



Movements of Shoulder Girdle

- Consists of bones that connects upper limb to axial skeleton.

- Bones of pectoral girdle are:

- Clavicle

- Scapula

- Joints of pectoral girdle are:

- Sternoclavicular Joint.

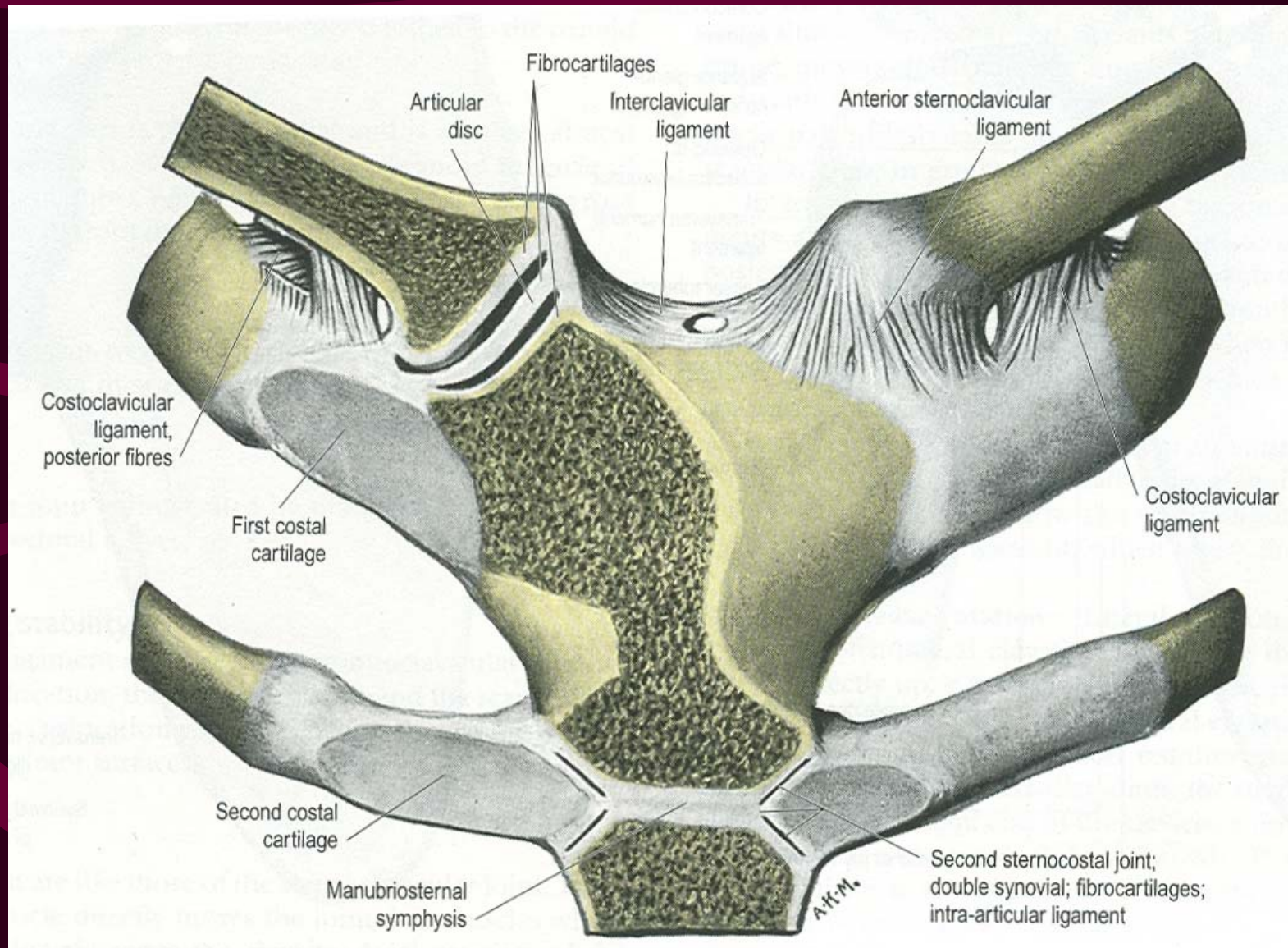
- Acromioclavicular joint.

- Only one small joint: Sternoclavicular connects the pectoral girdle to axial skeleton.
- Two bones Clavicle and Scapula are joined to one another by even smaller joint:
Acromioclavicular
- Remaining attachment is purely muscular
 - Account for greater mobility of shoulder girdle

- Function of pectoral girdle is to provide mobility on the thorax to enhance mobility of shoulder joint.
- Except during slight movements of shoulder joints, all movements of shoulder joints are accompanied by movement of clavicle and scapula.
- Shoulder joint, acromioclavicular and sternoclavicular joint moves together in harmony to provide thoraco-humeral articulation.

Brief anatomy of joints of pectoral girdle

Sternoclavicular Joint



- Saddle type of synovial joint.
- Articulation between sternal end of clavicle, clavicular notch of manubrium sterni and upper surface of first costal cartilage.

• Its surface is more extensive.

- It is covered by fibrocartilage and not by usual hyaline cartilage.
- It is of synovial variety.
- Clavicular surface is convex from above downward and concave from before backward.

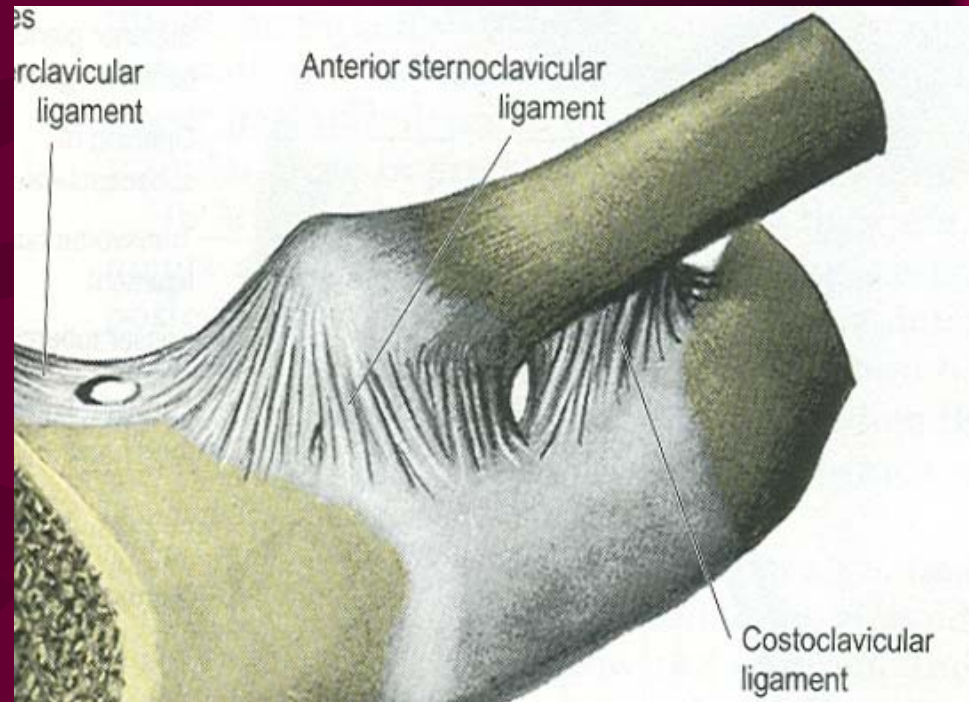
- Articular surface of sternal end is set at an angle of 45 degrees with transverse line.
- Notch on manubrium sterni is either plane or convex.
- Notch on manubrium sterni and costal cartilage are continuous articular surface covered by fibrocartilage.

Ligaments of the joint

- Capsular ligament
- Anterior and Posterior sternoclavicular ligament.
- Articular disc.
- Interclavicular ligament.

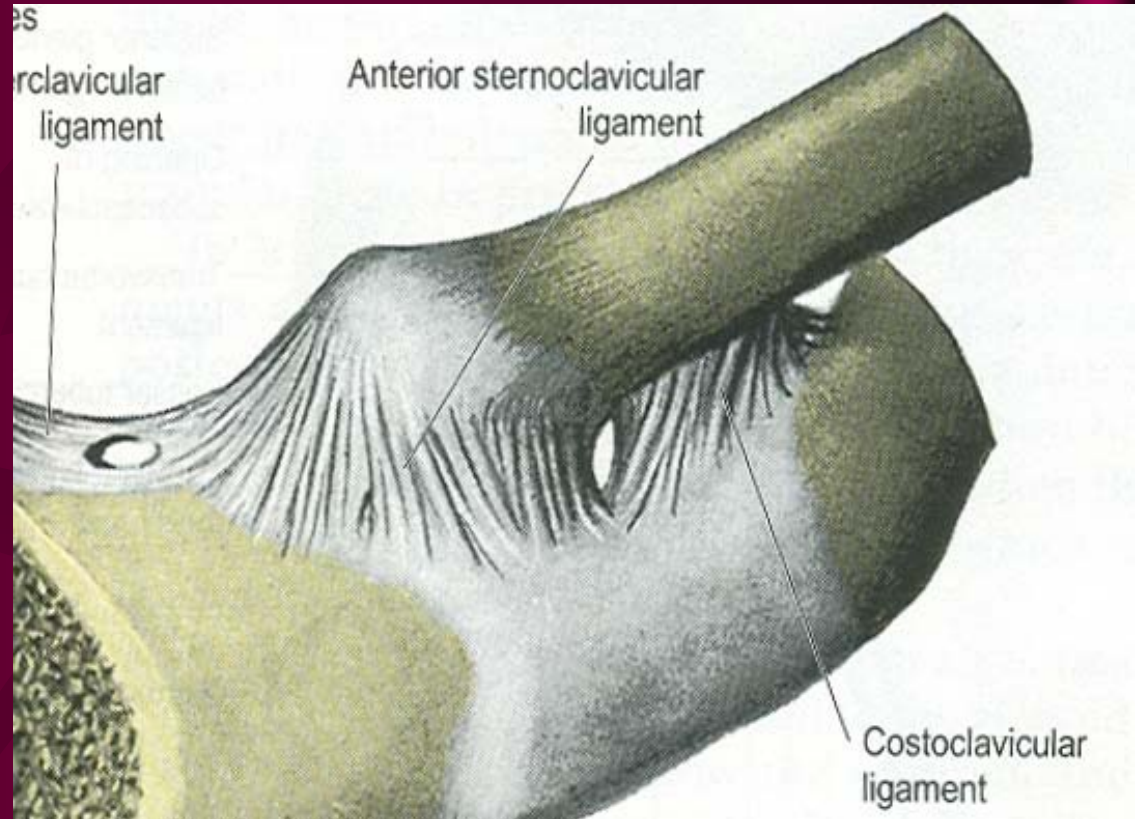
Capsular ligament

- Capsular ligament is attached to peripheral margin of the articulating bones. It is thickened in front and behind to form anterior and posterior sternoclavicular ligaments respectively.
- Capsule around lateral compartment is more lax than medial compartment.



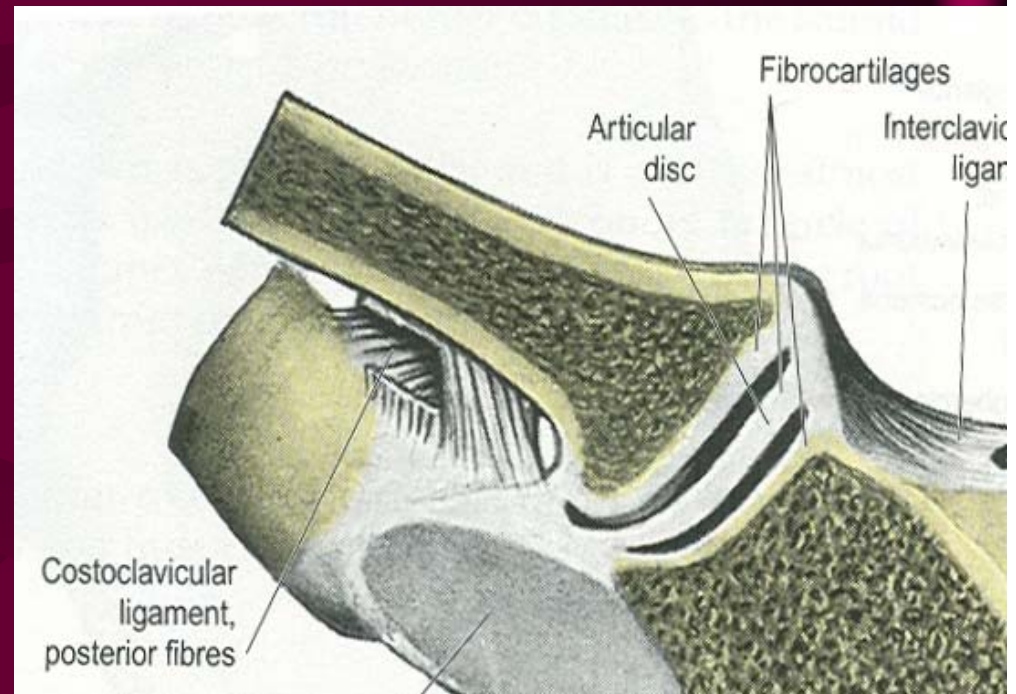
Anterior and posterior sternoclavicular ligament

- Anterior and posterior sternoclavicular ligament slopes downward and medially.
- They resist medial displacement of clavicle.



