



SCAPULOTHORACIC JOINT

Presented by: Archana K

Assistant professor

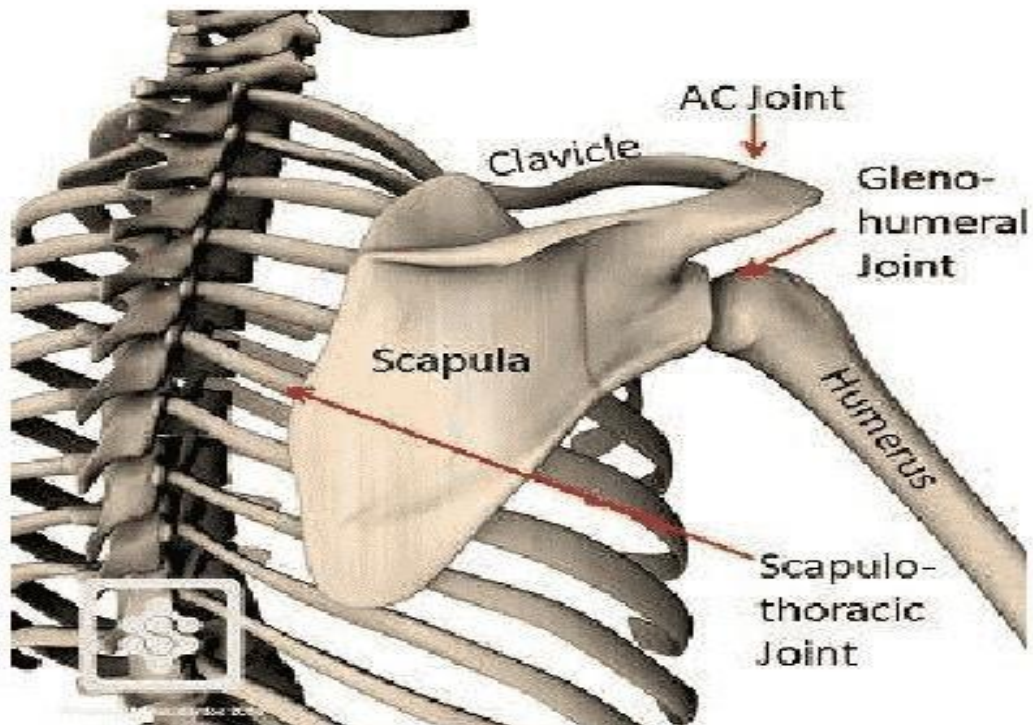
SNS COLLEGE OF PHYSIOTHERAPY



INTRODUCTION

- The scapulothoracic joint is considered as a part of shoulder complex.
- The scapulothoracic joint is formed by the articulation of scapula with the thorax.
- Not a true anatomic joint, It is a functional joint.
- Any movement at scapulothoracic joint(ST) results in movement of acromioclavicular joint(ac) and sternoclavicular joint(sc).

SCAPULOTHORACIC JOINT





ANATOMY

- The scapulothoracic articulation is formed by the **convex surface of the posterior thoracic cage** and the **concave surface of the anterior scapula**.
- Concerning that it is not a true joint, the scapulothoracic joint **doesn't have specific articular surfaces, ligaments nor the joint capsule**.

