Chapter 4
The Shoulder Girdle

Bones
- Key bony landmarks
  - Manubrium
  - Clavicle
  - Coracoid process
  - Acromion process
  - Glenoid fossa
  - Lateral border
  - Inferior angle
  - Medial border

Joints
- Shoulder girdle (scapulothoracic)
  - Scapula moves on the rib cage
  - Joint motion occurs at sternoclavicular joint & to a lesser amount at the acromioclavicular joint

Joints
- Sternoclavicular (SC)
  - (multiaxial) arthrodial classification
  - Movements
    - Anteriorly 15 degrees with protraction
    - Posteriorly 15 degrees with retraction
    - Superiorly 45 degrees with elevation
    - Inferiorly 5 degrees with depression

Joints
- Sternoclavicular (SC)
  - Ligamentous support
    - Anteriorly by the anterior SC ligament
    - Posteriorly by the posterior SC ligament
    - Costoclavicular & interclavicular ligaments provide stability against superior displacement
Joints

• Acromioclavicular (AC)
  – arthrodi classification
  – 20- to 30-degree total gliding & rotational motion
  accompanying other shoulder girdle & shoulder
  joint motions
  – supported by
    • Coracoclavicular ligaments
    • Superior acromioclavicular ligament
    • Inferior acromioclavicular ligament
  – often injured

Joints

• Scapulothoracic
  – not a true synovial joint
  – does not have regular synovial features
  – movement depends on SC & AC joints
  which allows the scapula to move
    • 25-degrees abduction-adduction
    • 60-degrees upward-downward rotation
    • 55-degrees elevation-depression
  – supported dynamically by its muscles
  – no ligamentous support

Movements

• Focus on specific
  bony landmarks
  – inferior angle
  – glenoid fossa
  – acromion process
• Shoulder girdle
  movements = scapula
  movements

Movements

• Abduction
  (protraction)
  – scapula moves
    laterally away from
    spinal column
• Adduction (retraction)
  – scapula moves
    medially toward spinal
    column

Movements

• Downward rotation
  – returning inferior angle
    inferomedially toward
    spinal column & glenoid
    fossa to normal position
• Upward rotation
  – turning glenoid fossa
    upward & moving inferior
    angle superolaterally
    away from spinal column

Movements

• Depression
  – downward or inferior
    movement, as in
    returning to normal
    position
• Elevation
  – upward or superior
    movement, as in
    shrugging shoulders
Movements

- Shoulder joint & shoulder girdle work together in carrying out upper extremity activities
- Shoulder girdle movement is not dependent upon the shoulder joint & its muscles

Movements

- Shoulder girdle muscles
  - Stabilize scapula so the shoulder joint muscles will have a stable base from which to exert force for moving the humerus
  - Contract to maintain scapula in a relatively static position during shoulder joint actions
  - Contract to move shoulder girdle & to enhance movement of upper extremity when shoulder goes through extreme ranges of motion

Movements

- For some shoulder girdle movements, scapula must rotate or tilt on its axis
- Lateral tilt (outward tilt)
  - during abduction
  - scapula rotates about its vertical axis resulting in posterior movement of medial border & anterior movement of lateral border
- Medial tilt (return from lateral tilt, inward tilt)
  - during extreme adduction
  - scapula rotates about its vertical axis resulting in anterior movement of medial border & posterior movement of lateral border

Movements

- Anterior tilt (upward tilt)
  - rotational movement of scapula about frontal axis occurring during glenohumeral hyperextension
  - superior border moving anteroinferiorly & inferior angle moving posterosuperiorly
- Posterior tilt (downward tilt)
  - rotational movement of scapula about frontal axis occurring during glenohumeral hyperflexion
  - superior border moving posteroinferiorly & inferior angle moving anterosuperiorly

Movements

- Synergy with muscles of glenohumeral joint
  - As shoulder joint goes through more extreme ranges of motion, scapular muscles contract to move shoulder girdle so that its glenoid fossa will be in a more appropriate position from which the humerus can move
  - Without the accompanying scapula movement humerus can only be raised into approximately 90 degrees of total shoulder abduction & flexion

