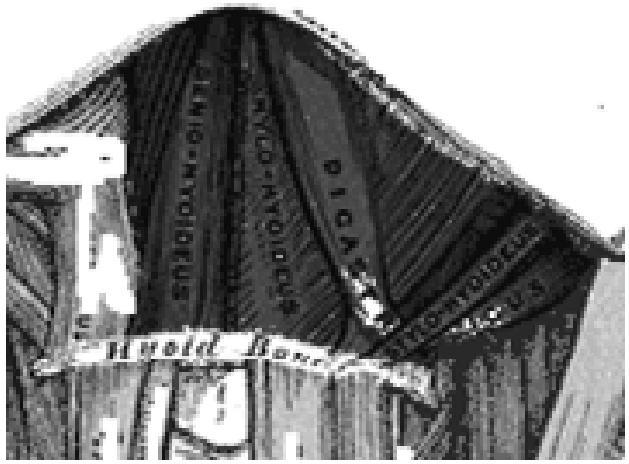
ANTERO-LATERAL MUSCLES OF THE NECK



Suprahyoid muscles: (a) Digastricus (Digastric muscle), (b) Mylohyoideus ,(c) Stylohyoideus, (d)Geniohyoideus

•During deglutition, they raise the hyoid bone, and with it the base of the tongue. When the hyoid bone is fixed by its depressors and those of the larynx, they depress the mandible.

•Widens the esophagus during swallowing.

Infrahyoid muscles: (a) Sternohyoideus (Sternothyroid), (b) Thyreohyoideus (Thyrohyoid) , (c) Sternothyreoideus (Sternothyroid), (d)Omohyoideus (Omohyoid)

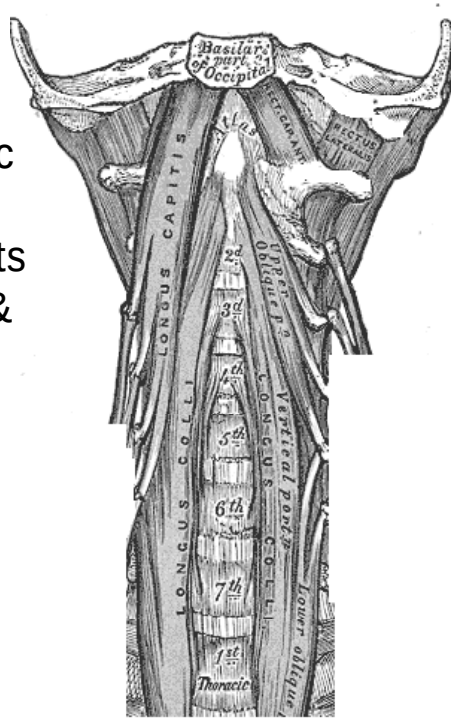
▪ All these 4 pairs of muscles are called **strap muscles**.They depress the larynx and hyoid bone, during deglutition.

▪Omohyoidei also carry hyoid backward and to one or the other side. They are concerned especially in prolonged inspiratory efforts.

▪Thyreohyoideus may act as an elevator of the thyroid cartilage

▪Sternothyreoideus acts as a depressor of the thyroid cartilage.

ANTERO-LATERAL MUSCLES OF THE NECK



Anterior Vertebral muscles: (a) Longus colli, (b)Rectus capitis anterior (c)Longus capitis, (d) Rectus capitis lateralis

• **Longus colli**: long muscle between atlas and 3rd thoracic vertebra, consists of three portions-upper oblique, lower oblique, and a vertical. Role: flexion & lateral rotation of neck (cervical portion of the vertebral column).

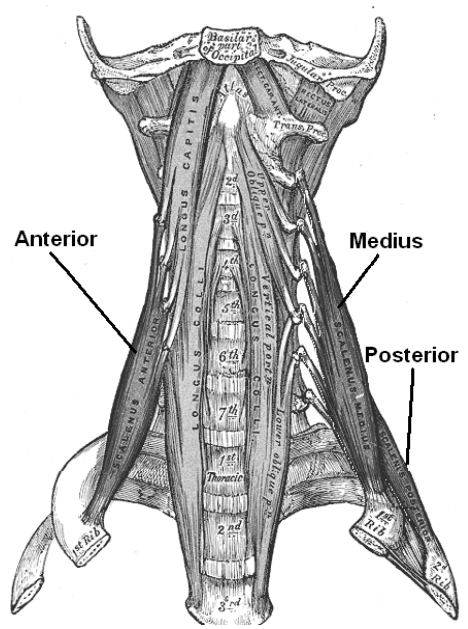
•**Longus capitis** and **Rectus capitis anterior:** direct antagonists of the muscles at the back of the neck-help to restore the head to its natural position after it has been drawn backward. They also aid in flexion of neck.