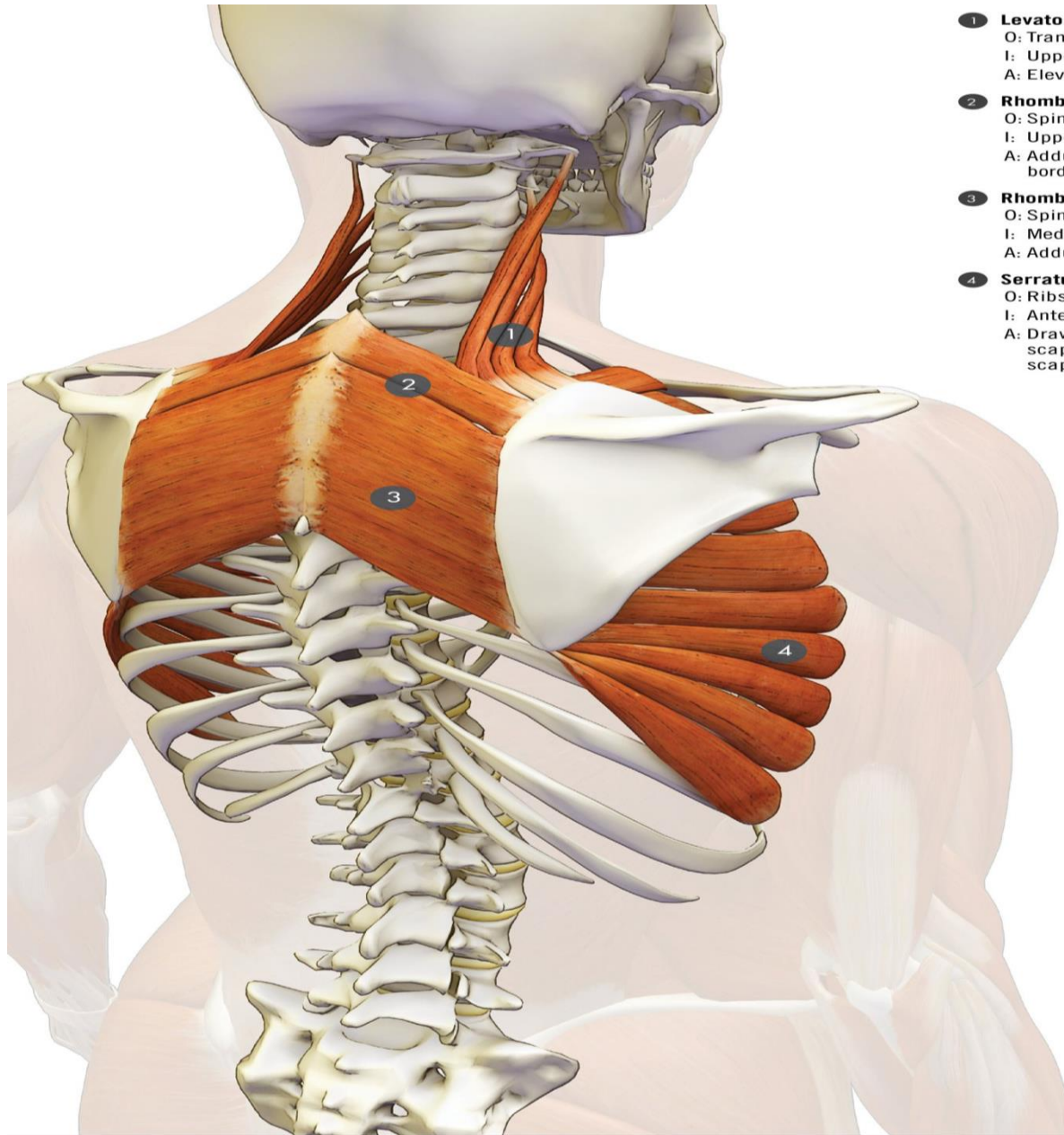


- The scapula is a flat bone, with the gliding surfaces formed by the subscapularis and serratus anterior muscle.
- It is attached to the axial skeleton through the acromioclavicular joint and the sternoclavicular joint.



SCAPULAR STABILITY

- Since it has no ligaments, the scapulothoracic junction is stabilized by the synchronized actions and passive tensions of the **three functional muscle** units;
 - The **trapezius** muscle.
 - The **serratus anterior** muscle.
 - The medial stabilizers of the scapula; **levator scapulae and rhomboid muscles**.



- 1 **Levator scapulae**
O: Transverse processes of C1-4.
I: Upper medial border of scapula.
A: Elevates scapula.
- 2 **Rhomboid minor**
O: Spinous processes of C7 and T1, ligamentum nuchae.
I: Upper medial border of scapula.
A: Adducts (retracts) scapula, depresses lateral border of scapula by elevating medial border.
- 3 **Rhomboid major**
O: Spinous processes of T2-5.
I: Medial border of scapula.
A: Adducts (retracts) scapula (opens chest forward).
- 4 **Serratus anterior**
O: Ribs 1-9.
I: Anterior (front) surface of scapula on medial border.
A: Draws scapula forward on chest wall, stabilizes scapula during push-up type movements, rotates scapula for abducting and raising arm.

Fig:1 <https://i.pinimg.com/originals/45/d2/6e/45d26e3b7623bdafb9e2854dfb6c1eba.jpg>



Blood supply:

- occipital, dorsal scapular arteries for the trapezius.
- Thoracodorsal artery for serratus anterior.
- Transverse and ascending cervical artery for the levator scapulae.

• Nerve supply:

- Accessory nerve for trapezius
- Long thoracic nerve for serratus anterior
- Dorsal scapular nerve for levator scapula.

RESTING POSITION OF SCAPULA

- 5cm away from midline
- Placed between 2nd and 7th rib.