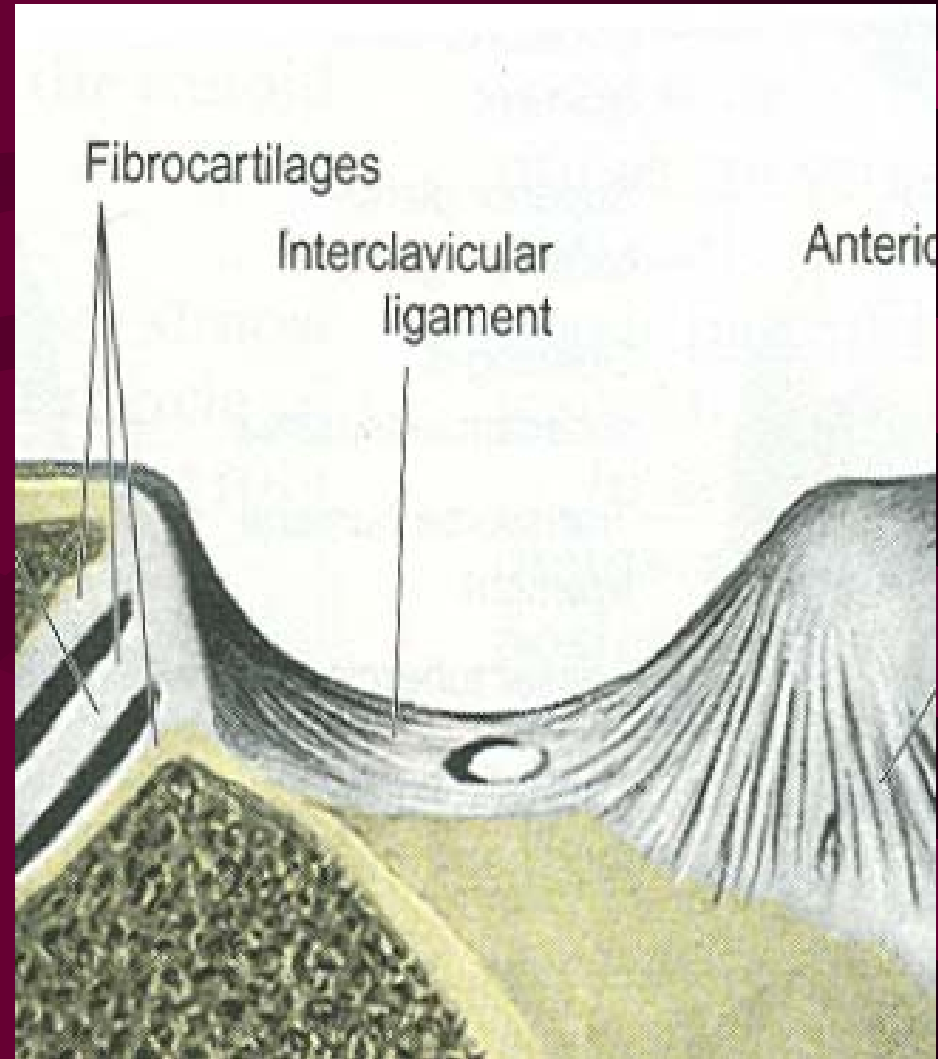
Articular disc

- Fibrocartilage that intervene between the clavicle and sternal notch.
- Divide the joint into two meniscoclavicular and meniscosternal compartments.
- Thick peripherally.
- Attached above to posterosuperior sternal end of clavicle, below to first costal cartilage and at periphery to fibrous capsule.



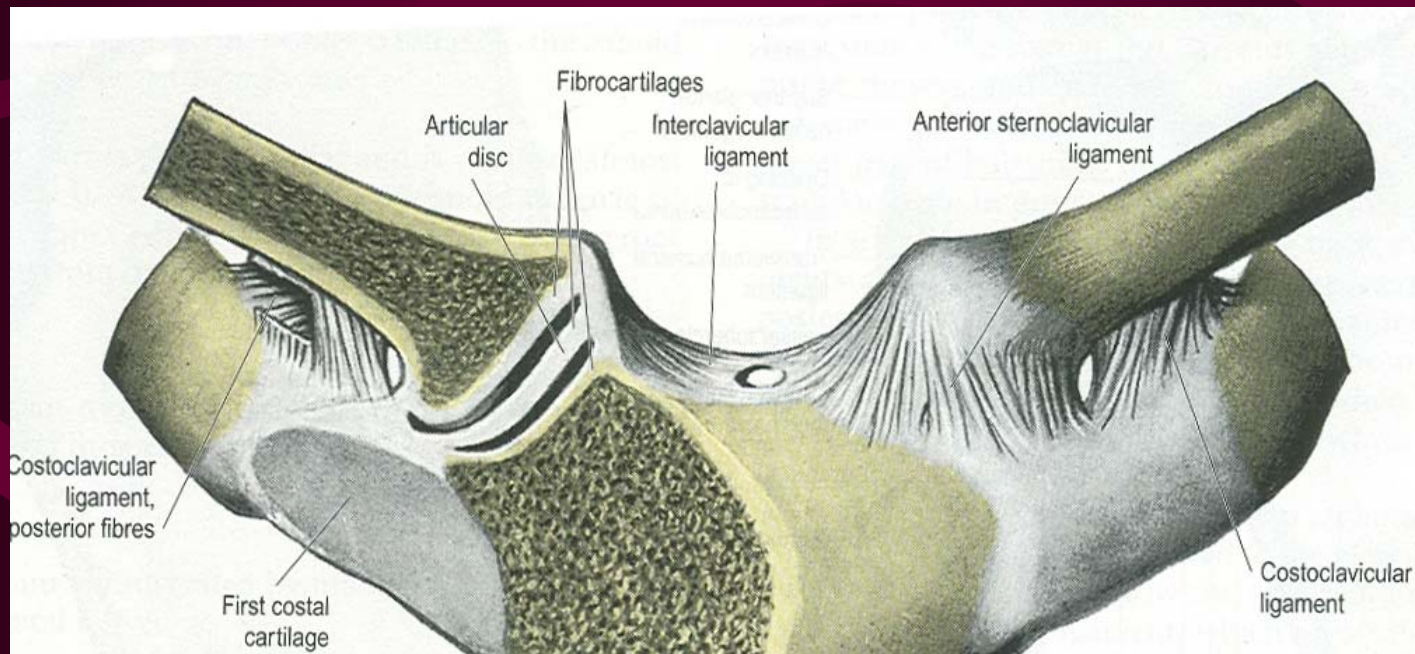
Interclavicular ligament

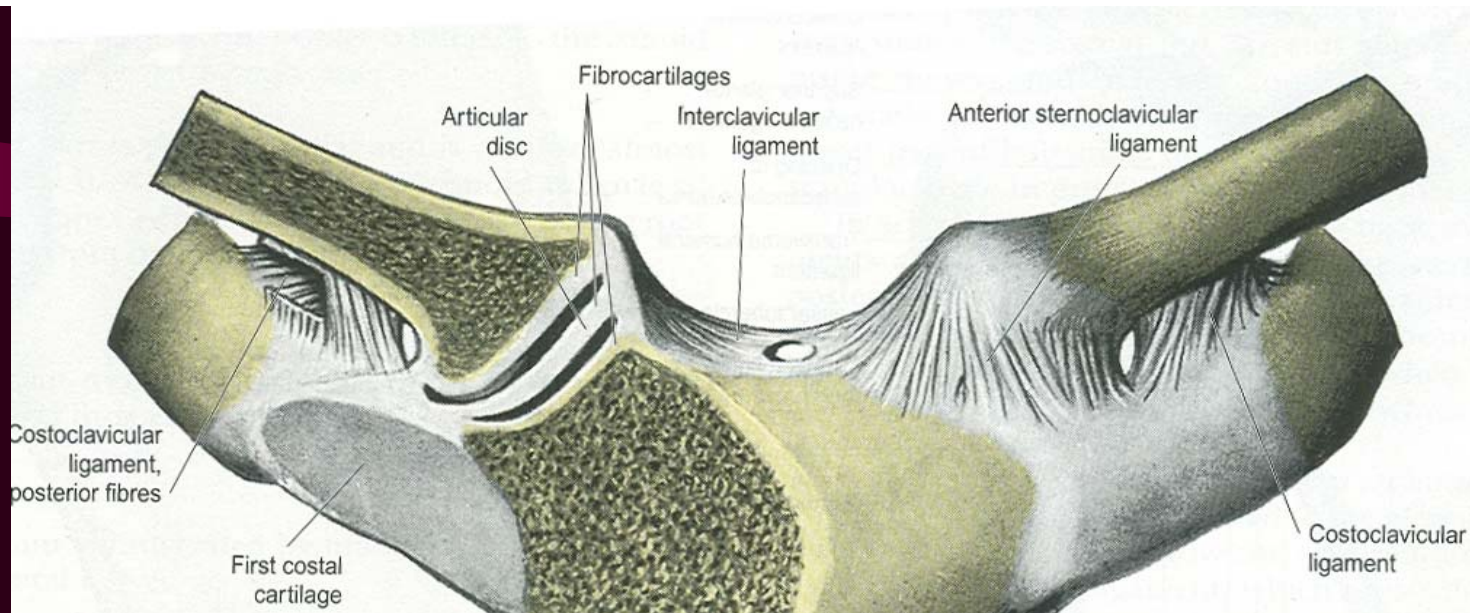
- Interclavicular ligament connects the upper part of sternal ends of both clavicle.
- Some fibre had attachment to suprasternal notch of manubrium.



Costoclavicular ligament

- Inverted cone shaped ligament.
- Attached below to first costal cartilage and first rib and above to inferior surface of clavicle close to sternal end.
- It had anterior and posterior laminae separated by a bursa.

