#### **Human Anatomy**

#### **Axial Muscles**

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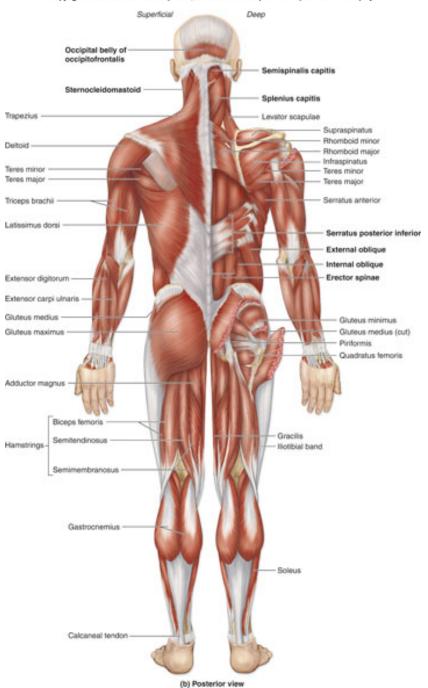
#### **Axial Muscles**

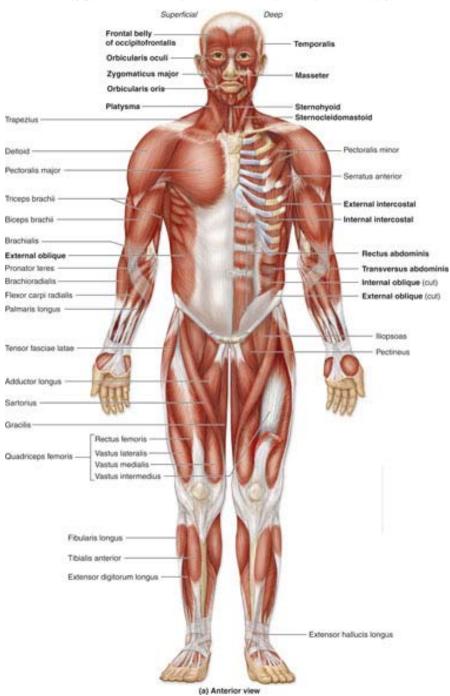
- Have both their origins and insertions on parts of the axial skeleton.
- Support and move the head and spinal column.
- Function in nonverbal communication by affecting facial features.
- Move the lower jaw during chewing.
- Assist in food processing and swallowing.
- Aid breathing.
- Support and protect the abdominal and pelvic organs.
- Are not responsible for stabilizing or moving the pectoral or pelvic girdles or their attached limbs.

Copyright © The McGraw-Hill Companies, Inc. Permission required for reproduction or display. Superficial<sup>\*</sup> Deep Frontal belly of occipitofrontalis Temporalis Orbicularis oculi-Zygomaticus major Masseter Orbicularis oris-Platysma -Sternohyold Sternocleidomastoid Trapezius -Pectoralis minor Defloid: Pectoralis major Serratus anterior Triceps brachii -External intercostal Internal intercostal Biceps brachs Brachialis -Rectus abdominis External oblique Pronator teres -Transversus abdominis Brachioradialis -Internal oblique (cut) Flexor carpi radialis -External oblique (cut) Palmaris longus Nopsoas Tensor fasciae latae Pectineus Adductor longus Sartorius Gracits -Rectus femoris Vastus lateralis Quadriceps femoris -Vastus medialis Vastus intermedius Fibularis longus Tibialis anterior -Extensor digitorum longus Extensor haliucis longus

(a) Anterior view

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Copyright © The McGraw-Hill Companies, Inc. Permission required for reproduction or display. Superficial Deep Occipital belly of occipitofrontalis Semispinalis capitis Sternocleidomastoid Splenius capitis Trapezius Levator scapulae Supraspinatus Rhomboid minor Deltoid -Rhomboid major Infraspinatus Teres minor Teres minor Teres major Teres major Serratus anterior Triceps brachil -Latissimus dorsi -Serratus posterior inferior External oblique Internal oblique - Erector spinae Extensor digitorum -Extensor carpi ulnaris -Gluteus medius -- Gluteus minimus Gluteus maximus Gluteus medius (cut) Piriformis Quadratus temoris Adductor magnus -Biceps femoris - Gracilis Semitendinosus -Hamstrings-- Hotibial band Semimembranosus -Gastroonemius -Soleus

(b) Posterior view

Calcaneal tendon -



### Muscles of the Head and Neck

- Separated into several specific groups.
- Almost all originate on either the skull or the hyoid bone.

