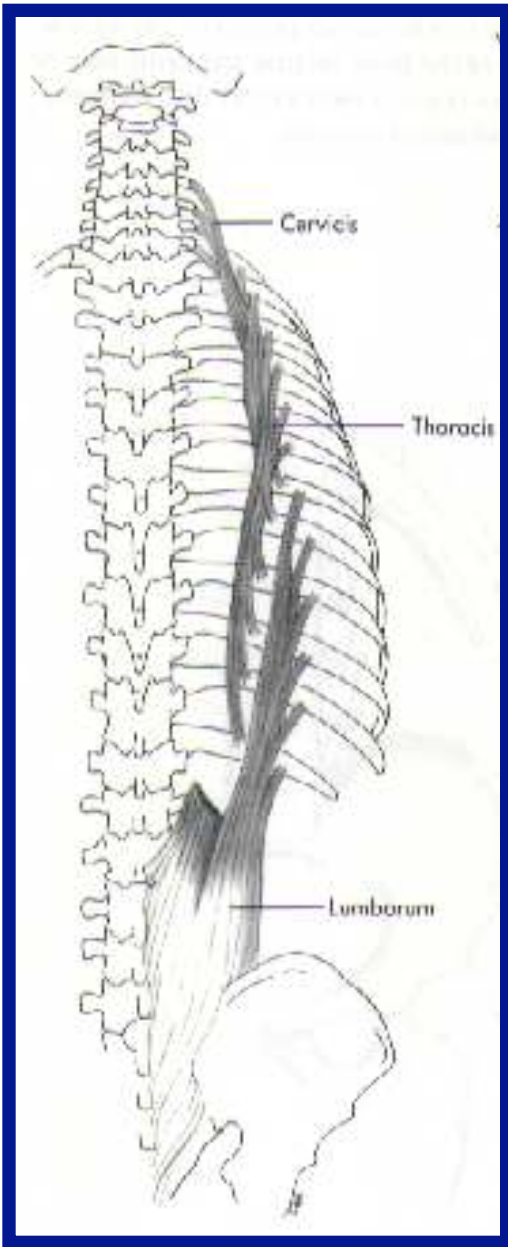


# Rectus abdominis

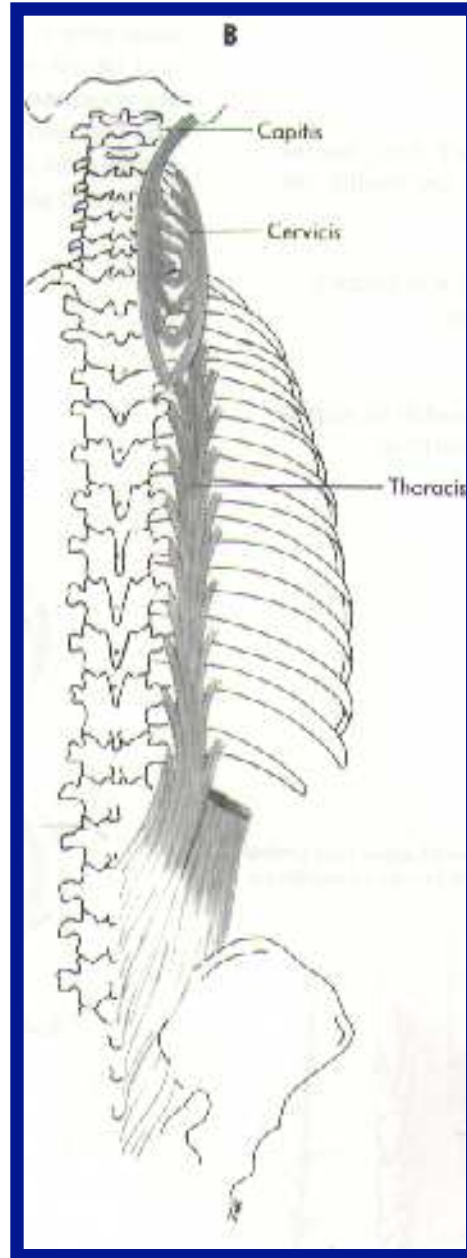


# Quadratus lumborum

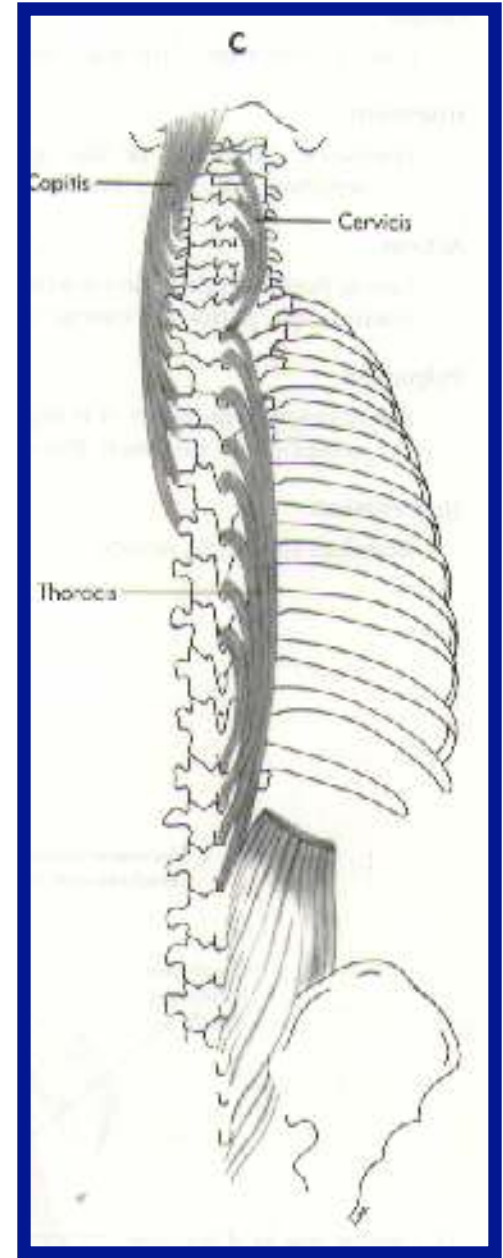