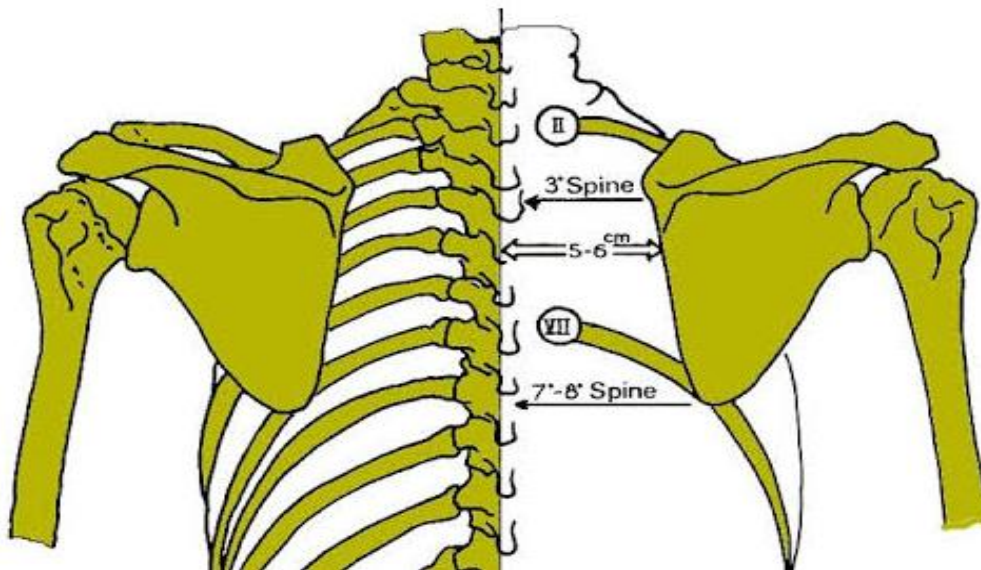


Fig:2 <https://www.google.com/imges.imgurl=httpslideplayer.comimagesPosition>.

- Scapula is internally rotated 35-45 degrees from coronal plane (superior view).

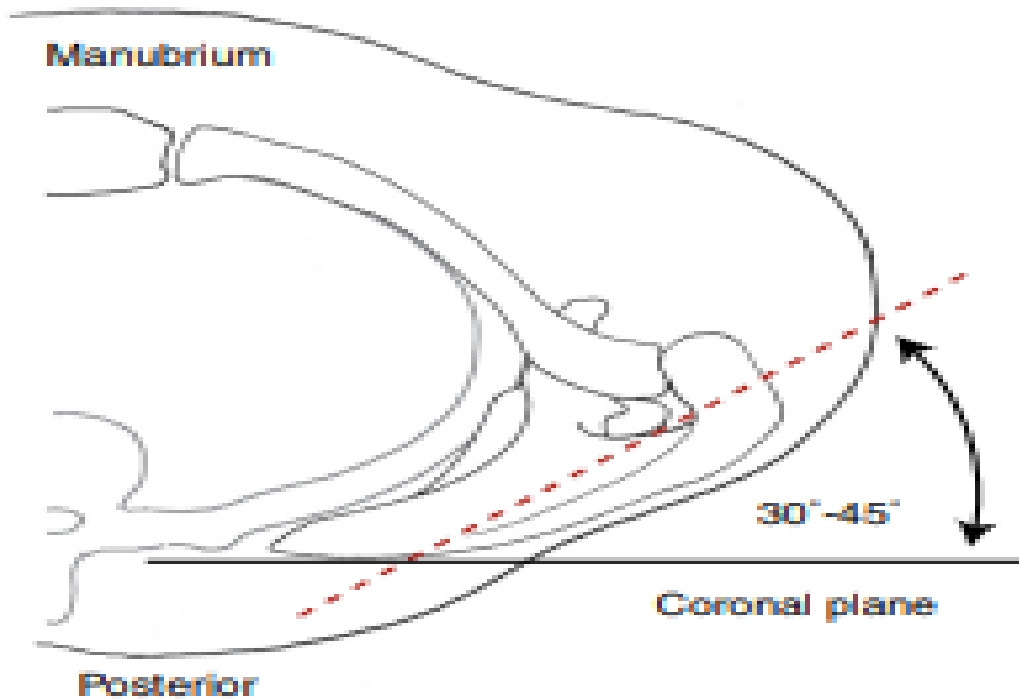


Fig3: Levangie, P. and Norkin, C., 2007. Joint Structure And Function. 5th ed. Philadelphia: F.A. Davis

- Anteriorly tilted 10-20 degrees from vertical (side view).