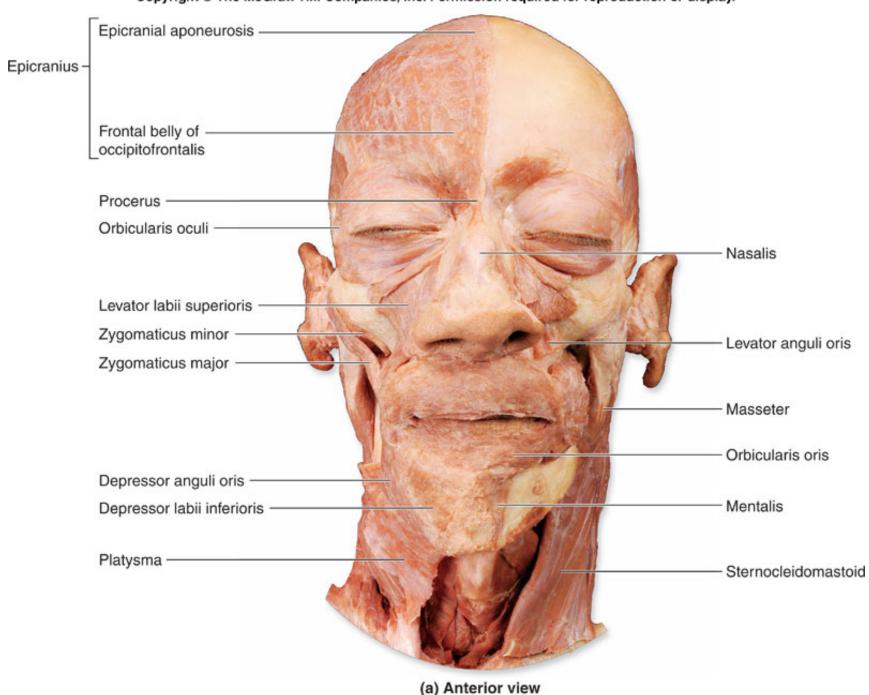


#### Muscles of Facial Expression

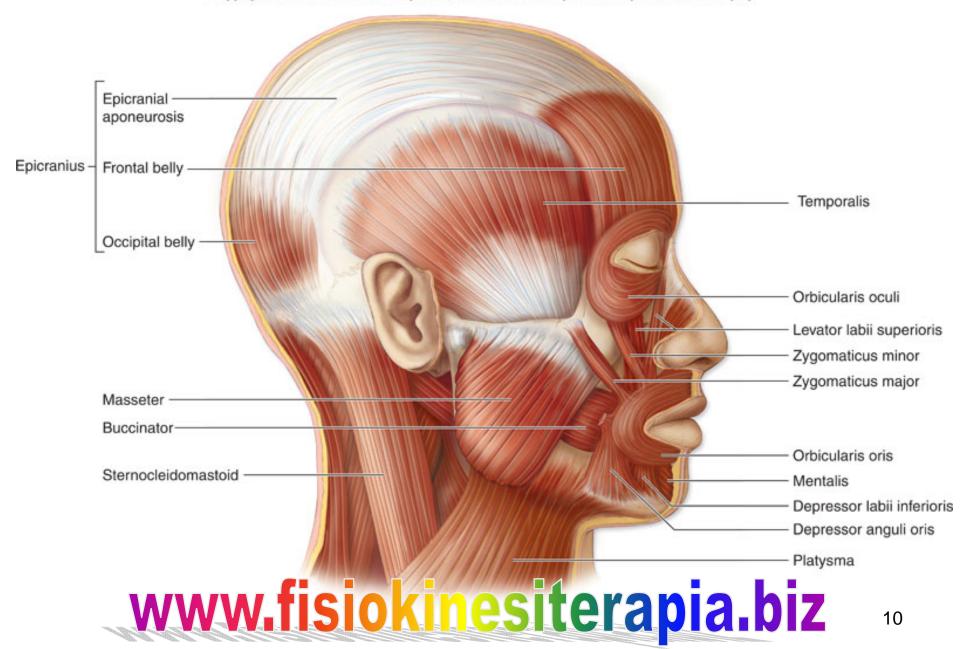
- Originate in the superficial fascia or on the skull bones.
- Insert into the superficial fascia of the skin.
- Contort the skin causing it to move.

Copyright © The McGraw-Hill Companies, Inc. Permission required for reproduction or display. Superficial Deep Epicranial aponeurosis Epicranius -Frontal belly of occipitofrontalis Procerus · Orbicularis oculi Nasalis Levator labii superioris Zygomaticus minor Levator anguli oris (cut) Zygomaticus major Masseter Buccinator Risorius Depressor anguli oris Orbicularis oris Depressor labii inferioris Mentalis Platysma -Sternocleidomastoid

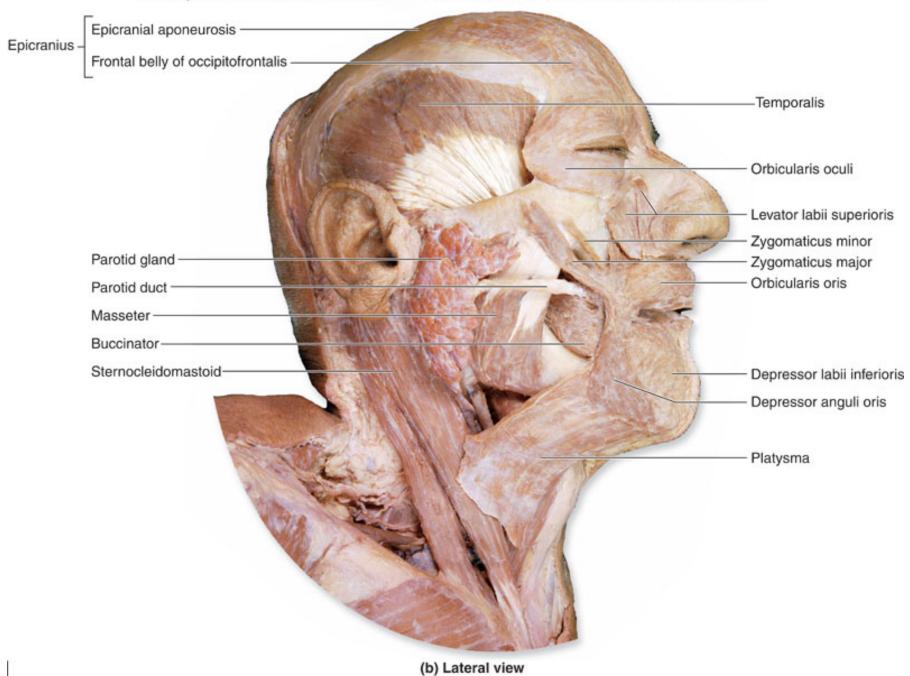
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### Muscles of Facial Expression

- Several are associated with the nose.
- The mouth is the most expressive part of the face
  - muscles in that area are very diverse
- Orbicularis oris consists of muscle fibers that encircle the opening of the mouth.
  - when it contracts the mouth closes

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Depressor anguli oris (frown)



Orbicularis oculi (blink/close eyes)



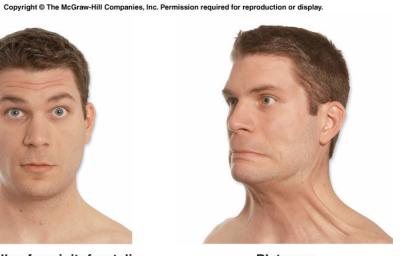
Zygomaticus major (smile)



Orbicularis oris (close mouth/kiss)



Frontal belly of occipitofrontalis (wrinkle forehead, raise eyebrows)

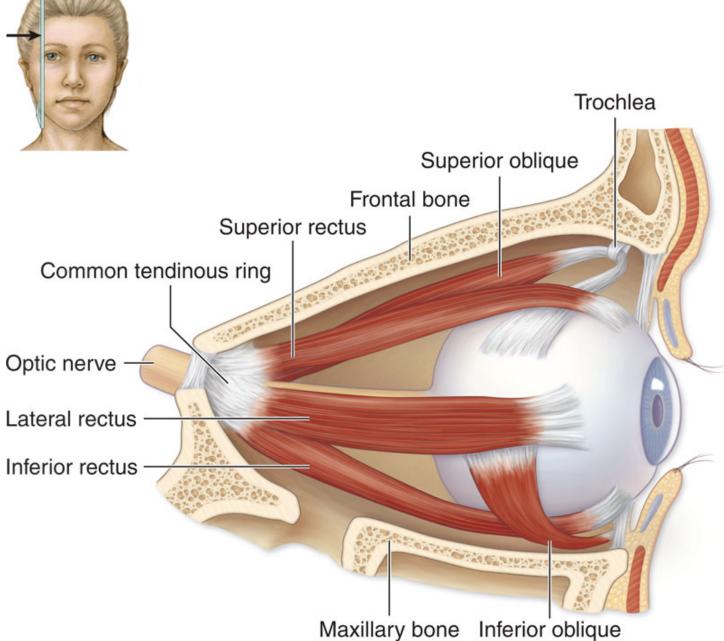


Platysma (tense skin of neck)



