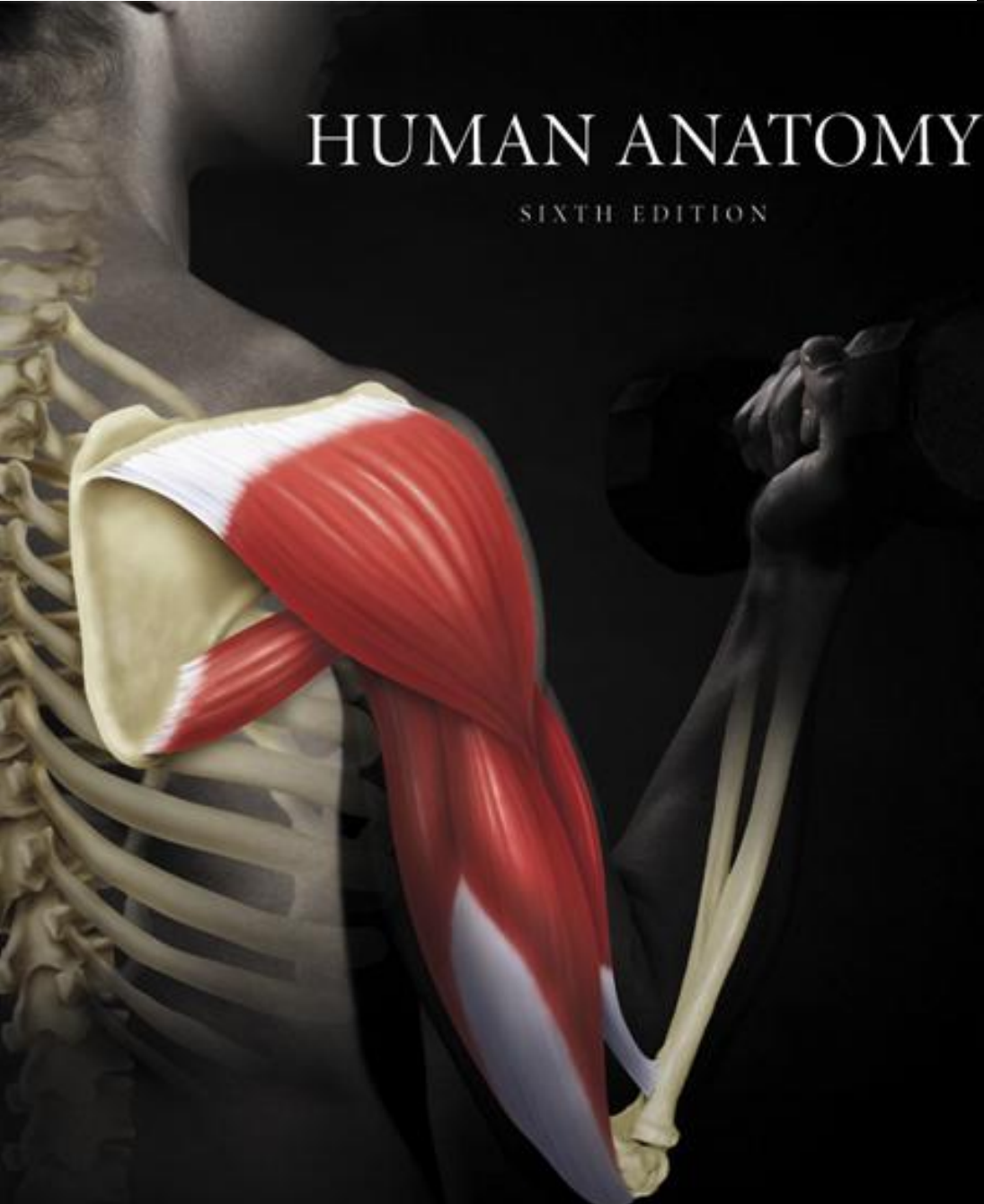


HUMAN ANATOMY

SIXTH EDITION



Chapter 10

The Muscular System: Axial Musculature

**PowerPoint® Lecture Slides
prepared by Jason LaPres
North Harris College
Houston, Texas**

Introduction

- The *axial musculature* arises on the axial skeleton.
 - Positions the head and vertebral column
 - Moves the rib cage
 - Axial muscles do not play a role in the movement or stabilization of the pectoral or pelvic girdles or the limbs.
- Roughly 60 percent of the skeletal muscles in the body are axial muscles.

The Axial Musculature

- The axial muscles fall into four logical groups based on location and/or function.
 - Muscles of the head and neck
 - Facial expression
 - Whistling
 - Sucking
 - Chewing
 - Swallowing
 - Contractions of the eye muscles
 - Muscles of the vertebral column
 - Oblique and rectus muscles
 - Diaphragm
 - Muscles of the pelvic floor

The Axial Musculature

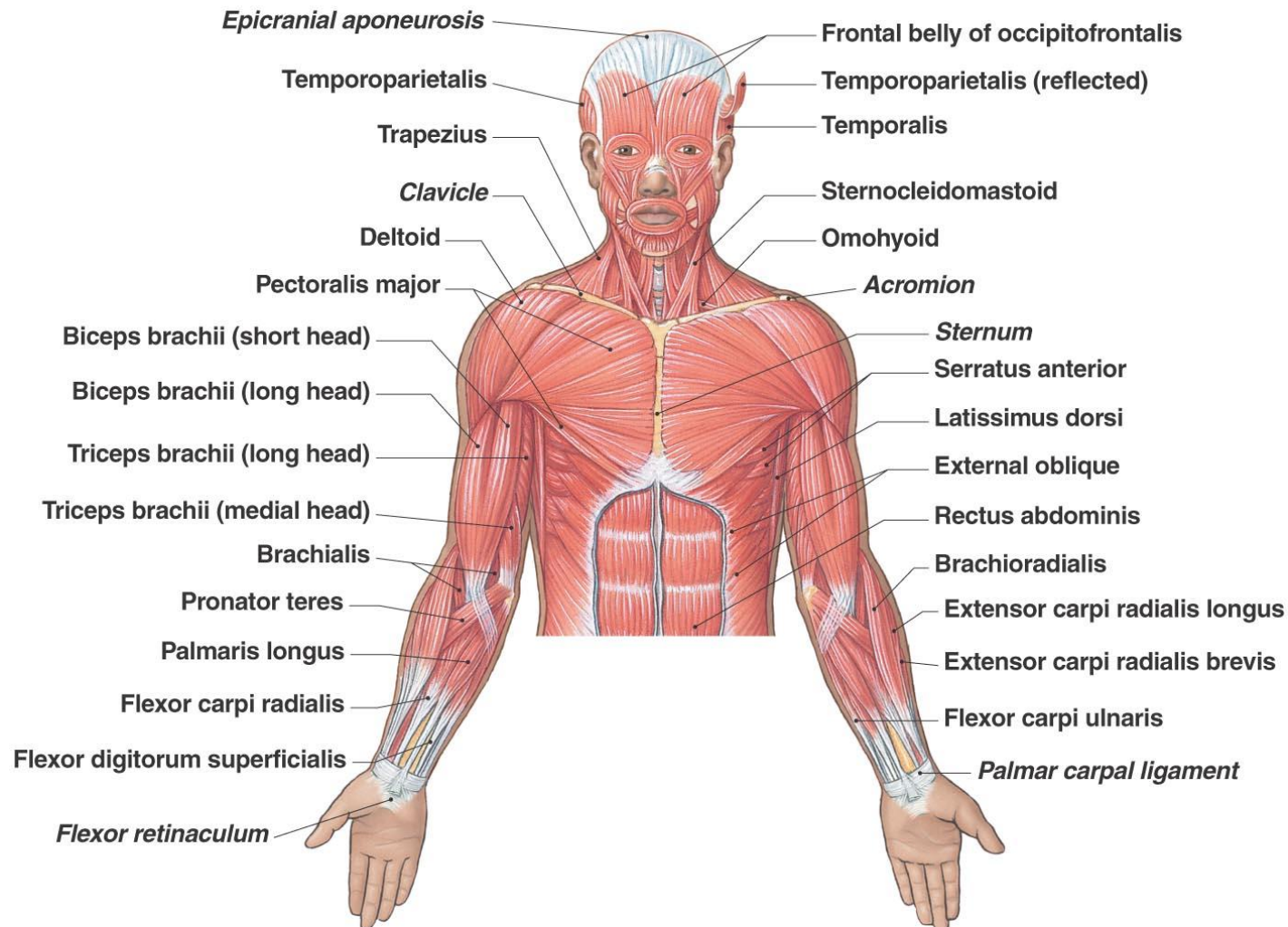
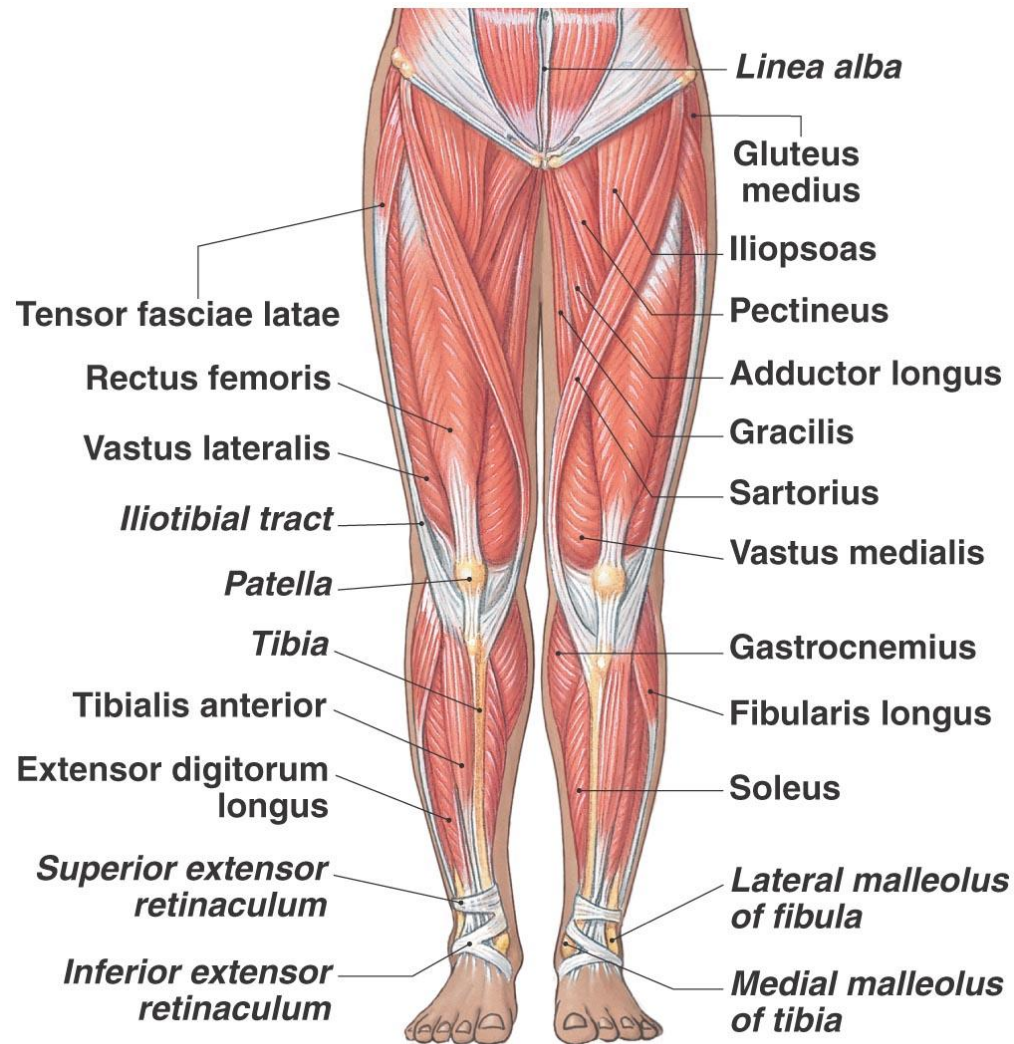


Figure 10.1 Superficial Skeletal Muscles, Anterior View

The Axial Musculature



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Figure 10.1 Superficial Skeletal Muscles, Anterior View

The Axial Musculature

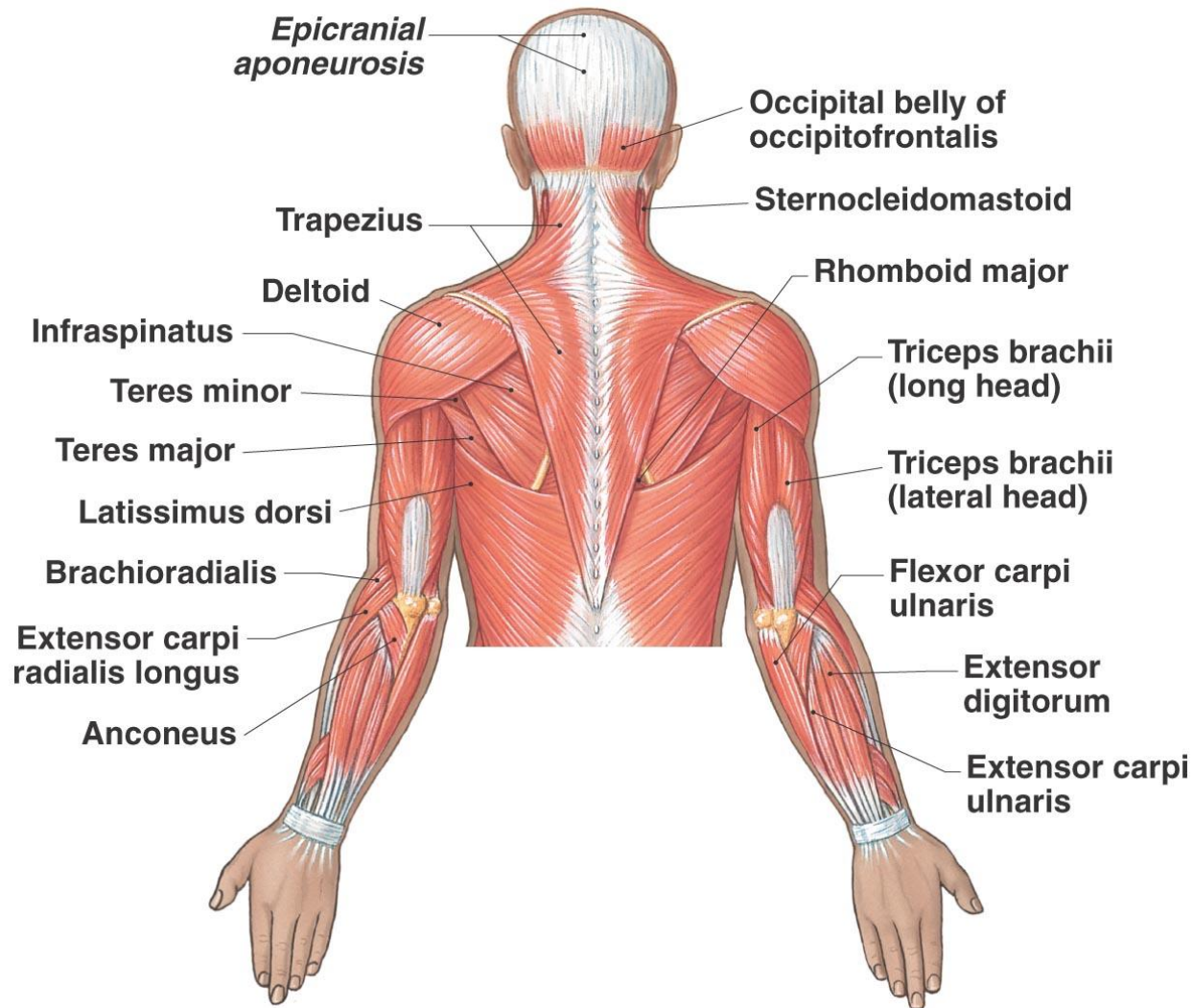


Figure 10.2 Superficial Skeletal Muscles, Posterior View

The Axial Musculature

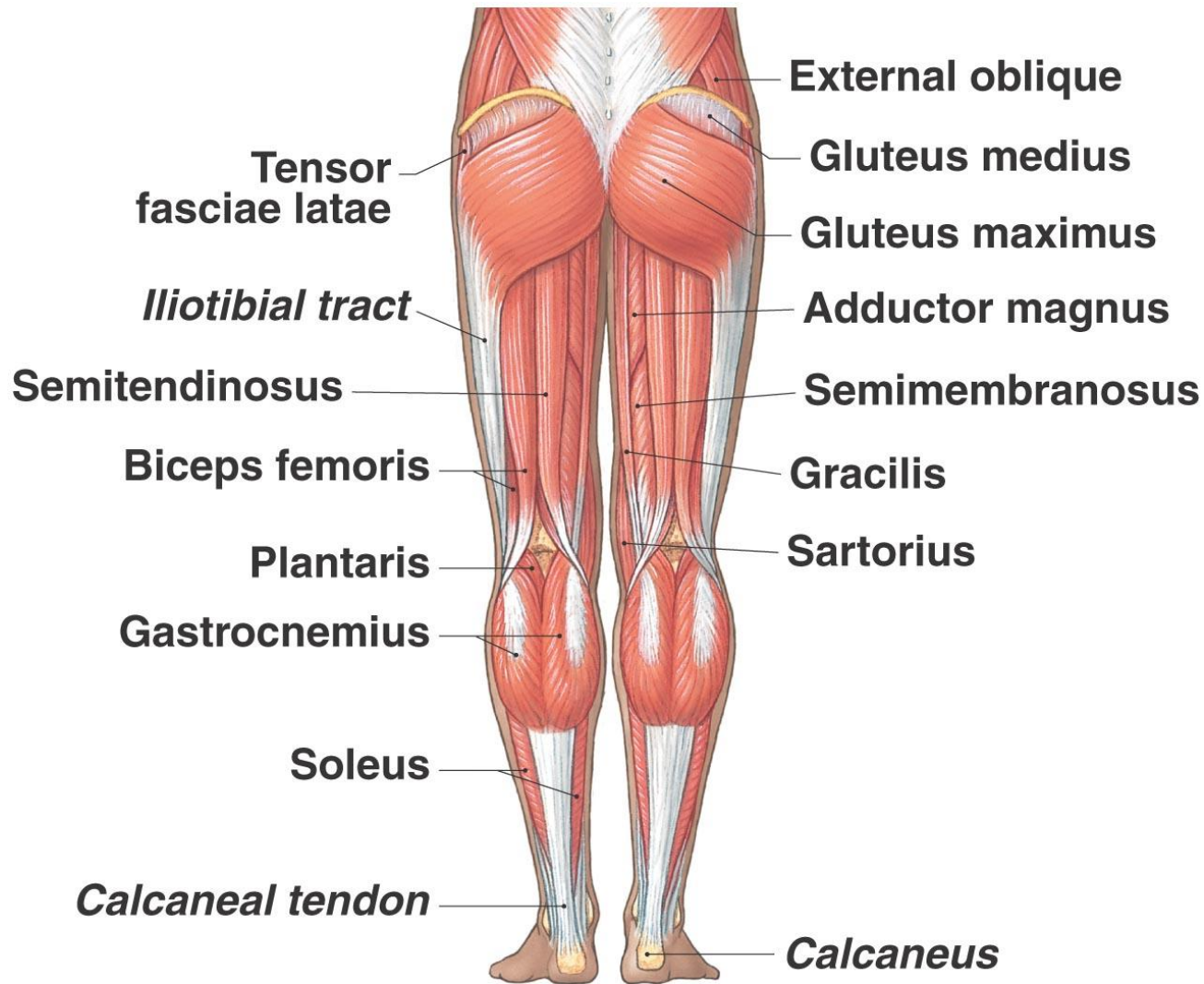


Figure 10.2 Superficial Skeletal Muscles, Posterior View

The Axial Musculature

- Muscles of the Head and Neck
 - Can be subdivided into several groups:
 - Muscles of facial expression
 - Extraocular muscles
 - Muscles of mastication
 - Muscles of the tongue
 - Muscles of the pharynx
 - Anterior muscles of the neck