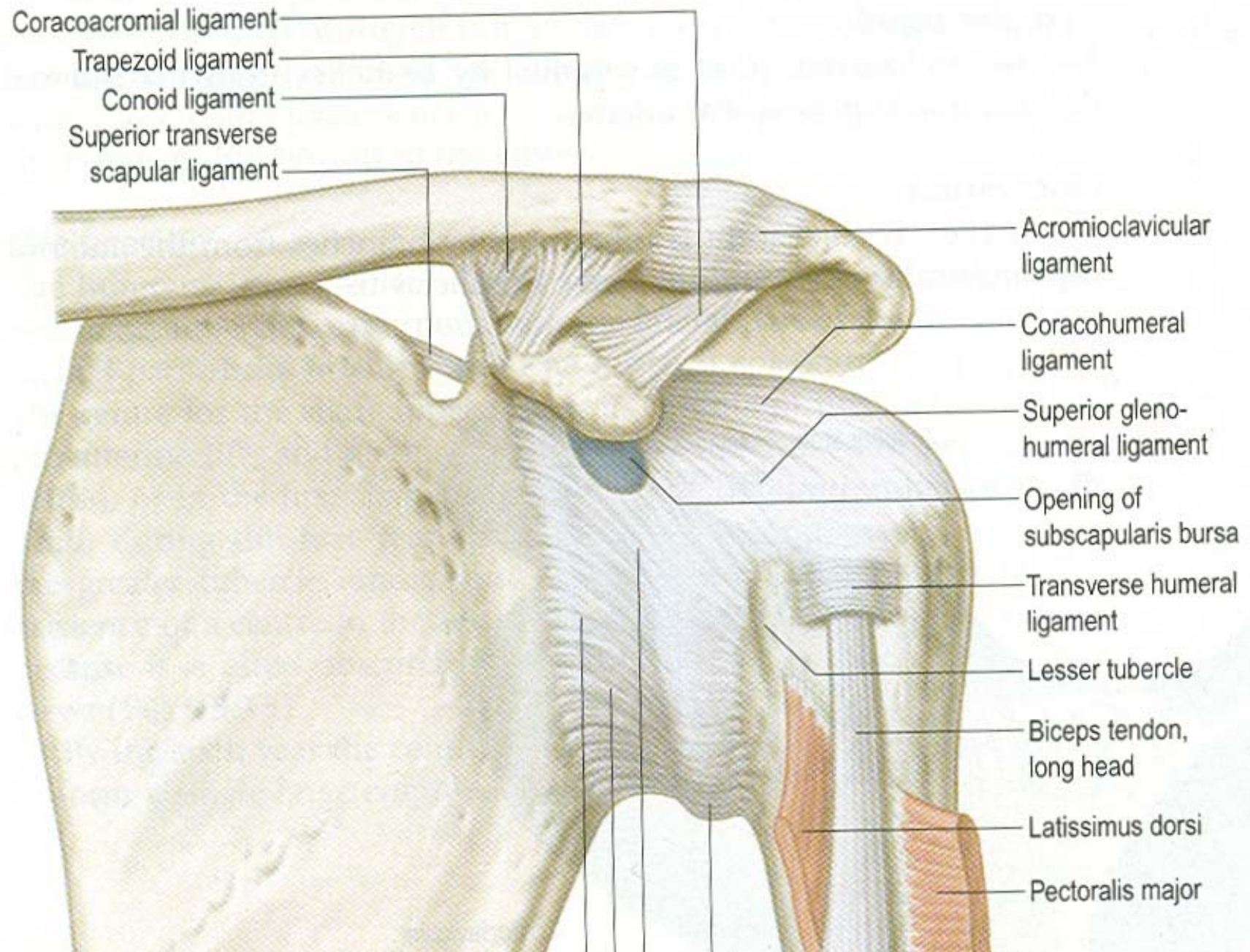




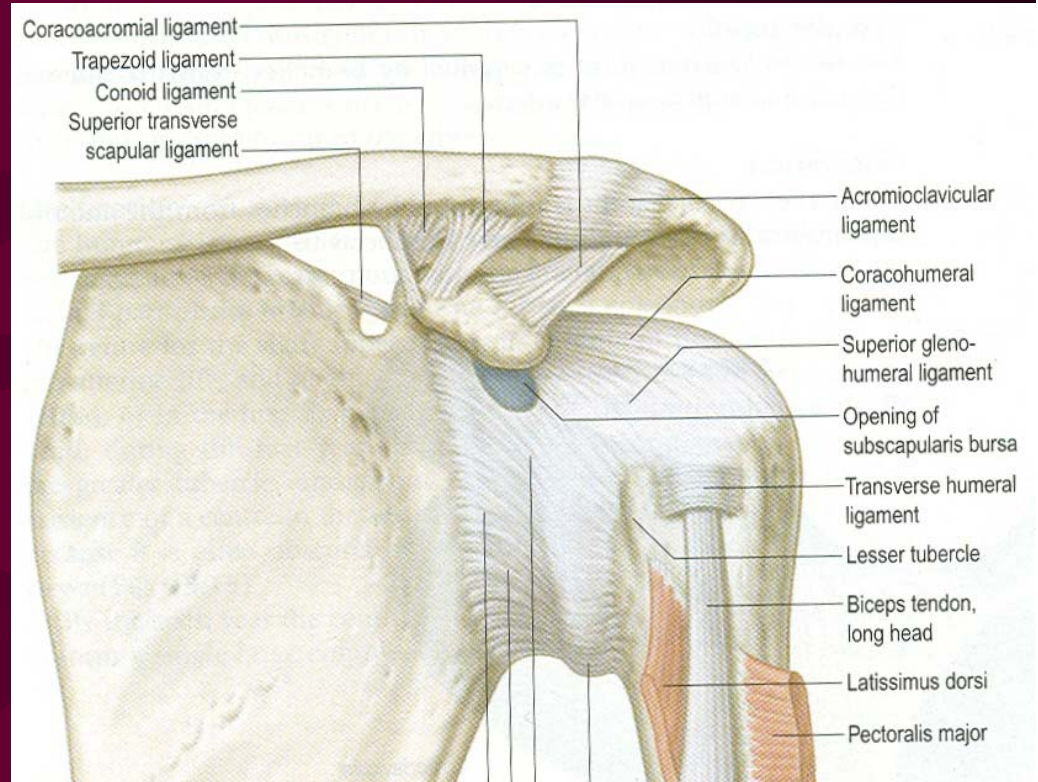
- Both the laminae fuse laterally and merge medially with capsule.
- Posterior fibres are shorter than the anterior.
- Anterior lamina is directed upward and laterally.
- Posterior lamina is directed upward and medially.

- **Nerve supply:**
 - » **Medial supraclavicular.**
 - » **Nerve to subclavius.**
- **Blood supply**
 - » **Internal thoracis.**
 - » **Supraclavicular artery.**

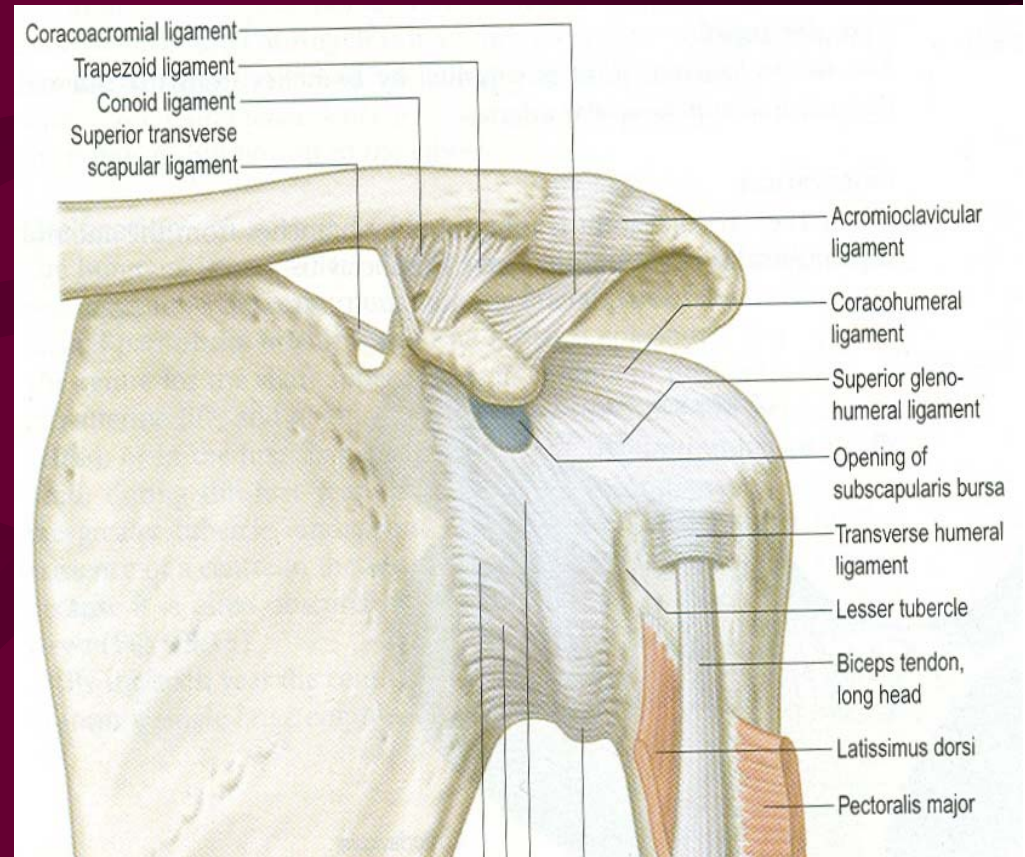
Acromio clavicular joint



- Plane synovial joint.
- Articulation between lateral end of clavicle and clavicular facet on medial margin of acromial process.
- Clavicular surface is smaller than acromial surface.



- Both have oval shaped articular surface with long axis directed antero posteriorly.
- Clavicular facet faces downward and laterlly and acromial facet is inclined in opposite direction.
- Articulating surfaces are plane but either surface may be convex and the other reciprocally concave.

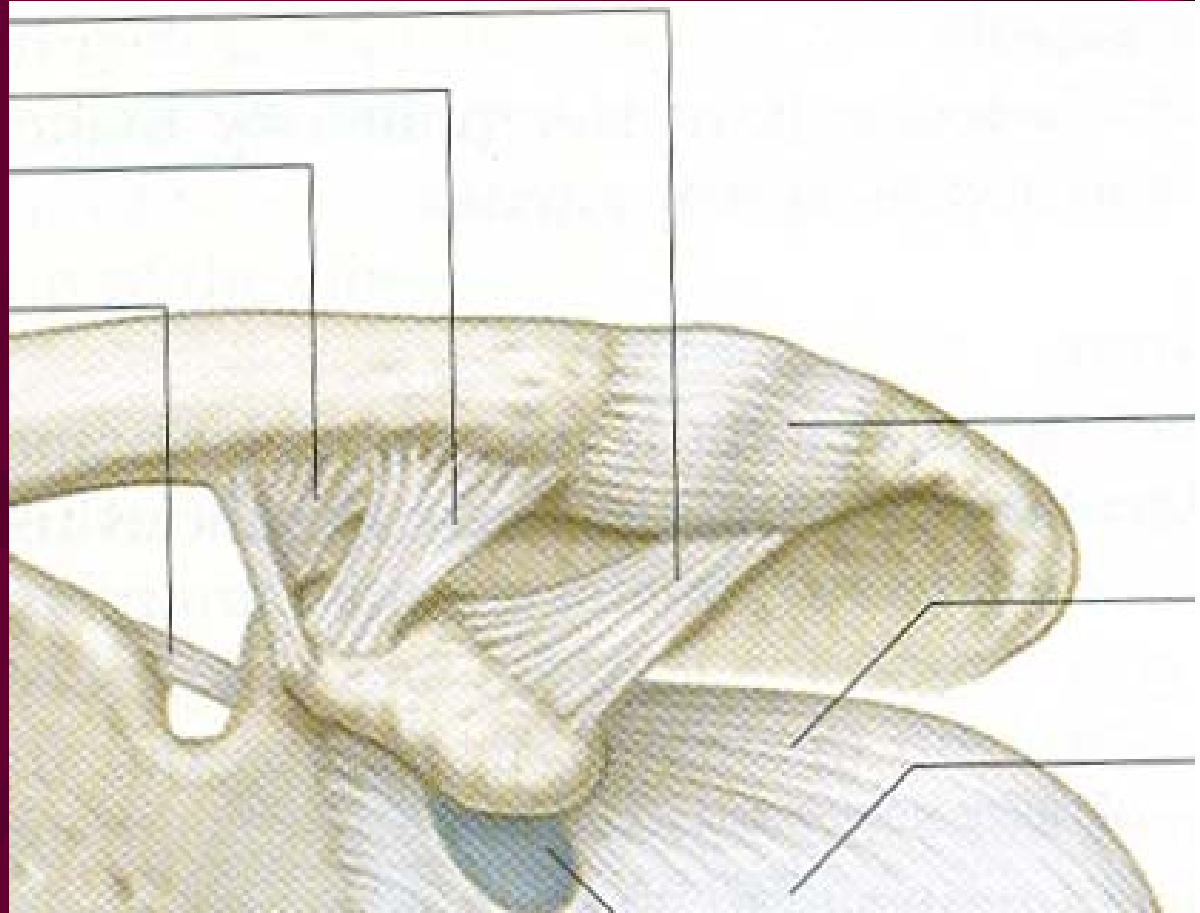


Ligaments:

- Capsular ligament.
- Acromioclavicular ligament.
- Articular disc.
- Coracoclavicular ligament.

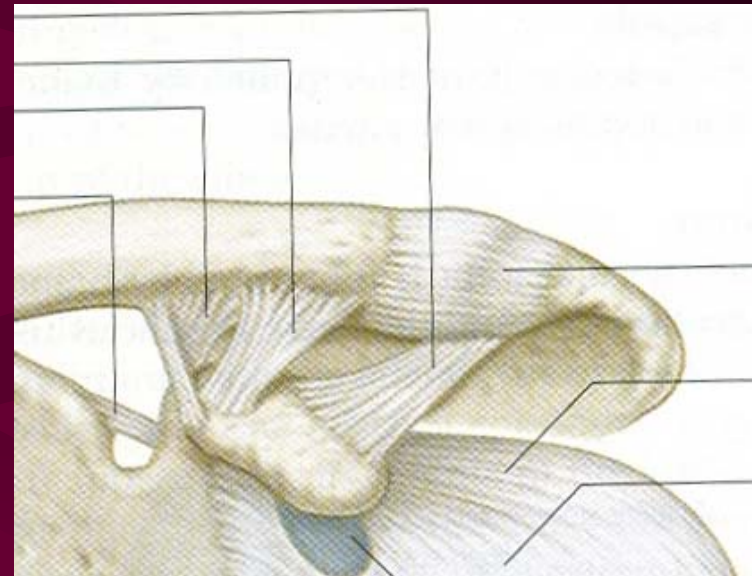
Capsular ligament

- It is attached to articulating margin
- It is thickened superiorly to form acromioclavicular ligament



Acromioclavicular ligament

- It is nearly quadrilateral in shape.
- It extend between upper aspect of lateral end of clavicle and adjoining acromion process.
- Its fibre interlace with aponeurosis of trapezius and deltoid

