

# The Upper Limb

L1

## (1) The Pectoral Region:

Naturally, the upper limbs are connected to the axial skeleton or trunk by means of bones known as *Pectoral Girdle*, (pectoral=shoulder) right & left.

### \* Bones of the shoulder girdle & arm:

The pectoral girdle consists of the *clavicle* & the *scapula* (shoulder blade), which articulate with one another at the acromioclavicular joints, so the scapulae & clavicles connect the upper limbs with trunk.

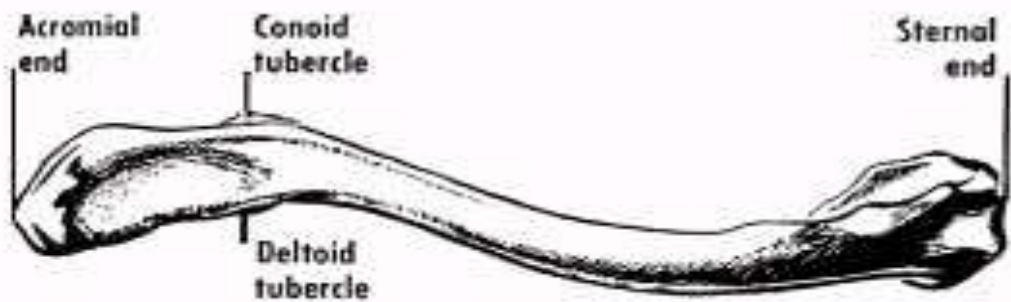
The scapula invaded with different types of muscles, these muscles act as shock-absorper.

The essential functional requirement of the pectoral girdle is the mobility over the thorax to assist the mobility of shoulder joint.

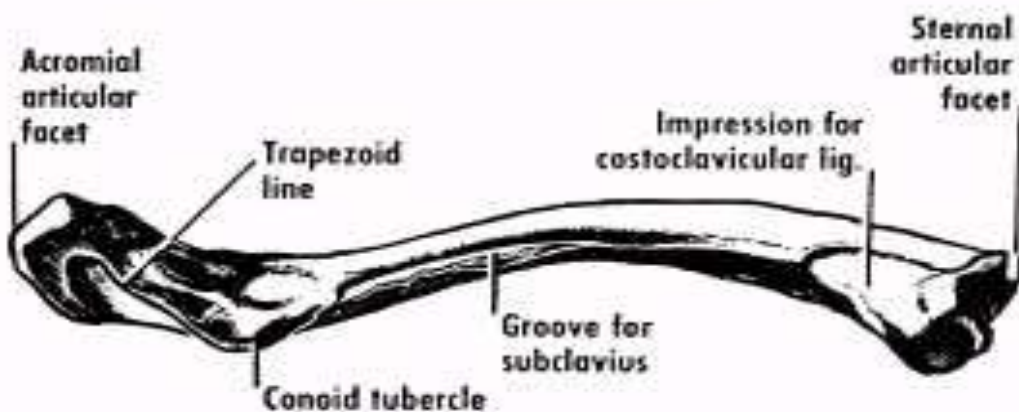
[1] **Clavicle:** it's a long, slender, S-like shaped bone that lies horozintally across the root of the neck. It articulates with the sternum & first costal cartilage medially & with the acromion process of the scapula laterally.

The clavicle acts to hold the arm away from the trunk. It also transmits forces from the upper limb to theaxial skeleton & provides attachment for muscles.

It's subcutaneous throughout it's length; it's medial two thirds are convex forward & it's lateral third is concave backward.



SUPERIOR AND ANTERIOR



INFERIOR

[2] **Scapula:** it's a flat, irregular, triangular bone that lies on the posterior thoracic wall between 2<sup>nd</sup> & 7<sup>th</sup> ribs.