•**Rectus lateralis** bends the head laterally.

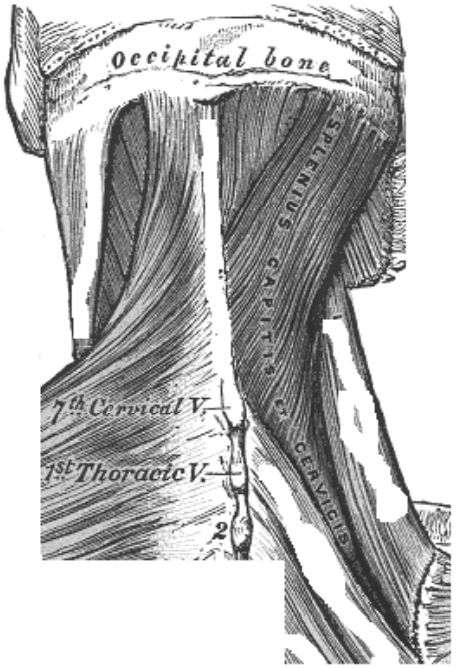
Lateral Vertebral muscles- scalene muscles :

Scalenus anterior, Scalenus medius : largest and longest of the three Scaleni, Scalenus posterior:smallest and most deeply seated of the three

▪When the Scaleni act from above, they elevate the first and second ribs, and are inspiratory muscles. Acting from below, they bend the vertebral column to one or other side. If the muscles of both sides act, the vertebral column is slightly flexed.



MUSCLES OF THE TRUNK



(I) Deep (or intrinsic) Muscles of the Back

- Complex group of muscles extending from the pelvis to skull. Concerned with the maintenance of posture & movements of vertebral column & head.

Superficial Layer of Deep Back Muscles :

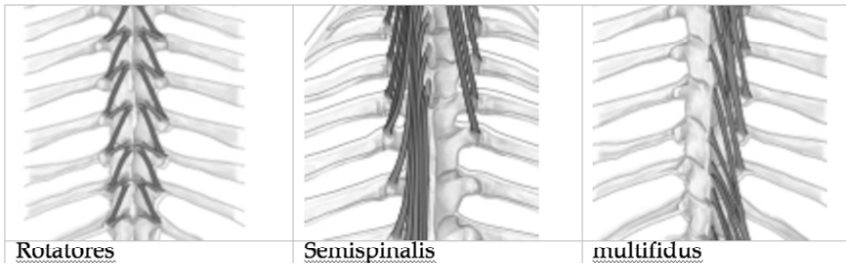
- Splenius muscles (Splenius capitis & Splenius cervicis):
- Acting together, draw the head directly backward, assisting the Trapezius and Semispinalis capitis
- Acting separately, they draw the head to one side and also assist in supporting the head in the erect position.

Intermediate Layer of Deep Back Muscles:

Sacrospinalis (Erector Spinae) Muscle: chief flexors of the vertebral column.

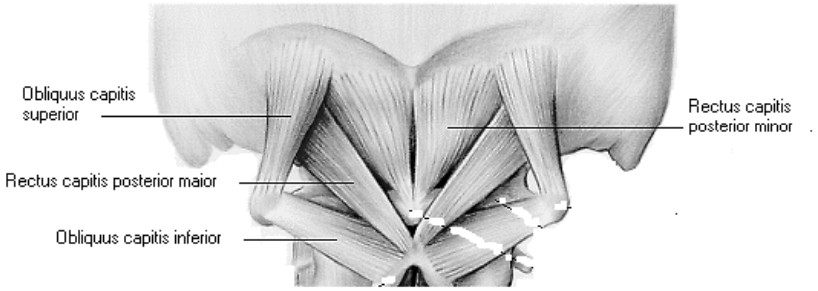
Deep Layer of Intrinsic Back Muscles:

Multifidus: extend trunk and stabilise vertebral column.
Semispinalis: (Capitis, Cervicis, Thoracis): extend head and cervical and thoracic regions of vertebral column.
Rotatores: rotate the superior vertebra
Interspinales and Intertransversarii: help to extend the vertebral column.