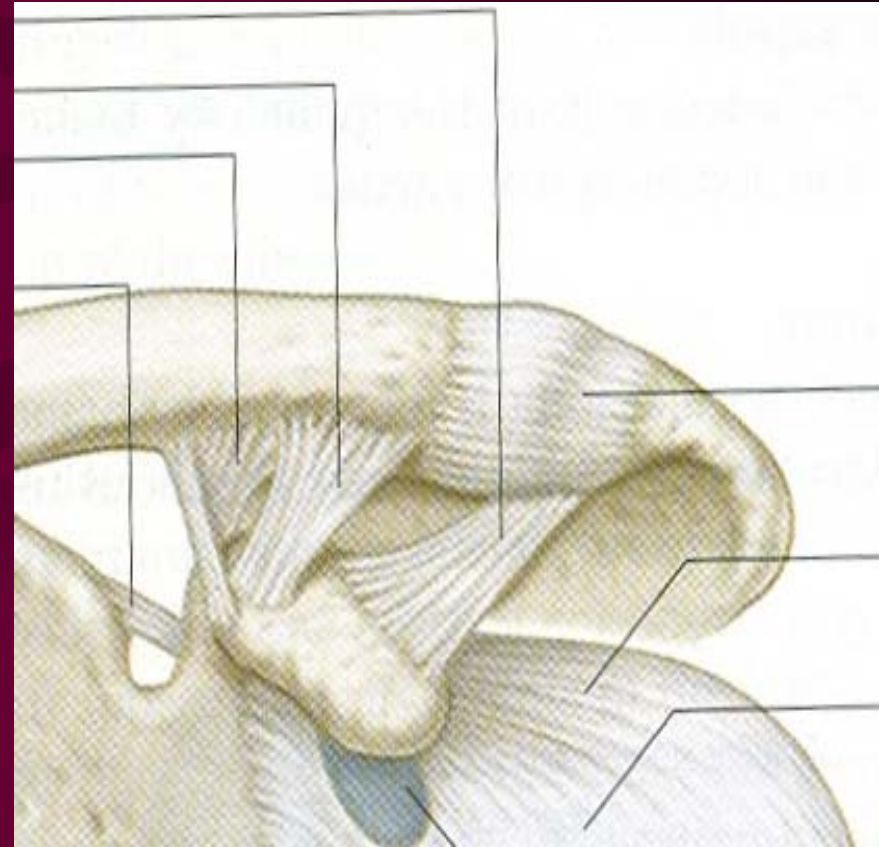


Articular disc

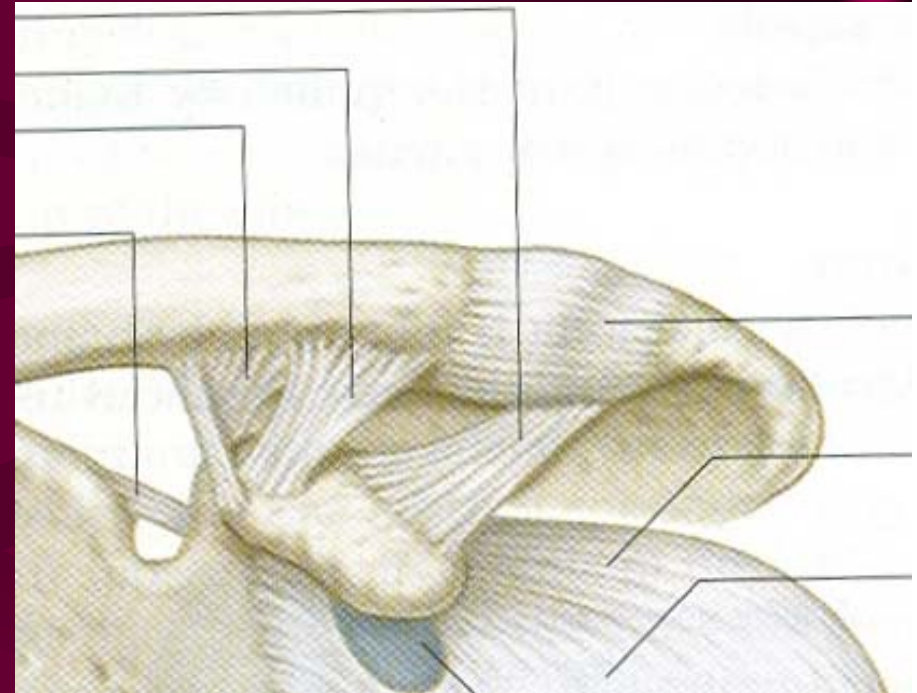
- It is often present in upper part of joint.
- It partially separates the articular surface and occasionally divides the joint completely

Coracoclavicular ligament

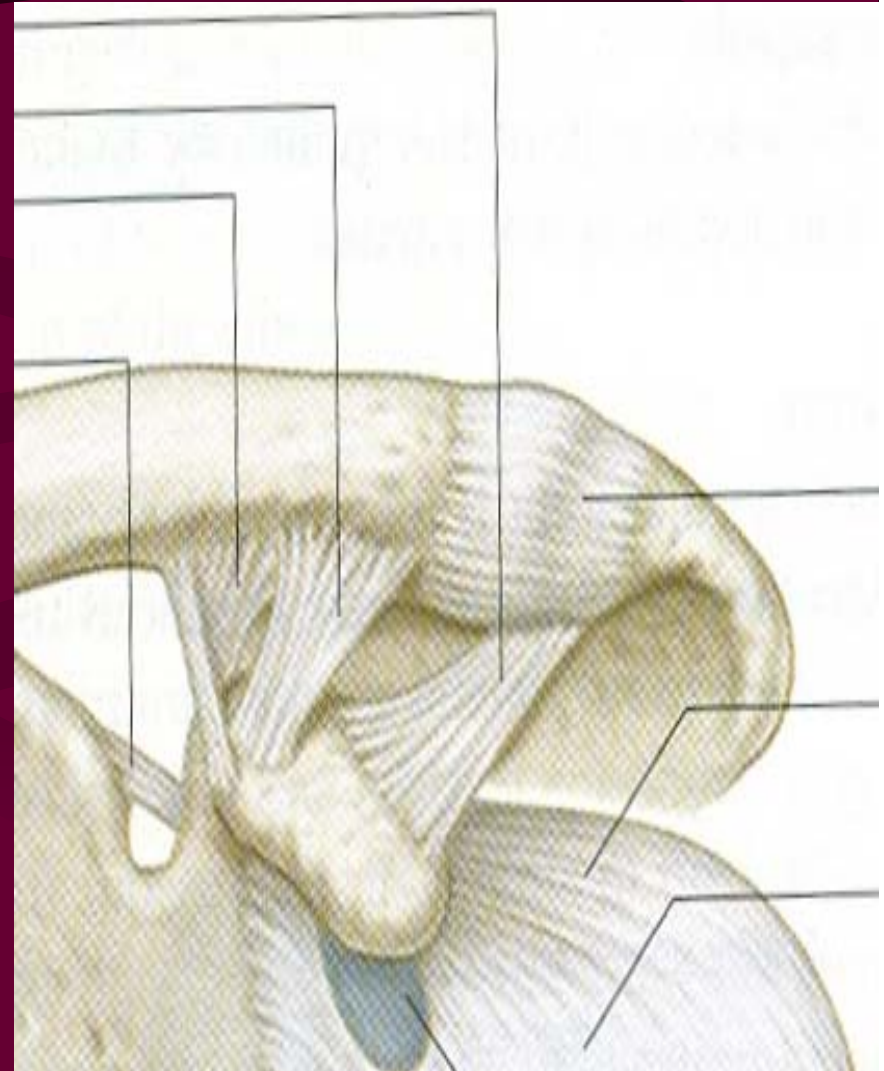
- It suspends the scapula from lateral third of clavicle and forms strong band of union between them.
- It has conoid and trapezoid part.
- Separate joint ??.
- Syndesmosis.



- Conoid part is inverted cone shaped.
- Its apex is attached to root of coracoid process above the suprascapular notch and its base is attached to conoid tubercle on under surface of clavicle at the junction of medial $\frac{2}{3}$ rd and lateral $\frac{1}{3}$ rd of clavicle.
- More dense then trapezoid part



- Trapezoid part is antero lateral to conoid part.
- It is quadrilateral in shape.
- It ascends from upper surface of coracoid process to trapezoid ridge on under surface of lateral third of clavicle.
- It has free anterior border.
- Its posterior border meets the conoid part at an angle directed in front.



- Blood supply :

- Suprascapular and thoracoacromial artery

Nerve supply

- Lateral supraclavicular nerve



Movements of pectoral girdle

- The movement of pectoral girdle are passive.
- No muscle connects the bones to move the joints.
- Muscles which move the scapula causes to move clavicle.
- All movement of scapula involve movement in the joint at either ends of clavicle.

During scapular movement, subclavius muscle steadies the clavicle by drawing it medially and downward.

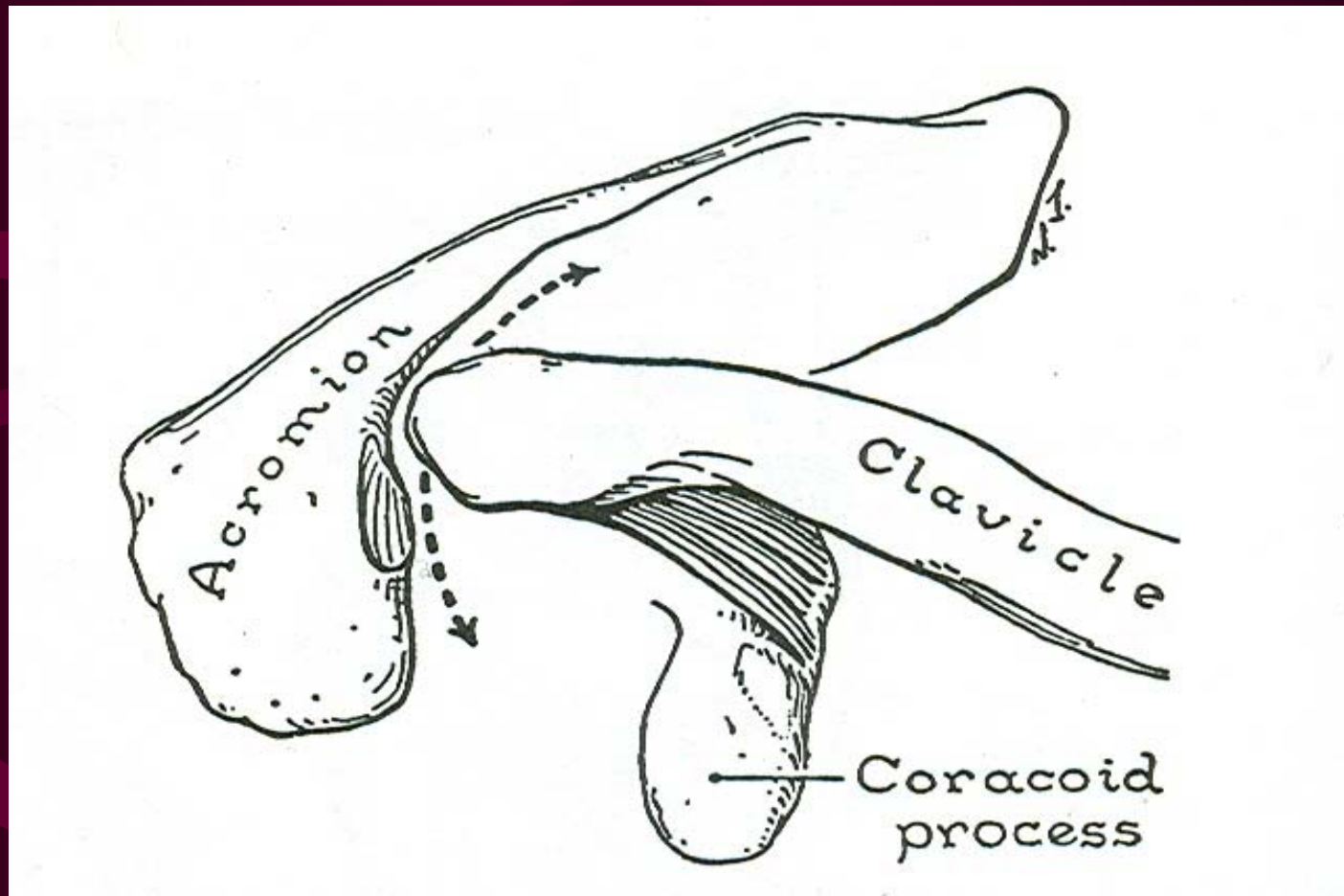
- Presence of loose areolar tissue between serratus anterior, subscapularis and chest wall facilitate scapular movement on thoracic wall.

– Joints allows following movements:

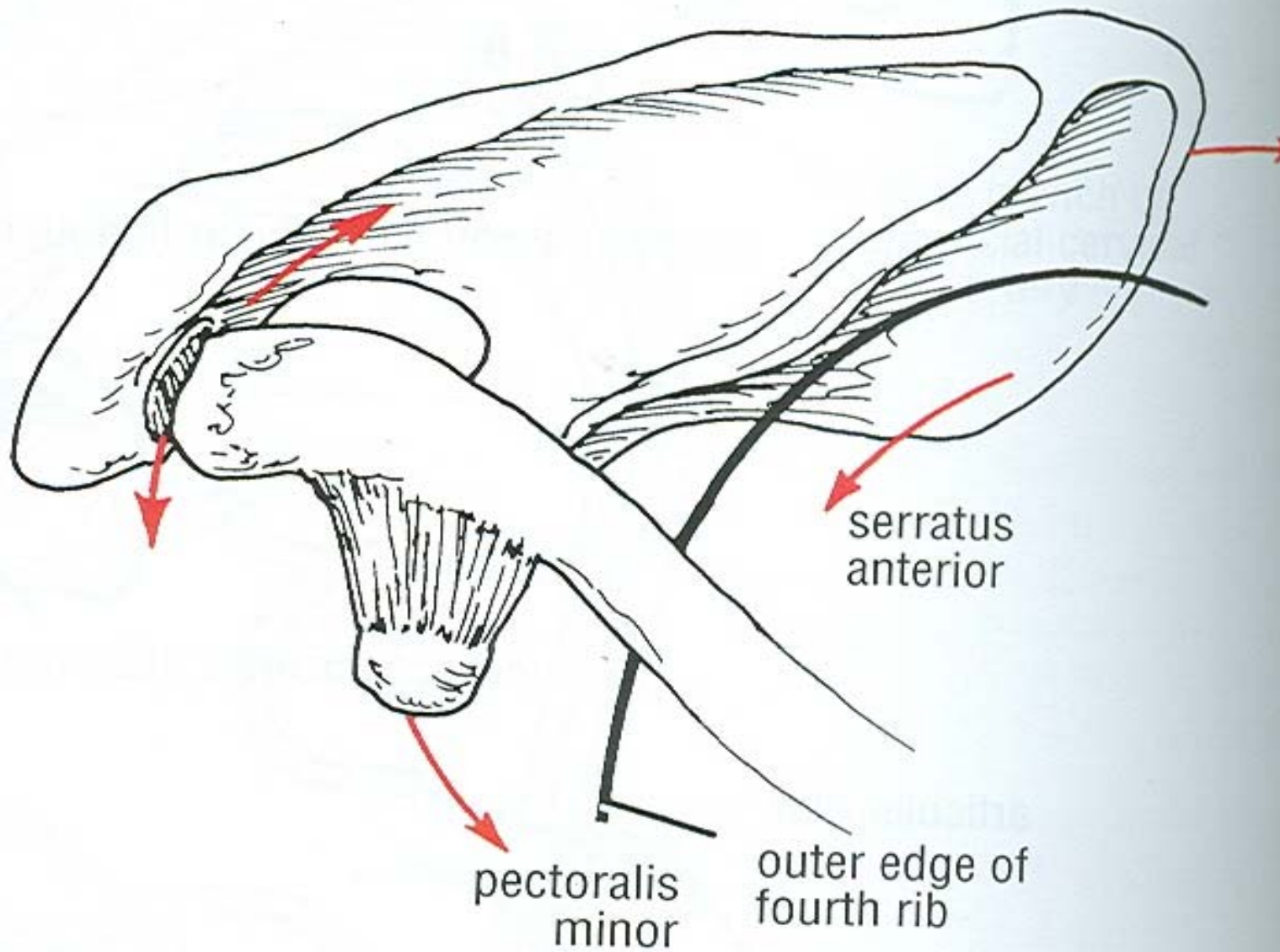
» Gliding.