The Axial Musculature

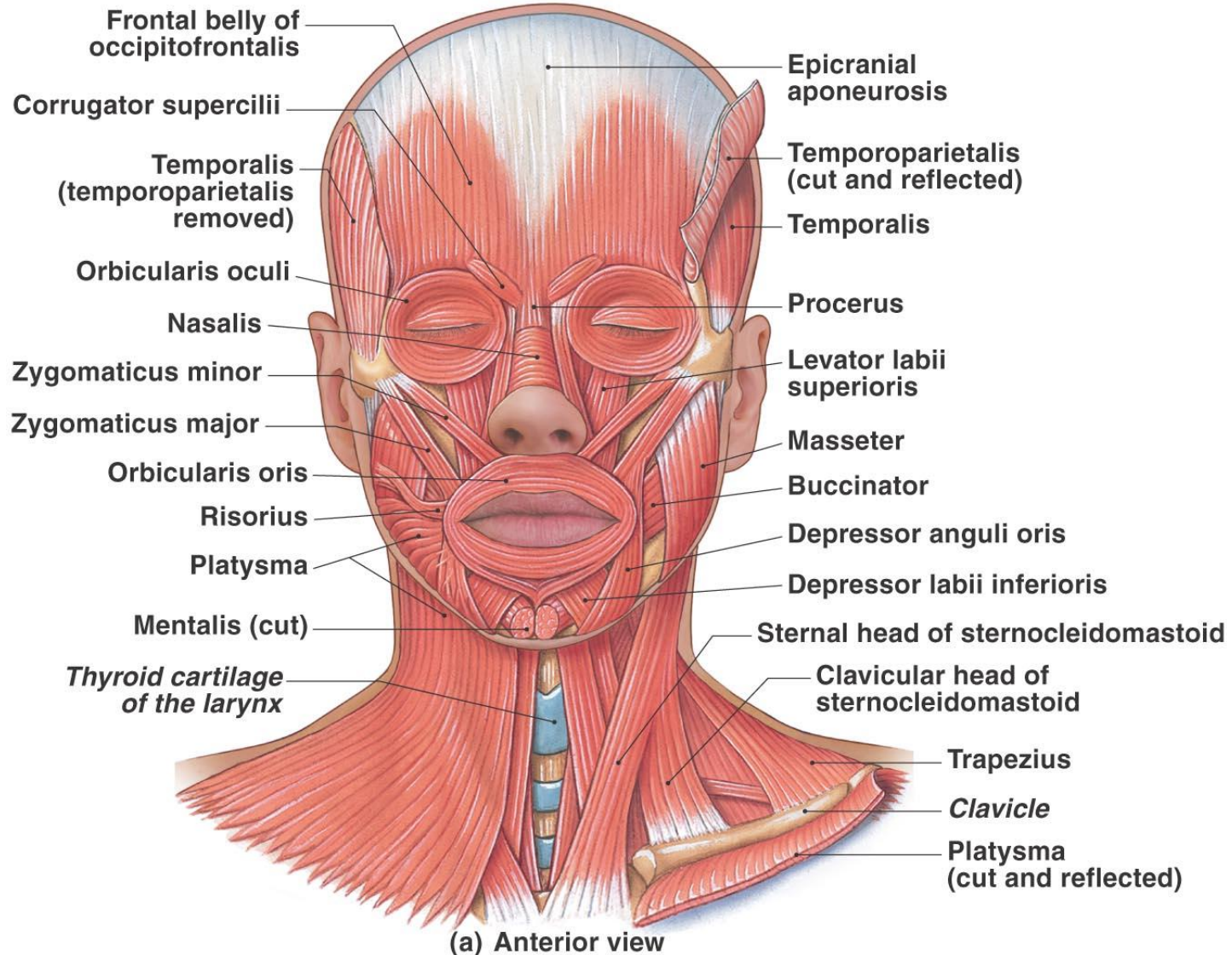


Figure 10.3 Muscles of the Head and Neck, Part I

The Axial Musculature

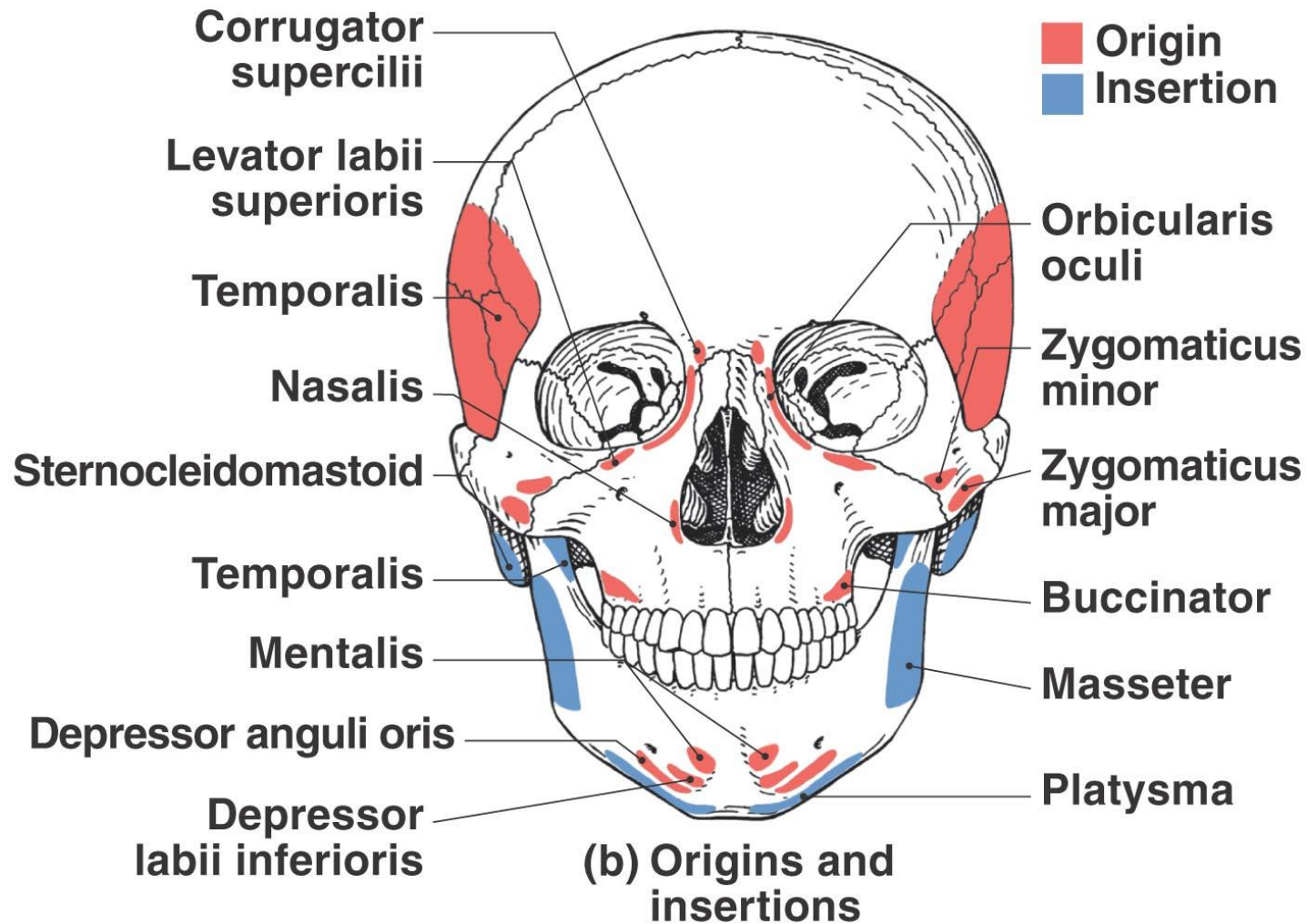


Figure 10.3 Muscles of the Head and Neck, Part I

The Axial Musculature

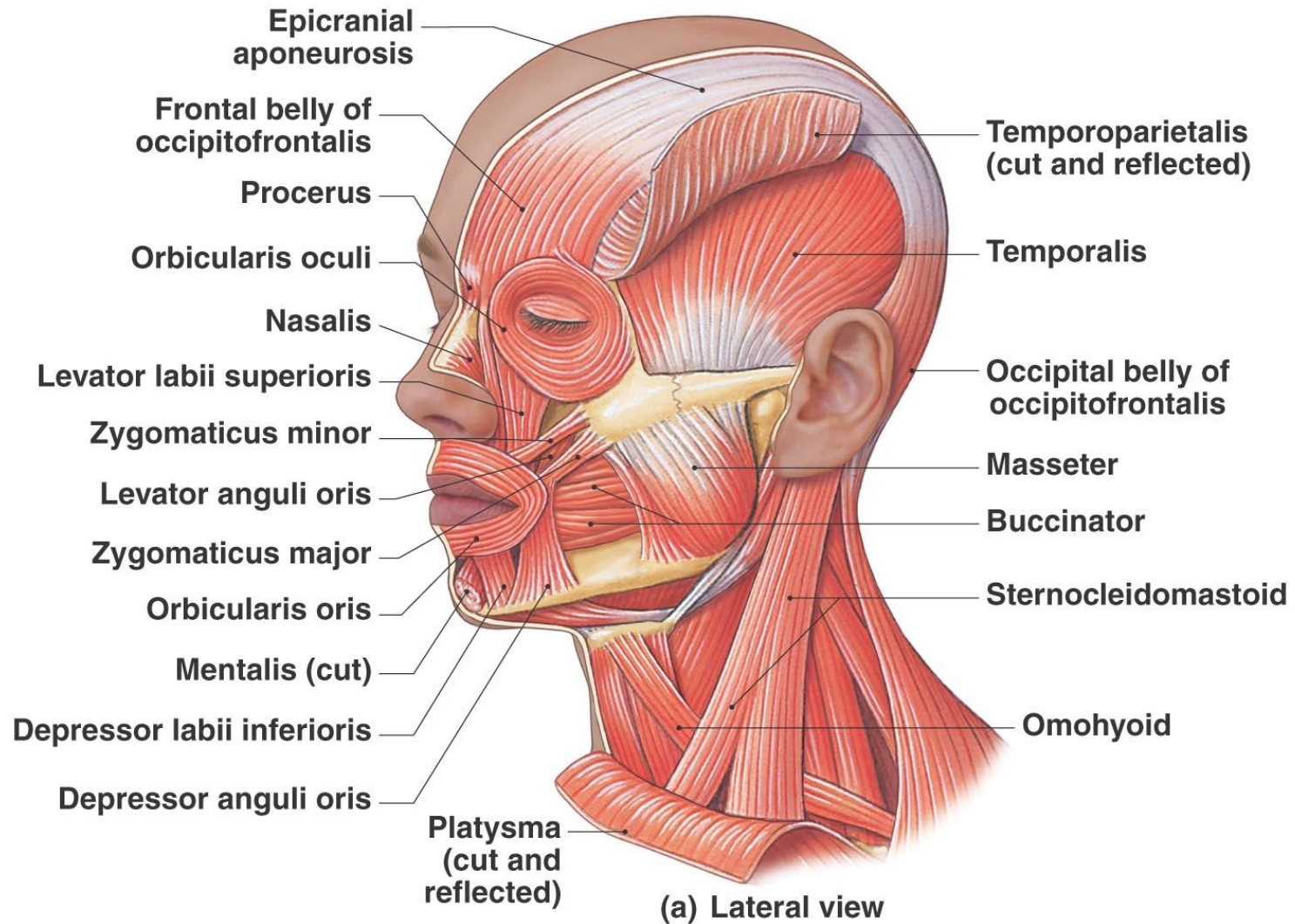


Figure 10.4 Muscles of the Head and Neck, Part II

The Axial Musculature

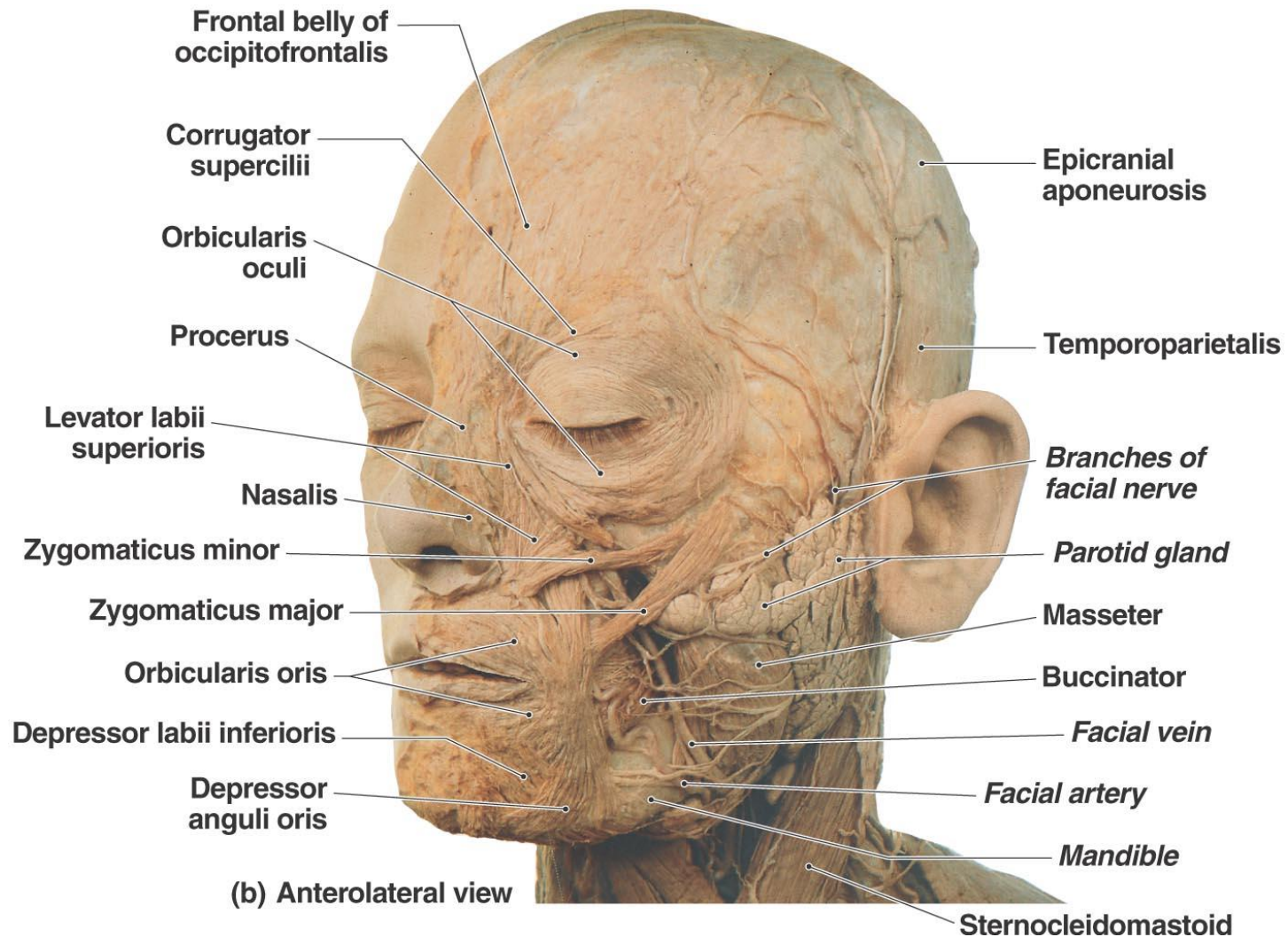


Figure 10.4 Muscles of the Head and Neck, Part II

The Axial Musculature

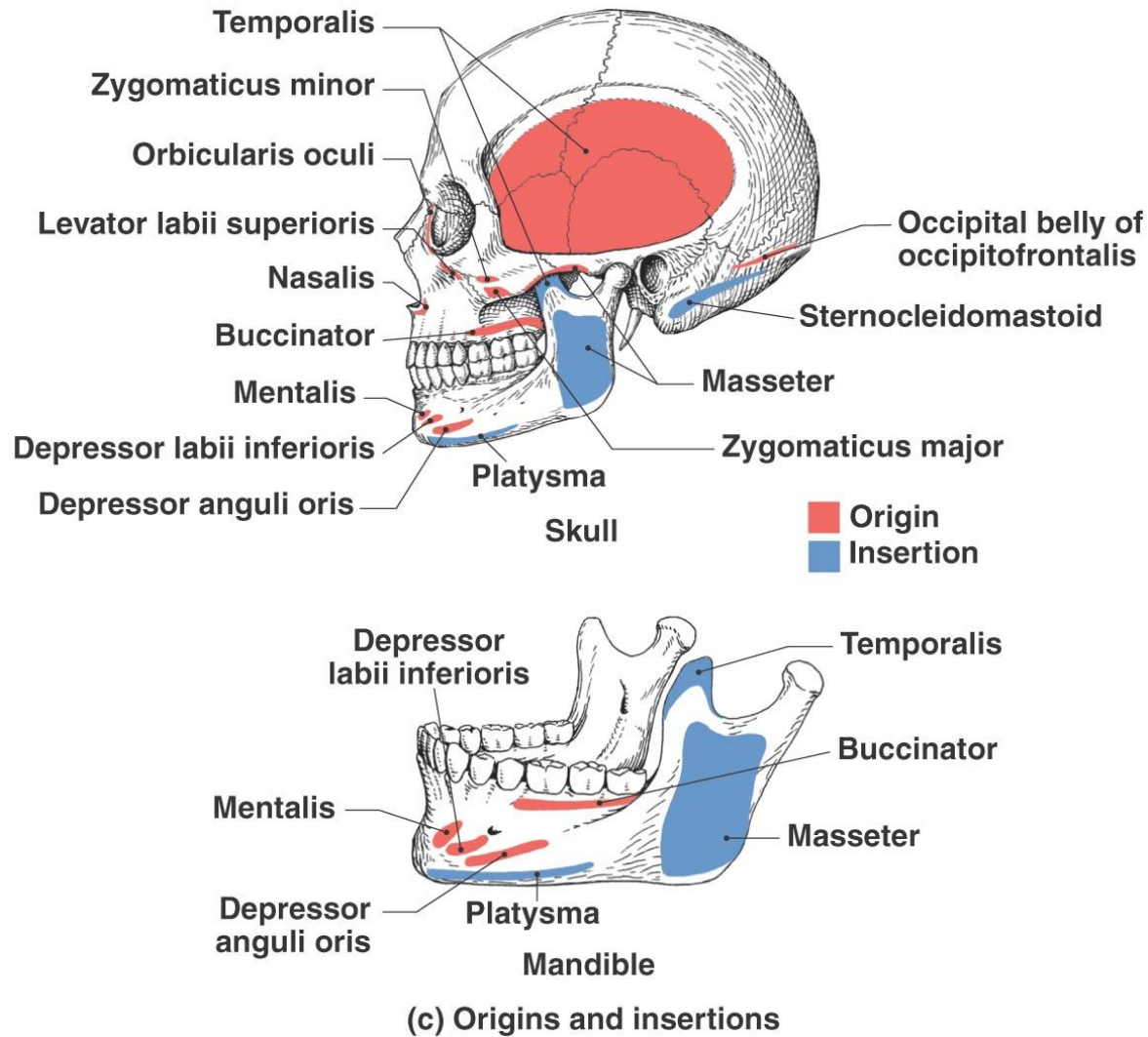


Figure 10.4 Muscles of the Head and Neck, Part II

The Axial Musculature

TABLE 10.1 Muscles of Facial Expression

Region/Muscle	Origin	Insertion	Action	Innervation
MOUTH				
Buccinator	Alveolar processes of maxilla and mandible opposite the molar teeth	Blends into fibers of orbicularis oris	Compresses cheeks	Facial nerve (N VII)
Depressor labii inferioris	Mandible between the anterior midline and the mental foramen	Skin of lower lip	Depresses lower lip	As above
Levator labii superioris	Inferior margin of orbit, superior to the infra-orbital foramen	Orbicularis oris	Elevates upper lip	As above
Mentalis	Incisive fossa of mandible	Skin of chin	Elevates and protrudes lower lip	As above
Orbicularis oris	Maxilla and mandible	Lips	Compresses, purses lips	As above
Risorius	Fascia surrounding parotid salivary gland	Angle of mouth	Draws corner of mouth to the side	As above
Levator anguli oris	Maxilla inferior to infra-orbital foramen	Skin at angle of mouth	Raises corner of mouth	As above
Depressor anguli oris	Anterolateral surface of mandibular body	Skin at angle of mouth	Depresses corner of mouth	As above
Zygomaticus major	Zygomatic bone near the zygomaticotemporal suture	Angle of mouth	Retracts and elevates corner of mouth	As above
Zygomaticus minor	Zygomatic bone posterior to zygomaticomaxillary suture	Upper lip	Retracts and elevates upper lip	As above
EYE				
Corrugator supercillii	Orbital rim of frontal bone near frontonasal suture	Eyebrow	Pulls skin inferiorly and anteriorly; wrinkles brow	As above