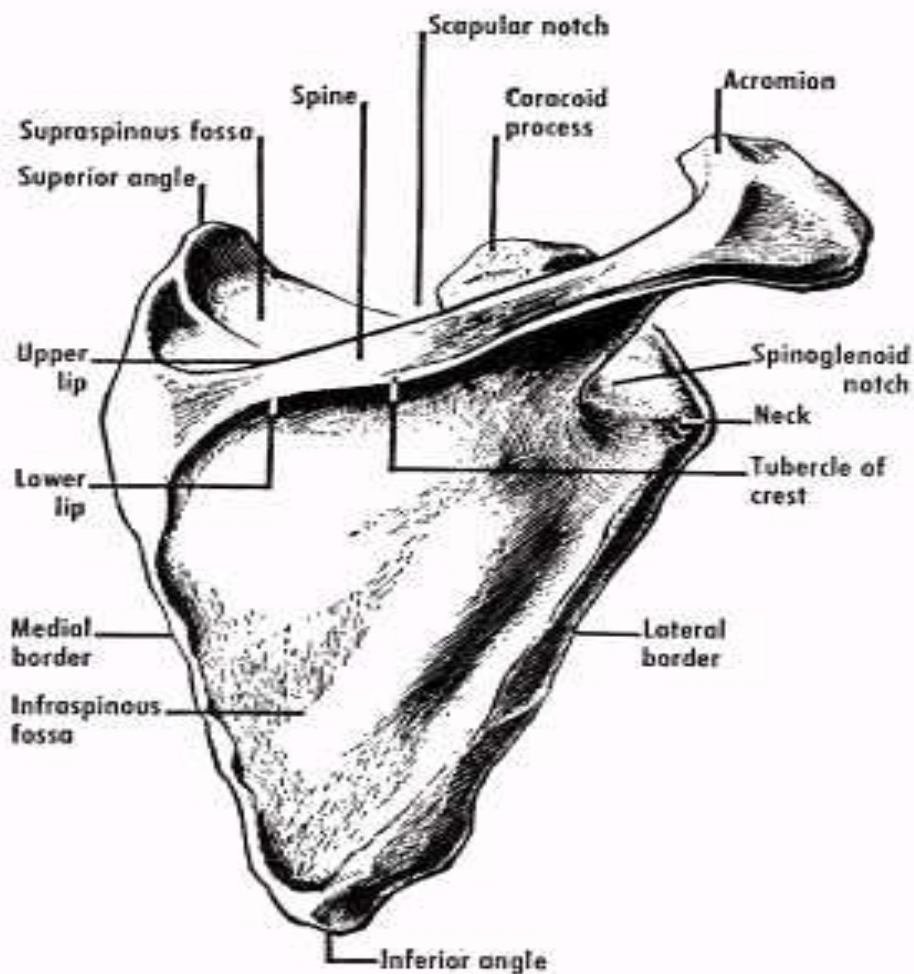
It's triangular bone has *three Borders*(margins): lateral(thick), medial & superior; it has *three Angles*: acromion, superior & inferior;