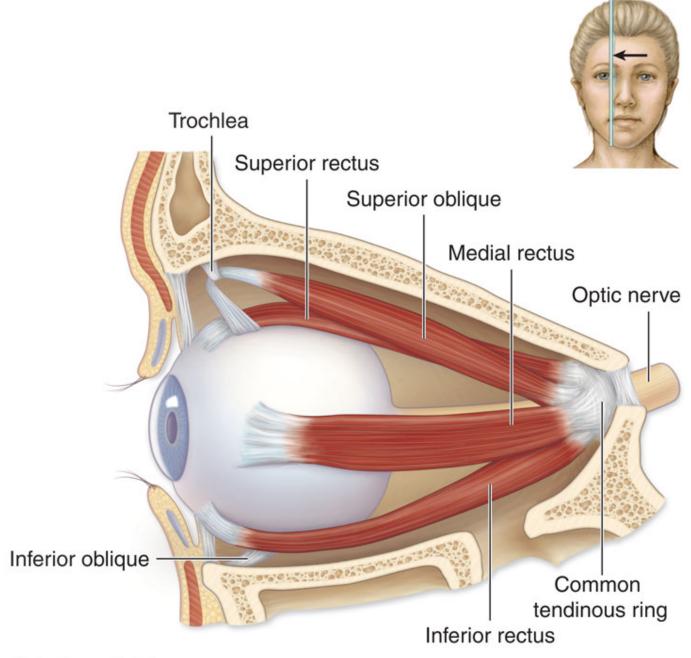
### Extrinsic Eye Muscles

- Often called extraocular muscles.
- Move the eyes.
- Are termed extrinsic because they originate within the orbit and insert onto the sclera.
- Six extrinsic eye muscles.
  - the rectus muscles
    - (medial, lateral, inferior, and superior)
  - the oblique muscles (inferior and superior)



(a) Lateral view, right eye

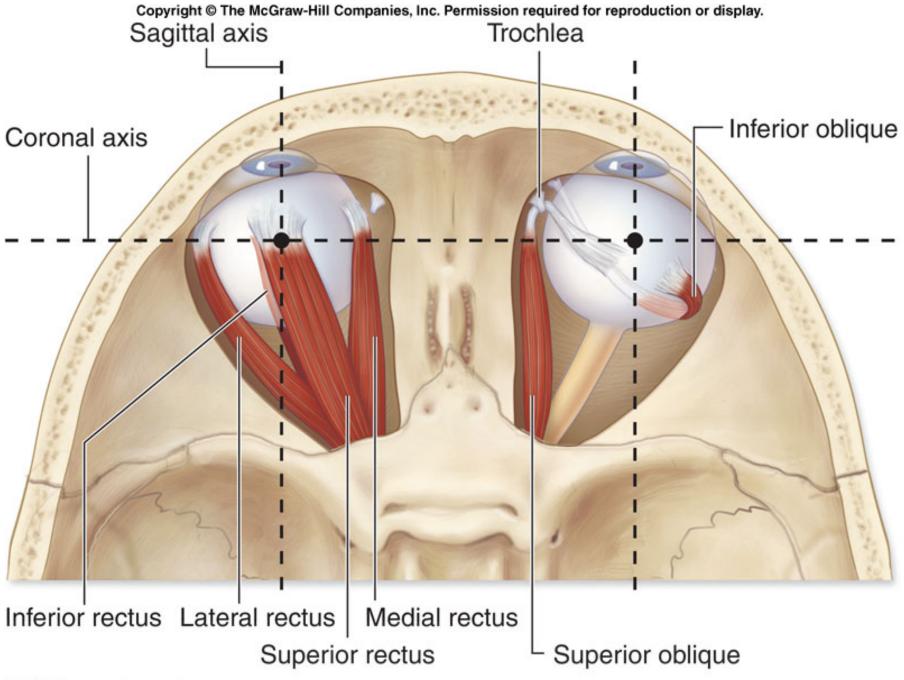
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(b) Medial view, right eye

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#### (c) Anterior view of right orbit, eye removed



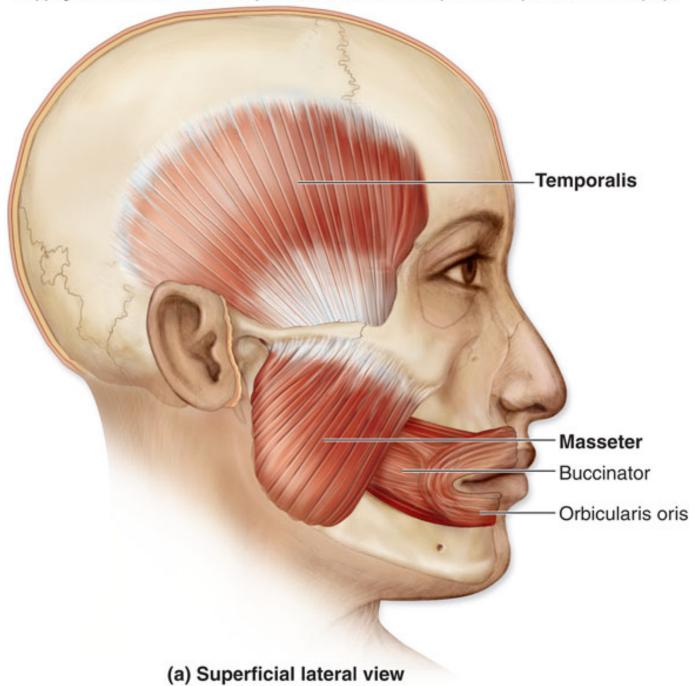
(d) Superior view



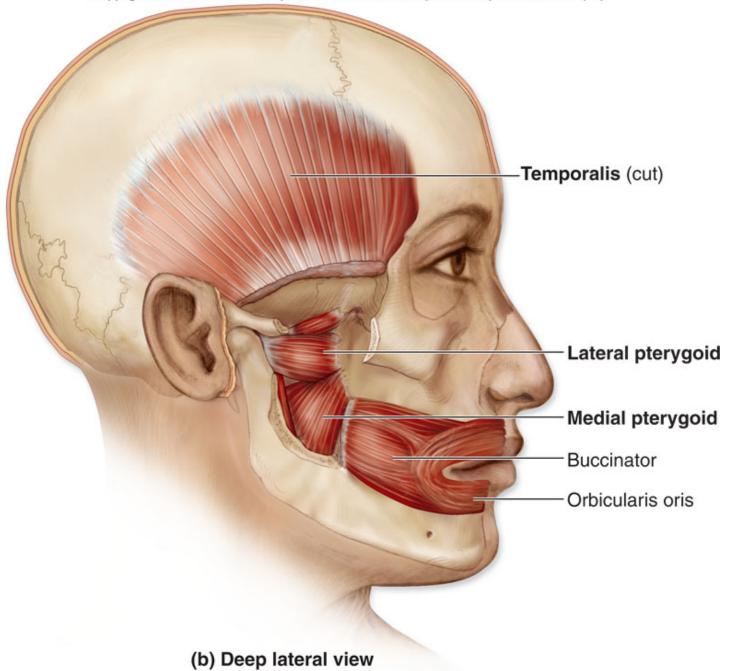
#### Muscles of Mastication

- Refers to the process of chewing.
- Move the mandible at the temporomandibular joint.
- Four paired muscles of mastication
  - temporalis
  - masseter
  - lateral pterygoids
  - medial pterygoids