(II) Suboccipital Muscles

- Muscles located below occipital bone assisting movement at the level of atlas.
- Rectus capitis posterior major & minor- extensor of atlanto-occipital joint
- Obliquus capitis superior & inferior-Rotator of head

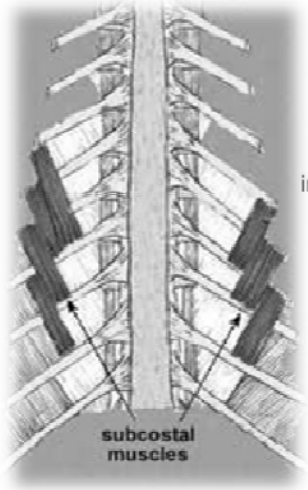


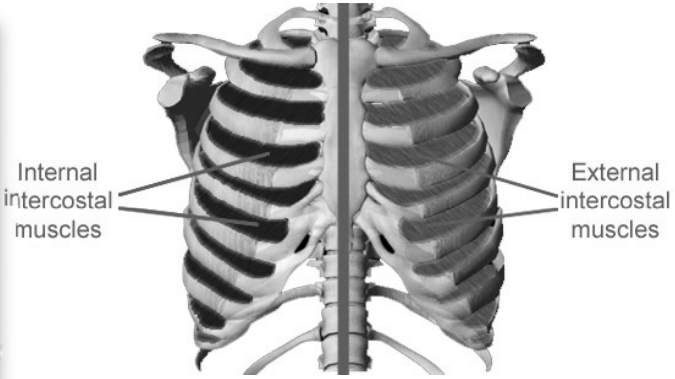
(III) Muscles of the Thorax

(1) Intercostal muscles (Intercostales externi & interni): mainly involved in the mechanical aspect of breathing, help expand & contract the size of chest cavity as we breathe.

(**2) Subcostales (Infracostales) :** part of innermost intercostal muscle group

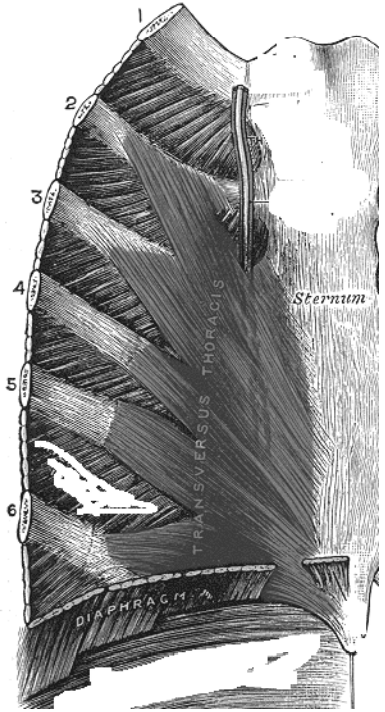
(3) Levatores costarum: suggested to have a proprioceptive function.

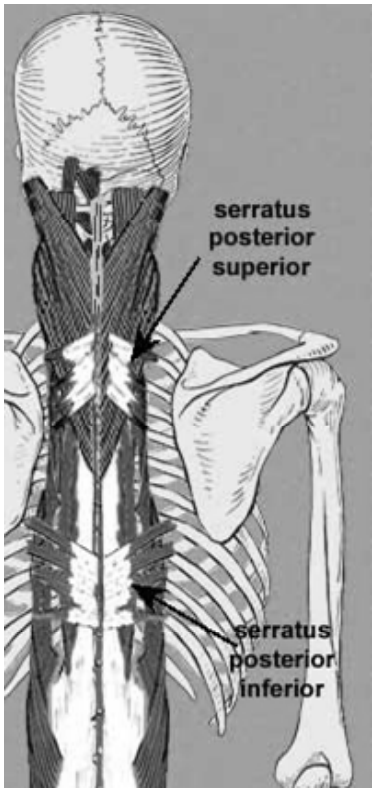




(4) Serratus posterior (superior and inferior):

- rotation and extension of the trunk
- movement of the ribs
- contributes to forced expiration of air from lungs.





(5) Transversus thoracis (Triangularis sterni):

- separates the thoracic cage from the parietal pleura
- depresses the ribs
- contributes to forced expiration

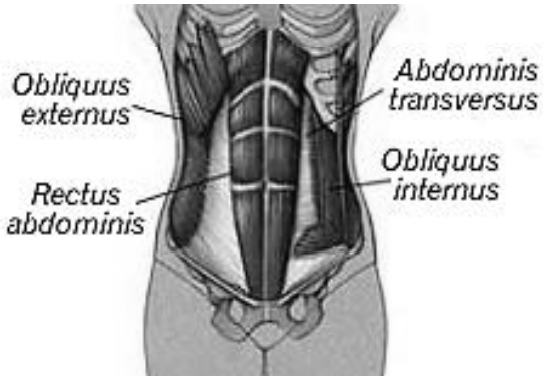
(6) Diaphragm:

- Main muscle of inspiration
- In all expulsive acts, diaphragm is called into action to give additional power to each expulsive effort. Thus, before sneezing, coughing, laughing, crying, or vomiting, and previous to the expulsion of urine or feces, or of the fetus from the uterus, a deep inspiration occurs.