**Iliocostalis branch**

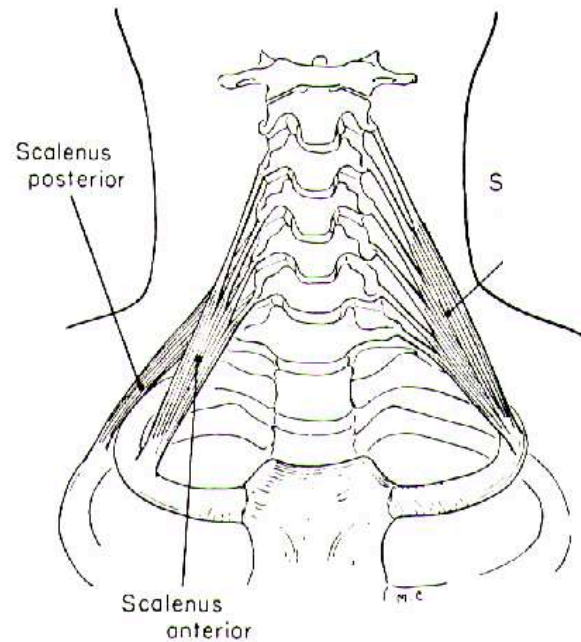


**Longissimus branch**



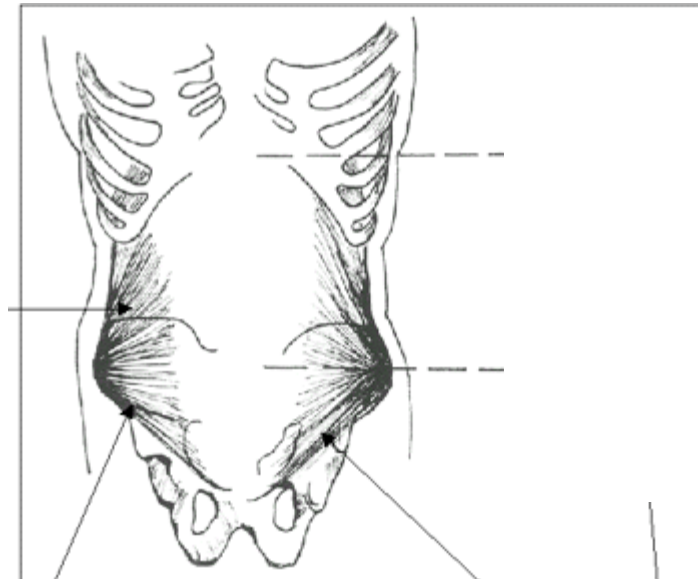
**Spinalis branch**

# Scalenes (or scaleni)





# Internal oblique



# Sternocleidomastoid