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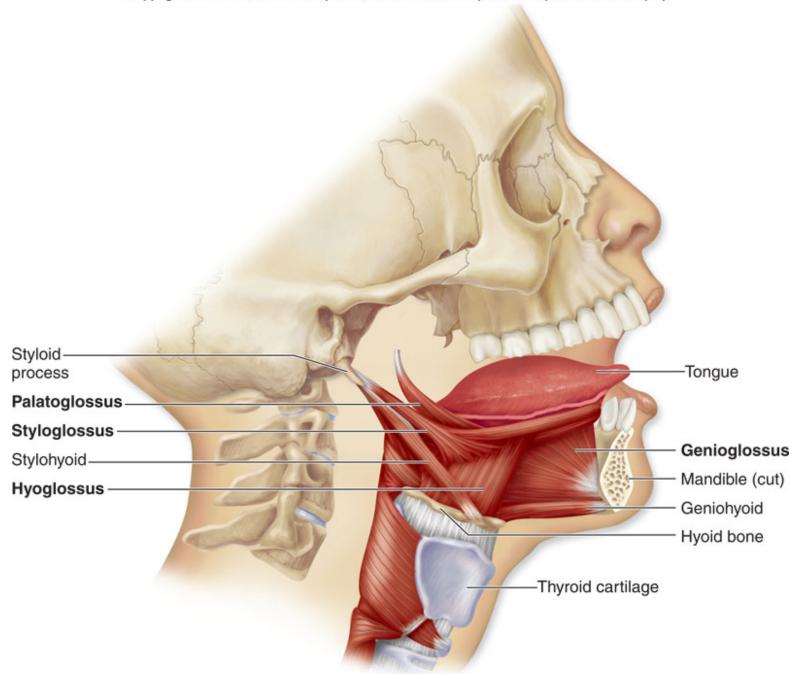
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# Muscles That Move the Tongue

- The left and right genioglossus muscles originate on the mandible and protract the tongue.
- The left and right styloglossus muscles originate on the styloid processes of the temporal bone.
  - elevate and retract the tongue (pull the tongue back into the mouth)
- The left and right hyoglossus muscles originate at the hyoid bone and insert on the sides of the tongue.
  - Depress and retract the tongue
- The left and right palatoglossus muscles originate on the soft palate.
  - elevate the posterior portion of the tongue



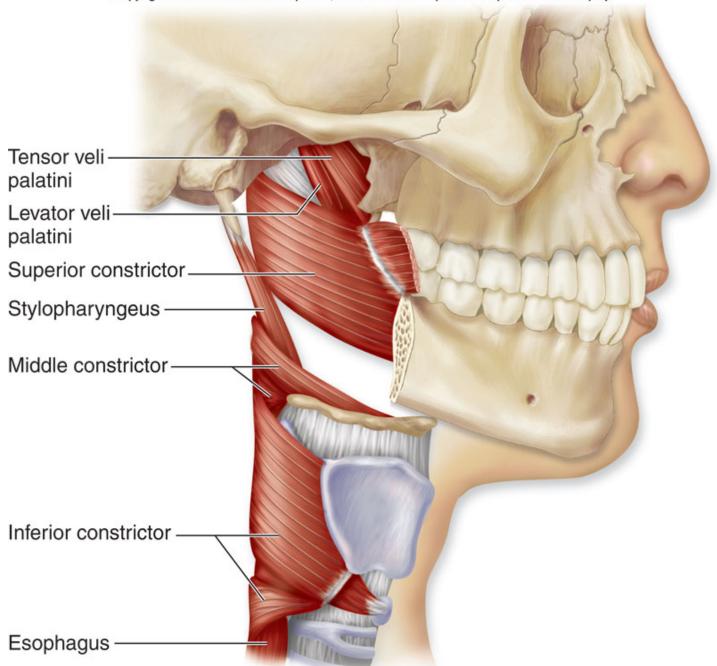
Right lateral view



## Muscles That Move the Tongue

- The tongue is an agile, highly mobile organ.
- It consists of intrinsic muscles that curl, squeeze, and fold the tongue during chewing and speaking.
  - the tongue itself is a big muscle
- Extrinsic muscles of the tongue, originate on other head and neck structures and insert on the tongue.
  - glossus = "tongue"
- Used in various combinations to accomplish the precise, complex, and delicate tongue movements required for proper speech.
- Manipulate food within the mouth in preparation for swallowing.

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**Bight lateral view** 



#### Muscles of the Pharynx

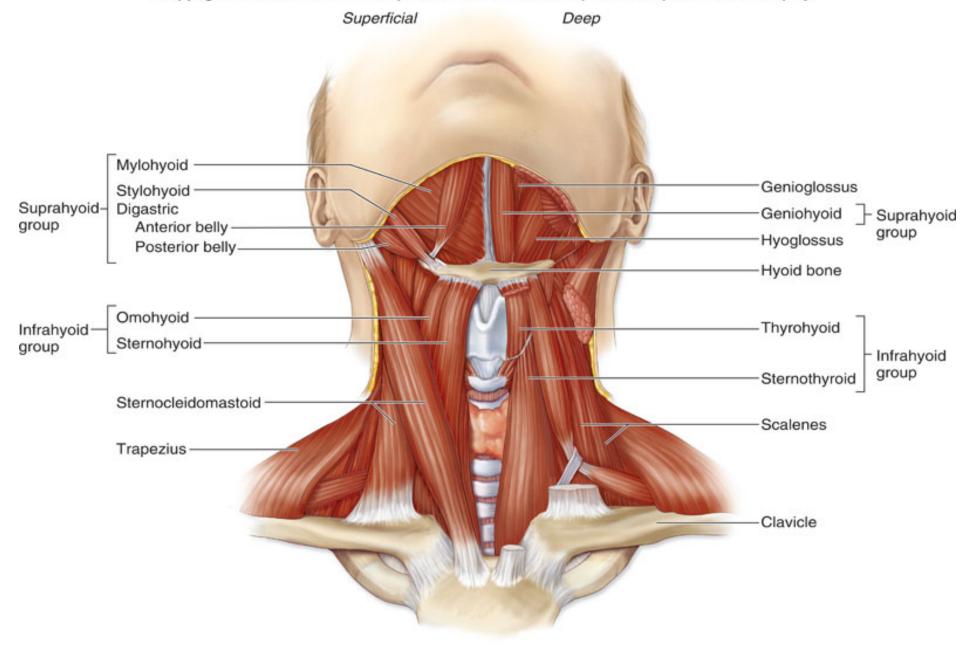
- Commonly known as the "throat."
- Is a funnel-shaped tube that lies posterior to both the oral and nasal cavities.
- Muscles help form or attach to this tube and aid in swallowing.
- Primary pharynx muscles are the pharyngeal constrictors (superior, middle, and inferior).
- Initiate swallowing and force the bolus inferiorly into the esophagus.
- Help elevate or tense the palate when swallowing.



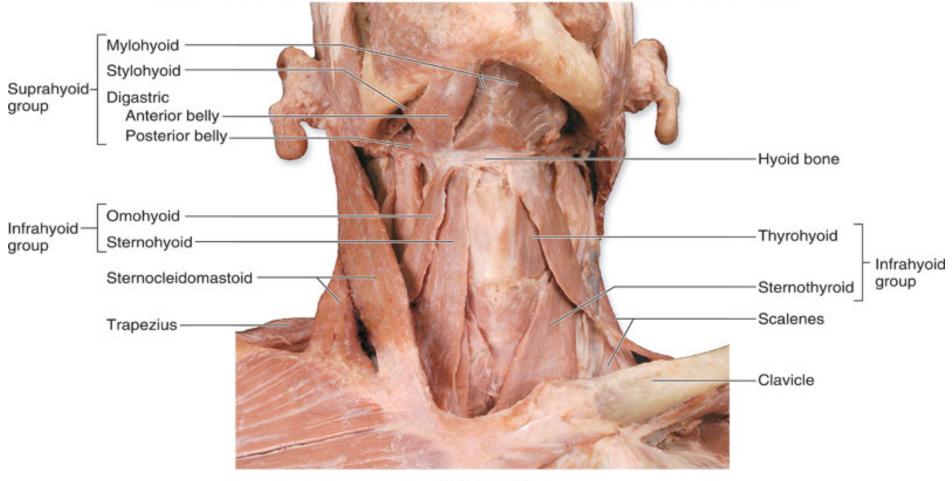
## Muscles of the Anterior Neck

- The suprahyoid muscles are superior to the hyoid bone.
- The infrahyoid muscles are inferior to the hyoid bone.