» Rotating.

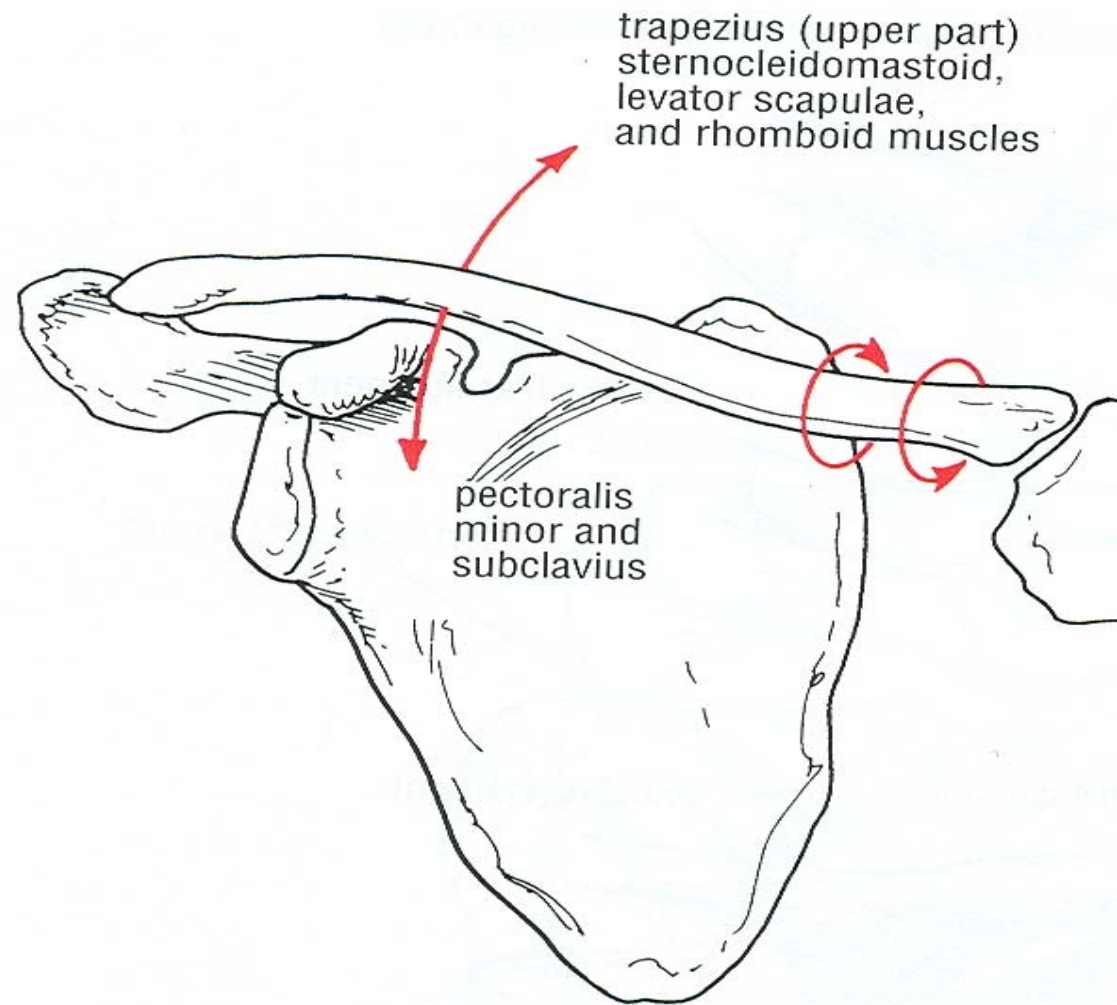
Gliding Movement



trapezius
(middle fibers), levator
scapulae, and rhomboids



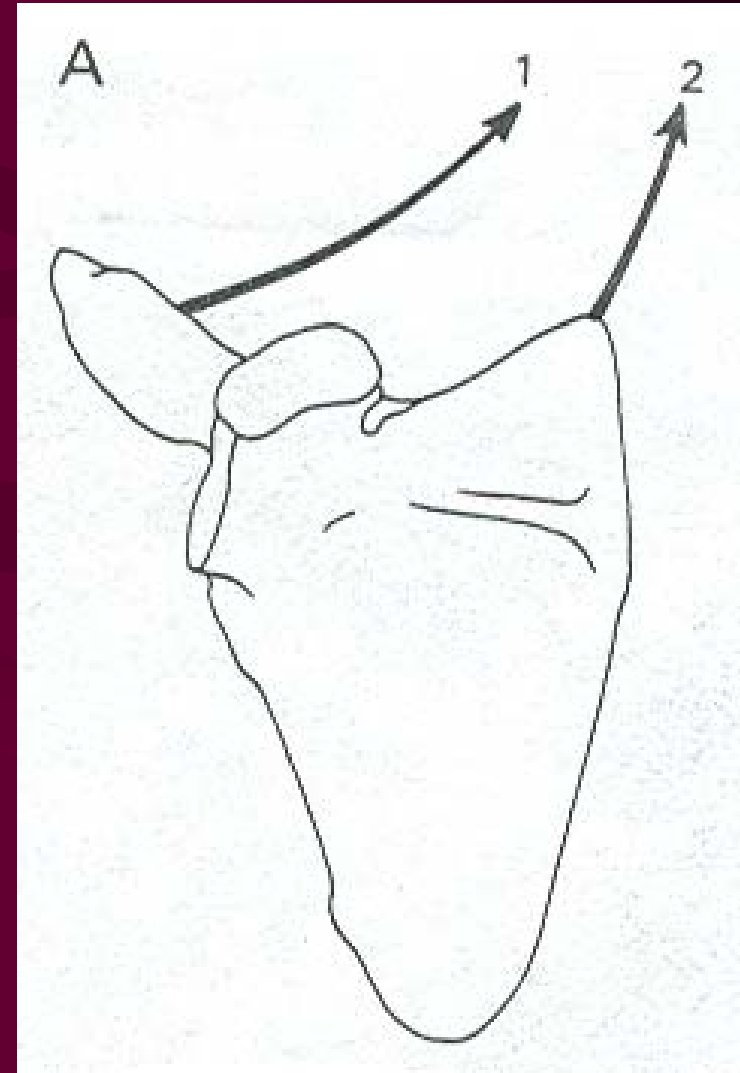
Rotating Movement



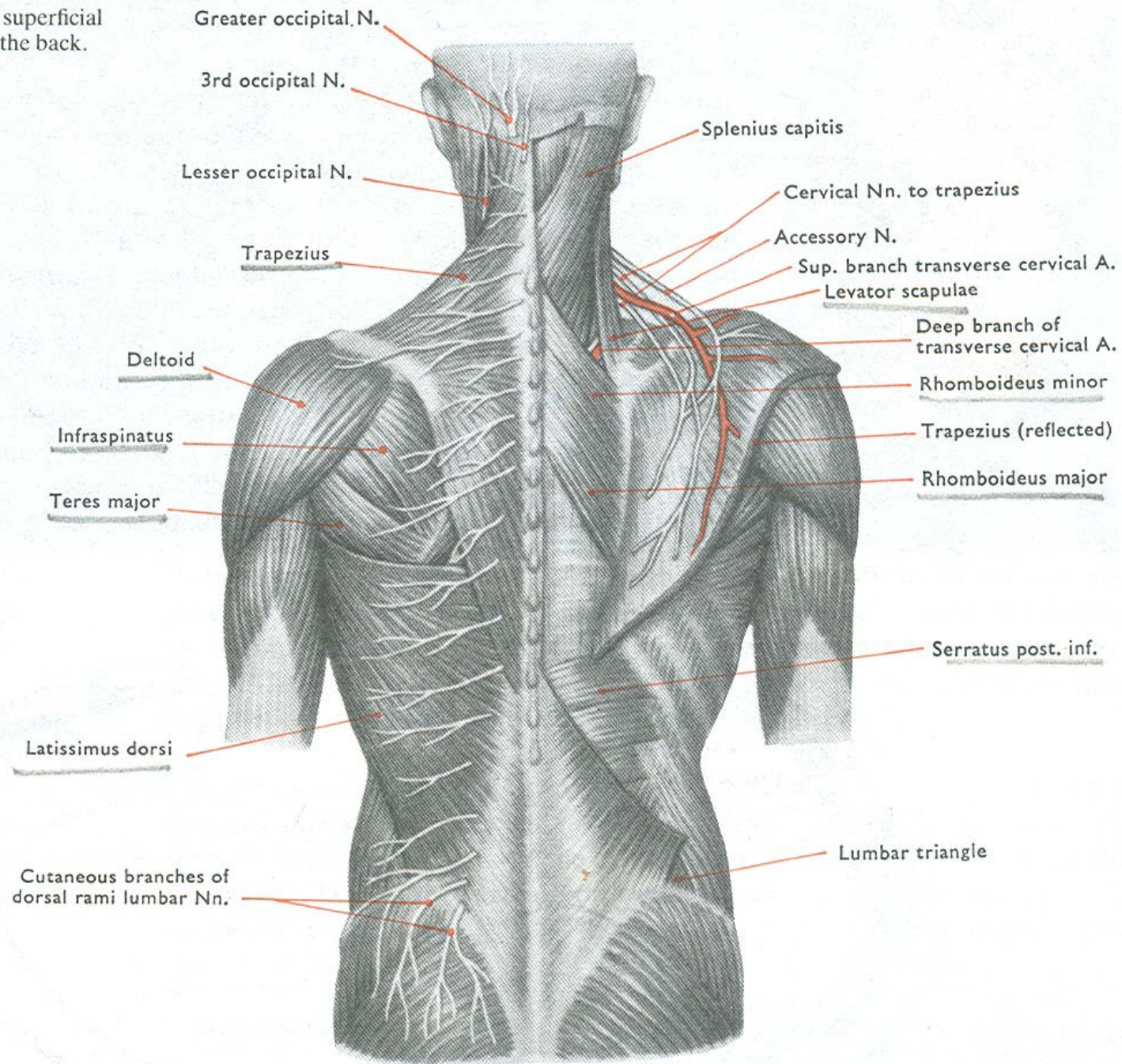
- Gliding movements occur in:
 - Elevation and depression.
 - Protraction and retraction.
- Rotatory movements occur in:
 - Forward and backward movements.

Elevation and Depression

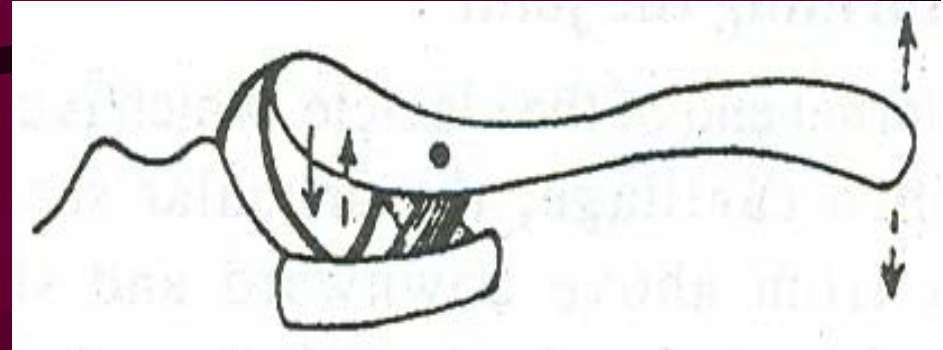
- Described as shrugging of shoulders.
- Scarse movement at acromioclavicular joint.
- Muscles producing the elevation are:
 - Upper part of trapezius.
 - Levator scapulae.