(IV) Muscles of the Abdomen

▪Work with back muscles to hold our body upright, supporting the weight of rib cage, arms, and head. They support and protect the spinal column. They hold & support internal organs. They assist with the vital functions of breathing, waste removal, reproduction.Abdominal muscles must be strong in order to insulate and protect the vital organs located in the abdominal cavity. Muscles of abdomen may be divided into 2 groups:

1. Antero-lateral Muscles of Abdomen: (a) Obliquus externus and internus (b)Transversus (c)Rectus (d) Pyramidalis



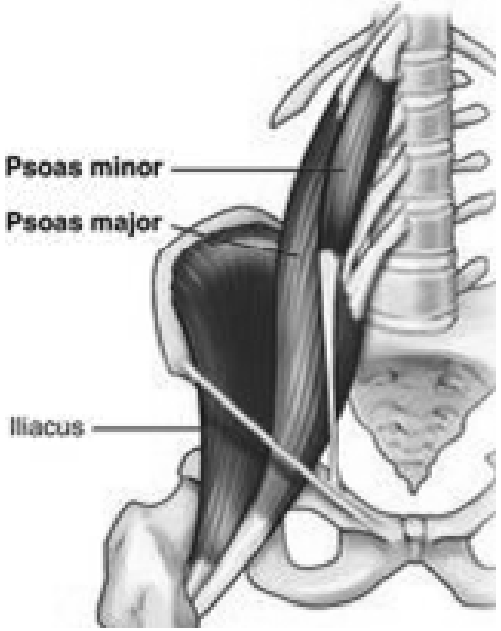
- They compress the abdominal viscera by constricting the cavity of the abdomen, thus aiding expulsion of feces from the rectum, the urine from the bladder, the fetus from the uterus, and the contents of the stomach in vomiting. Also compress the lower part of the thorax, materially assisting expiration.
- Help to draw pelvis upward, as in climbing; or, acting singly,draw pelvis upward, & bend the vertebral column to one side or the other.

2. The Posterior Muscles of the Abdomen

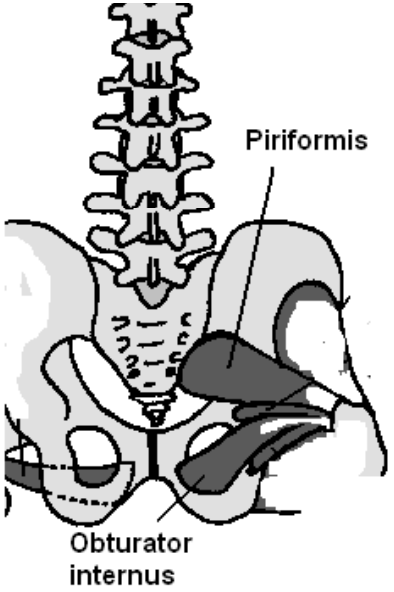
Psoas major and Psoas minor:acts to flex and rotate the thigh and to flex and laterally bend the spine.

Iliacus:Thigh Flexors

Quadratus lumborum: draws down the last rib,acts as a muscle of inspiration by helping to fix the origin of the diaphragm



(V) Muscles of the Pelvis

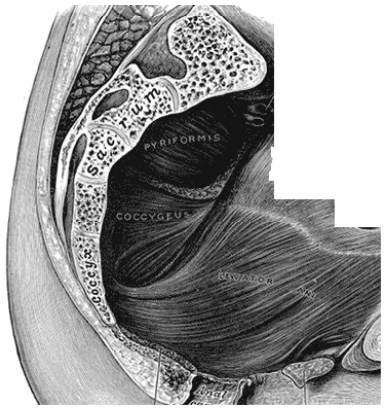


(1)Obturator internus and Piriformis: Muscles of lower extremity .

- Obturator internus: help laterally rotate extended thigh and abduct flexed thigh, as well as to steady the femoral head in the acetabulum.
- Piriformis: part of the lateral rotators of hip, laterally rotates the extended thigh, important in walking.