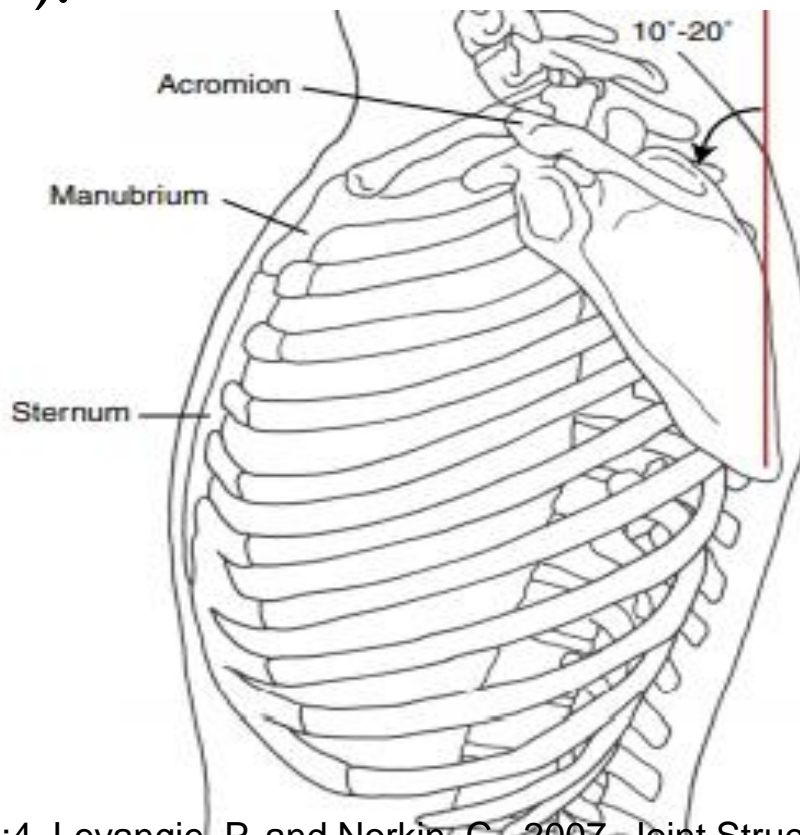


Fig:4 Levangie, P. and Norkin, C., 2007. Joint Structure And Function. 5th ed. Philadelphia: F.A. Davis

- Upwardly rotated 10-20 degrees from vertical (posterior view).

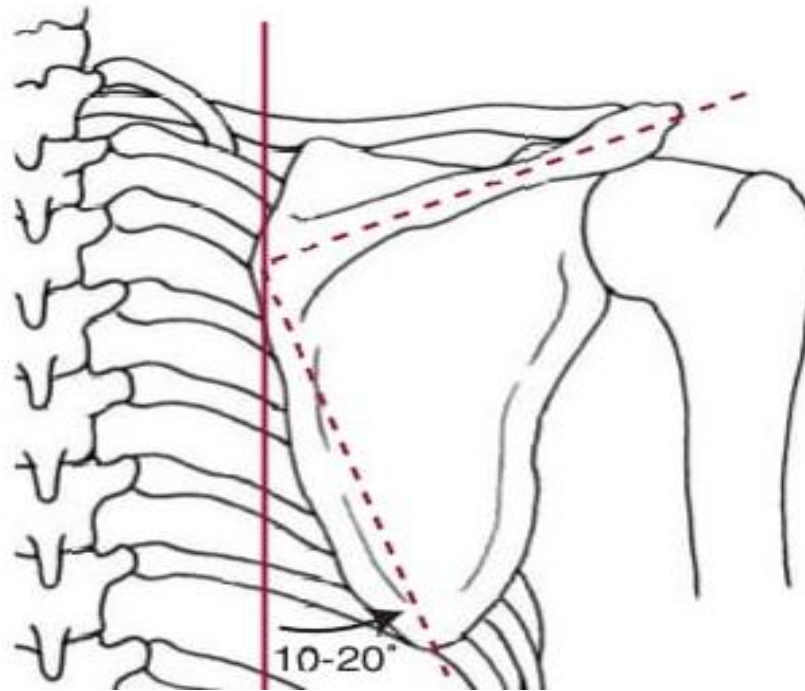


Fig 5 : Levangie, P. and Norkin, C., 2007. Joint Structure And Function. 5th ed. Philadelphia: F.A. Davis.



SCAPULO THORACIC JOINT FUNCTION

- Increasing the range of motion of the shoulder to provide greater reach.
- Maintaining favourable length tension relationships for the deltoid muscle to function above 90 degree of glenohumeral elevation and to allow better shoulder joint stability throughout the motion.



- Injury prevention through shock absorption of forces applied to the outstretched arm.
- Permitting elevation of the body in activities such as walking with crutches or performing seated push ups during transfers by person with a disability such as paraplegia.



KINEMATICS OF SCAPULOTHORACIC JOINT

- The motions of the scapula includes three rotations:
 1. Upward/Downward rotation.
 2. Internal/External rotation.
 3. Anterior/posterior tilting.

- Has two translatory motions:
 1. Elevation/Depression.
 2. Protraction/Retraction.