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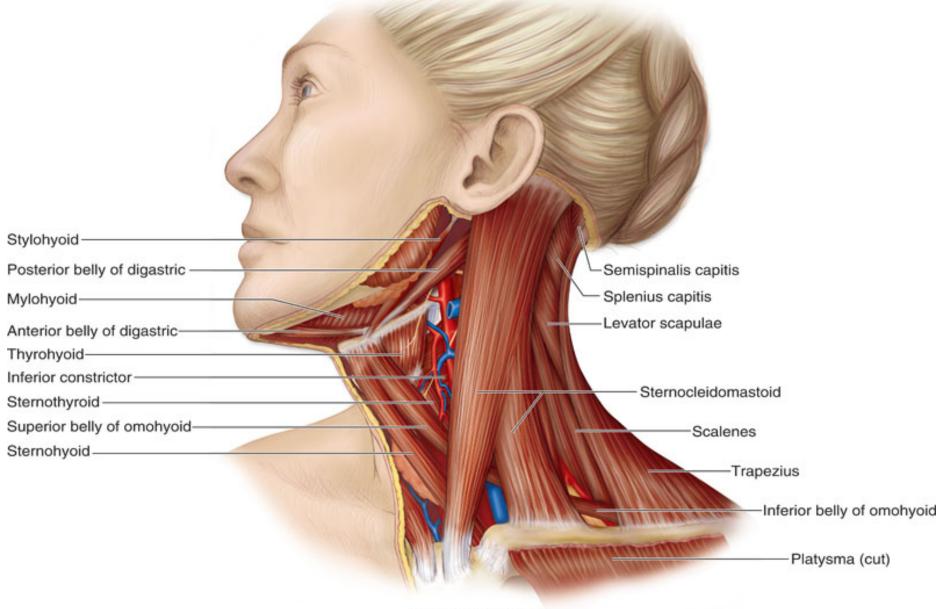
Anterior view



#### Anterior and Lateral Neck Muscles

- Flex the head and neck downward.
  - "neck flexion" and "head flexion" refer to the same movement
- The main muscles are the sternocleidomastoid and the three scalenes.

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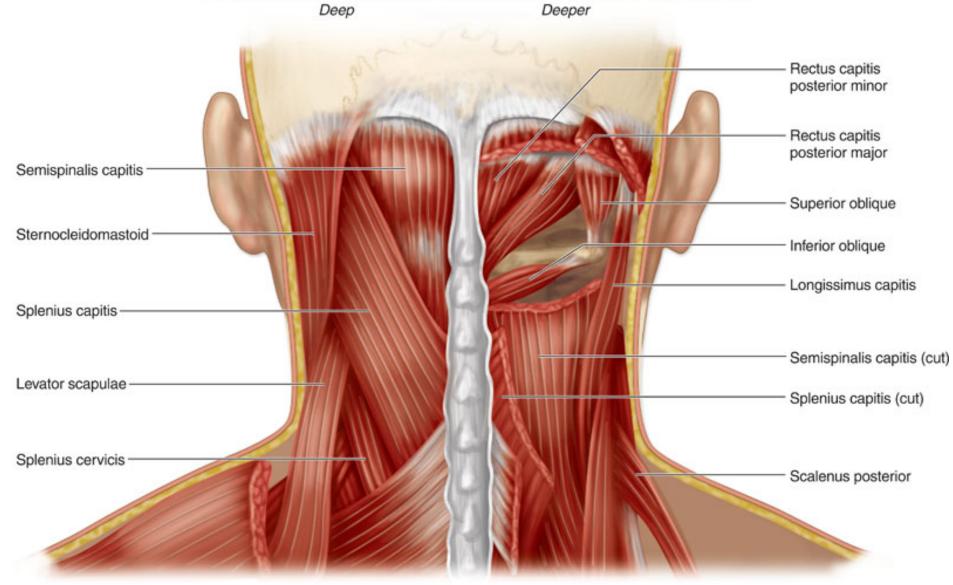




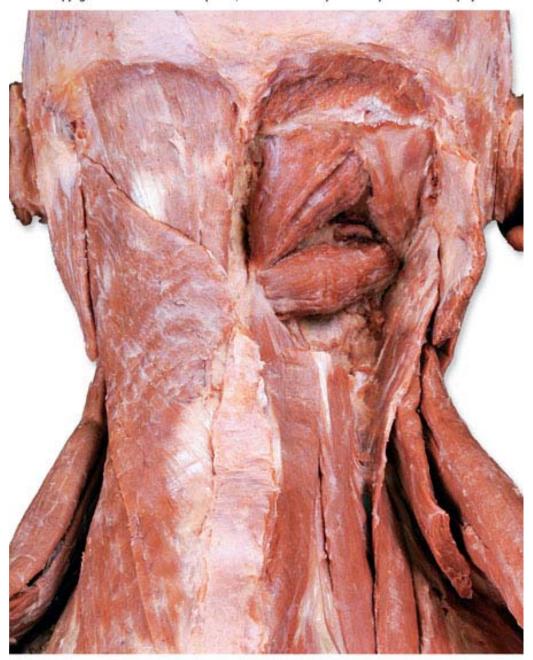
#### Posterior Neck Muscles

- Extend the head/neck.
- The trapezius attaches to the skull and helps extend the head/neck.
- Primary function is to help move the pectoral girdle.

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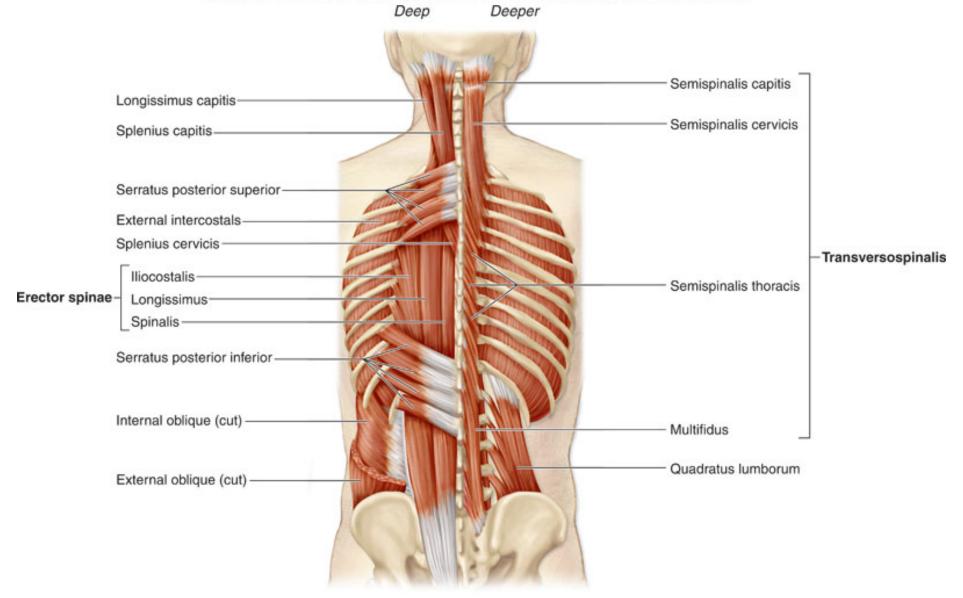
Posterior view



## Muscles of the Vertebral Column

- Very complex.
- Have multiple origins and insertions.
- Exhibit quite a bit of overlap.
- Are covered by the most superficial back muscles.
  - trapezius and latissimus dorsi
- The "neck" is the cervical portion of the vertebral column.
- The muscles extend the cervical portion of the vertebral column.