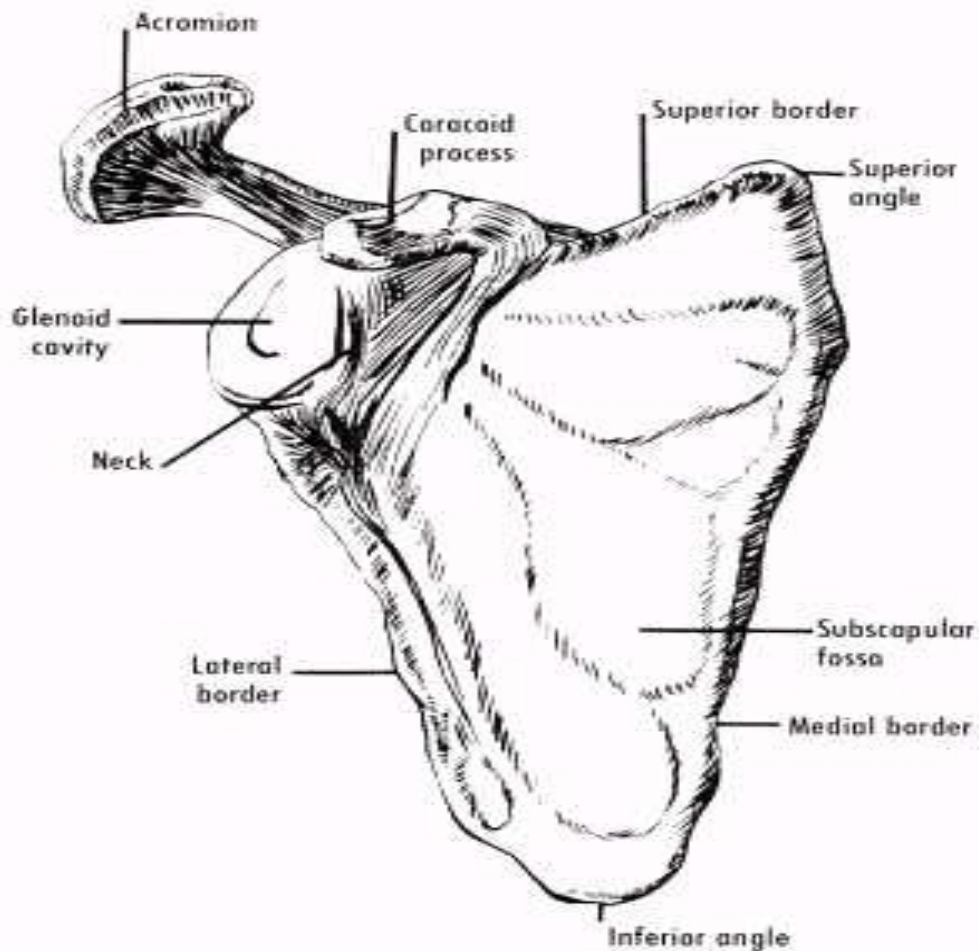
It has *two Surfaces*: anterior(ventral, costal) & posterior(dorsal).

The posterior surface, the *spine of the scapula* projects backward. The lateral end of the spine is free & forms the *acromion*, which articulates with the clavicle. The superolateral angle of the scapula forms the pear-shaped fossa *glenoid cavity* or *fossa*, which articulates with the head of the humerus at the shoulder joint. The *coracoid process* projects upward & forward above the glenoid cavity & provides attachment for muscles & ligaments. Medial to the base of the coracoid process is the *suprascapular notch*. The posterior surface is divided by the spine into *supraspinous fossa* above & an *infraspinous fossa* below.

The anterior surface of the scapula is concave & forms the shallow *subscapular fossa*.

The inferior angle of the scapula can be palpated easily in the living subject & marks the level of the seventh rib & the spine of the seventh thoracic vertebra.





[3] **Humerus:** it's one of the long bones in the body, it forms the skeleton of the arm. It consists of proximal end which articulates with the scapula at the shoulder joint, & a distal end which articulates with the radius & ulna at the elbow joint & roughly cylindrical body or shaft.

The upper end of the humerus has a *head* which is hemispherical in shape (forms about 1/3 of a sphere) & articulates with the glenoid cavity of the scapula. Immediately below the head is the *anatomic neck*. Below the neck are the *greater & lesser tuberosities*, separated from each other by the *intertubercular* or *bicipital groove* (site of insertion of the tendon of long head of biceps muscle).