Levator palpebrae superioris	Inferior aspect of lesser wing of the sphenoid superior to and anterior to optic canal	Upper eyelid	Elevates upper eyelid	Oculomotor nerve (N III) ^a
Orbicularis oculi	Medial margin of orbit	Skin around eyelids	Closes eye	Facial nerve (N VII)

The Axial Musculature

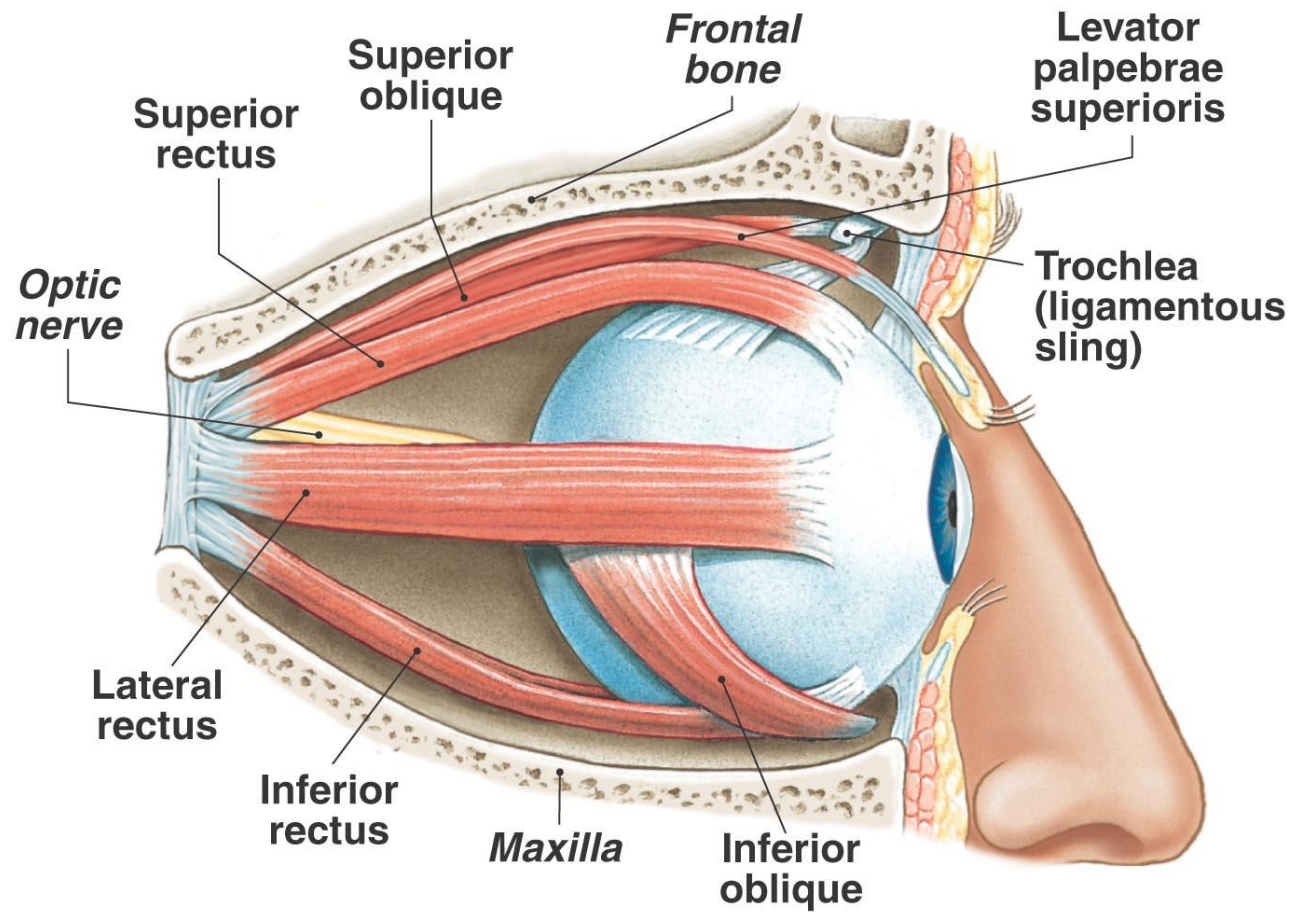
TABLE 10.1 Muscles of Facial Expression (*Continued*)

Region/Muscle	Origin	Insertion	Action	Innervation
NOSE				
Procerus	Lateral nasal cartilages and the aponeuroses covering the inferior portion of the nasal bones	Aponeurosis at bridge of nose and skin of forehead	Moves nose, changes position, shape of nostrils	As above
Nasalis	Maxilla and alar cartilage of nose	Bridge of nose	Compresses bridge, depresses tip of nose; elevates corners of nostrils	As above
SCALP (EPICRANIUM)^b				
Occipitofrontalis				
Frontal belly	Epicranial aponeurosis	Skin of eyebrow and bridge of nose	Raises eyebrows, wrinkles forehead	As above
Occipital belly	Superior nuchal line and adjacent region of mastoid portion of the temporal bone	Epicranial aponeurosis	Tenses and retracts scalp	As above
Temporoparietalis	Fascia around external ear	Epicranial aponeurosis	Tenses scalp, moves auricle of ear	As above
NECK				
Platysma	Fascia of the superior thorax between cartilage of second rib and acromion of scapula	Mandible and skin of cheek	Tenses skin of neck, depresses mandible	As above

^aThis muscle originates in association with the extra-ocular muscles, so its innervation is unusual, as detailed in Chapter 15.

^bIncludes the epicranial aponeurosis, temporoparietalis, and occipitofrontalis muscles.

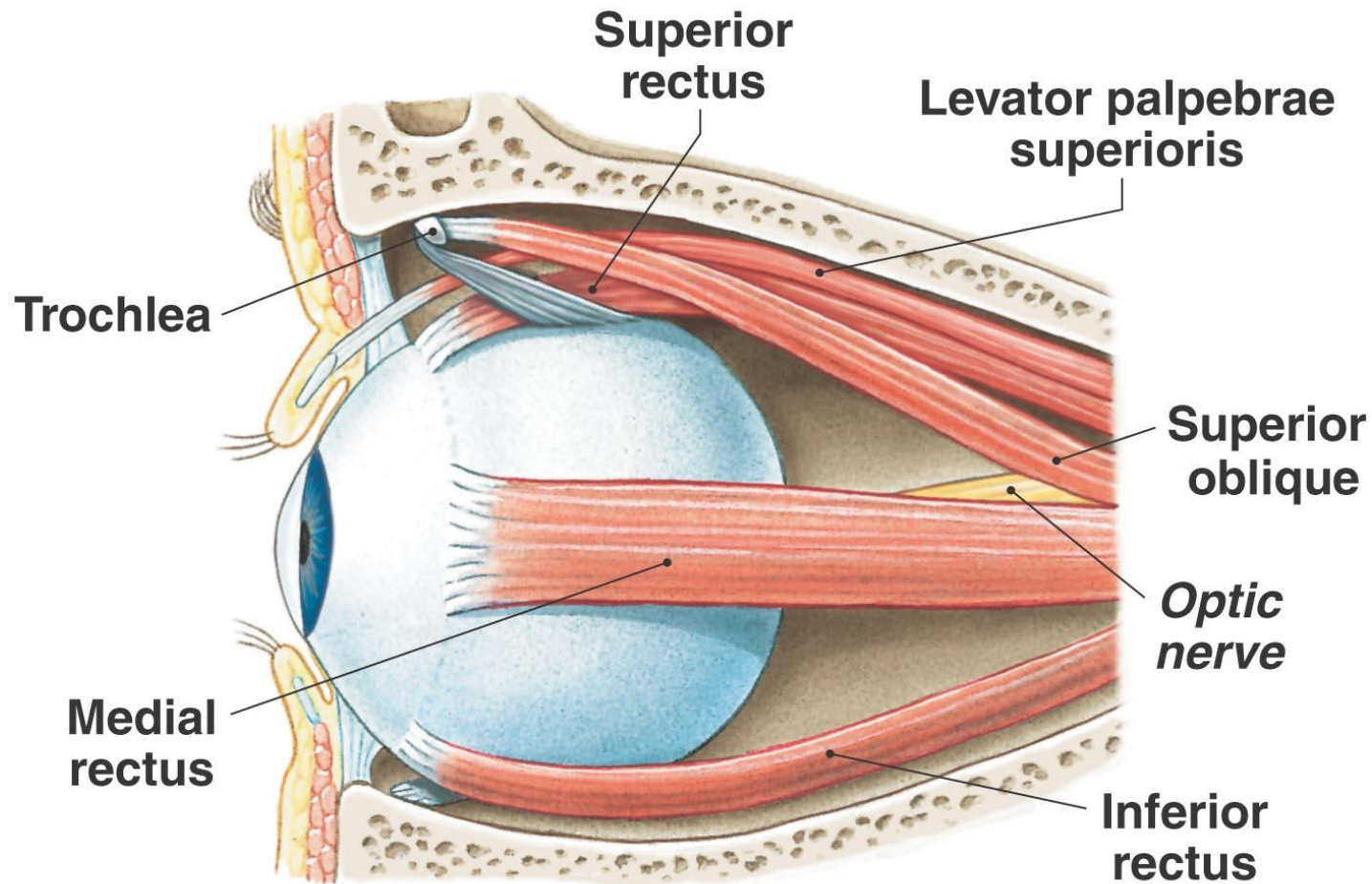
The Axial Musculature



(a) Lateral surface, right eye

Figure 10.5 Extraocular Muscles (Lateral Surface of Right Eye)

The Axial Musculature



(b) Medial surface, right eye

Figure 10.5 Extra-ocular Muscles (Medial Surface of Right Eye)

The Axial Musculature

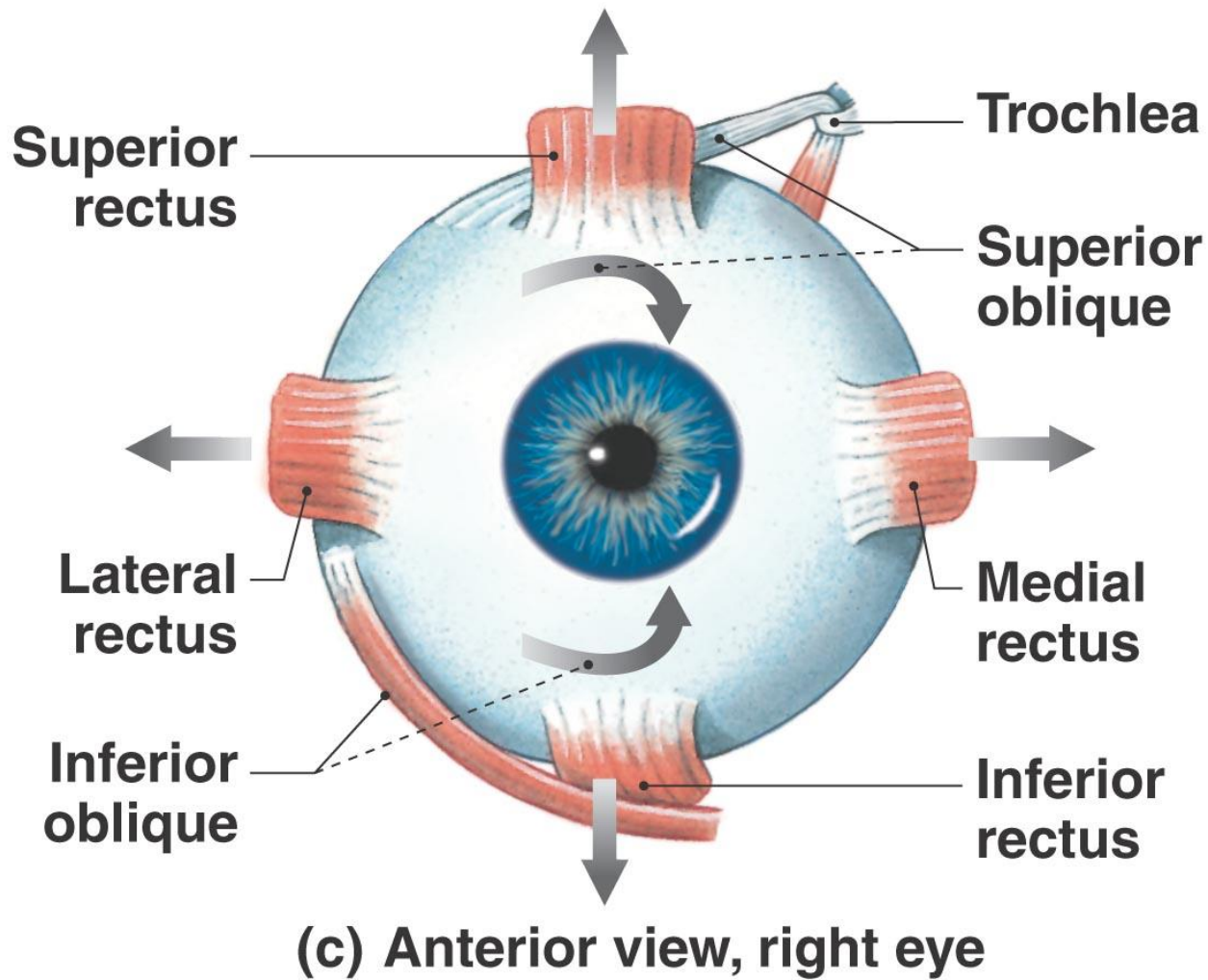


Figure 10.5 Extra-ocular Muscles (Anterior View of Right Eye)