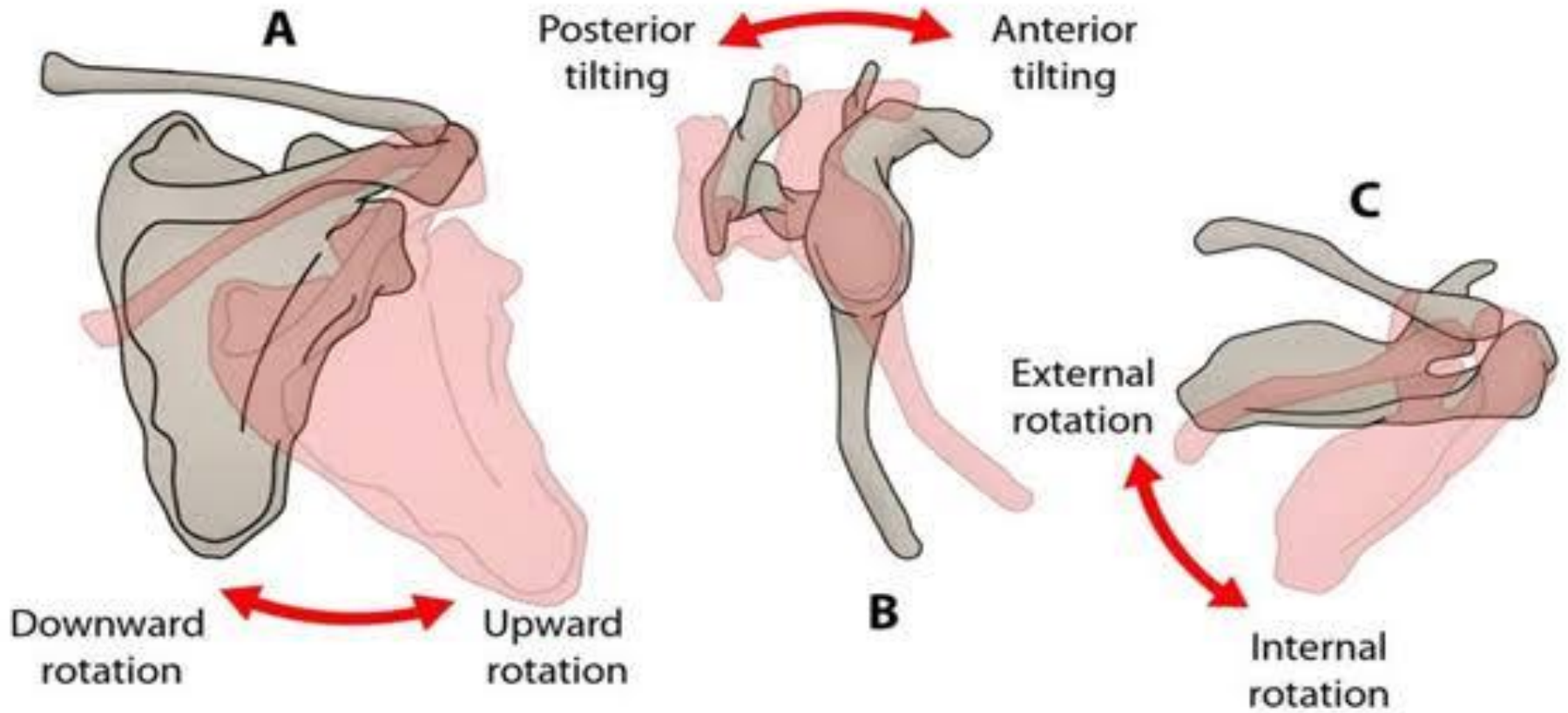


Fig 6 <https://www.blogger.com/profile/10938801091299703292>



Upward rotation

- It is the upward movement of the glenoid fossa, or the movement of the inferior angle of scapula (lower border) away from the vertebral column.
- Upward rotation is observed during elevation of arm.



- ROM-50-60 degrees.
- Results from a combination of sternoclavicular and acromioclavicular joint

Upward rotation of scapula is produced by:

- Clavicular posterior rotation
- Sternoclavicular joint elevation
- Upward rotation of acromioclavicular joint