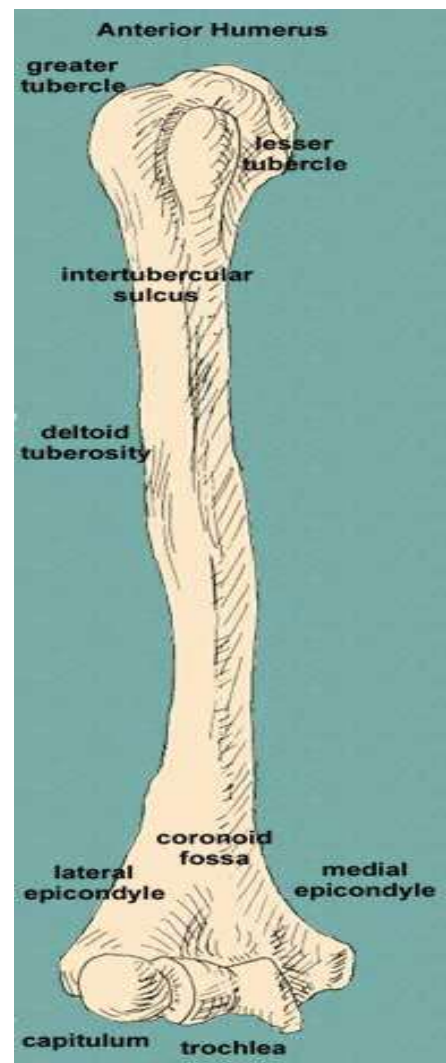
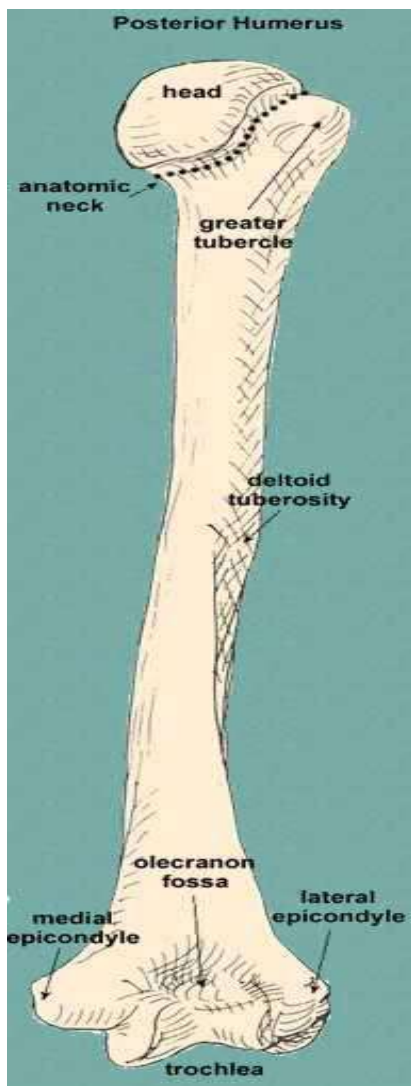
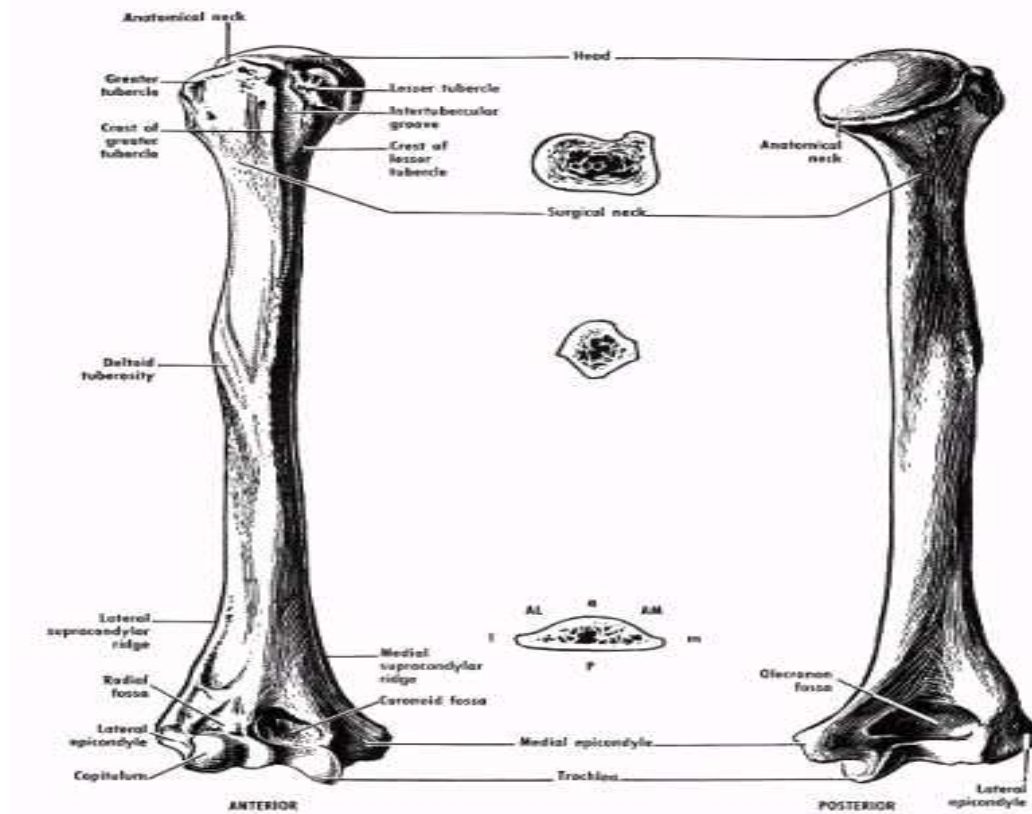
Where the upper end of the humerus joins the shaft is a narrow *surgical neck* (because fractures here are fairly common).