The Axial Musculature

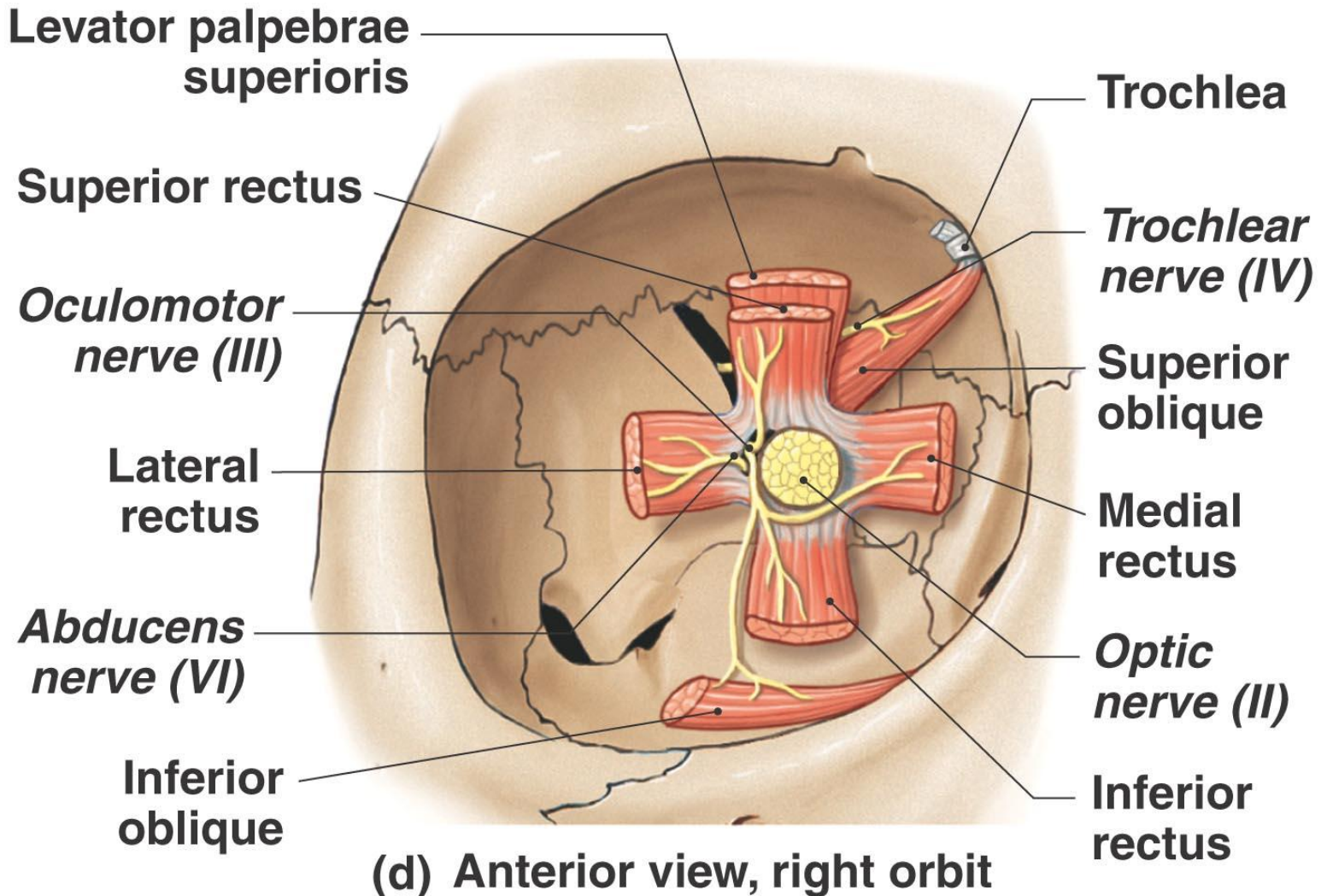


Figure 10.5 Extraocular Muscles (Anterior View of Right Orbit)

The Axial Musculature

TABLE 10.2 Extra-ocular Muscles

Muscle	Origin	Insertion	Action	Innervation
Inferior rectus	Sphenoid around optic canal	Inferior, medial surface of eyeball	Eye looks down	Oculomotor nerve (N III)
Medial rectus	As above	Medial surface of eyeball	Eye looks medially	As above
Superior rectus	As above	Superior surface of eyeball	Eye looks up	As above
Lateral rectus	As above	Lateral surface of eyeball	Eye looks laterally	Abducens nerve (N VI)
Inferior oblique	Maxilla at anterior portion of orbit	Inferior, lateral surface of eyeball	Eye rolls, looks up and laterally	Oculomotor nerve (N III)
Superior oblique	Sphenoid around optic canal	Superior, lateral surface of eyeball	Eye rolls, looks down and laterally	Trochlear nerve (N IV)

The Axial Musculature

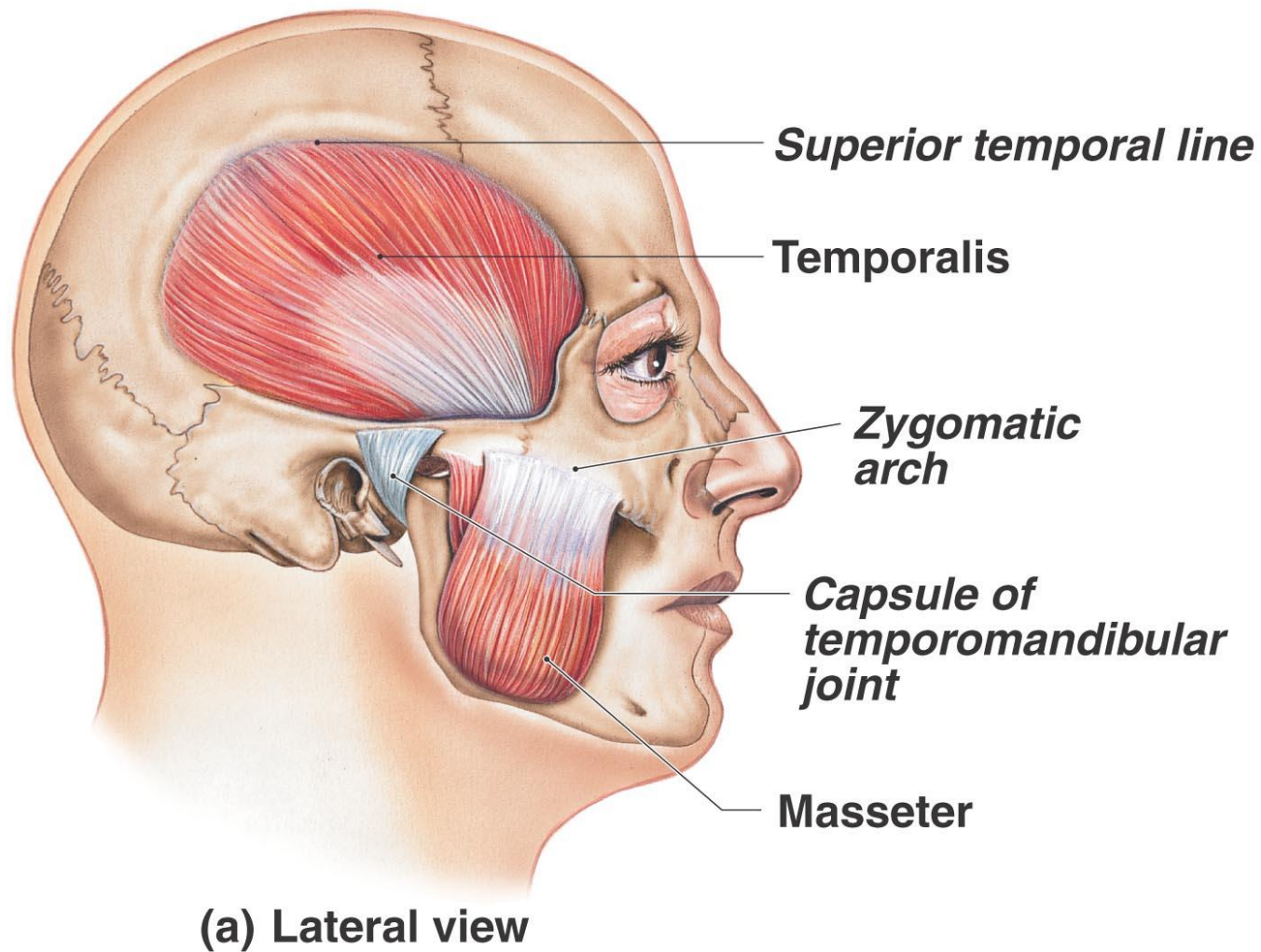


Figure 10.6 Muscles of Mastication (Lateral View)

The Axial Musculature

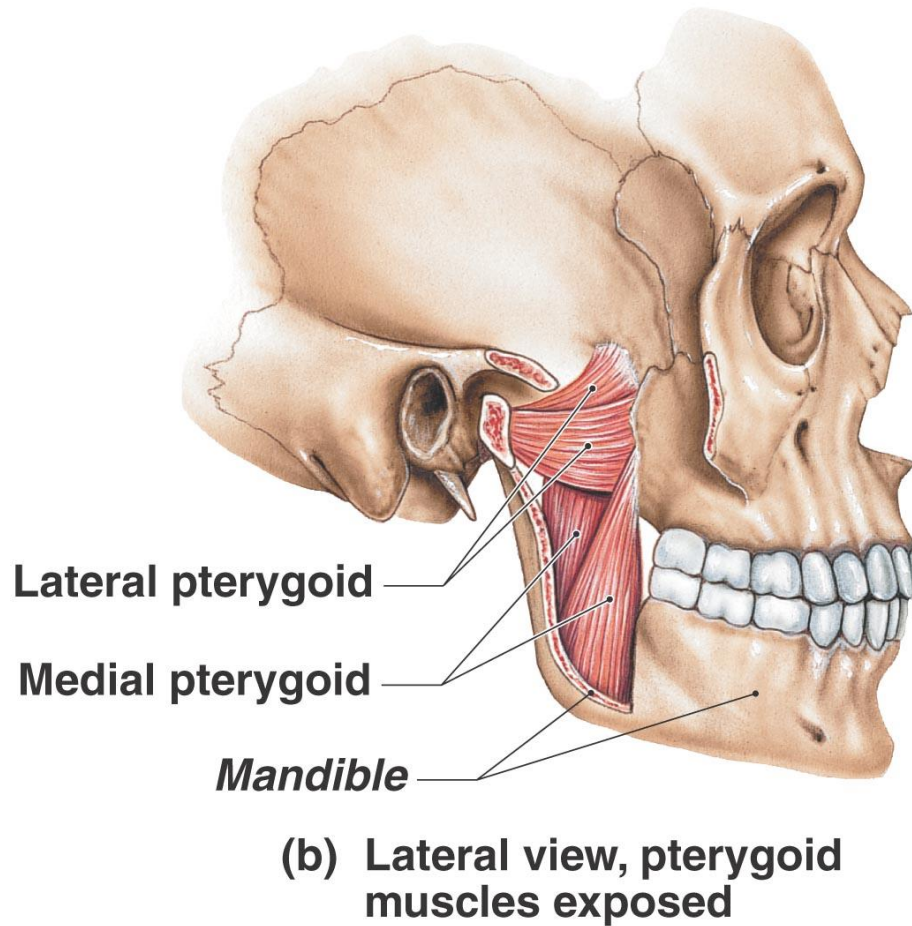


Figure 10.6 Muscles of Mastication (Lateral View, Pterygoid Muscles Exposed)

The Axial Musculature

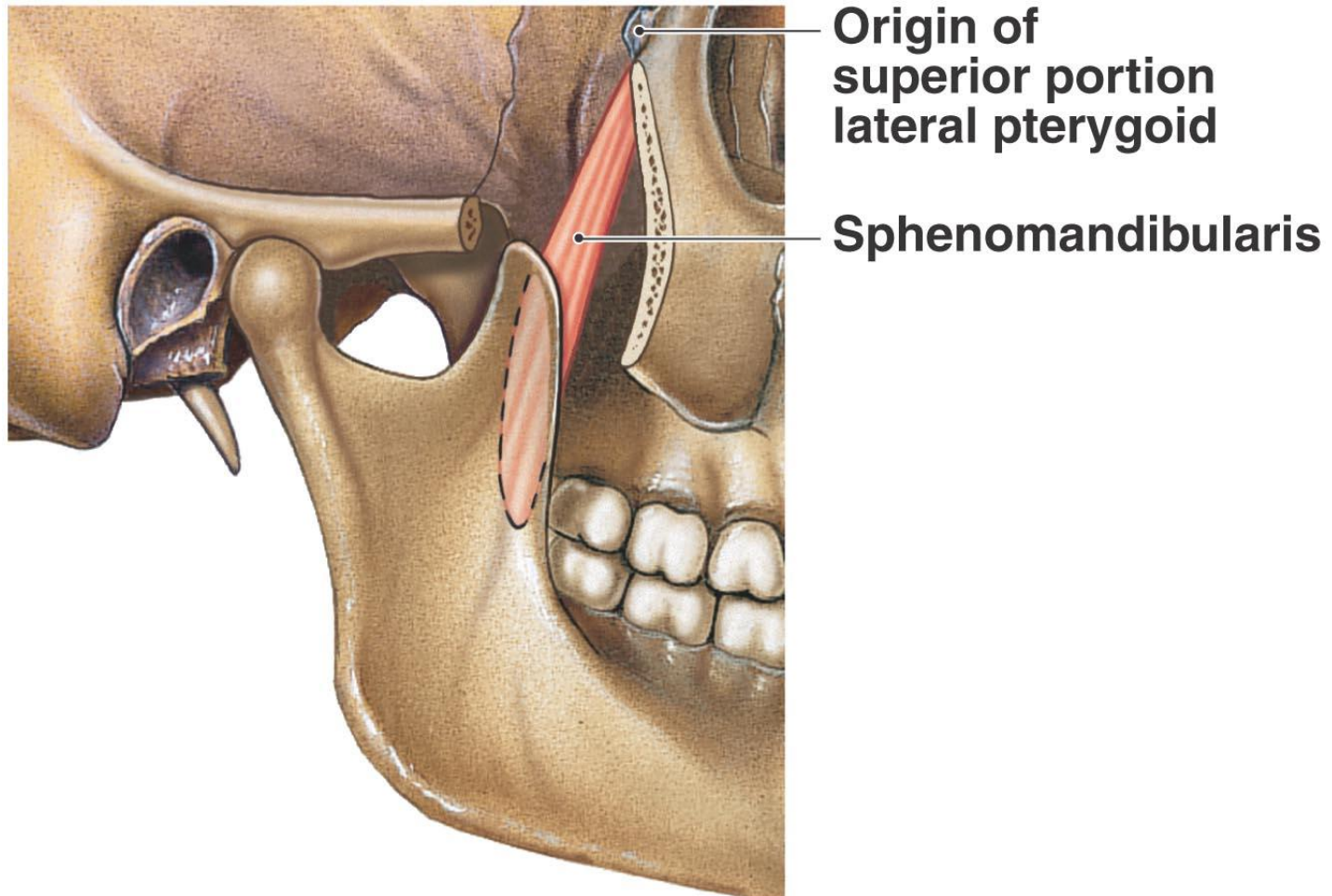


Figure 10.7 The Sphenomandibularis Muscle

The Axial Musculature

TABLE 10.3 Muscles of Mastication

Muscle	Origin	Insertion	Action	Innervation
Masseter	Zygomatic arch	Lateral surface and angle of mandibular ramus	Elevates mandible and closes jaws	Trigeminal nerve (N V), mandibular branch
Temporalis	Along temporal lines of skull	Coronoid process of mandible	As above	As above
Pterygoids	Lateral pterygoid plate	Medial surface of mandibular ramus		
Medial pterygoid	Lateral pterygoid plate and adjacent portions of palatine bone and maxilla	Medial surface of mandibular ramus	Elevates the mandible and closes the jaws, or moves mandible side to side	As above
Lateral pterygoid	Lateral pterygoid plate and greater wing of sphenoid	Anterior part of the neck of the mandibular condyle	Opens jaws, protrudes mandible, or moves mandible side to side	As above

The Axial Musculature

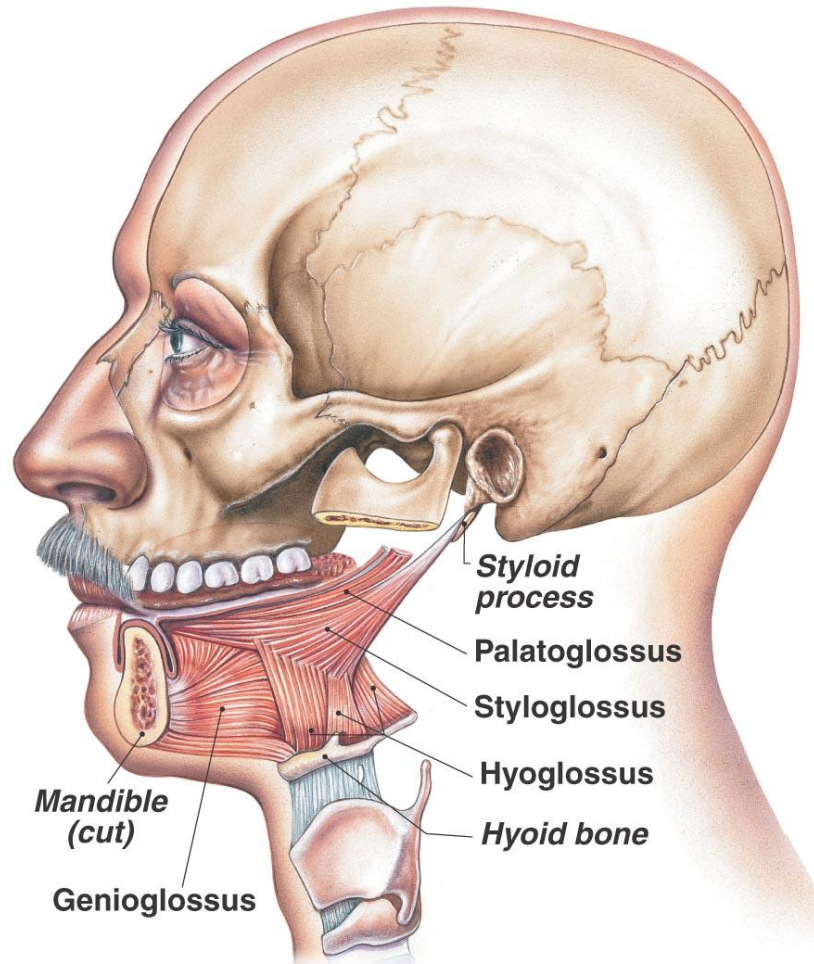


Figure 10.8 Muscles of the Tongue

The Axial Musculature

TABLE 10.4 Muscles of the Tongue

Muscle	Origin	Insertion	Action	Innervation
Genioglossus	Medial surface of mandible around chin	Body of tongue, hyoid bone	Depresses and protracts tongue	Hypoglossal nerve (N XII)
Hyoglossus	Body and greater horn of hyoid bone	Side of tongue	Depresses and retracts tongue	As above
Palatoglossus	Anterior surface of soft palate	As above	Elevates tongue, depresses soft palate	Branch of pharyngeal plexus (N X)
Styloglossus	Styloid process of temporal bone	Along the side to tip and base of tongue	Retracts tongue, elevates sides	Hypoglossal nerve (N XII)