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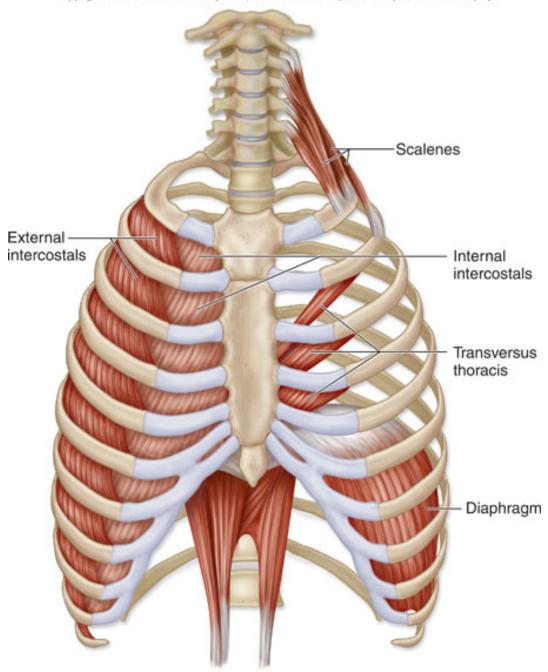


Posterior view



## Muscles of Respiration

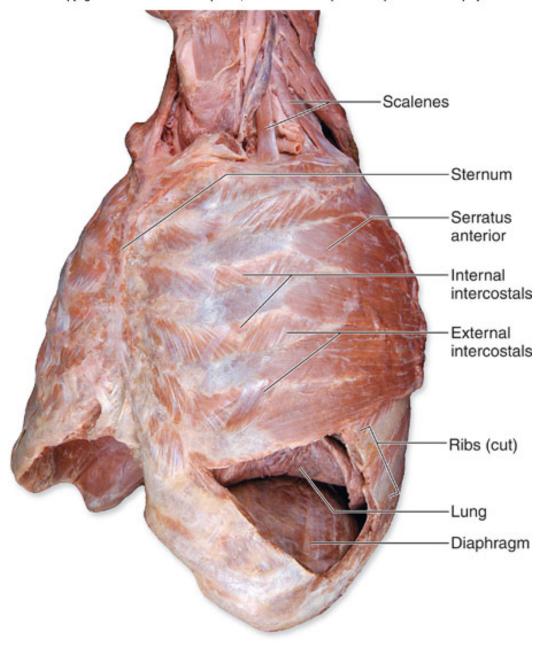
- Respiration involves inhalation and exhalation.
- During inhalation, several muscles contract to increase the dimensions of the thoracic cavity as the lungs fill with air.
- The thoracic cavity expands both to cause the lungs to fill with air and to accommodate the expanding lungs.
- During exhalation, some respiratory muscles contract and others relax, collectively decreasing the dimensions of the thoracic cavity and forcing air out of the lungs.
- Are on the anterior and posterior surfaces of the thorax.
- Are covered by more superficial muscles that move the upper limb.



(a) Anterior view

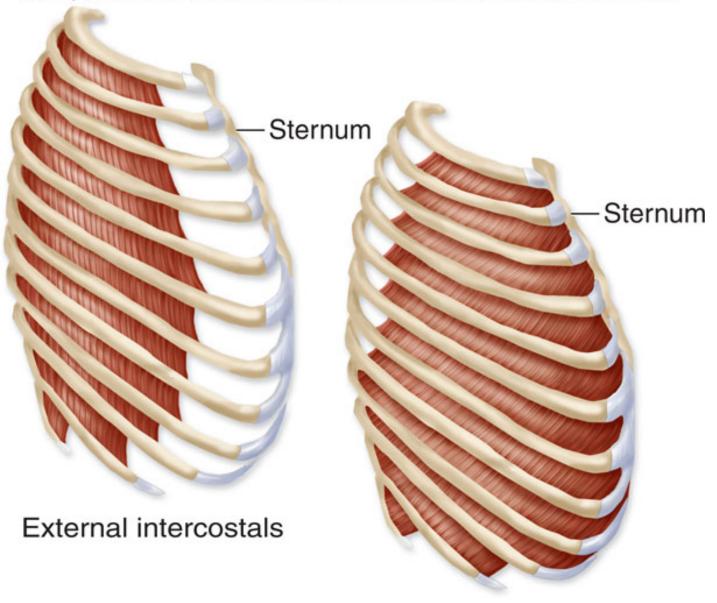
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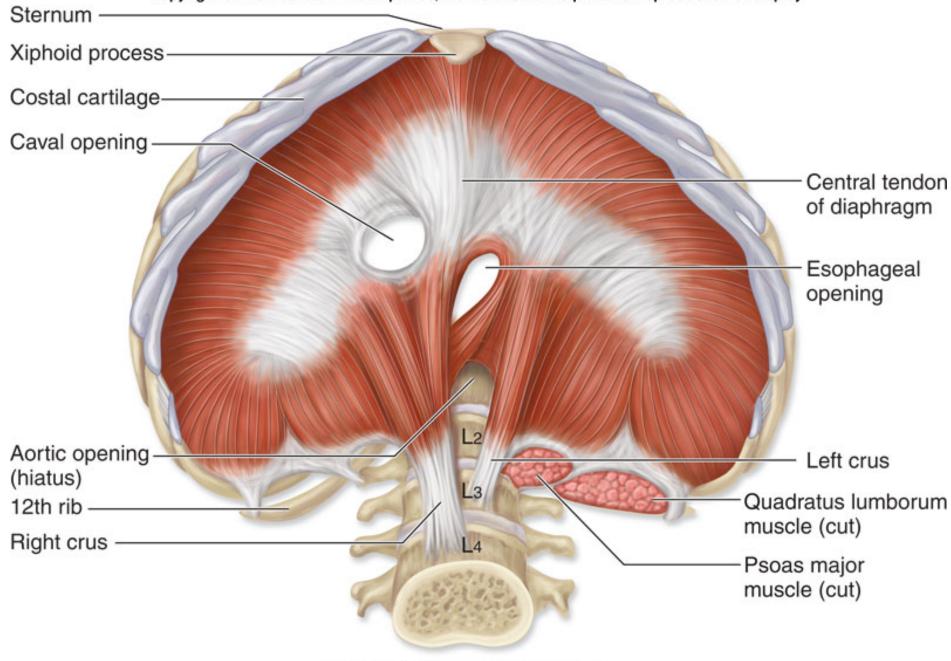
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Internal intercostals

(c) Lateral view

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(d) Diaphragm, inferior view



## The Diaphragm

- Is an internally placed, dome-shaped muscle.
- Forms a partition between the thoracic and abdominal cavities.
- The most important muscle associated with breathing.
- The muscle fibers converge from its margins toward a fibrous central tendon.
- A strong aponeurosis is the insertion tendon for all peripheral muscle fibers.