About halfway down the lateral aspect of the shaft is a roughened elevation called the *deltoid tuberosity*. Behind & below the tuberosity is a *spiral groove* or *radial groove* (which accommodates the radial nerve).

The lower end of the humerus possesses the *medial & lateral epicondyles* (for the attachment of muscles & ligaments), the rounded *capitulum* for articulation with the head of radius, & the pulley-shaped *trochlea* for articulation with the trochlear notch of ulna.

Above the capitulum is the *radial fossa*, which receives the head of the radius when the elbow is flexed. Above the trochlea anteriorly is the *coronoid fossa*, which during the same movement receives the coronoid process of the ulna.

Above the trochlea posteriorly is the *olecranon fossa*, which receives the olecranon process of the ulna when the elbow joint is extended.



## **Muscle attachment**:-

The muscular attachment between the pectoral girdle & the trunk are of two types

- 1- Direct attachment
- 2- Indirect attachment

**{1} Direct attachment:** is provided by the following muscles that are inserted to the clavicle & scapula from the axial skeleton:

- 1- Pectoralis minor, it's a thin triangular muscle
- 2- Trapezius
- 3- Rhomboideus
- 4- Levator Scapulae
- 5- Serratus Anterior, it's a large thin muscle that covers the lateral chest wall.

**{2} Indirect attachment:** to the axial skeleton is provided by the great muscles of the axillary folds:

- 1- Pectoralis Major, it's a thick triangular muscle.
  - 2- Latissimus Dorsi
- \* Also muscular attachment of the upper limbs & the pectoral girdle to the skeleton indirectly include following muscles:
- 3- Deltoid muscle
  - 4- Short scapular muscles:
    - a- Supraspinatus
    - b- Infraspinatus
    - c- Teres Major
    - d- Teres Minor
    - e- Subscapularis
  - 5- Biceps Brachii
  - 6- Coracobrachialis
  - 7- Long head of Triceps brachii