(2) Levator ani and Coccygeus:

- **Levatores ani** constrict lower end of rectum and vagina. They elevate and invert lower end of rectum after it has been protruded & everted during expulsion of faeces. They are also muscles of forced expiration.
- **Coccygei** pull forward and support the coccyx, after it has been pressed backward during defecation or parturition.
- Levatores ani and Coccygei together form a muscular pelvic diaphragm which supports the pelvic viscera.



(VI) Muscles of the Perineum

- Posterior boundary contains the termination of the anal canal and is known as the **anal region while** the anterior, which contains the external urogenital organs, is termed the **urogenital region.**
- Muscles of the perineum may be divided into two groups:

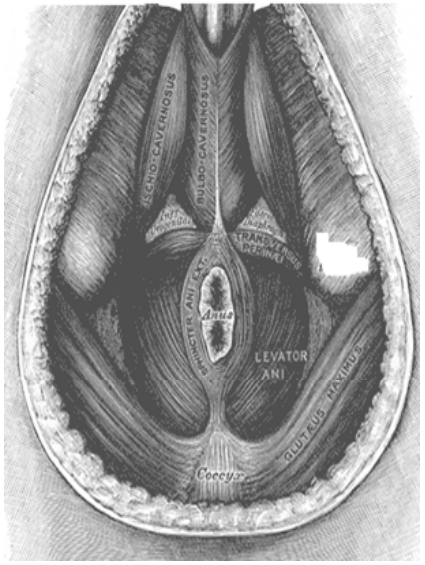
(1) Muscles of the Anal Region:

Corrugator cutis ani: By its contraction it raises the skin into ridges around the margin of the anus.

Sphincter ani externus:Like other muscles,it is always in a state of tonic contraction, and having no antagonistic muscle it keeps the anal canal and orifice closed. Can be put into a condition of greater contraction by own will, so as more firmly to occlude the anal aperture.

Sphincter ani internus: Entirely involuntary. Helps Sphincter ani externus to occlude the anal aperture and aids in expulsion of feces.

(2) Muscles of urogenital region (In male):



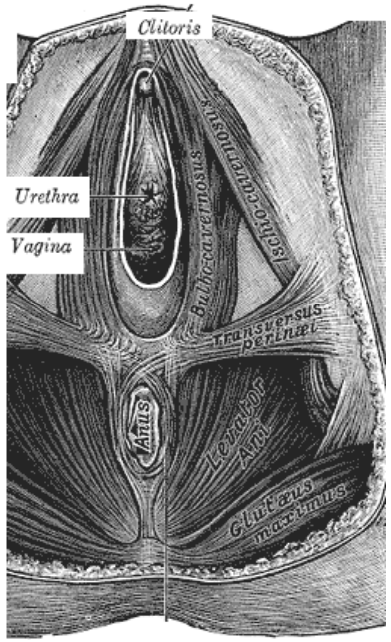
Transversus perinæi superficialis: serves to fix the central tendinous point of the perineum.

Ischiocavernosus (Erector penis): compresses the crus penis & retards the return of blood through veins, and thus serves to maintain the organ erect

Bulbocavernosus: helps to empty the canal of the urethra, after the bladder has expelled its contents.Only comes into action at the end of the micturition process.

Transversus perinæi profundus and Sphincter urethræ membranaceæ: Act together as a sphincter, compressing urethra. During transmission of fluids ,they only come into action at the end of the process to eject the last drops of the fluid.

(2) Muscles of urogenital region (In Female):



Transversus perinæi superficialis: serves to fix the central tendinous point of the perineum.

•Ischiocavernosus (Erector clitoridis):compresses the crus clitoridis & retards the return of blood through the veins, and thus serves to maintain the organ erect.

Bulbocavernosus (Sphincter vaginæ): diminishes the orifice of the vagina.

•contributes to the erection of the clitoris, during the contraction of the muscle.

Transversus perinæi profundus and Sphincter urethræ membranaceæ: Act together as a sphincter, compressing urethra.

MUSCLES OF THE UPPER EXTREMITY

Muscles of the upper extremity are divisible into groups, corresponding with the different regions of the limb.