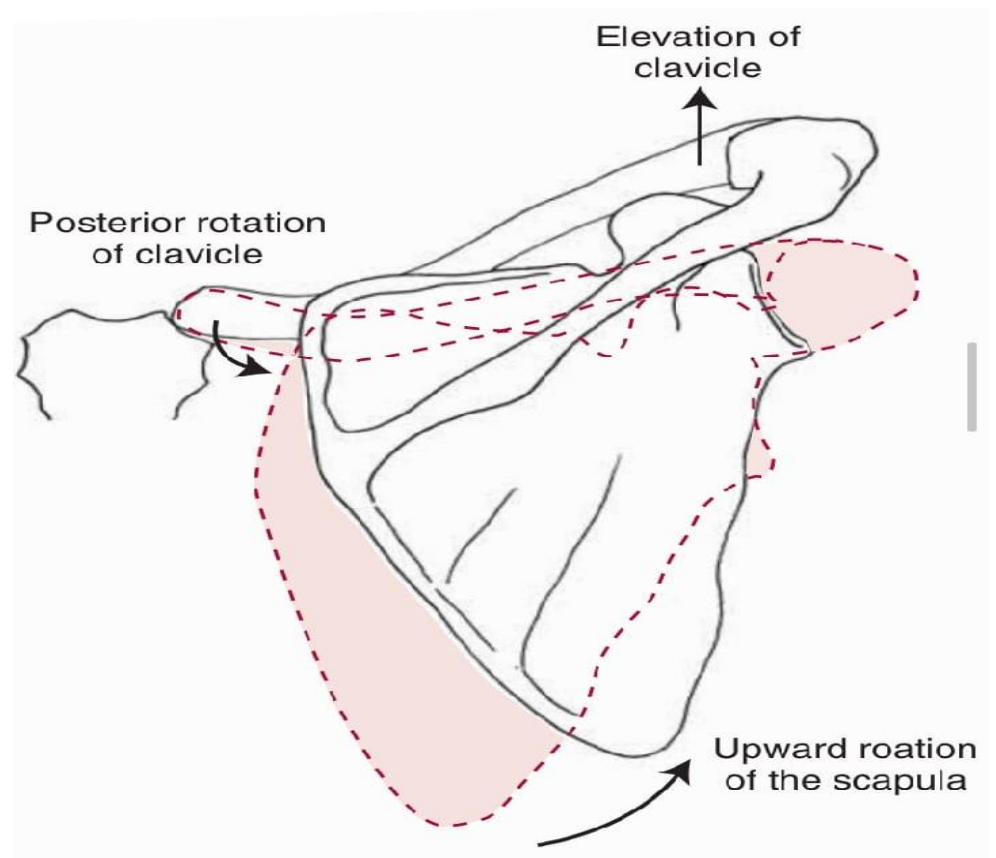


Fig7: Levangie, P. and Norkin, C., 2007. Joint Structure And Function. 5th ed. Philadelphia: F.A. Davis

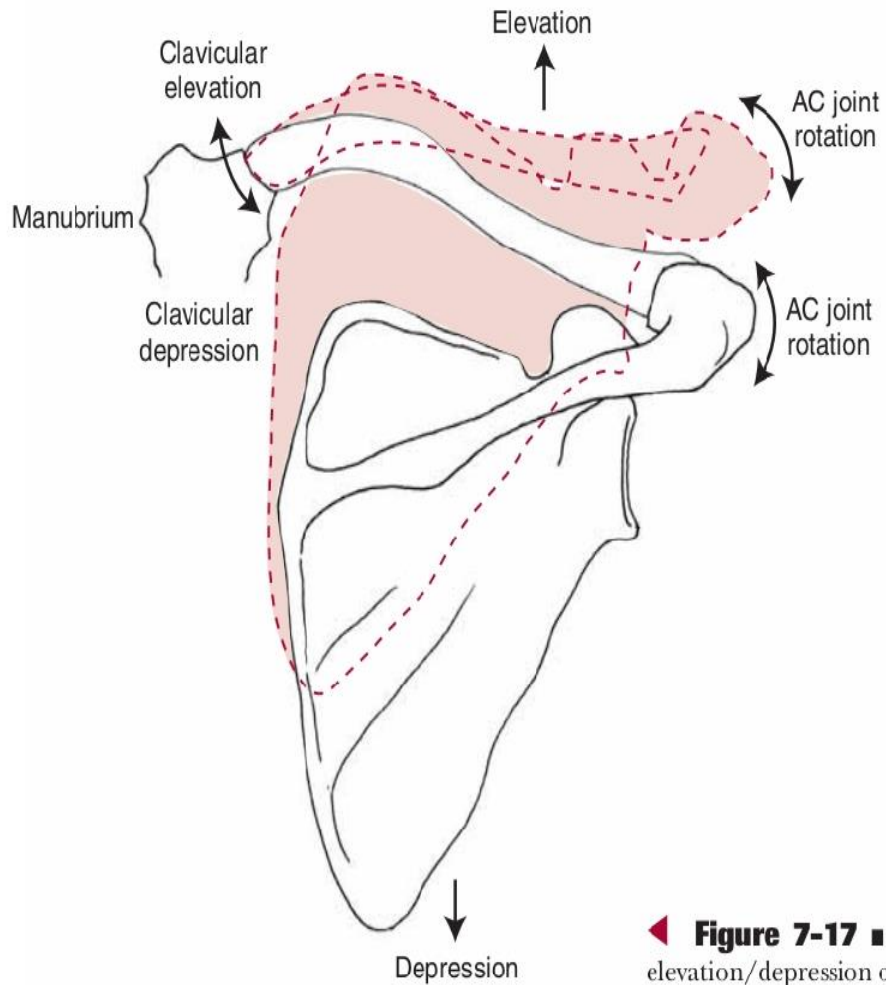


Downward rotation

- It is the downward movement of scapula or movement of the inferior angle towards the vertebral column.

Elevation

- Translational motion.
- Produced by elevation of clavicle at sternoclavicular joint and rotation at acromioclavicular joint.