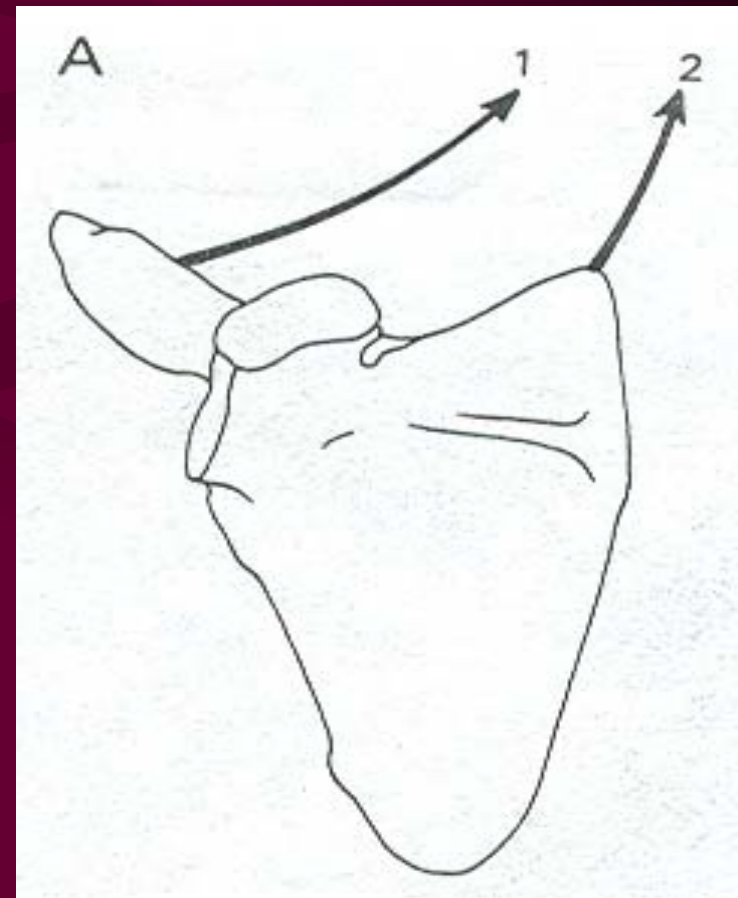
of superficial
of the back.



- During elevation upward swing of clavicle takes place at acromioclavicular joint.



- This is associated with downward rotation of sternal end of clavicle above the articular disc in meniscoclavicular compartment around an anteroposterior axis passing through the clavicle above the medial attachment of costoclavicular ligament.

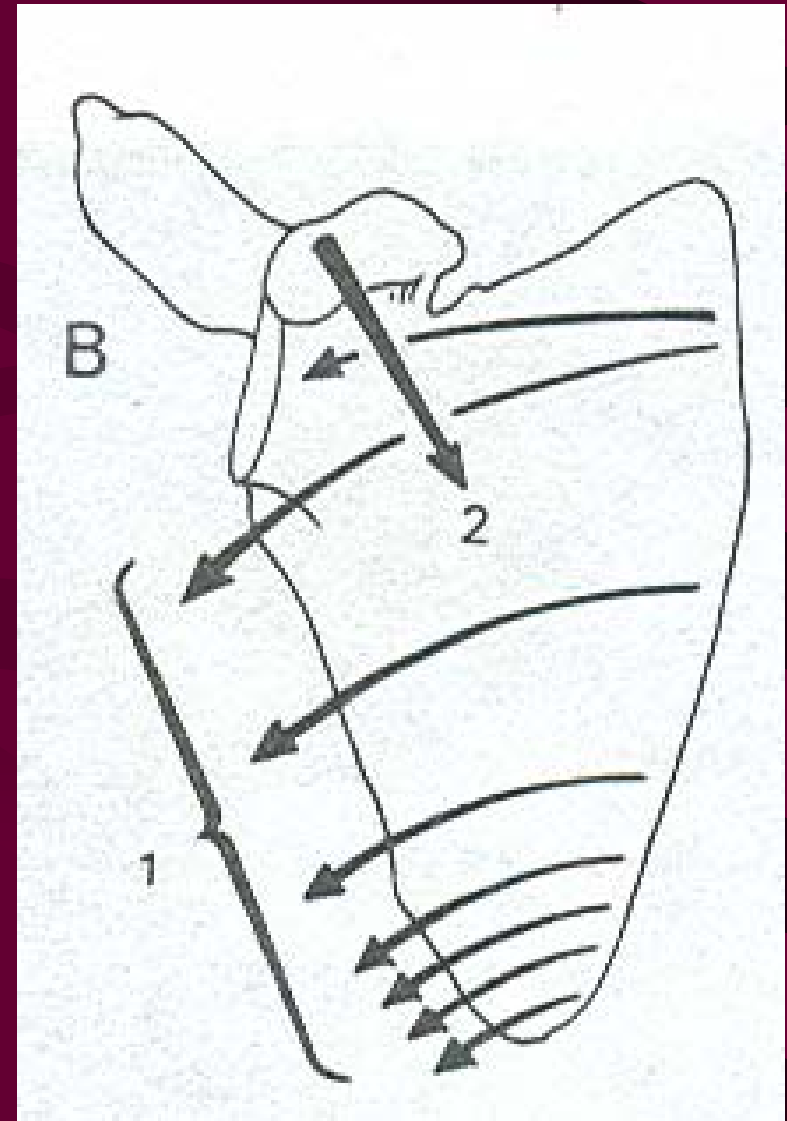


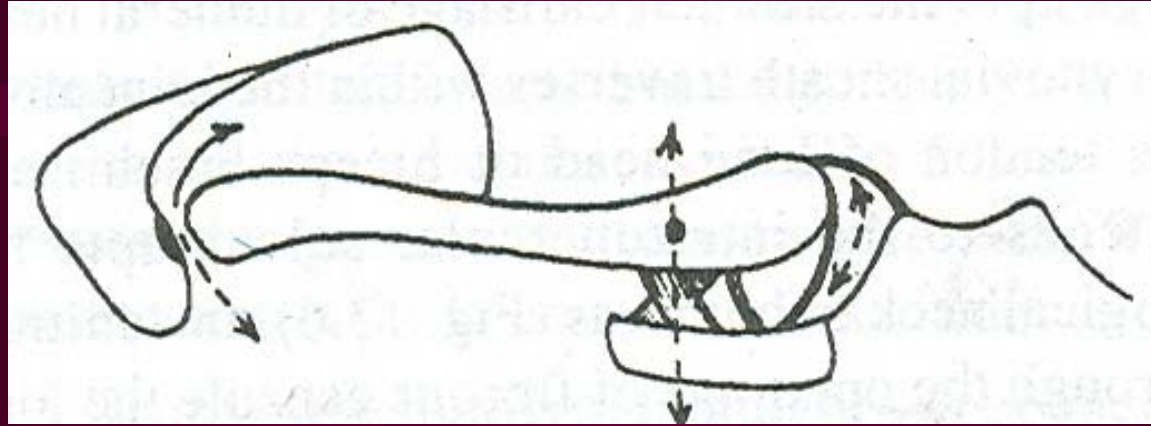
- Tension of costoclavicular ligament and lower part of fibrous capsule check the further downward movement of sternal end.
- Depression of scapula is usually brought about by weight of upper limb.
- Active depression is produced by lower part of serratus anterior and pectoralis minor.

Protraction and Retraction

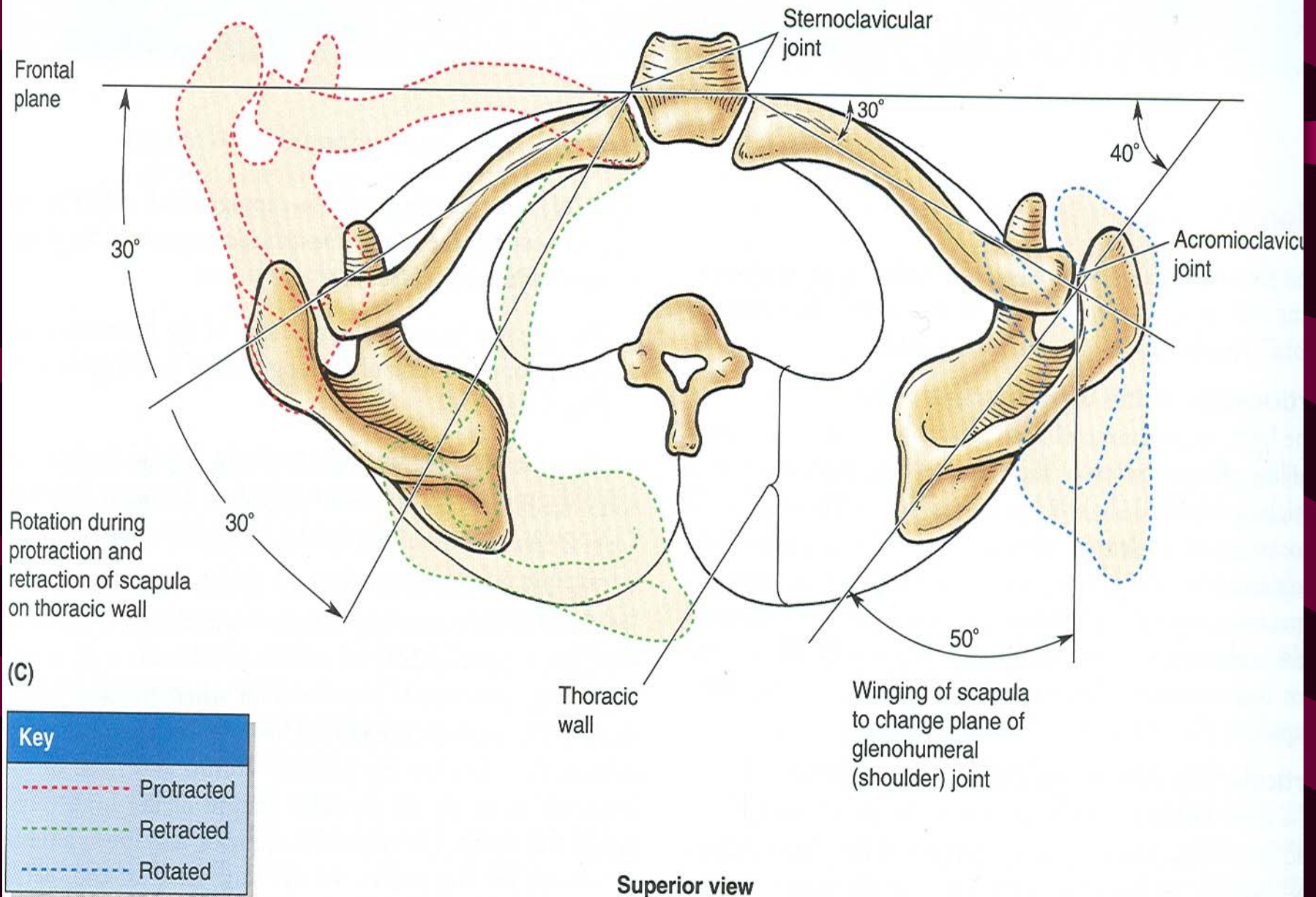
- Described as forward and backward movement of scapula.
- As in pushing and punching.
- Scapula glides forward and backward around the chest wall. Protraction usually occurs with some lateral rotation of scapula.

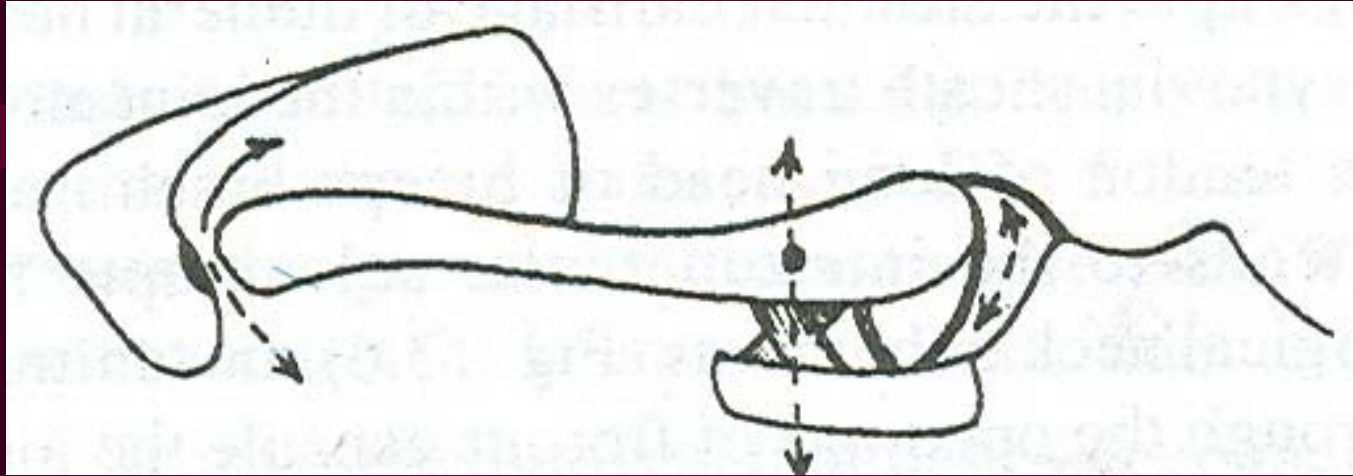
- Protraction is produced by
 - serratus anterior
 - pectoralis minor.
- Upper part of latissimus dorsi acts as strap over the inferior angle of scapula.