I. Muscles Connecting Upper Extremity to Vertebral Column

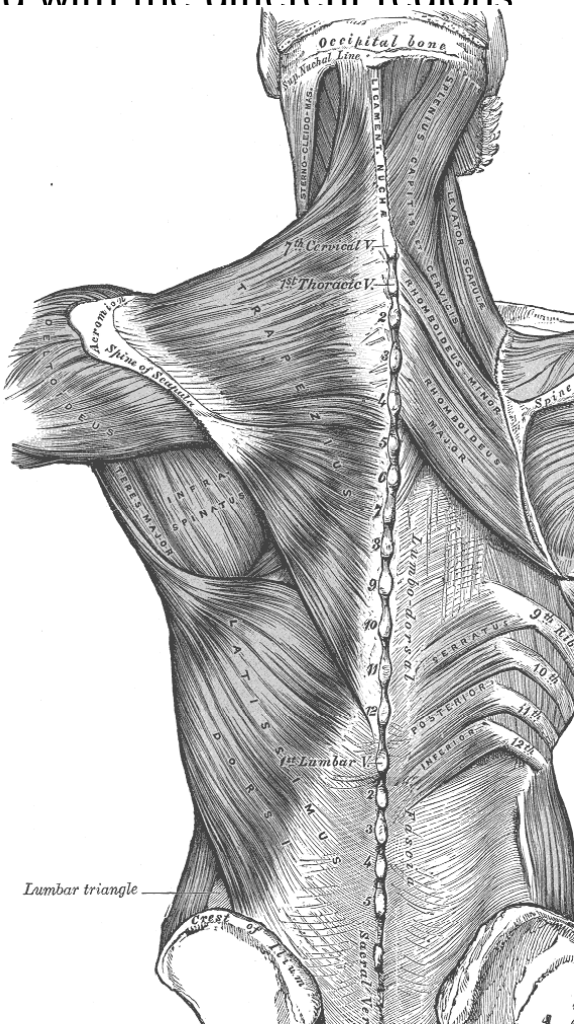
Trapezius: flat, triangular muscle, covering the upper and back part of the neck and shoulders; rotation, retraction, elevation, depression of scapula

Rhomboideus major: Helps to hold the scapula (and thus upper limb) onto the ribcage. Retracts scapula, pulling it towards the vertebral column.

Latissimus dorsi:covers the lumbar region and the lower half of the thoracic region,

Rhomboideus minor: Retracts and rotates scapula.

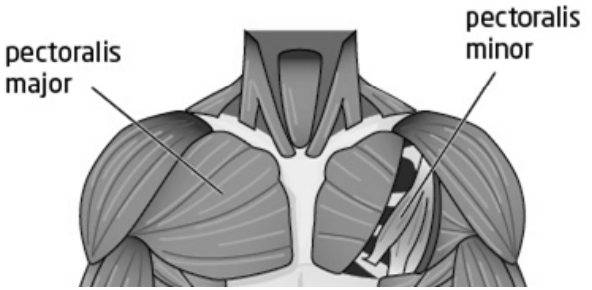
Levator scapulæ:main function is to lift the scapula



II. Muscles Connecting Upper Extremity to Anterior and Lateral Thoracic Walls

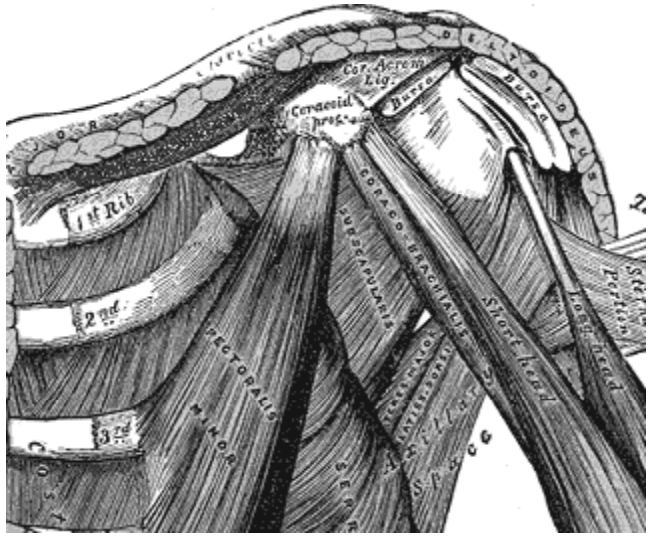
(a) Pectoralis major: thick, fan-shaped muscle, situated at the upper and forepart of the chest. Primarily responsible for movement of the shoulder joint;flexion of humerus (eg: lifting a child);adducts the humerus (eg: flapping the arms).; rotates the humerus medially (eg: arm-wrestling);also responsible for keeping the arm attached to the trunk of the body.

(b) Pectoralis minor: Depresses the point of the shoulder drawing the scapula inferior and medial, towards the thorax.