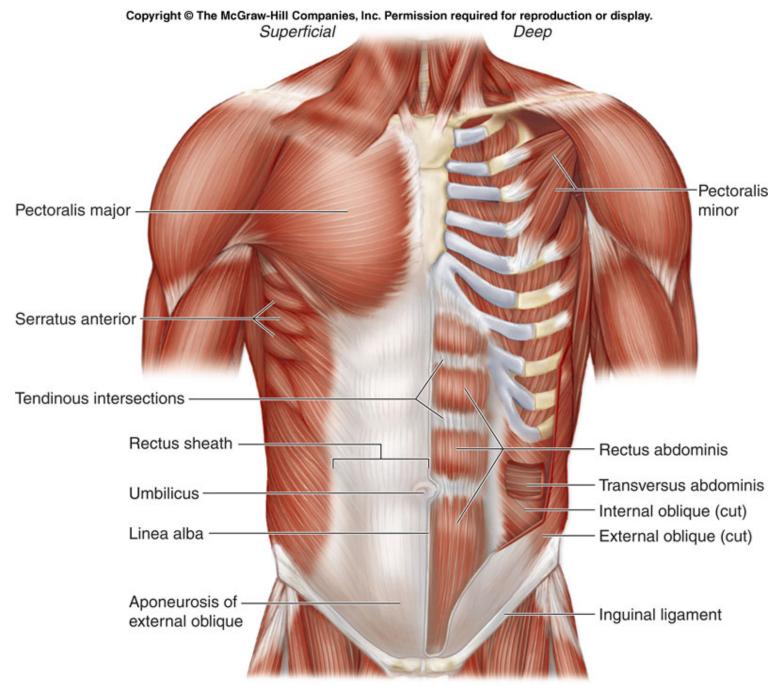
## The Diaphragm

- When the diaphragm contracts, the central tendon is pulled inferiorly toward the abdominal cavity, thereby increasing the vertical dimensions of the thoracic cavity.
- As it compresses the abdominal cavity, it also increases intra-abdominal pressure.
- Also important in helping return venous blood to the heart from the lower half of the body.



# Muscles of the Abdominal Wall

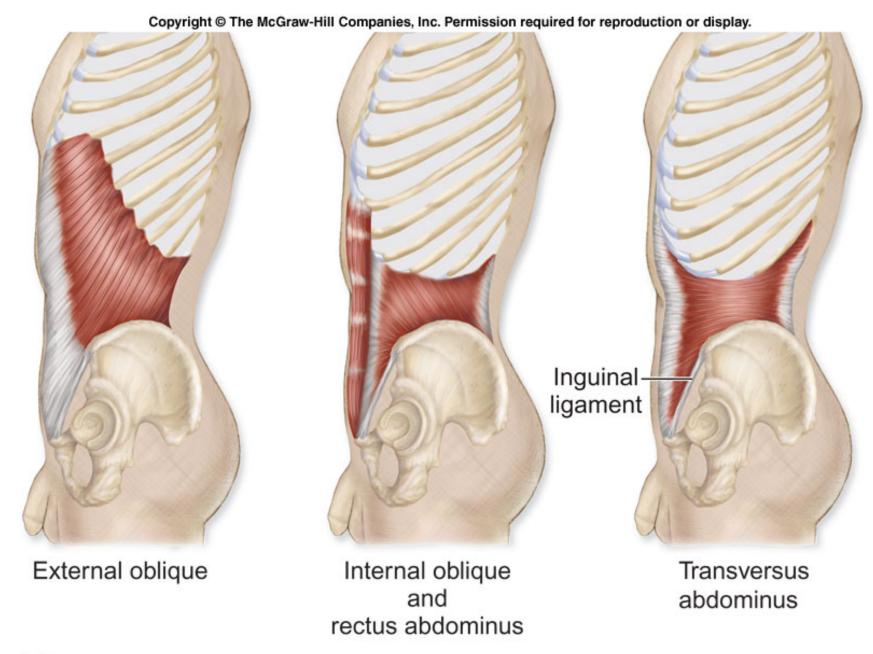
- Four pairs of muscles collectively compress and hold the abdominal organs in place.
  - the external oblique
  - internal oblique
  - transversus abdominis
  - rectus abdominis
- Work together to flex and stabilize the vertebral column.
- When they unilaterally contract they laterally flex the vertebral column.



(a) Anterior view

Copyright © The McGraw-Hill Companies, Inc. Permission required for reproduction or display. Tendinous intersections External intercostal Rectus Rectus sheathabdominis Umbilicus-Linea alba-Transversus abdominis Aponeurosis of -Internal oblique (cut) external oblique External oblique (cut) Inguinal ligament