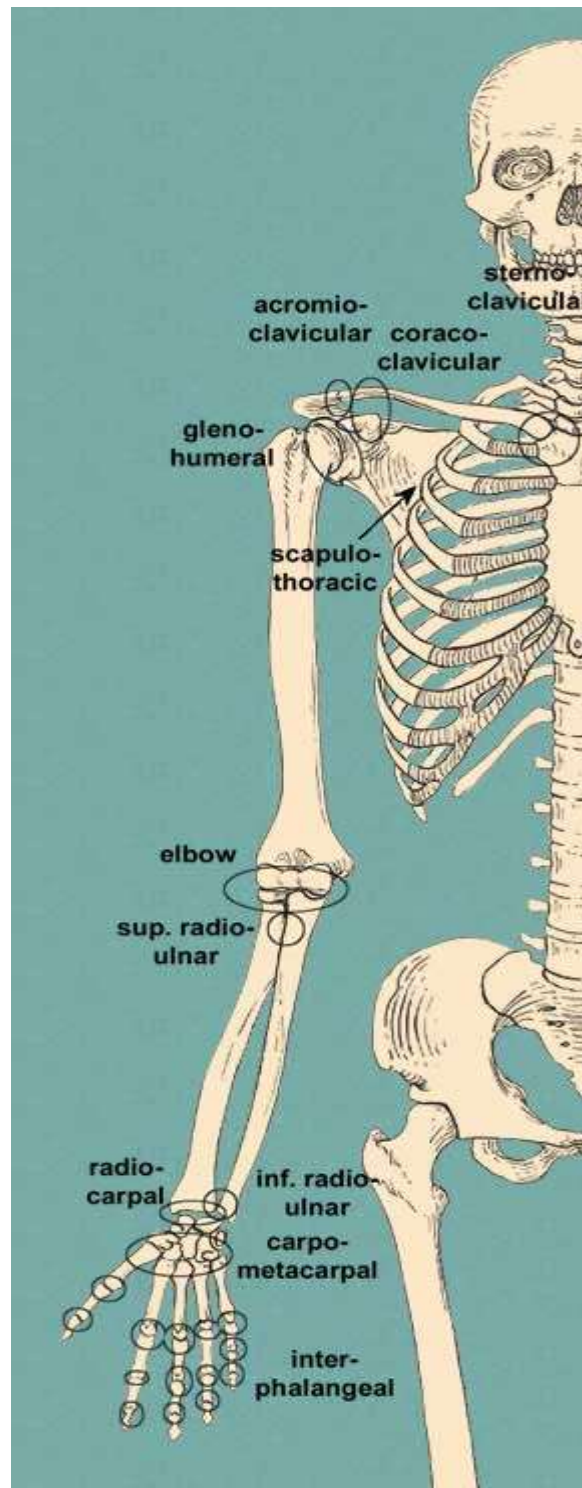
## **\* Joints**:-

(1) Sternoclavicular joint: it's a synovial double-plane joint with a capsule occurs between the sternal end of the clavicle, the manubrium sterni & the 1<sup>st</sup> costal cartilage.

(2) Acromioclavicular joint: it's a synovial plane joint with a capsule occurs between the acromion of the scapula & the lateral end of the clavicle.

(3) Shoulder joint: it's a synovial ball & socket joint with a capsule occurs between the rounded head of the humerus & the shallow, pear-shaped glenoid cavity of the scapula.





- **The superficial part of the Back and the Scapular region:**

- **Muscles**

1- Trapezius, it's a large, flat, triangular muscle that extends over the back of the neck & thorax.

2- Latissimus Dorsi, it's a large, flat, triangular muscle that extends over the lumbar region & the lower part of the thorax.

3- Levator Scapulae

4- Rhomboid Minor

5- Rhomboid Major

6- Deltoid, it's thick, triangular & covers the shoulder joint. It forms the rounded contour of the shoulder.

7- Supraspinatus

8- Infraspinatus

9- Teres Minor

10- Teres Major

11- Subscapularis

**\* *Rotator Cuff* :** four muscles- the supraspinatus, the infraspinatus, the teres minor & the subscapularis\_ form what is termed the rotator cuff.

The tone of these muscles assists in holding the head of the humerus in the glenoid cavity of the scapula during movements at the shoulder joint. Therefore, they assist in stabilizing the shoulder joint. The cuff lies on the anterior, superior, & posterior aspects of the joint. The cuff is deficient inferiorly & this is a site of potential weakness.