(c)Subclavius : small triangular muscle, placed between the clavicle and the first rib;depresses the shoulder (clavicle). Anteriorly

(d)Serratus anterior (*Serratus magnus*): situated between the ribs and the scapula.Termed "big swing muscle" or "boxer's muscle" as it is largely responsible for protraction of scapula ie pulling of the scapula forward and around the rib cage that occurs when someone throws a punch.Also aids in upward rotation of the scapula (eg: lifting a weight overhead)



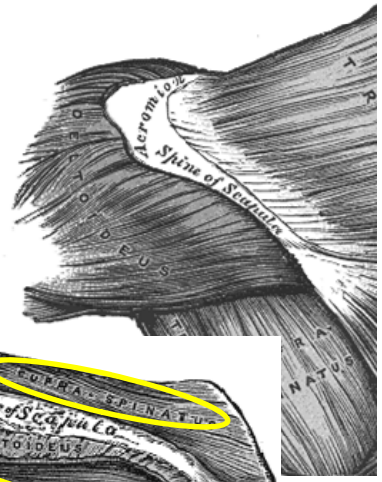
III. Muscles of the Shoulder

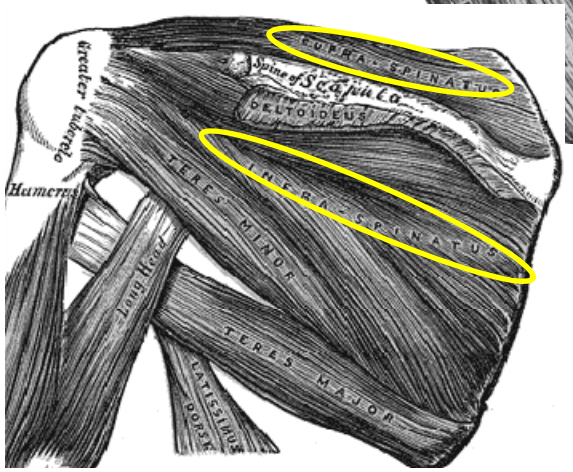
(a) Deltoideus (*Deltoid muscle*): large, thick, triangular muscle, covering the shoulder-joint in front, behind, and laterally. Raises the arm from the side, so as to bring it at right angles with the trunk.

(b) Supraspinatus: Its contraction leads to abduction of the arm at the shoulder joint; one of rotator cuff (musculotendinous support). Helps to stabilize the shoulder joint and humerus.

(c) Infraspinatus:rotator cuff, externally rotate the arm and stabilize the shoulder joint.

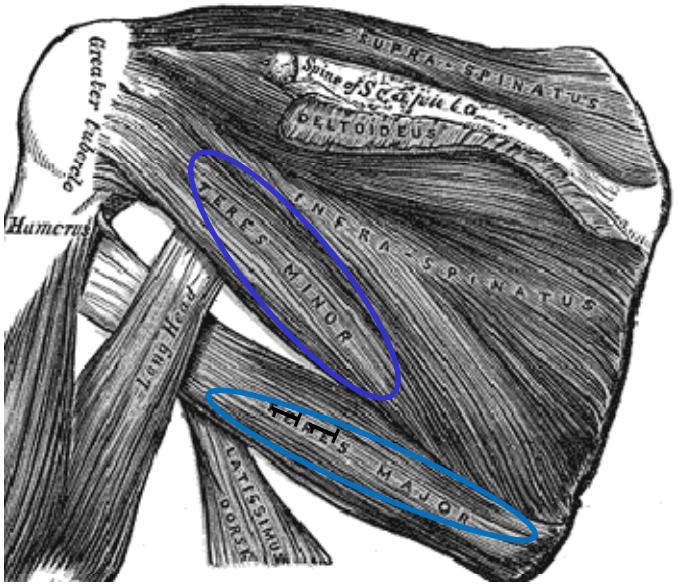
(d) Subscapularis: rotates the head of the humerus inward;Prevents displacement of the head of the humerus





(e) Teres minor:narrow, elongated muscle of the rotator cuff that stabilises humerus;laterally rotates the arm,adducts the forearm

(f) Teres major:medial rotator and adductor of humerus.Assists latissimus dorsi in drawing the previously raised humerus downward and backward.Also helps stabilize the humeral head in the glenoid cavity.