(b) Anterolateral view

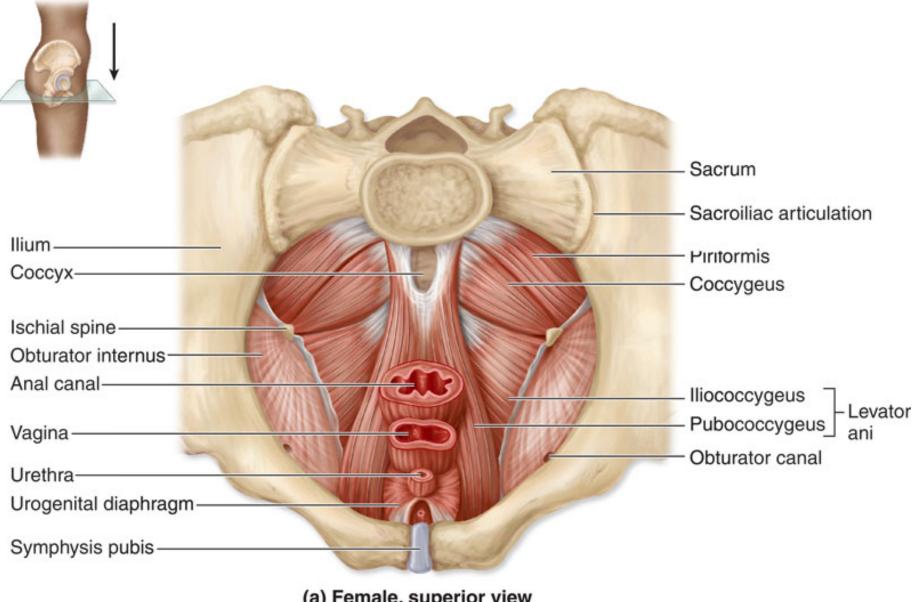




### Muscles of the Pelvic Floor

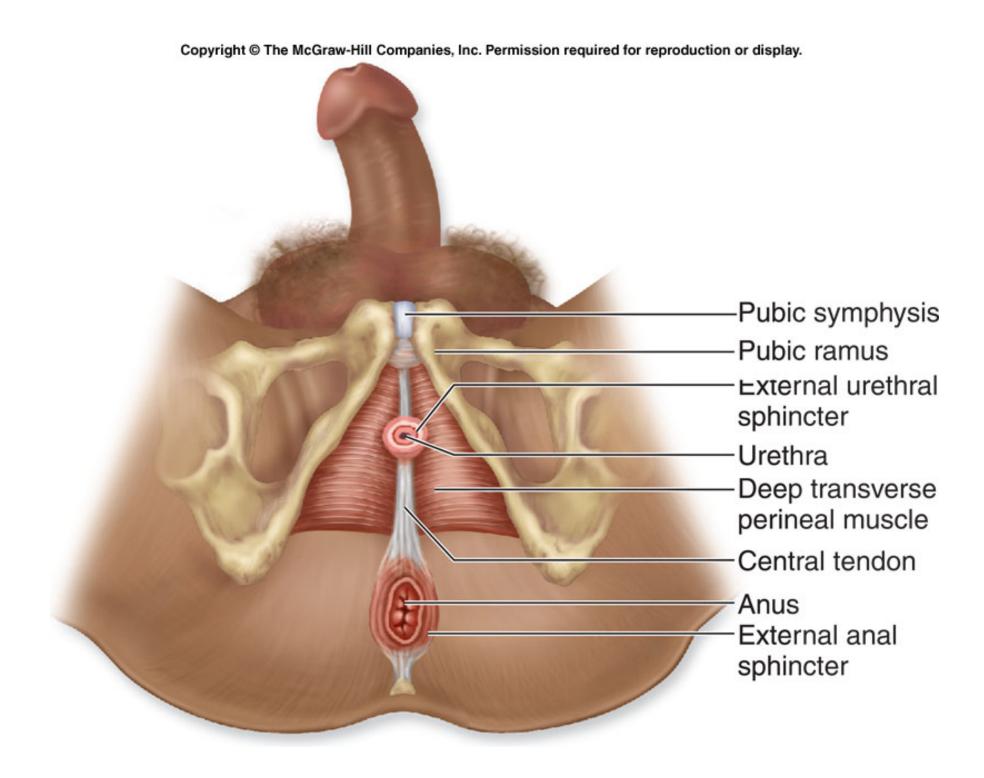
- Formed by three layers of muscles and associated fasciae, collectively known as the pelvic diaphragm.
  - extends from the ischium and pubis of the ossa coxae across the pelvic outlet to the sacrum and coccyx
- Collectively form the pelvic floor and support the pelvic viscera
  - the pelvic cavity floor is composed of muscle layers that form the urogenital and anal triangles, extend across the pelvic outlet, and support the organs in the pelvic cavity

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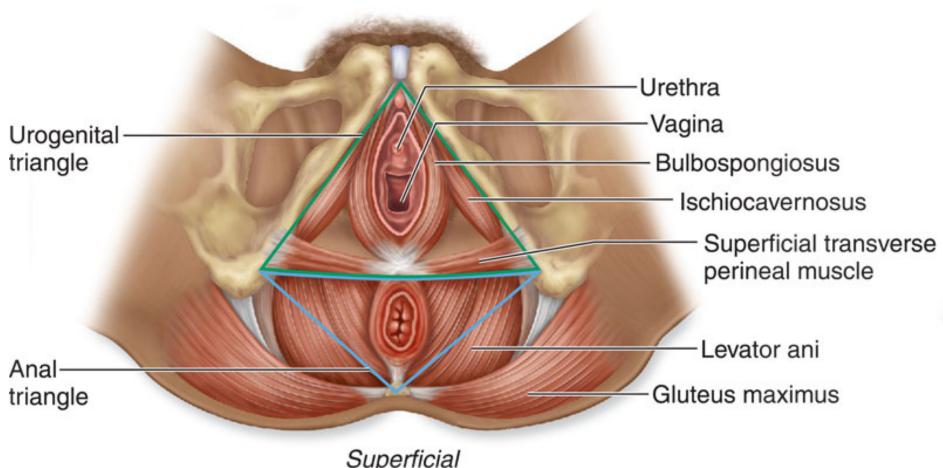


Copyright © The McGraw-Hill Companies, Inc. Permission required for reproduction or display. Raphe Bulbospongiosus Urogenital Ischiocavernosus triangle Superficial transverse perineal muscle Levator ani Anal-Gluteus maximus triangle

Superficial

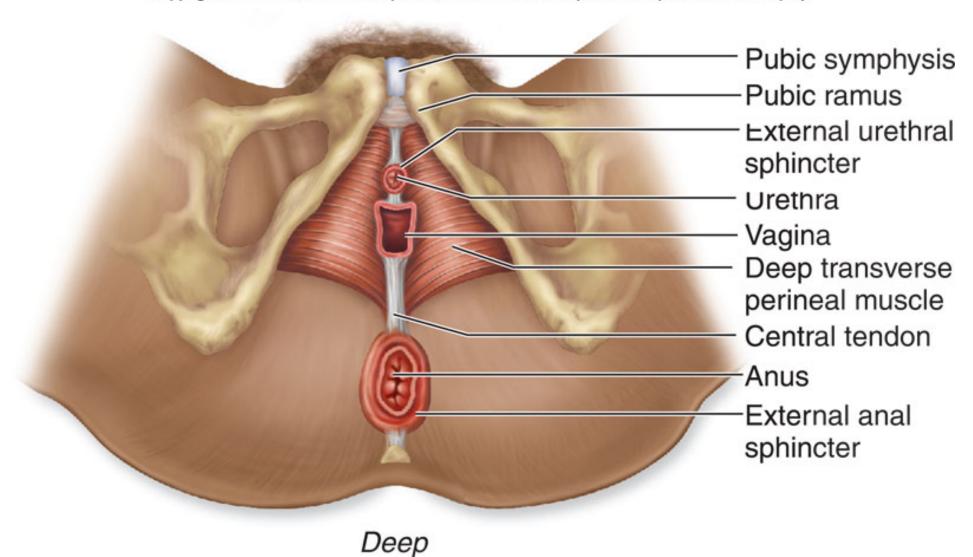


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- A portion of the viscera protrudes through a weakened point of the muscular wall of the abdominopelvic cavity.
- Significant medical problem develops if the herniated portion of the intestine swells, becoming trapped.
- Blood flow to the trapped segment may diminish, causing that portion of the intestine to die.
- Called a strangulated intestinal hernia.
  - is very painful and can be life-threatening



## Two Types of Hernias

- There are two types of hernias.
  - inguinal hernias and
  - femoral hernias
- An inguinal hernia is the most common type of hernia to require treatment.
- The inguinal region is one of the weakest areas of the abdominal wall.



### Inguinal Hernia

- Males are more likely to develop inguinal hernias than females.
- Rising pressure in the abdominal cavity provides the force to push a segment of the small intestine into the canal.
- There are two types of inguinal hernia.
  - direct inguinal hernia the loop of small intestine protrudes directly through the superficial inguinal ring, but not down the entire length of the inguinal canal, and creates a bulge in the lower anterior abdominal wall
  - indirect inguinal hernia herniation travels down the entire inguinal canal and may even extend all the way into the scrotum



### Femoral Hernia

- Occurs in the upper thigh, just inferior to the inguinal ligament, originating in the femoral triangle.
- Medial part of the femoral triangle is relatively weak and prone to stress injury, allowing a loop of small intestine to protrude.
- Women more commonly develop femoral hernias because of the greater width of their femoral triangle.