The Axial Musculature

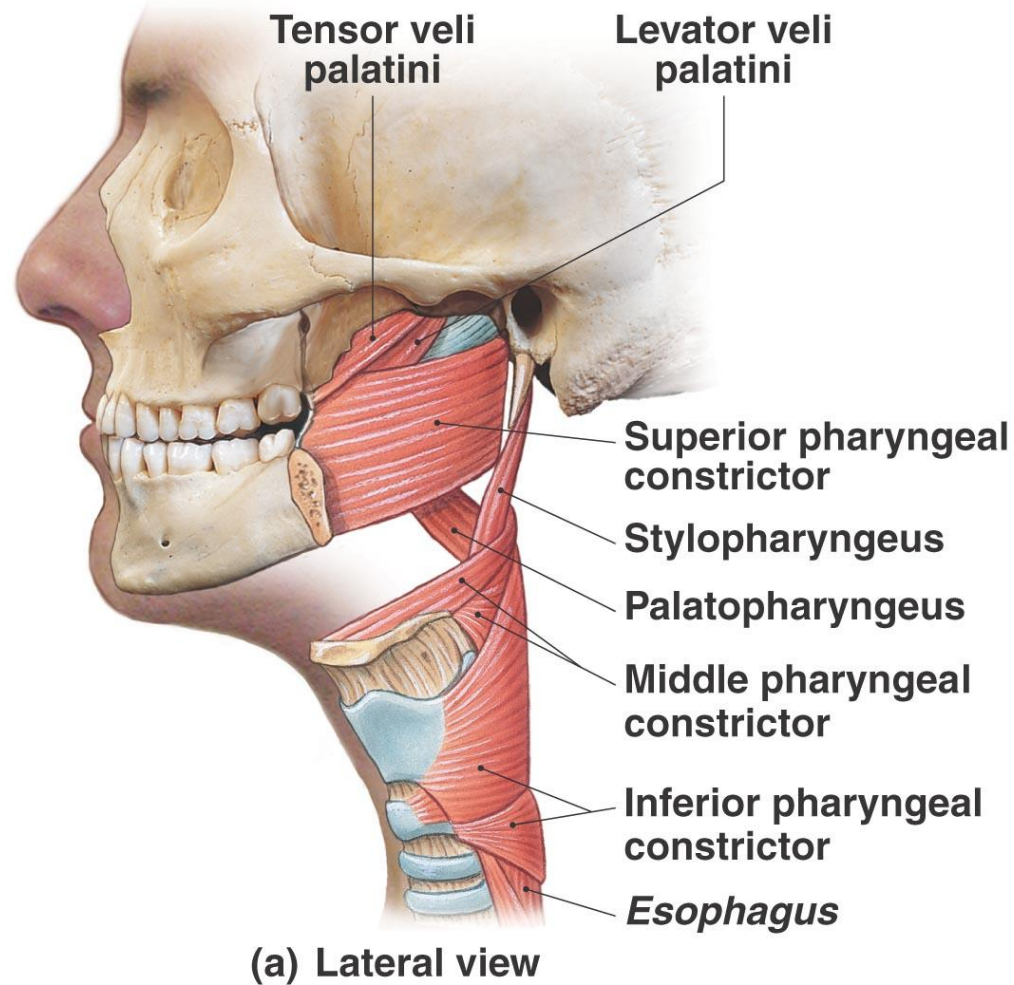


Figure 10.9 Muscles of the Pharynx (Lateral View)

The Axial Musculature

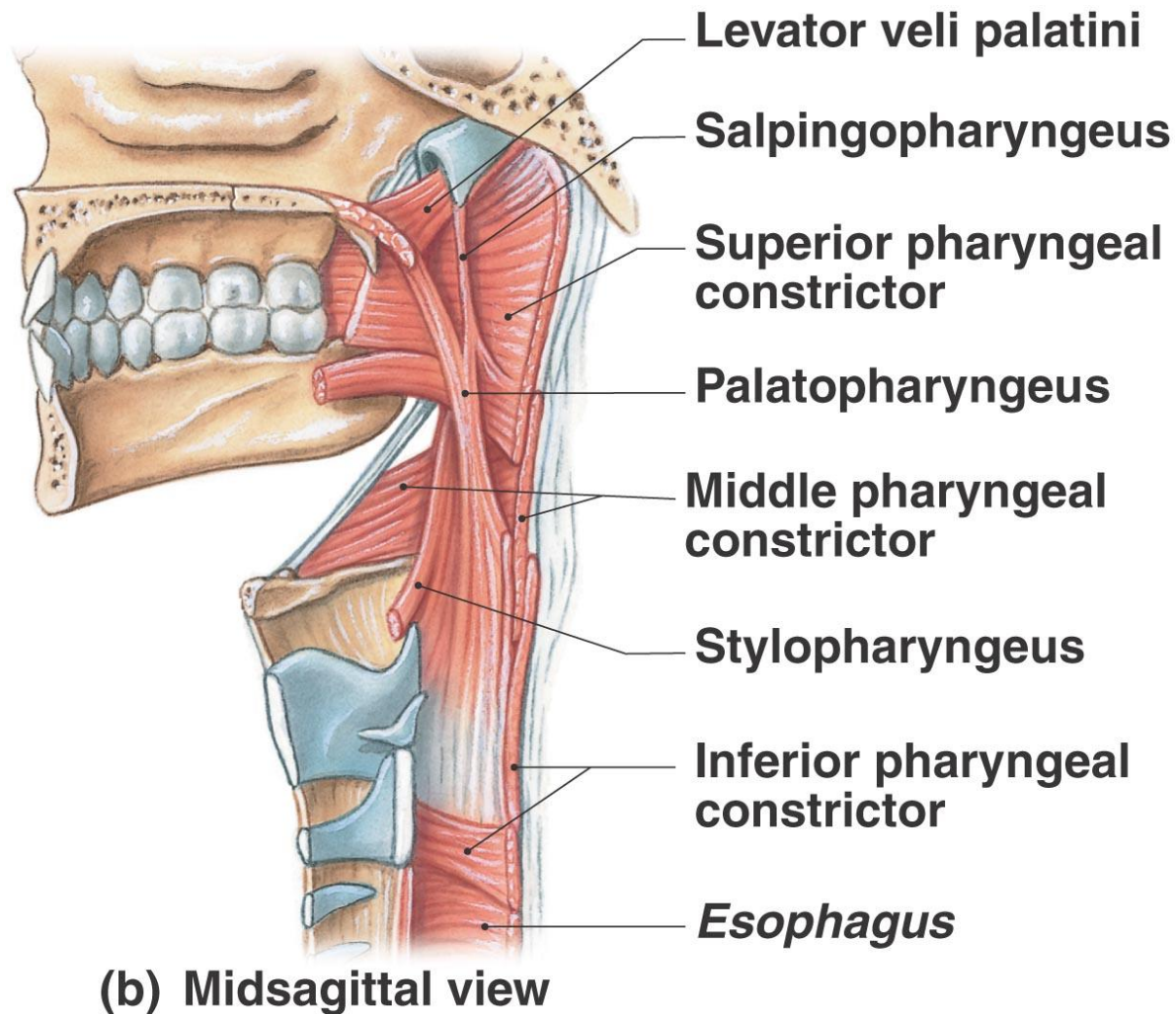


Figure 10.9 Muscles of the Pharynx (Midsagittal View)

The Axial Musculature

TABLE 10.5 Muscles of the Pharynx

Muscle	Origin	Insertion	Action	Innervation
PHARYNGEAL CONSTRUCTORS			Constrict pharynx to propel bolus into esophagus	Branches of pharyngeal plexus (N X)
Superior constrictor	Pterygoid process of sphenoid, medial surfaces of mandible, and the side of the tongue	Median raphe attached to occipital bone		N X
Middle constrictor	Horns of hyoid bone	Median raphe		N X
Inferior constrictor	Cricoid and thyroid cartilages of larynx	Median raphe		N X
LARYNGEAL ELEVATORS*			Elevate larynx	Branches of pharyngeal plexus (N IX & X)
Palatopharyngeus	Soft and hard palates	Thyroid cartilage		N X
Salpingopharyngeus	Cartilage around the inferior portion of the auditory tube	Thyroid cartilage		N X
Stylopharyngeus	Styloid process of temporal bone	Thyroid cartilage		N IX
PALATAL MUSCLES				
Levator veli palatini	Petrous part of temporal bone, tissues around the auditory tube	Soft palate	Elevate soft palate	Branches of pharyngeal plexus (N X)
Tensor veli palatini	Sphenoidal spine, pterygoid process, and tissues around the auditory tube	Soft palate	As above	N V

*Assisted by the thyrohyoid, geniohyoid, stylohyoid, and hyoglossus muscles, discussed in Tables 10.4 and 10.6.

The Axial Musculature

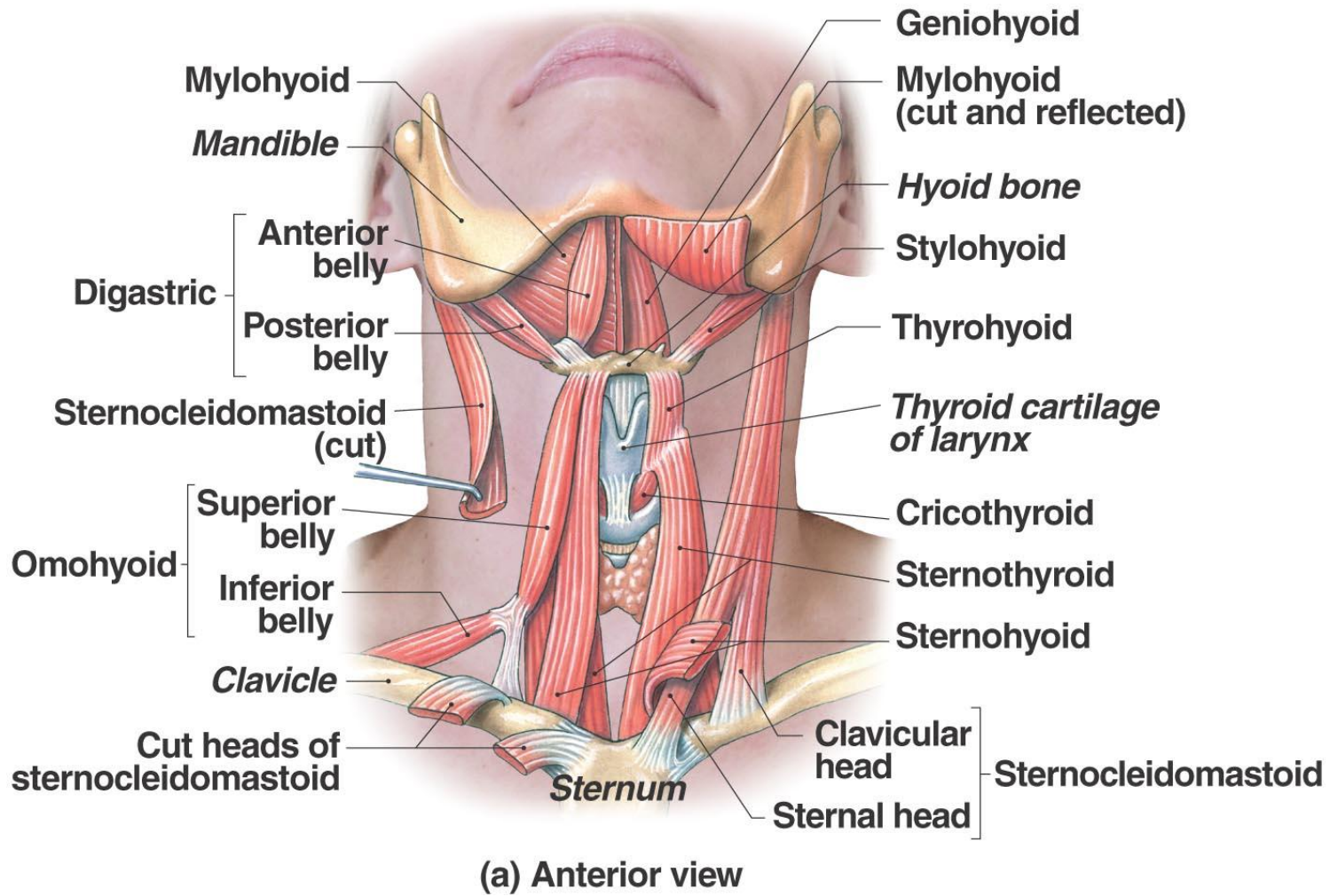


Figure 10.10 Anterior Muscles of the Neck, Part I (Anterior View)

The Axial Musculature

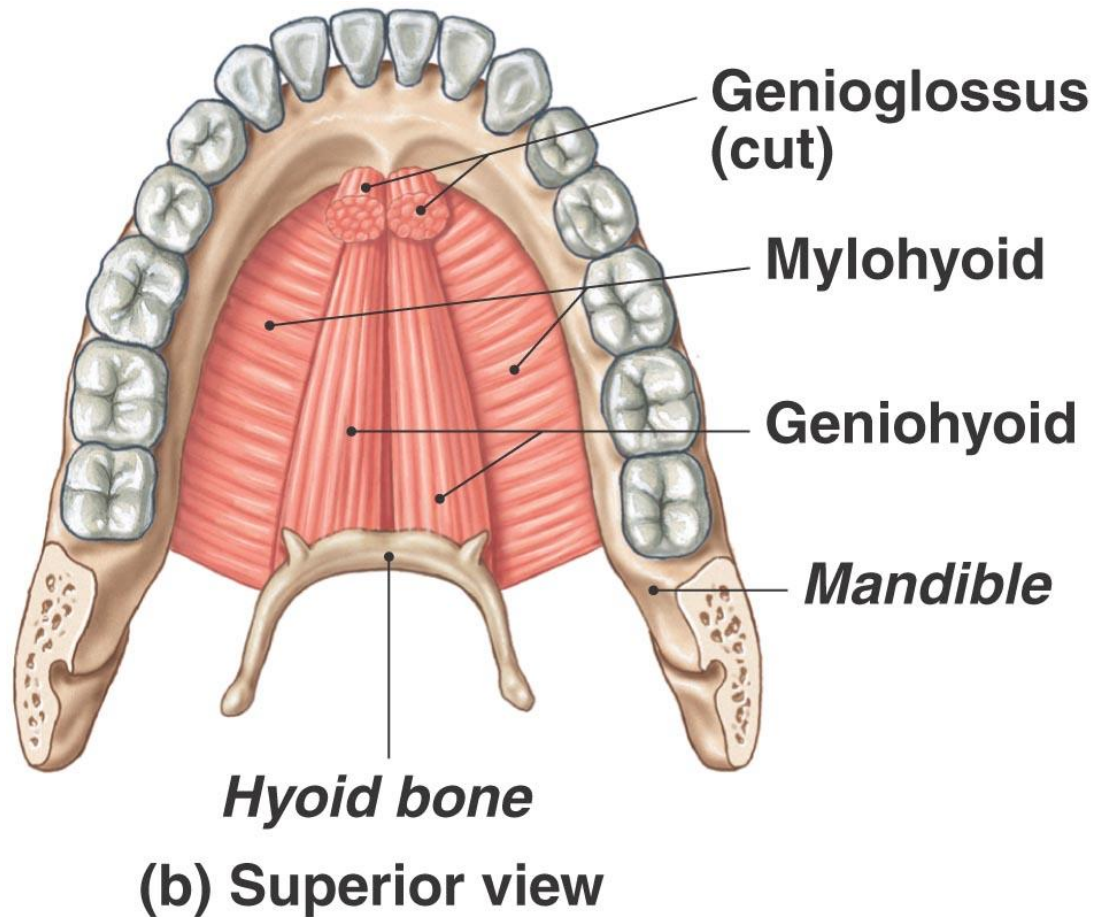


Figure 10.10 Anterior Muscles of the Neck, Part I (Superior View)

The Axial Musculature

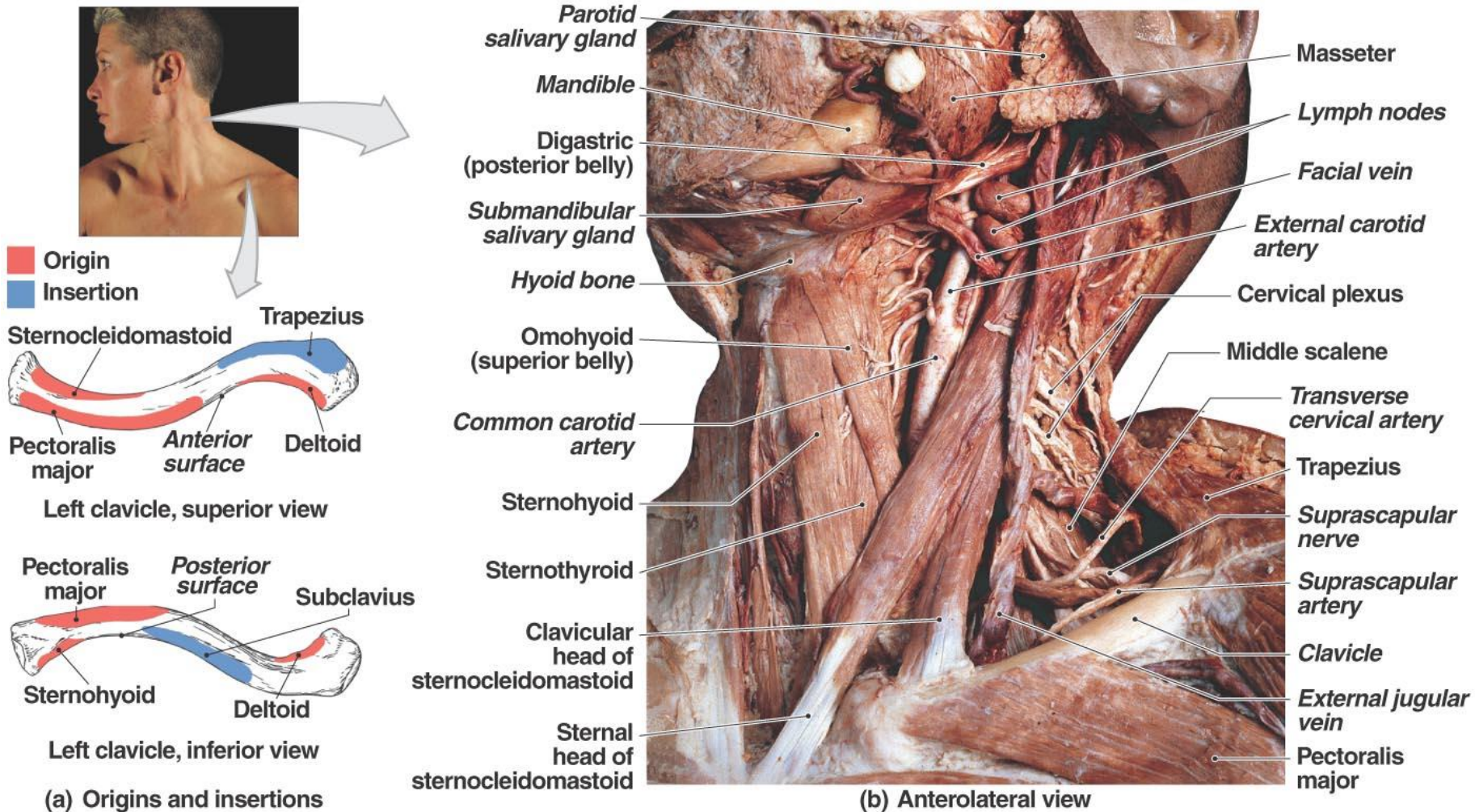


Figure 10.11 Anterior Muscles of the Neck, Part II

The Axial Musculature

TABLE 10.6 Anterior Muscles of the Neck

Muscle	Origin	Insertion	Action	Innervation
Digastric		Hyoid bone	Depresses mandible, opening mouth, and/or elevates larynx	
Anterior belly	From inferior surface of mandible at chin			Trigeminal nerve (N V), mandibular branch
Posterior belly	From mastoid region of temporal bone			Facial nerve (N VII)
Geniohyoid	Medial surface of mandible at chin	Hyoid bone	As above and retracts hyoid bone	Cervical nerve C ₁ via hypoglossal nerve (N XII)
Mylohyoid	Mylohyoid line of mandible	Median connective tissue band (raphe) that runs to hyoid bone	Elevates floor of mouth, elevates hyoid bone, and/or depresses mandible	Trigeminal nerve (N V), mandibular branch
Omoxyoid*	Superior border of the scapula near the scapular notch	Hyoid bone	Depresses hyoid bone and larynx	Cervical spinal nerves C ₂ –C ₃
Sternohyoid	Clavicle and manubrium	Hyoid bone	As above	Cervical spinal nerves C ₁ –C ₃
Sternothyroid	Dorsal surface of manubrium and first costal cartilage	Thyroid cartilage of larynx	As above	As above
Stylohyoid	Styloid process of temporal bone	Hyoid bone	Elevates larynx	Facial nerve (N VII)
Thyrohyoid	Thyroid cartilage of larynx	Hyoid bone	Elevates larynx, depresses hyoid bone	Cervical spinal nerves C ₁ –C ₂ via hypoglossal nerve (N XII)
Sternocleidomastoid		Mastoid region of skull and lateral portion of superior nuchal line	Together, they flex the neck; alone, one side bends neck toward shoulder and turns face to opposite side	Accessory nerve (N XI) and cervical spinal nerves (C ₂ –C ₃) of cervical plexus
Clavicular head	Attaches to sternal end of clavicle			
Sternal head	Attaches to manubrium			

*Superior and inferior bellies, united at central tendon anchored to clavicle and first rib.