◀ **Figure 7-17** ■ Elevation and depression of the scapula are produced by elevation/depression of the clavicle at the SC joint and by rotations at the AC joint.



Protraction

- Translatory motion of the scapula
- Also called scapular abduction.
- Full range scapular protraction results glenoid fossa to face anteriorly with the ribcage.
- Along with protraction, internal rotation takes place.

Protraction of scapula is produced by protraction at sternoclavicular joint and rotation at acromioclavicular joint.

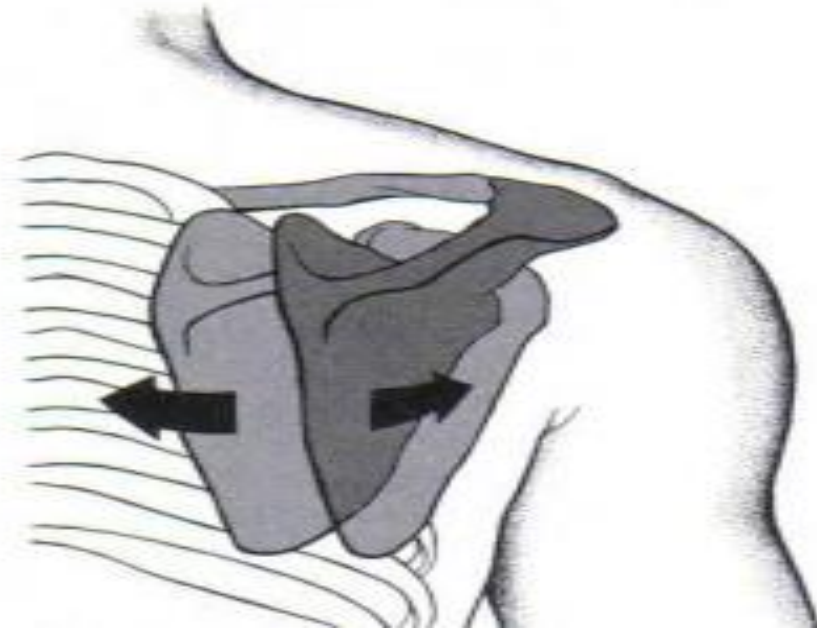
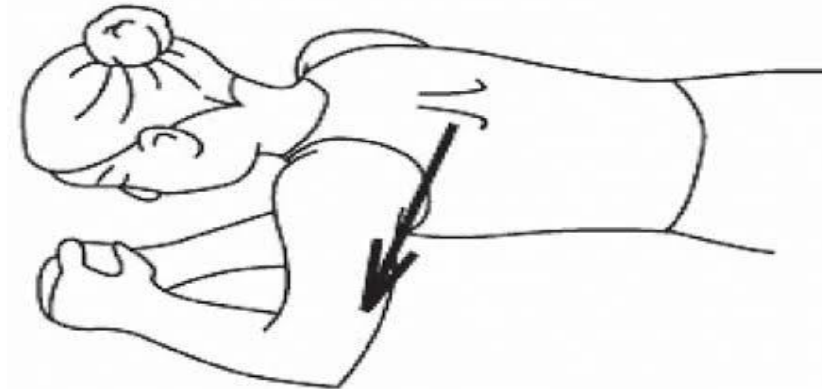
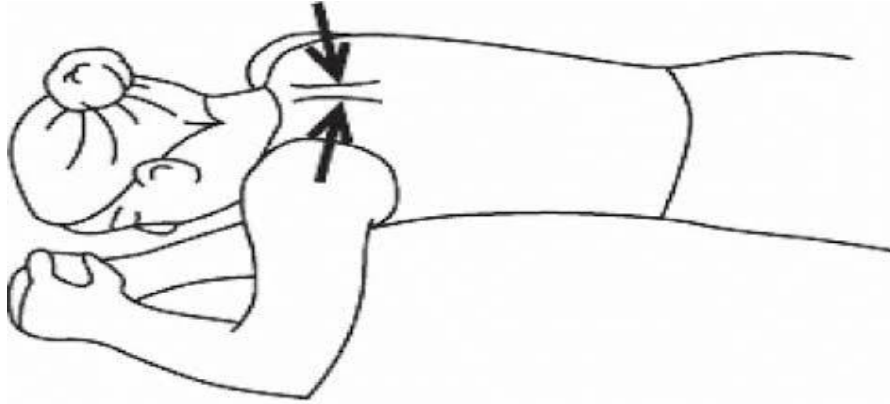


Fig 9: (From:Neumann, D., Kelly, E., Kiefer, C., Martens, K. and Grosz, C., n.d. Kinesiology Of The Musculoskeletal System. 1st ed. p.97.)





Internal and External rotation

- Internal rotation/external rotation is accompanied by protraction/retraction of clavicle at sternoclavicular joint.
- Approximately 15 to 16 degree of internal rotation occurs at the acromioclavicular joint during normal elevation of the arm.