- During protraction lateral end of clavicle along with acromial process advances forward.
- This is associated with backward swing of sternal end of clavicle along articular disc in sterno clavicular joint.

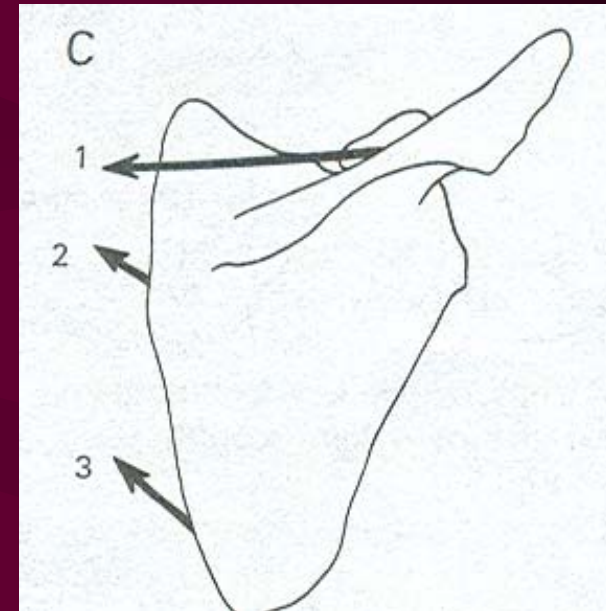




- This movement takes place in vertical axis medial to attachment of costoclavicular ligament.
- Backward gliding of sternal and is checked by anterior sterno clavicular and posterior laminar of costoclavicular ligament.

Retraction

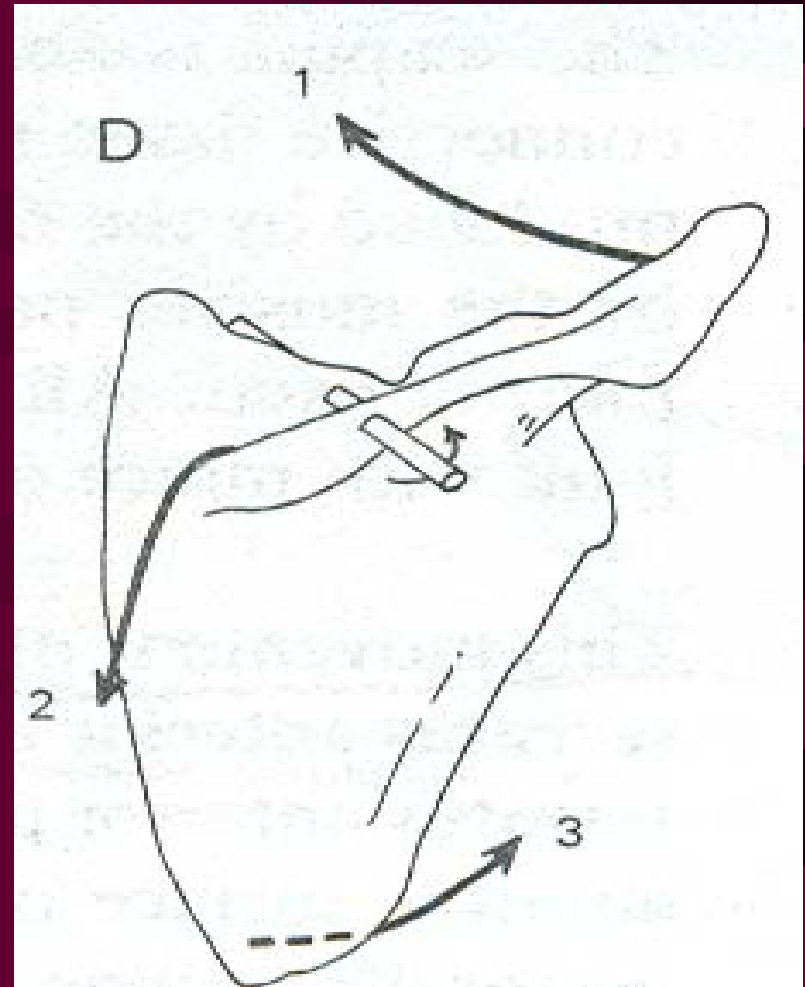
- Reverse of protraction movement
- Muscle producing are
 - Middle part of trapezius
 - Rhomboid minor
 - Rhomboid major
- Movement occur in same axis
- Forward swing of clavicle at sternoclavicular joint is checked by posterior sternoclavicular and anterior lamina of costoclavicular ligament.



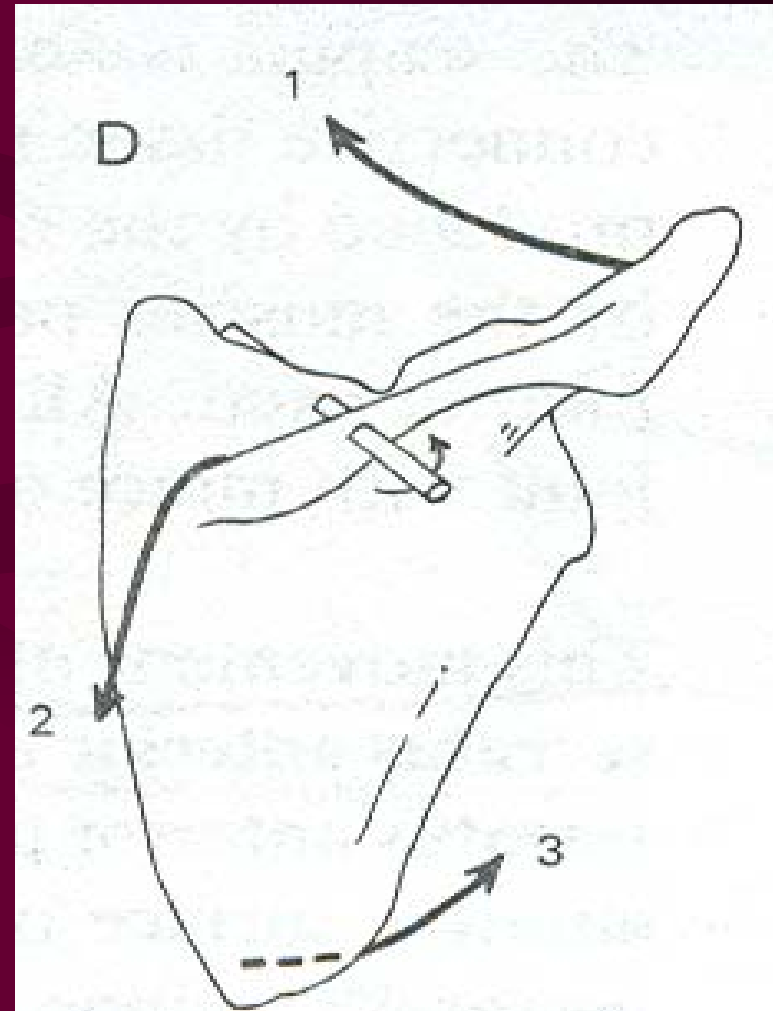
Forward and Backward rotation of scapula

- Also known as lateral and medial rotation.
- Observed in elevation of arm above the head, during abduction or flexion of shoulder joint.
- Manifested by lateral swing of inferior angle of scapula so that the glenoid cavity is directed almost vertically upward.

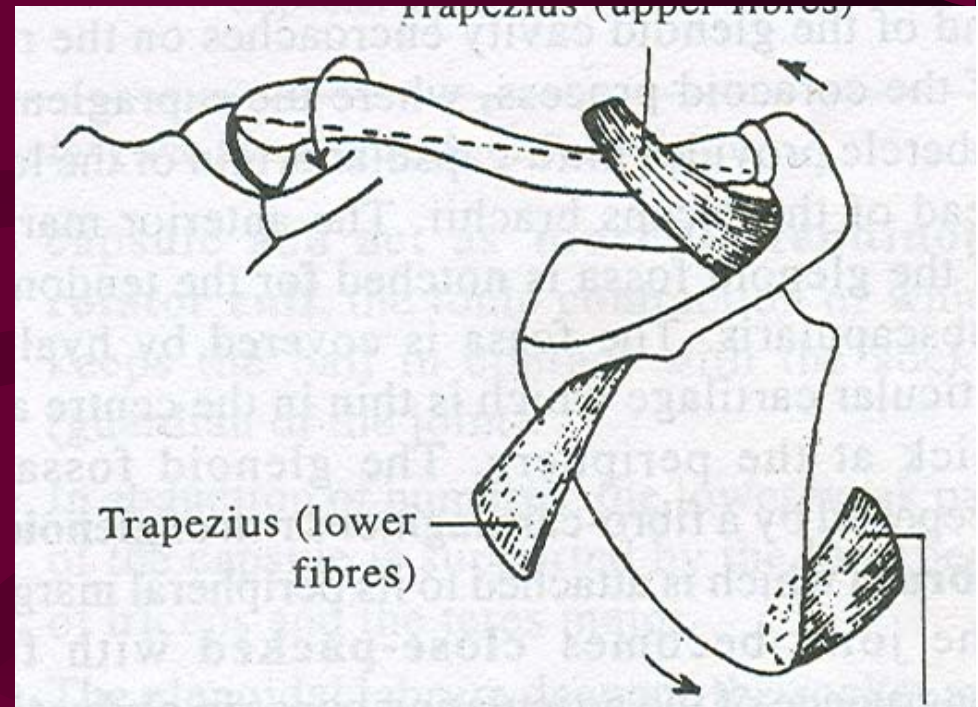
- The movement takes place around a horizontal axis passing through the middle of scapular spine and sternoclavicular joint.



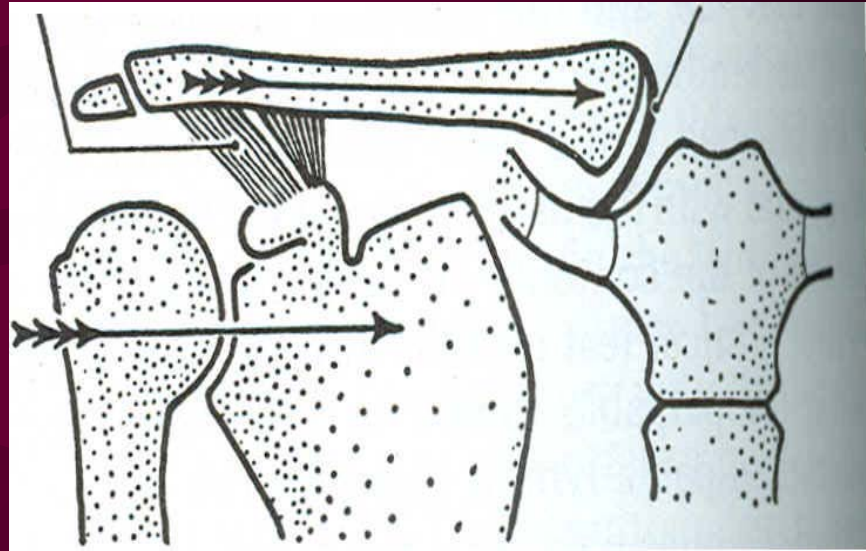
- Forward scapular movement is produced by
 - Upper and lower part of trapezius.
 - Lower five digitations of serratus anterior.



- Scapular rotation is initiated at acromioclavicular joint.
- The scapula does not retain its position relative to clavicle.



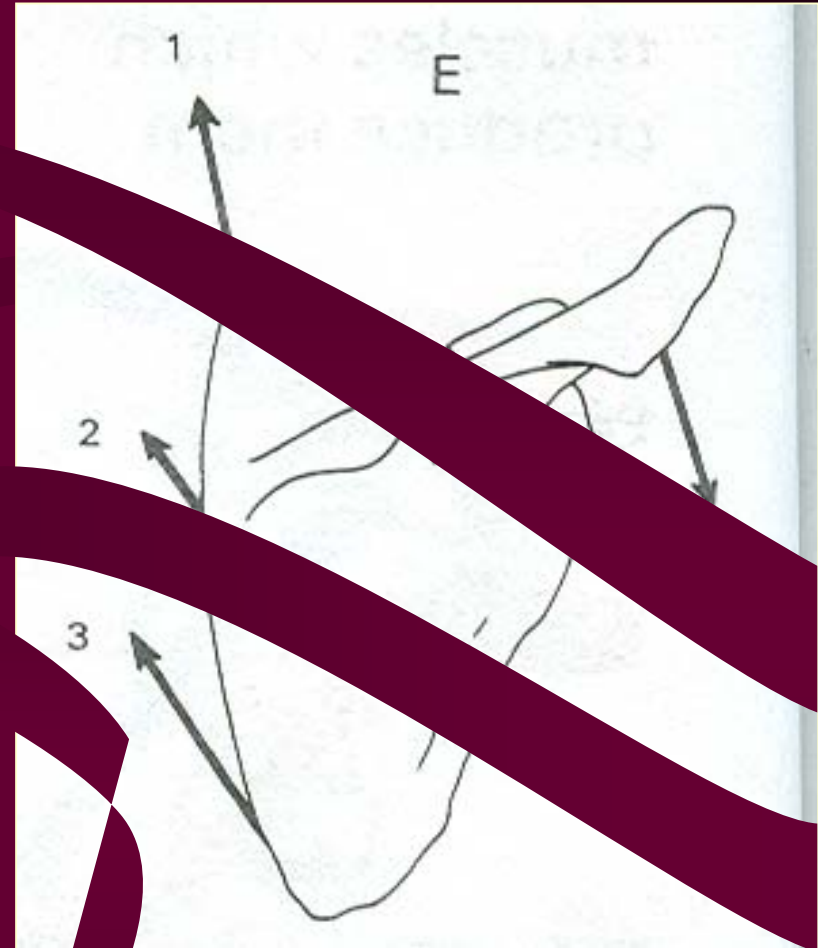
- Rotating force is then transmitted to sternoclavicular joint along the long axis of clavicle.
- Movement takes place in meniscoclavicular compartment at sternal end.