The Axial Musculature

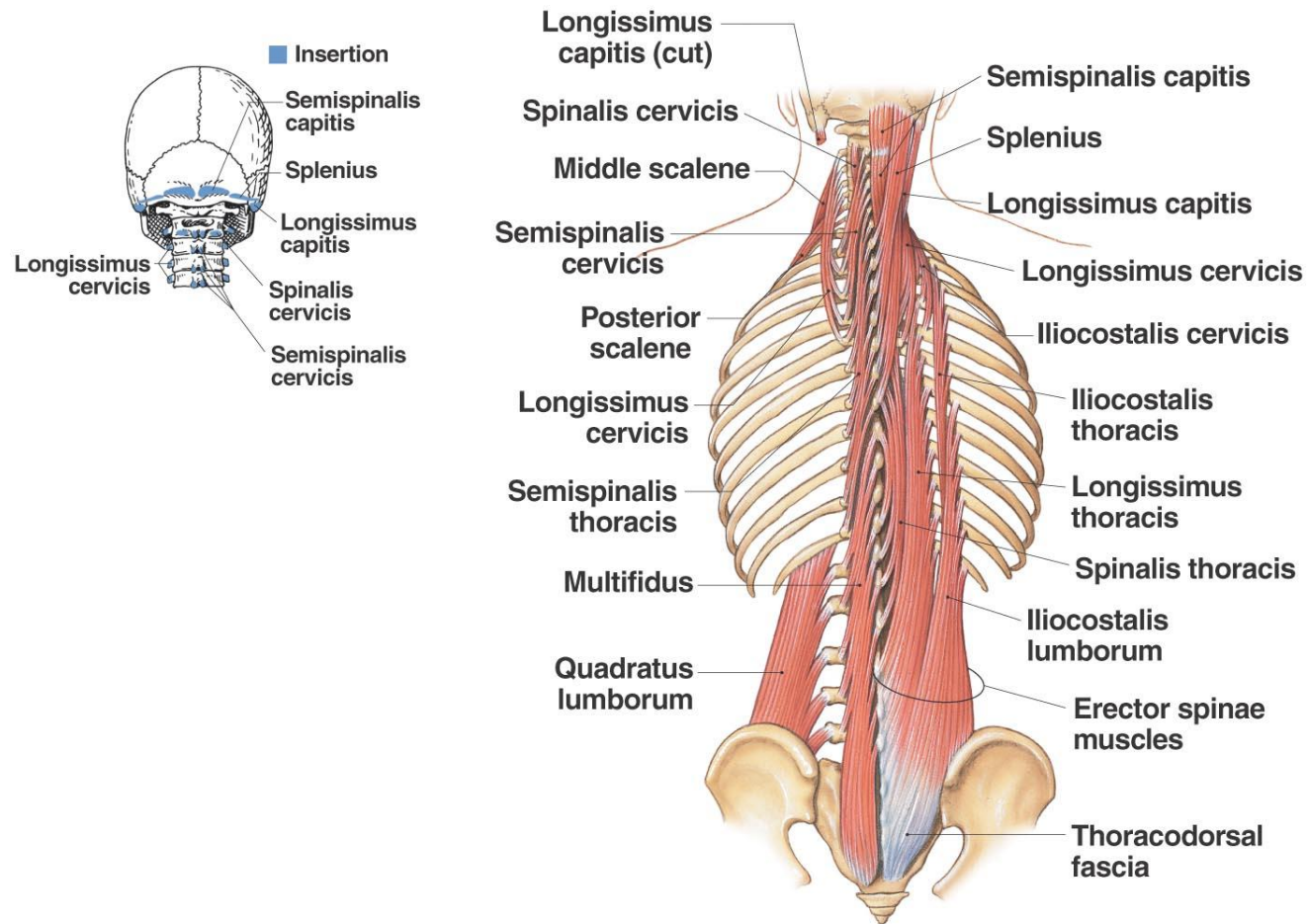


The Head and Neck

The Axial Musculature

- Muscles of the Vertebral Column
 - Back muscles form three distinct layers:
 - Superficial—move the neck
 - Intermediate—extend the vertebral column
 - Deep—interconnect vertebrae
 - *Extrinsic muscles*—those in the superficial and intermediate layers
 - *Intrinsic (or true) muscles*—those in the deepest layer; in turn, these intrinsic muscles are arranged in superficial, intermediate, and deep layers

The Axial Musculature



(a) The erector spinae, posterior view

Figure 10.12

Muscles of the Vertebral Column, Posterior View of Superficial (Right) and Deeper (Left) Muscles

The Axial Musculature



The Erector Spinae Muscles

The Axial Musculature

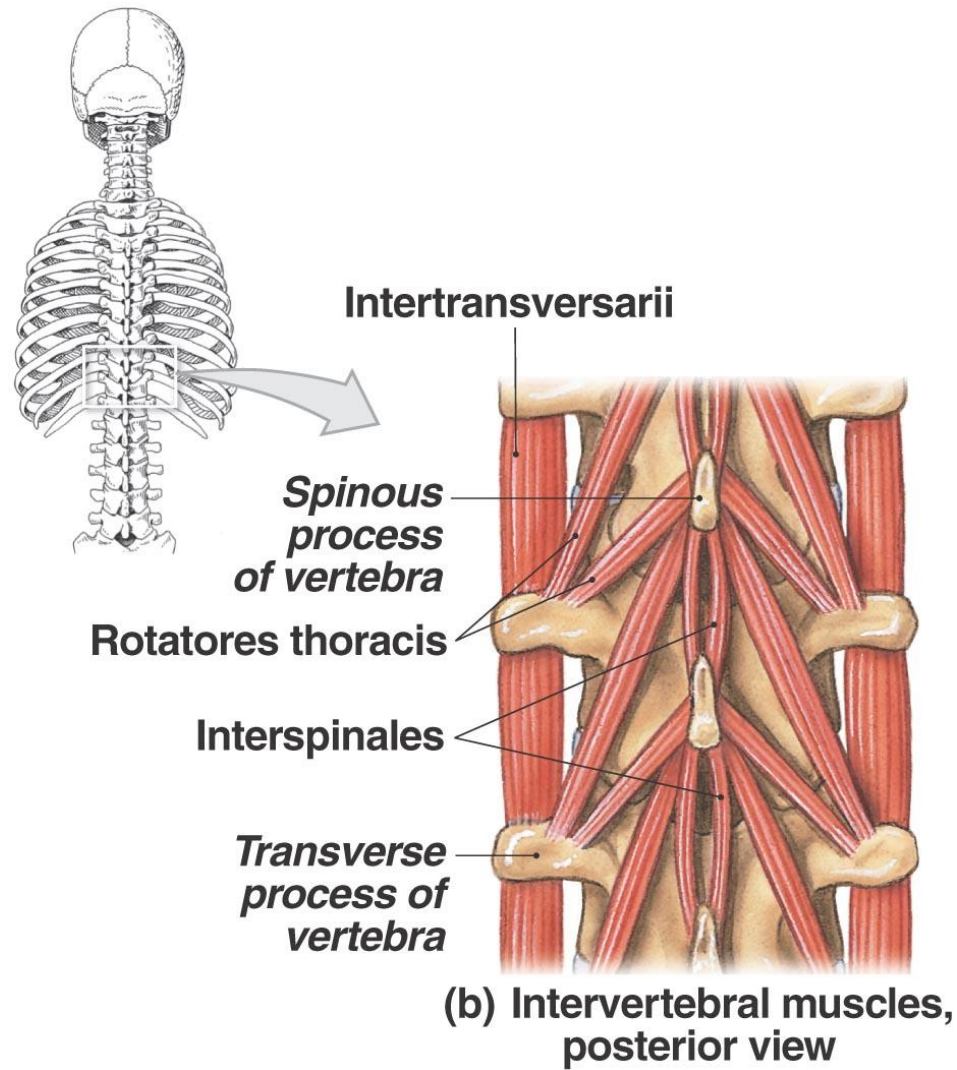
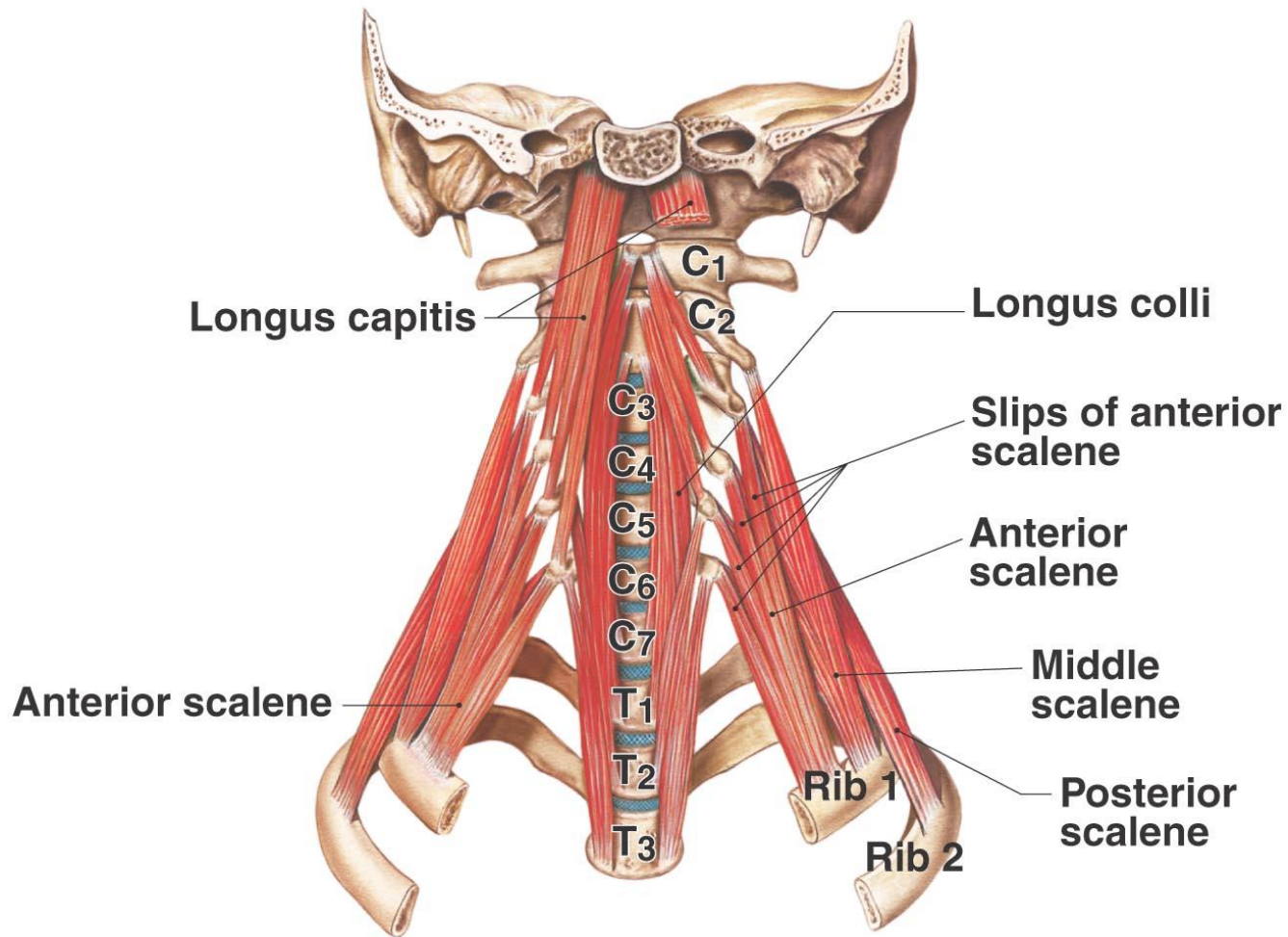


Figure 10.12 Muscles of the Vertebral Column

The Axial Musculature



(c) Muscles on the anterior surfaces of the cervical and upper thoracic vertebrae

Figure 10.12 Muscles of the Vertebral Column

The Axial Musculature

TABLE 10.7 Muscles of the Vertebral Column

Group/Muscle	Origin	Insertion	Action	Innervation
SUPERFICIAL LAYER				
Splenius (Splenius capitis, splenius cervicis)	Spinous processes and ligaments connecting inferior cervical and superior thoracic vertebrae	Mastoid process, occipital bone of skull, superior cervical vertebrae	The two sides act together to extend neck; either alone rotates and laterally flexes neck to that side	Cervical spinal nerves
Erector Spinae SPINALIS GROUP				
Spinalis cervicis	Inferior portion of ligamentum nuchae and spinous process of C ₇	Spinous process of axis	Extends neck	As above
Spinalis thoracis	Spinous processes of inferior thoracic and superior lumbar vertebrae	Spinous processes of superior thoracic vertebrae	Extends vertebral column	Thoracic and lumbar spinal nerves
LONGISSIMUS GROUP				
Longissimus capitis	Transverse processes of inferior cervical and superior thoracic vertebrae	Mastoid process of temporal bone	The two sides act together to extend neck; either alone rotates and laterally flexes neck to that side	Cervical and thoracic spinal nerves
Longissimus cervicis	Transverse processes of superior thoracic vertebrae	Transverse processes of middle and superior cervical vertebrae	As above	As above
Longissimus thoracis	Broad aponeurosis and at transverse processes of inferior thoracic and superior lumbar vertebrae; joins iliocostalis	Transverse processes of superior thoracic and lumbar vertebrae and inferior surfaces of lower 10 ribs	Extension of vertebral column; alone, each produces lateral flexion to that side	Thoracic and lumbar spinal nerves
ILOCOSTALIS GROUP				
Iliocostalis cervicis	Superior borders of vertebrosternal ribs near the angles	Transverse processes of middle and inferior cervical vertebrae	Extends or laterally flexes neck, elevates ribs	Cervical and superior thoracic spinal nerves
Iliocostalis thoracis	Superior borders of ribs 6–12 medial to the angles	Superior ribs and transverse processes of last cervical vertebra	Stabilizes thoracic vertebrae in extension	Thoracic spinal nerves
Iliocostalis lumborum	Iliac crest, sacral crests, and lumbar spinous processes	Inferior surfaces of ribs 6–12 near their angles	Extends vertebral column, depresses ribs	Inferior thoracic nerves and lumbar spinal nerves

The Axial Musculature

TABLE 10.7 Muscles of the Vertebral Column (Continued)

Group/Muscle	Origin	Insertion	Action	Innervation
DEEP MUSCLES OF THE SPINE (TRANSVERSOSPINALIS)				
Semispinalis				
Semispinalis capitis	Processes of inferior cervical and superior thoracic vertebrae	Occipital bone, between nuchal lines	Together the two sides extend neck; alone, each extends and laterally flexes neck and turns head to opposite side	Cervical spinal nerves
Semispinalis cervicis	Transverse processes of T ₁ –T ₅ or T ₆	Spinous processes of C ₂ –C ₅	Extends vertebral column and rotates toward opposite side	As above
Semispinalis thoracis	Transverse processes of T ₆ –T ₁₀	Spinous processes of C ₅ –T ₄	As above	Thoracic spinal nerves
Multifidus	Sacrum and transverse process of each vertebra	Spinous processes of the third or fourth more superior vertebra	As above	Cervical, thoracic, and lumbar spinal nerves
Rotatores (cervicis, thoracis, and lumborum)	Transverse processes of the vertebrae in each region (cervical, thoracic, and lumbar)	Spinous process of adjacent, more superior vertebra	As above	As above
Interspinales	Spinous process of each vertebra	Spinous processes of more superior vertebra	Extends vertebral column	As above
Intertransversarii	Transverse processes of each vertebra	Transverse process of more superior vertebra	Lateral flexion of vertebral column	As above
SPINAL FLEXORS				
Longus capitis	Transverse processes of cervical vertebrae	Base of the occipital bone	Together the two sides flex the neck; alone each rotates head to that side	Cervical spinal nerves
Longus colli	Anterior surfaces of cervical and superior thoracic vertebrae	Transverse processes of superior cervical vertebrae	Flexes and/or rotates neck; limits hyperextension	As above
Quadratus lumborum	Iliac crest and iliolumbar ligament	Last rib and transverse processes of lumbar vertebrae	Together they depress ribs; alone, each produces lateral flexion of vertebral column; fixes floating ribs (11 and 12) during forced exhalation	Thoracic and lumbar spinal nerves

The Axial Musculature

- Oblique and Rectus Muscles
 - The muscles of the oblique and rectus groups lie between the vertebral column and the ventral midline.
 - The *oblique muscles* can compress underlying structures or rotate the vertebral column, depending on whether one or both sides are contracting.
 - The *rectus muscles* are important flexors of the vertebral column, acting in opposition to the erector spinae.