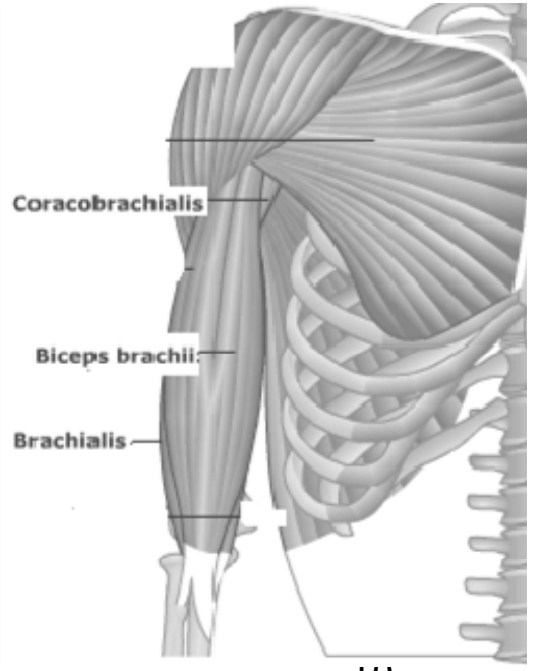
IV. Muscles of the Arm

(a) Coracobrachialis: draws the humerus forward and medialward, assists in retaining the head of humerus in contact with the glenoid cavity.

(b) Biceps brachii(*Biceps).*flexor of the elbow, powerful supinator

(c) Brachialis: flexor of the forearm, forms an important defence to the elbow-joint.Biceps brachii and Brachialis flex the arm upon the forearm, as in efforts of climbing.

(d) Triceps brachii(*Triceps).*Posterior arm muscle,great extensor muscle of forearm,direct antagonist of the Biceps brachii and Brachialis



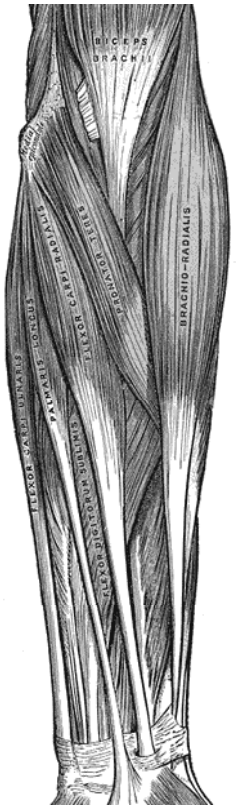
V. Muscles of the Forearm (antibrachial)

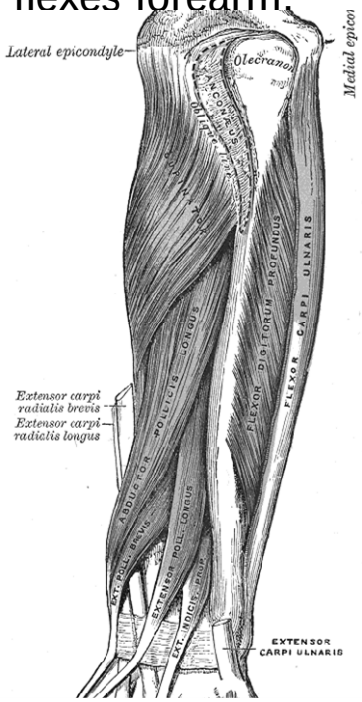
1. Volar Antibrachial Muscles:

Superficial Group: Pronator teres,Palmaris longus, Flexor carpi radialis, flexor carpi ulnaris, Flexor digitorum sublimis

Deep Group: Flexor digitorum profundus, Flexor pollicis longus, Pronator quadratus

These muscles act upon the forearm, the wrist, and hand (rotates. flexes forearm, pronates hand, abductor of wrist,bending elbow.





2. Dorsal Antibrachial Muscles:

Superficial Group: Brachioradialis (*Supinator longus*), Extensor digitorum communis, Extensor carpi radialis longus, Extensor digiti quinti proprius, Extensor carpi radialis brevis, Extensor carpi ulnaris, Anconæus

Deep Group: Supinator, Extensor pollicis brevis, Abductor pollicis longus, Extensor pollicis longus, Extensor indicis proprius

- direct antagonists of Pronator and Flexor muscles
- extends forearm, wrist, phalanges, flexor of the elbow-joint, abduct the wrist.

VI. Muscles of the Hand

(1)Muscles of thumb: occupy the radial side and produce the thenar eminence.;position the thumb for grasping--Abductor Pollicis Brevis, Adductor Pollicis, First Dorsal Interosseous, Flexor Pollicis Brevis, Opponens Pollicis.

(2) Muscles of little finger:occupy the ulnar side and give rise to the hypothenar eminence--Opponens digiti minimi, Abductor minimi digiti,Flexor digiti minimi brevis, Extensor digiti minimi, lumbrical.

(3) Muscles in middle of palm and between the metacarpal bones.