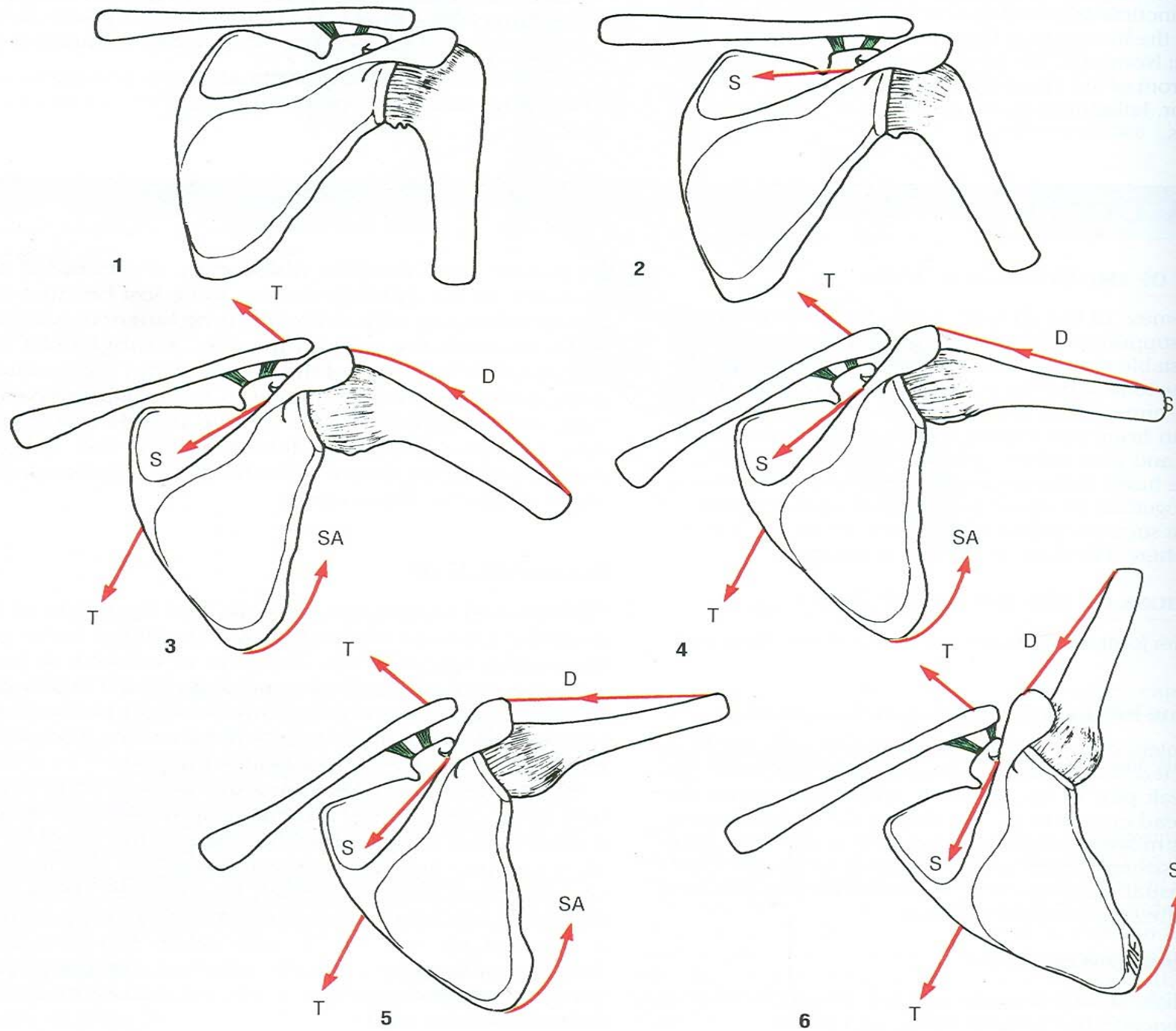
- Out of possible 60 degree of scapular rotation, the acromioclavicular joint permits 20 degrees and sternoclavicular joint permits remaining 40 degrees.
- Further rotation is checked by tension of coracoclavicular ligament.

Backward rotation of scapula.

- It is opposite movement.
- Gravity play a major role.
- Active movement is assisted by
 - Levator scapulae
 - Both rhomboids
 - Latissimus dorsi

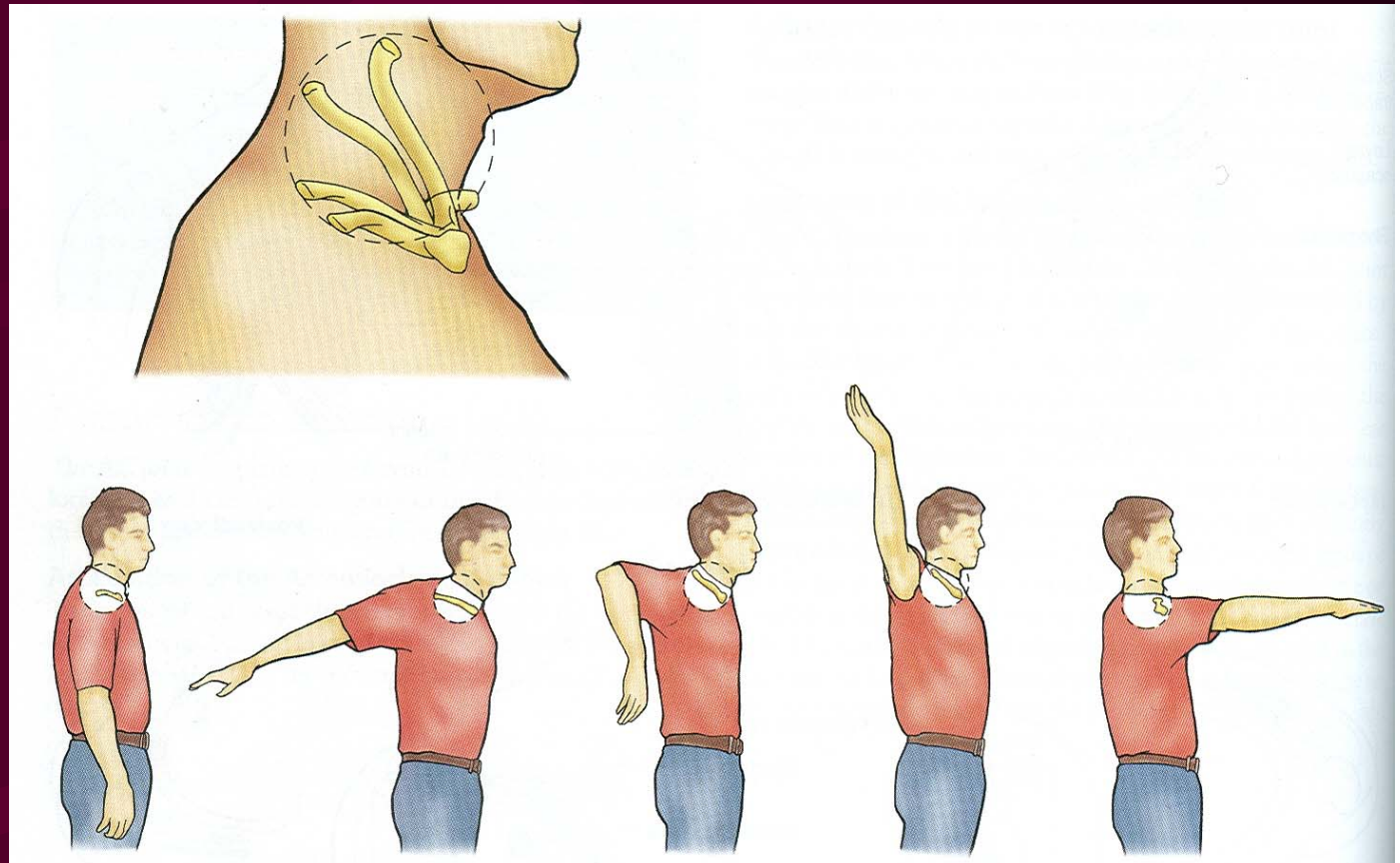


Movement of Pectoral girdle in
overall abduction of arm upto 180
degrees



Movement of clavicle association with movement at shoulder joint

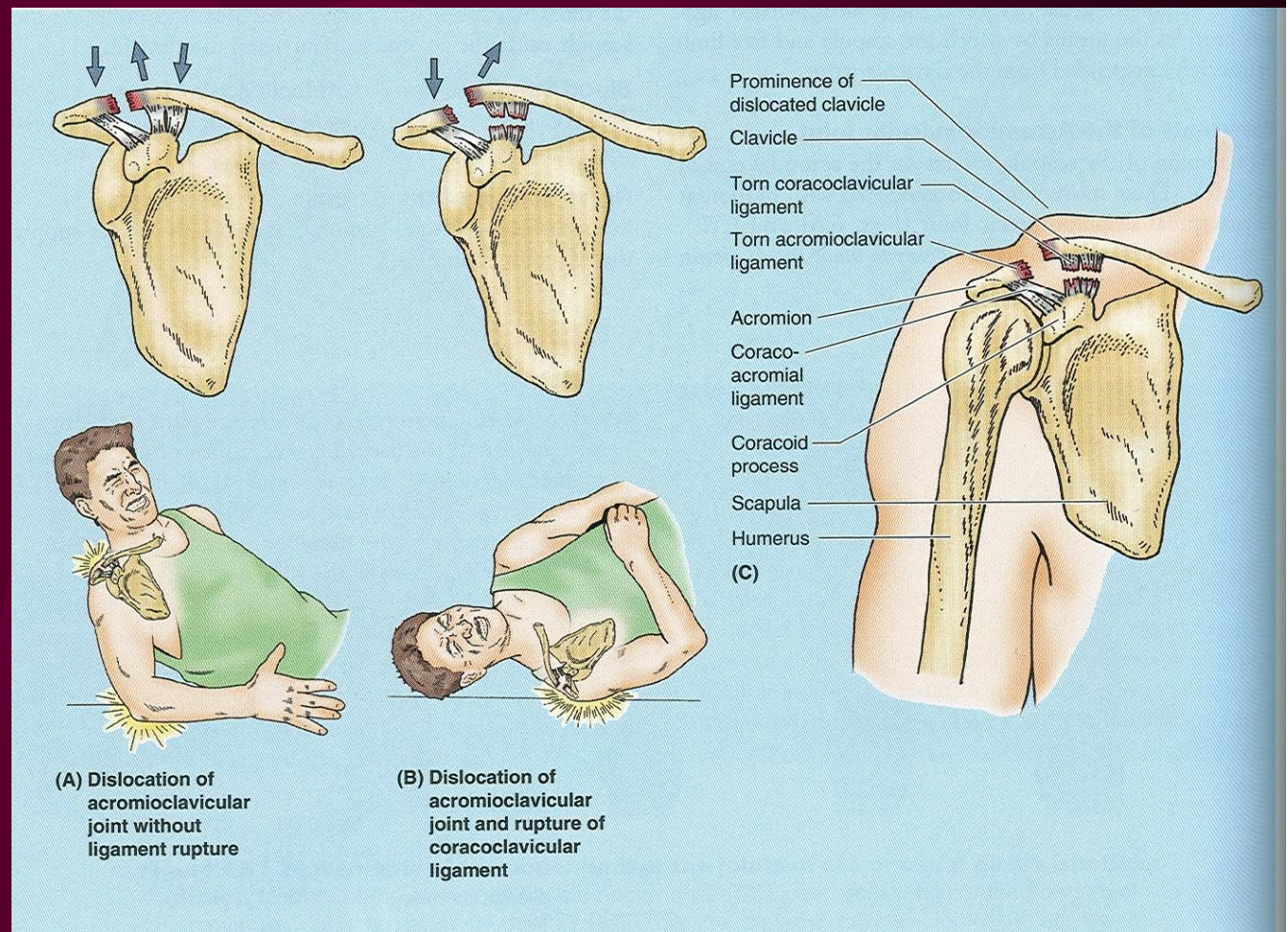
- Clavicle moving clockwise



Applied anatomy

- Dislocation of Sternoclavicular joint is rare than fracture of clavicle at its junction of middle and lateral third.
- Most dislocation occurs in young persons associated with epiphysial plate fracture.

- Acromioclavicular is weak and dislocation of joint easily occur by direct blow.
- Occur commonly in player of
 - Football.
 - Soccer.
 - Hockey.
 - Martial arts.



- Acromioclavicular injury commonly called “Shoulder separation” when coracoclavicular ligament is torn.
- Acromion becomes more prominent.
- Clavicle moves superiorly.

