Muscles of the Anterior Neck and Throat: Suprahyoid & Infrahyoid

- Neck is divided into 2 triangle (anterior & posterior) by the sternocleidomastoid muscle

- Anterior Triangle:
  - Suprahyoid muscles (found above hyoid bone)
  - Infrahyoid muscles (found below hyoid bone)
Muscles of the Anterior Neck and Throat: Suprahyoid & Infrahyoid

![Diagram of muscles in the anterior neck and throat](image)

- **Mylohyoid**
- **Stylohyoid**
  - Hyoid bone
- **Omohyoid** (superior belly)
- **Sternohyoid**
- **Sternocleidomastoid**
- **Omohyoid** (inferior belly)
- **Anterior belly**
- **Posterior belly**
- **Digastric**
- **Stylohyoid** (cut)
- **Thyrohyoid**
  - Thyroid cartilage of the larynx
  - Thyroid gland
- **Sternothyroid**

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Figure 10.8a
Muscles of the Anterior Neck and Throat: Suprahyoid & Infrahyoid

- Events of Swallowing (After tongue and buccinator squeeze food back toward the pharynx…)

- 1) Suprahyoid muscles pull the hyoid bone upward and forward toward the mandible resulting in the widening of the pharynx and closing the respiratory passageways
  - The hyoid bone is attached by the thyrohyoid membrane to the larynx, the larynx is also pulled upward & forward which widens the pharynx and closes the respiratory passageway

- 2) The tensor and levator veli palatini muscles close the nasal passageways to prevent food entrance

- 3) The pharyngeal constrictor muscleless propel food through the pharynx into the esophagus

- 4) The infrahyoid muscles return the hyoid bone and larynx back to their normal inferior position

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Muscles of the Anterior Neck and Throat: Infrahyoid

- Tensor veli palatini
- Levator veli palatini
- Styloid process
- Superior pharyngeal constrictor
- Middle pharyngeal constrictor
- Hyoid bone
- Thyrohyoid membrane
- Inferior pharyngeal constrictor
- Esophagus
- Buccinator
- Mandible
- Mylohyoid (cut)
- Geniohyoid
- Hyoglossus
- Thyroid cartilage of larynx
- Trachea

(b)
Muscles of the Neck: Head Movements

- Head is moved by muscles originating from the axial skeleton
- Major head flexor is the sternocleidomastoid muscles
- Synergists to head flexion are the suprathyroid and infrahyoid
- Lateral head movements are accomplished by the sternocleidomastoid and scalene muscles
- Head extension is accomplished by the deep splenius muscles and aided by the superficial trapezius
Muscles of the Neck: Head Movements

(a) Anterior
Muscles of the Neck: Head Movements

- **Mastoid process**
- **Spleniun capitis**
- **Spinous processes of the vertebrae**
- **Spleniun cervicis**

*Figure 10.9b*
Trunk Movements: Deep Back Muscles

- Extension is effected by the deep or intrinsic back muscles associated with the vertebral column.
- Superficial back muscles are associated with movements of the shoulder girdle and upper limbs.
- Think of each muscle as a string that, when pulled, moves a vertebrae attached below it.
Trunk Movements: Deep Back Muscles

- The prime mover of back extension is the erector spinae
- Erector spinae, or sacrospinalis, muscles consist of three columns on each side of the vertebrae – iliocostalis, longissimus, and spinalis
- Back muscles can extend and hyperextend the spine
- Lateral bending of the back is accomplished by unilateral contraction of these muscles
Trunk Movements: Deep Back Muscles

- Short muscles of the back:
  - Rotatores muscle
  - Multifidus muscle
  - Interspinales muscle
  - Intertransversarii muscle
- All act as synergists in extension and rotation of the spine
- The trunk muscles maintain the curvature of the spine
- Postural muscles
Deep Back Muscles

- **Sternocleidomastoid**: prime mover of active head flexion (against resistance...e.g. when lying down) each muscle alone rotates head toward the shoulder on the opposite side

- **Scalenes**: elevate 1st two ribs (aids inspiration and head rotation/flexion)

- **Splenius**: acts as a group to extend or hyperextend the head. Muscle alone on one side rotates & bends head laterally toward the same side.

- **Erector spinae**: Prime mover of back extension. Controls bending forward via resistance. Powerful extensors providing return to erect position.

- **Longissimus**: thoracis & cervicis act together to extend vertebral column. Capitis extends head & turns face toward the same side.

- **Spinalis**: extends vertebral column

- **Semispinalis**: "" & head, and rotates them to the opposite side. Acts synergistically w/ sternocleidomastoid muscles of opposite side.