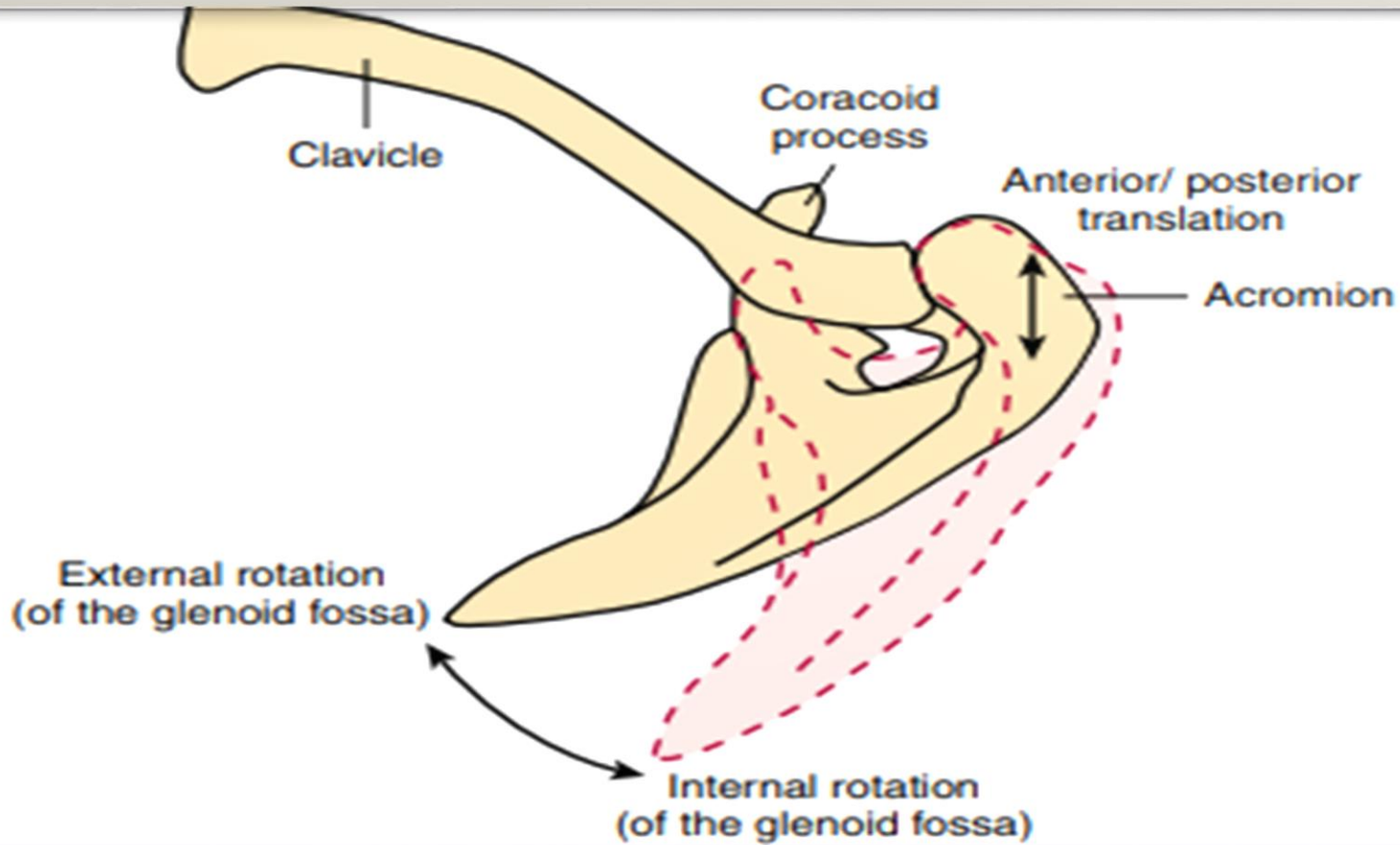


Fig 11: Levangie, P. and Norkin, C., 2007. Joint Structure And Function. 5th ed. Philadelphia: F.A. Davis



Anterior / Posterior tilt

- Anterior tilt moves the acromion process anteriorly while moving inferior angle of scapula posteriorly.
- Posterior tilt reverses the motion.



PATHOMECHANICS



Scapular dyskinesis

- Is an alteration or deviation in the normal resting or active position of scapula during shoulder movement.
- It can be due to:
 - muscle imbalance, injury to nerves or to the bones that support the scapula.



Fig 12: <https://images.app.goo.gl/x1kdVrecSsACzEH46>



Scapular winging

- Excessive internal rotation of scapula results in prominence of medial border of scapula
- Due to poor neuro muscular control of scapulo thoracic muscles.



Fig 13: Carol A Oatis, 2017 .kinesiology the mechanics and pathomechanics 3rd ed .philadelphia



THANKYOU