The Axial Musculature

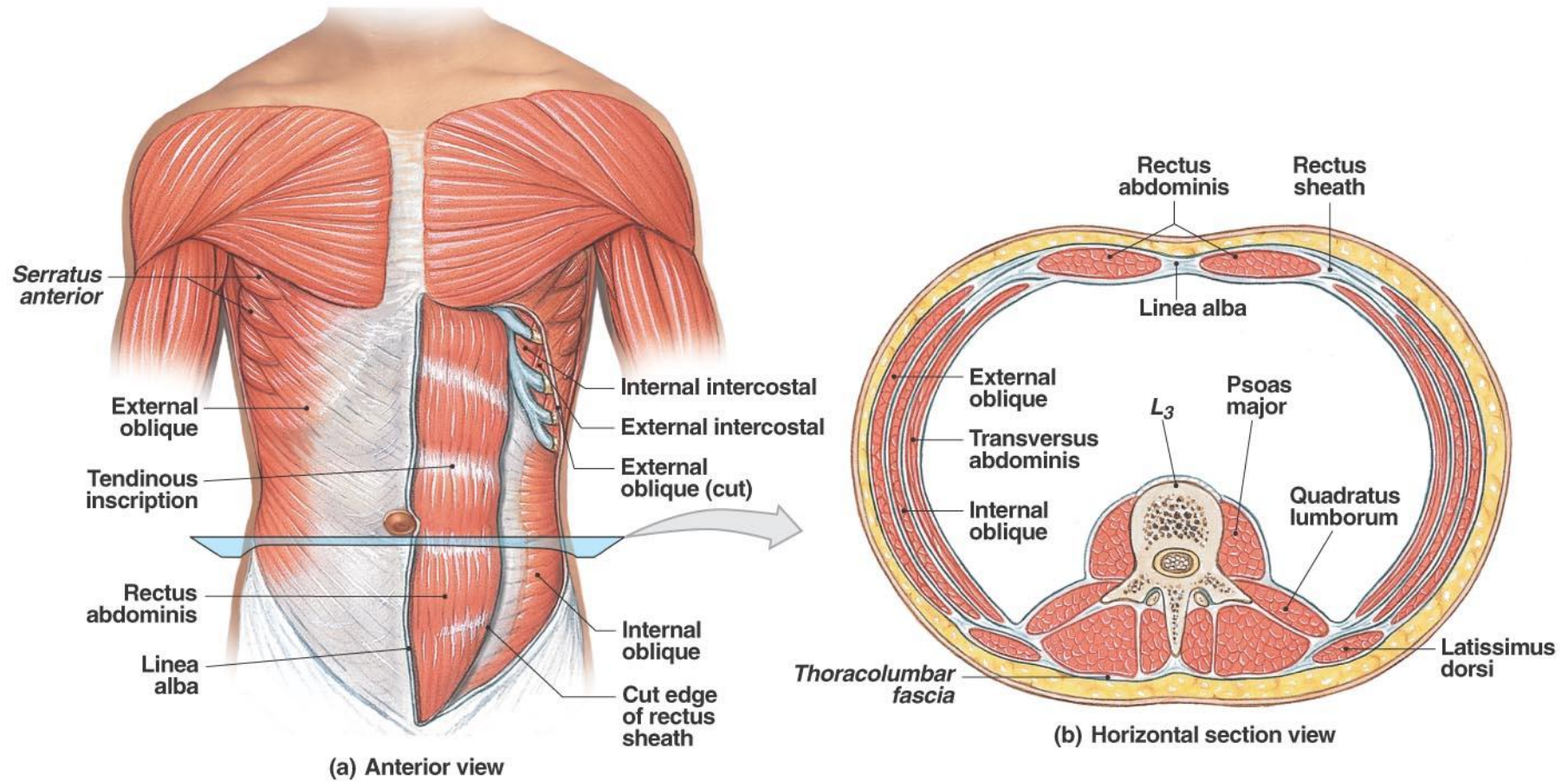


Figure 10.13 The Oblique and Rectus Muscles

The Axial Musculature

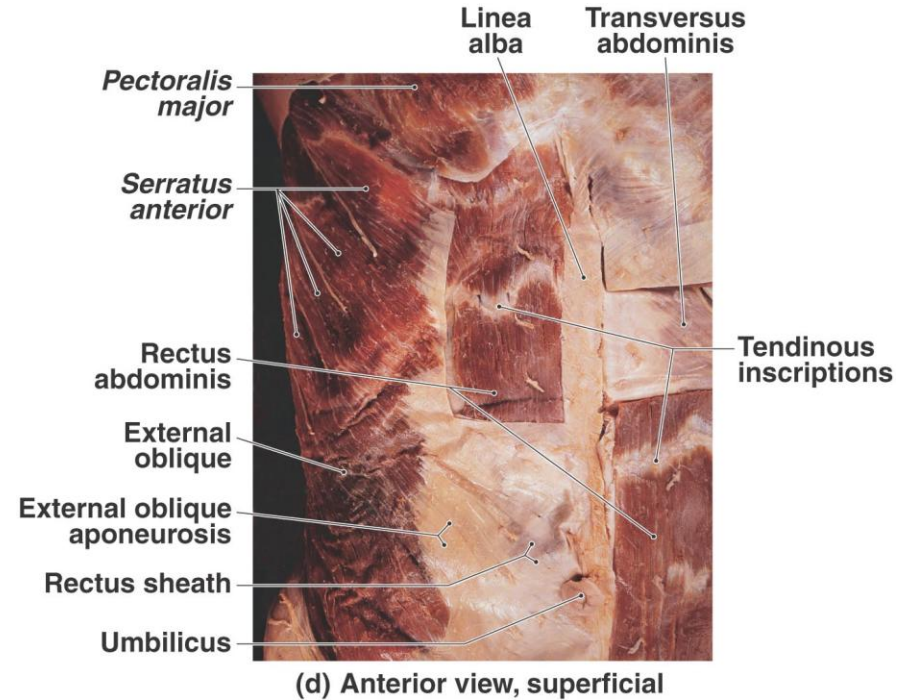
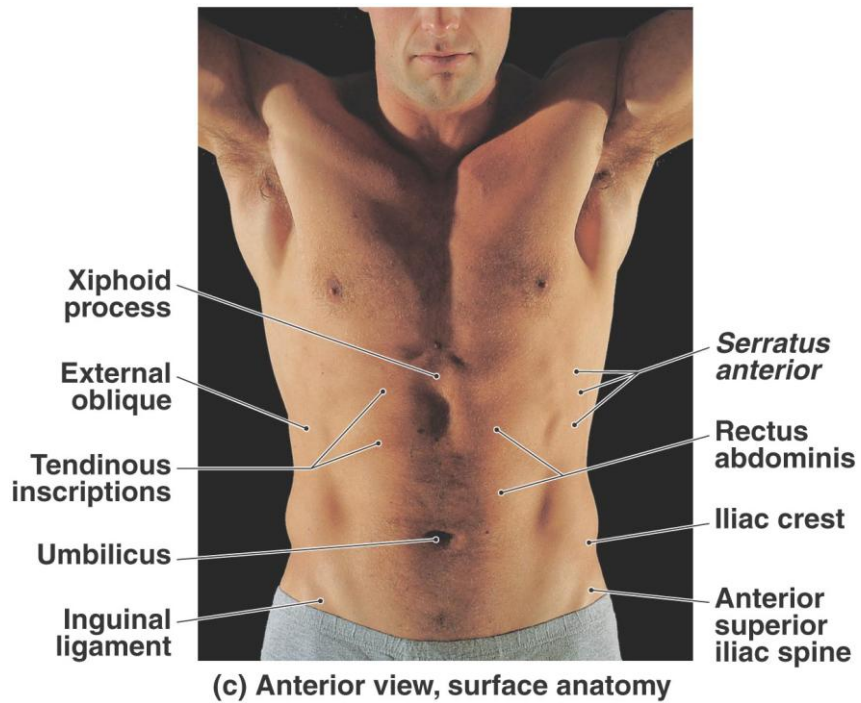