Movements

- Synergy with muscles of glenohumeral joint
  - This works through the appropriate muscles of both joints working in synergy to accomplish the desired action of the entire upper extremity
  - Ex. to raise our hand out to the side laterally as high as possible, the serratus anterior & trapezius (middle & lower fibers) muscles upwardly rotate scapula as supraspinatus & deltoid initiate glenohumeral abduction
  - This synergy between scapula & shoulder joint muscles enhances movement of entire upper extremity
Shoulder Girdle Movements

- Elevation
- Depression
- Abduction
- Adduction
- Upward Rotation
- Downward Rotation

Muscles

- 5 muscles primarily involved in shoulder girdle movements
  - All originate on axial skeleton & insert on scapula and/or clavicle
  - Do not attach to humerus & do not cause shoulder joint actions
  - Essential in providing dynamic stability of the scapula so it can serve as a relative base of support for shoulder joint activities such as throwing, batting, & blocking

Shoulder Girdle Muscles

- 5 muscles primarily involved in shoulder girdle movements
  - Trapezius - upper, middle, lower
  - Rhomboid - deep
  - Levator scapula
  - Serratus anterior
  - Pectoralis minor - deep

Shoulder Girdle Muscles

- Location & action
  - Anterior
    - Pectoralis minor – abduction, downward rotation, & depression
    - Subclavius – depression
  - Posterior & laterally
    - Serratus anterior – abduction & upward rotation

Shoulder Girdle Muscles

- Location & action
  - Posterior
    - Trapezius
      - Upper fibers – elevation & extension of the head
      - Middle fibers – elevation, adduction, & upper rotation
      - Lower fibers – adduction, depression, & upper rotation
      - Rhomboid – adduction, downward rotation, & elevation
      - Levator scapulae – elevation

Trapezius muscle

- Upper fibers: elevation of scapula, extension & rotation of head
- Middle fibers: elevation, upward rotation, & adduction
- Lower fibers: depression, adduction, & upward rotation
Levator scapulae muscle

- Elevates the medial margin of the scapula

Rhomboid muscles - major & minor

- Rhomboid major & minor muscles work together
- Adduction (retraction): draw scapula toward spinal column
- Downward rotation: from upward rotated position they draw scapula in downward rotation
- Elevation: slight upward movement accompanying adduction

Serratus anterior muscle

- Abduction (protraction): draws medial border of scapula away from vertebrae
- Upward rotation: longer, lower fibers tend to draw inferior angle of scapula farther away from vertebrae, thus rotating scapula upward slightly

Pectoralis minor muscle

- Abduction (protraction): draws scapula forward & tends to tilt lower border away from ribs
- Downward rotation: as it abducts, it draws scapula downward
- Depression: when scapula is rotated upward, it assists in depression

Subclavius muscle

- Stabilization & protection of sternoclavicular joint
- Depression
- Abduction

Scapula Abduction

- Scapula move laterally away from spinous processes without rotation
- EX. Push-up & bench press
- Agonists
  - Pectoralis minor
  - Serratus anterior
**Scapula Adduction**
- Return from abduction
- Occurs with retractions
- Agonists
  - Middle Trapezius
  - Rhomboids

**Scapula Upward Rotation**
- Lateral & upward movement
- Agonists
  - Middle Trapezius
  - Lower Trapezius
  - Serratus anterior

**Scapula Downward Rotation**
- Downward & Medial Movement
- Glenoid Fossa is rotated downward when downward movement of shoulder joint occurs
- EX. Lat Pulls - pulling wt. down
- Agonists
  - Pectoralis Minor
  - Rhomboid

**Scapula Elevation**
- Lifting scapula without rotation in anatomic position
- Shoulder Shrug
- Agonists
  - Levator Scapula
  - Upper Trapezius
  - Rhomboid

**Scapula Depression**
- EX. Dip
- Agonists
  - Lower Trapezius
  - Pectoralis Minor