- **Quadratus lumborum**: flexes vertebral column laterally when acting separately. Together maintains posture. Assists in forced inspiration
Trunk Movements: Deep Back Muscles

(a)
Mylohyoid
Stylohyoid
Hyoid bone
Omohyoid
(Superior belly)
Sternohyoid
Sternocleidomastoid
Omohyoid
(Inferior belly)

(b)
Anterior belly
Posterior belly
Stylohyoid (cut)
Thyrohyoid
Thyroid cartilage of the larynx
Thyroid gland
Sternothyroid

(c)
Mastoid process of temporal bone
Longissimus capitis

(d)
Iliocostalis cervicis
Longissimus cervicis
Iliocostalis thoracis
Longissimus thoracis
Spinalis thoracis
Erector spinae
Iliocostalis lumborum
External oblique

Figure 10.9d
Trunk Movements: Short Muscles

- Four short muscles extend from one vertebra to another

- These muscles are synergists in extension and rotation of the spine
Muscles of Respiration: External Intercostals

- The primary function of deep thoracic muscles is to promote movement for breathing

- External intercostals muscles (inspiratory muscles)—more superficial layer that lifts the rib cage and increases thoracic volume to allow inspiration
Muscles of Respiration: The Diaphragm

Figure 10.10b
**Muscles of Respiration: Internal Intercostals & Diaphragm**

- Internal intercostals muscles– form deeper layer that aids in forced expiration by depressing the rib cage
- Quiet expiration is accomplished by relaxing the diaphragm, external intercostals & elastic recoil of lungs
- Diaphragm – muscular partition between the thoracic and abdominopelvic cavities.
  - Upon contraction it moves inferiorly and flattens increasing the volume of the thoracic cavity.
  - Can be contracted voluntarily to put pressure on pelvic organ contents (e.g. urine, feces, baby).
  - Served by the phrenic nerve.
Muscles of the Abdominal Wall

Figure 10.11a
Muscles of the Abdominal Wall: Trunck Movements & Compression of Abdominal Viscera

- Area of no bony reinforcement
- Alteration of fasicle directions formed by the external (\) & internal (/) obliques and the transversus abdominus (-) muscles gives greater strength
- These 3 muscles blend into the broad aponeuroses anteriorly and enclose the rectus abdominus fusing and forming the linea alba
- The “Ab” muscles protect and support the viscera, lateral flexion, rotation of the trunk, and anterior flexion (e.g. sit-ups)
- They relax during inspiration
- Involved with urination, defecation, childbirth, vomiting, coughing, screaming, and sneezing
Muscles of the Pelvic Floor (Pelvic Diaphragm)

- The pelvic diaphragm is composed of two paired muscles – levator ani and coccygeus

- These muscles:
  - Close the inferior outlet of the pelvis
  - Support the pelvic floor
  - Elevate the pelvic floor to help release feces
  - Resist increased intra-abdominal pressure
Figure 10.12b

Muscles of the Pelvic Floor

- Pubic ramus
- External urethral sphincter
- Deep transverse perineal muscle
- Central tendon
- Anus
- External anal sphincter
- Urethral opening
- Vaginal opening
- Penis
- Midline raphe
- Ischiocavernosus
- Bulbospongiosus
- Superficial transverse perineal muscle
- Levator ani
- Gluteus maximus
- Clitoris
- Urethral opening
- Vaginal opening
- Anus
Muscles Inferior to the Pelvic Floor

- Two sphincter muscles allow voluntary control of urination (external urethral sphincter) and defecation (external anal sphincter)

- The ischiocavernosus and bulbospongiosus assist in erection of the penis and clitoris

- Central tendon of the perineum: site of insertion of the perineal muscles
Extrinsic Shoulder Muscles

- Sternocleidomastoid
- Subclavius
- Clavicle
- Subscapularis
- Pectoralis minor
- Coracobrachialis
- Serratus anterior
- Humerus
- Deltoid
- Pectoralis major
- Sternum
- Biceps brachii
Extrinsic Shoulder Muscles

- Muscles of the thorax

- Most muscles of the thorax run from the ribs and the vertebral column to the shoulder girdle

- They fix the scapula to the wall of the thorax and move the scapula

  - Anterior: pectoralis major, pectoralis minor, serratus anterior, and subclavius

  - Posterior: latissimus dorsi, trapezius muscles, levator scapulae, and rhomboids

  - These muscles are involved with the movements of the scapula including elevation, depression, rotation, and lateral and medial movements
Extrinsic Shoulder Muscles

- Most scapular movements are promoted by the serratus anterior muscles (anteriorly) & the posterior muscles described later.

- A simple movement of the scapula involves the concerted effort of several muscles working in combination

- Prime movers of shoulder elevation are the trapezius and levator scapulae
Extrinsic Shoulder Muscles

Figure 10.13b
Extrinsic Shoulder Muscles

- Trapezius, serratus anterior, latissimus dorsi depress the scapulae against resistance
- Serratus anterior is involved mainly in the forward movements (abduction) of the scapula (pushing, punching)
- Trapezius and rhomboids are involved in retraction (adduction) of the scapula
- Thus, the serratus anterior and trapezius & rhomboids are antagonists in forward/backward movement of the scapula