Figure 10.13 The Oblique and Rectus Muscles

The Axial Musculature

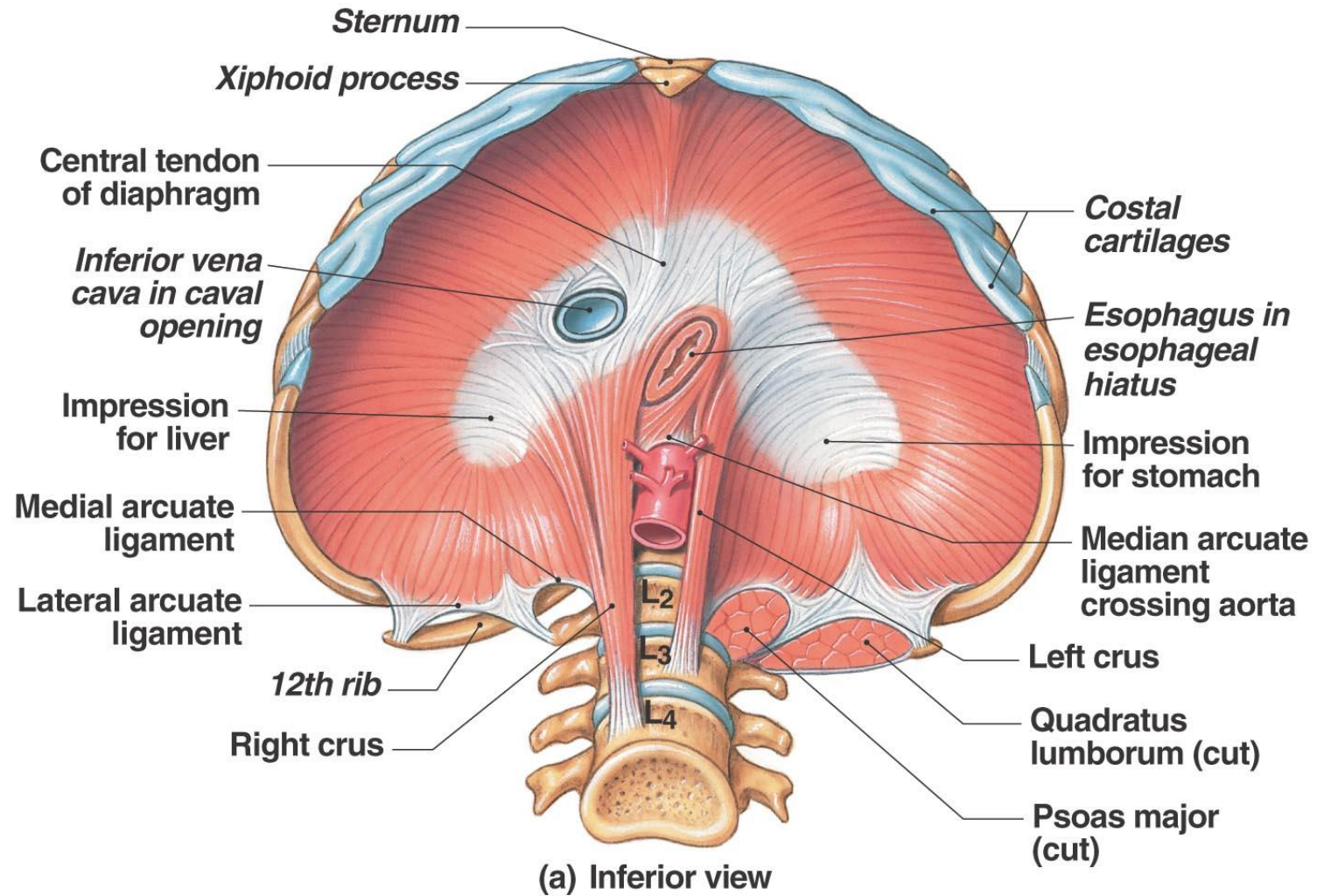


Figure 10.14 The Diaphragm

The Axial Musculature

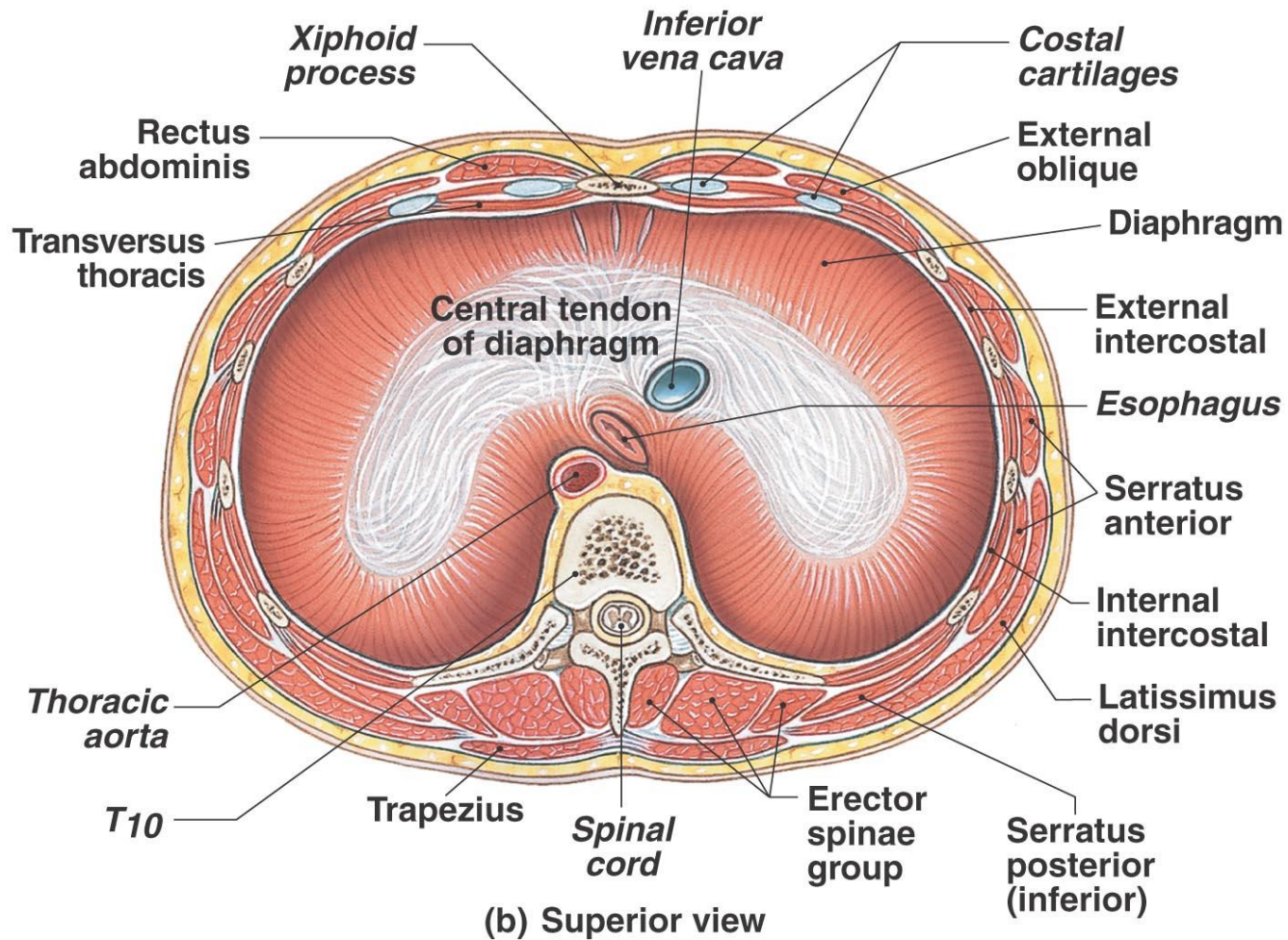


Figure 10.14 The Diaphragm

The Axial Musculature

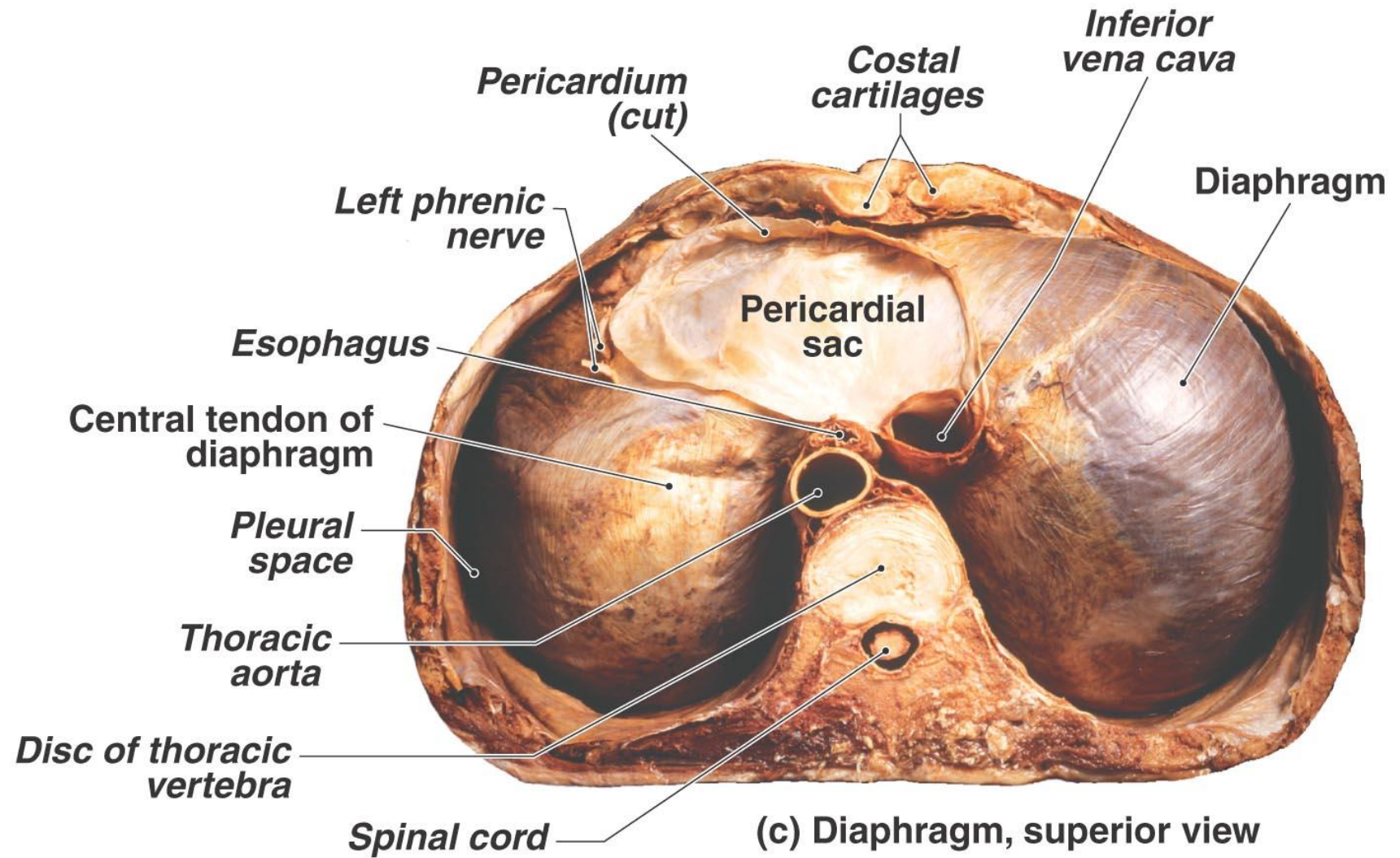


Figure 10.14 The Diaphragm

The Axial Musculature

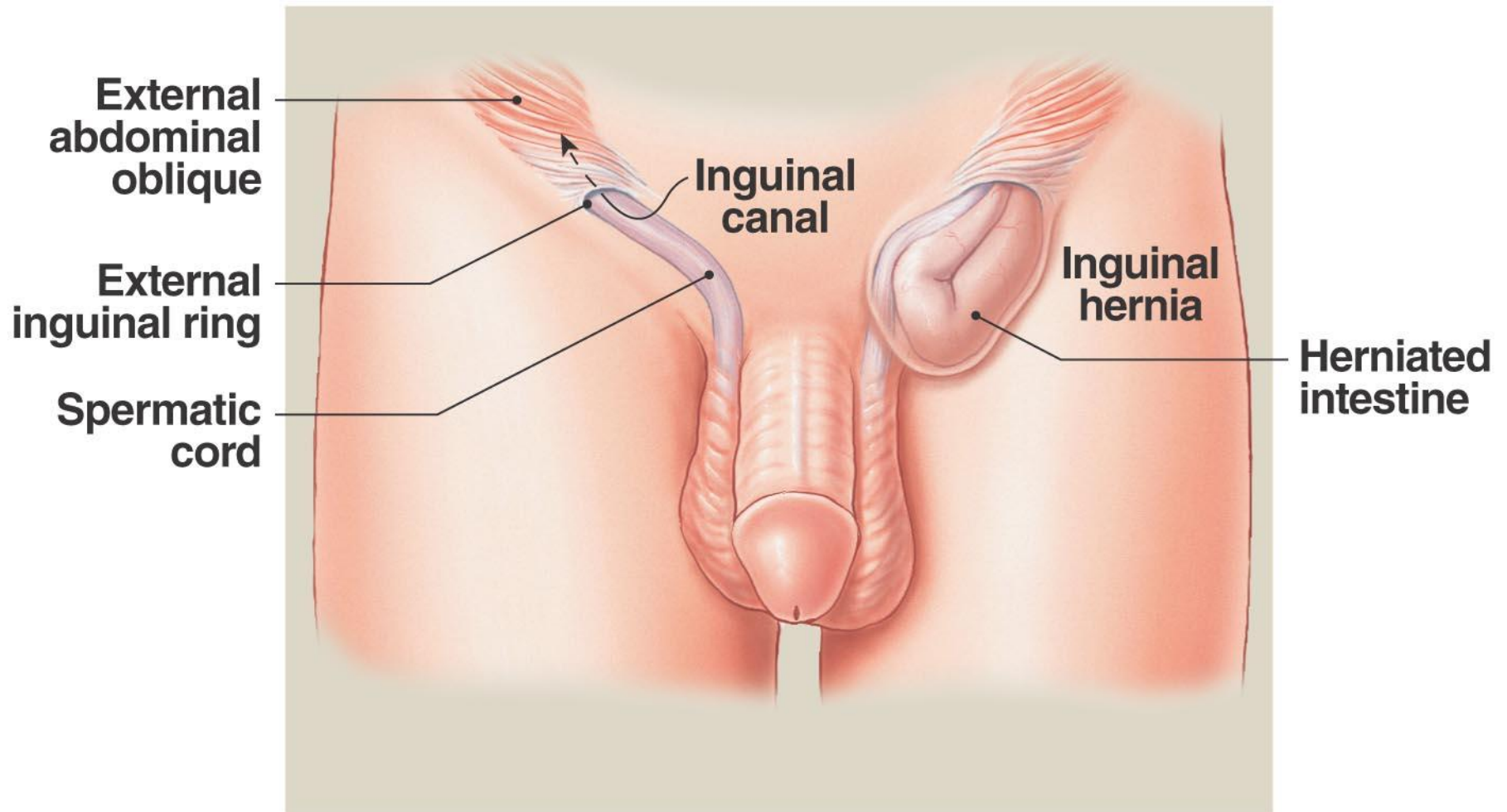


Figure 10.15 An Inguinal Hernia

The Axial Musculature

TABLE 10.8 Oblique and Rectus Muscles

Group/Muscle	Origin	Insertion	Action	Innervation
OBLIQUE GROUP				
Cervical region				
Scalenes (anterior, middle, and posterior)	Transverse and costal processes of cervical vertebrae C ₂ –C ₇	Superior surface of first two ribs	Elevate ribs and/or flex neck; one side bends neck and rotates head and neck to opposite side	Cervical spinal nerves
Thoracic region				
External intercostals	Inferior border of each rib	Superior border of more inferior rib	Elevate ribs	Intercostal nerves (branches of thoracic spinal nerves)
Internal intercostals	Superior border of each rib	Inferior border of the more superior rib	Depress ribs	As above
Transversus thoracis	Posterior surface of sternum	Cartilages of ribs	As above	As above
Serratus posterior				
superior	Spinous processes of C ₇ –T ₃ and ligamentum nuchae	Superior borders of ribs 2–5 near angles	Elevates ribs, enlarges thoracic cavity	Thoracic nerves (T ₁ –T ₄)
inferior	Aponeurosis from spinous processes of T ₁₀ –L ₃	Inferior borders of ribs 8–12	Pulls ribs inferiorly; also pulls outward, opposing diaphragm	Thoracic nerves (T ₉ –T ₁₂)
Abdominal region				
External oblique	External and inferior borders of ribs 5–12	External oblique aponeuroses extending to linea alba and iliac crest	Compresses abdomen; depresses ribs; flexes, laterally flexes, or rotates vertebral column to the opposite side	Intercostal nerves 5–12, iliohypogastric, and ilioinguinal nerves
Internal oblique	Thoracolumbar fascia and iliac crest	Inferior surfaces of ribs 9–12, costal cartilages 8–10, linea alba, and pubis	As above, but rotates vertebral column to same side	As above
Transversus abdominis	Cartilages of ribs 6–12, iliac crest, and thoracolumbar fascia	Linea alba and pubis	Compresses abdomen	As above

The Axial Musculature

TABLE 10.8 Oblique and Rectus Muscles (*Continued*)

Group/Muscle	Origin	Insertion	Action	Innervation
RECTUS GROUP				
Cervical region	<i>Includes the geniohyoid, omohyoid, sternohyoid, sternothyroid, and thyrohyoid muscles in Table 10.6</i>			
Thoracic region				
Diaphragm	Xiphoid process, ribs 7–12 and associated costal cartilages, and anterior surfaces of lumbar vertebrae	Central tendinous sheet	Contraction expands thoracic cavity, compresses abdominopelvic cavity	Phrenic nerves (C ₃ –C ₅)
Abdominal region				
Rectus abdominis	Superior surface of pubis around symphysis	Inferior surfaces of cartilages (ribs 5–7) and xiphoid process of sternum	Depresses ribs, flexes vertebral column and compresses abdomen	Intercostal nerves (T ₇ –T ₁₂)

The Axial Musculature

- Muscles of the Perineum and the Pelvic Diaphragm
 - Three main functions:
 - Support the organs of the pelvic cavity
 - Flex the joints of the sacrum and coccyx
 - Control the movement of materials through the urethra and anus

The Axial Musculature

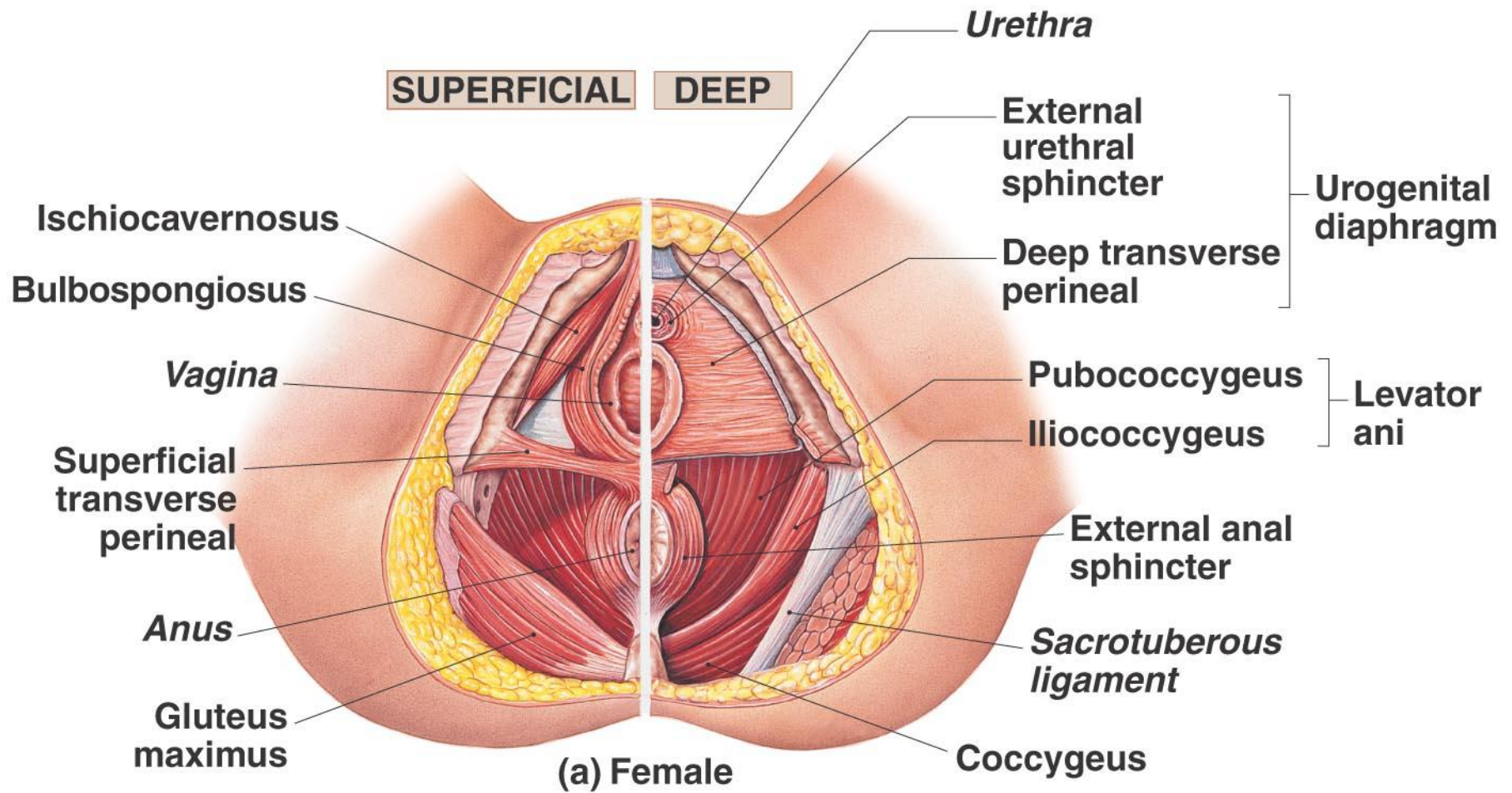


Figure 10.16 Muscles of the Pelvic Floor (Female)

The Axial Musculature

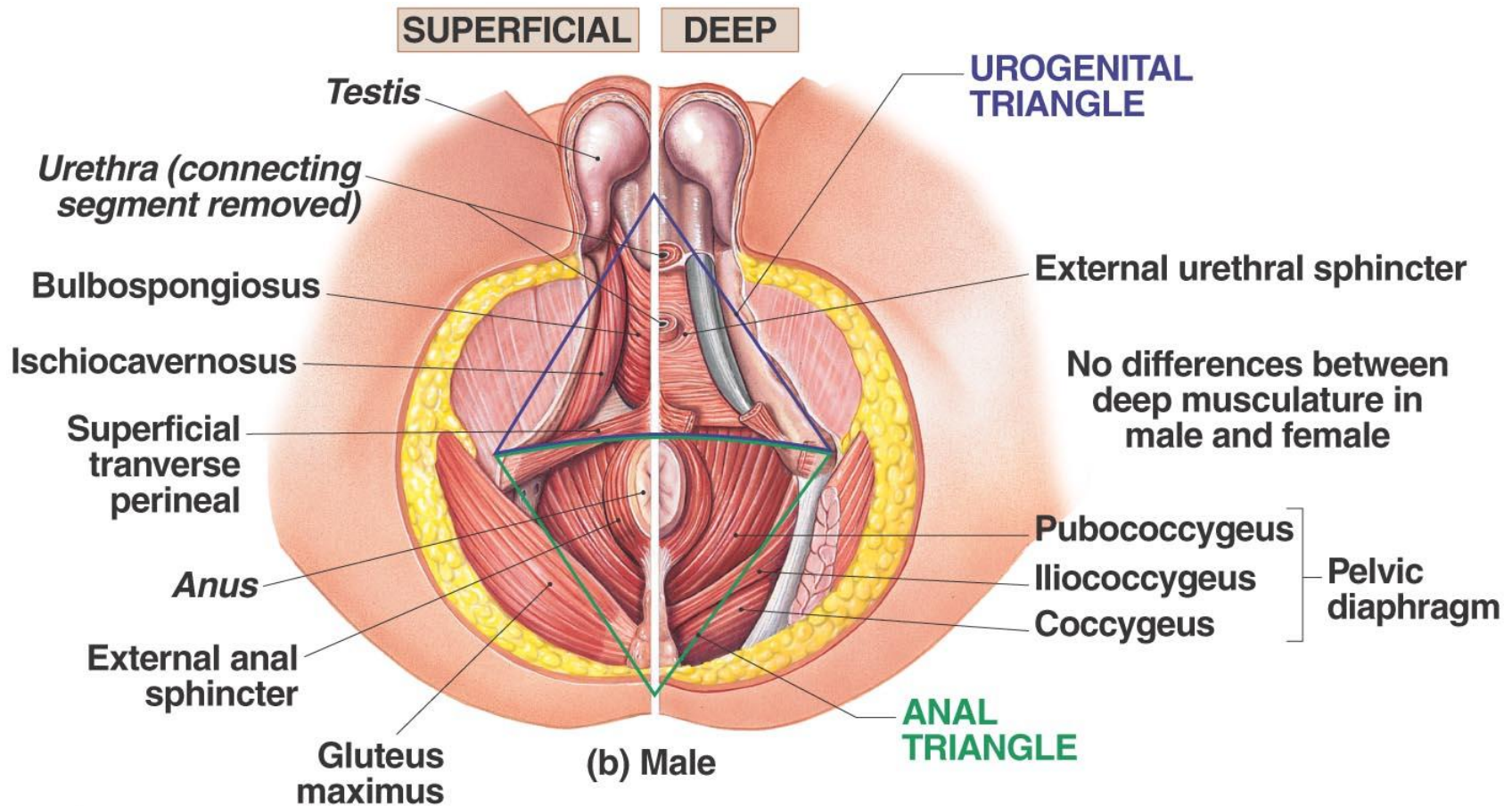


Figure 10.16 Muscles of the Pelvic Floor (Male)

The Axial Musculature

TABLE 10.9 Muscles of the Perineum

Group/Muscle	Origin	Insertion	Action	Innervation
UROGENITAL TRIANGLE				
Superficial muscles				
Bulbospongiosus				
Male	Perineal body (central tendon of perineum) and medium raphe	Corpus spongiosum, perineal membrane and corpus cavernosum	Compresses base, stiffens penis, ejects urine or semen	Pudendal nerve, perineal branch (S ₂ –S ₄)
Female	Perineal body (central tendon of perineum)	Bulb of vestibule, perineal membrane, body of clitoris, and corpus cavernosum	Compresses and stiffens clitoris, narrows vaginal opening	As above
Ischiocavernosus	Ramus and tuberosity of ischium	Corpus cavernosum of penis or clitoris; also to ischiopubic ramus (in female only)	Compresses and stiffens penis or clitoris, helping to maintain erection	As above
Superficial transverse perineal	Ischial ramus	Central tendon of perineum	Stabilizes central tendon of perineum	As above
Deep muscles				
Deep transverse perineal	Ischial ramus	Median raphe of urogenital diaphragm	As above	As above
External urethral sphincter:				
Male	Ischial and pubic rami	To median raphe at base of penis; inner fibers encircle urethra	Closes urethra; compresses prostate and bulbo-urethral glands	As above
Female	Ischial and pubic rami	To median raphe; inner fibers encircle urethra	Closes urethra; compresses vagina and greater vestibular glands	As above

The Axial Musculature

TABLE 10.10 Muscles of the Pelvic Diaphragm

Group/Muscle	Origin	Insertion	Action	Innervation
ANAL TRIANGLE Coccygeus	Ischial spine	Lateral, inferior borders of the sacrum and coccyx	Flexes coccygeal joints; elevates and supports pelvic floor	Inferior sacral nerves (S ₄ -S ₅)
Levator ani: Iliococcygeus	Ischial spine, pubis	Coccyx and median raphe	Tenses floor of pelvis, supports pelvic organs, flexes coccygeal joints, elevates and retracts anus	Pudendal nerve (S ₂ -S ₄)
Pubococcygeus External anal sphincter	Inner margins of pubis Via tendon from coccyx	As above Encircles anal opening	As above Closes anal opening	As above Pudendal nerve; hemorrhoidal branch (S ₂ -S ₄)