Shoulder Movement Coordination Deficits

*ICD-9-CM codes*: 840.2  Shoulder ligament sprain  
840.0  Acromioclavicular joint sprain

*ICF codes*:  
Activities and Participation Domain codes:  
- **d4305** Putting down objects  (Using hands, arms or other parts of the body to place an object down on a surface or place, such as when lowering a container of water to the ground.)  
- **d4451** Pushing  (Using fingers, hands and arms to move something from oneself, or to move it from place to place, such as when pushing an animal away.)  
- **d4452** Reaching  (Using the hands and arms to extend outwards and touch and grasp something, such as when reaching across a table or desk for a book.)  
- **d4300** Throwing  (Using fingers, hands and arms to lift something and propel it with some force through the air, such as when tossing a ball.)  
- **d4550** Crawling  (Moving the whole body in a prone position from one place to another on hands, or hands and arms, and knees.)  
- **d4551** Climbing  (Moving the whole body upwards or downwards, over surfaces of objects, such as climbing steps, rocks, ladders of stairs, curbs or other objects.)  

Body Structure code: **s7203** Ligaments and fasciae of shoulder region  
Body Functions code: **b7601** Control of complex voluntary movements

**Common Historical Findings**

*Glenohumeral ligaments and fasciae involvement:*  
Shoulder pain during activity - aching afterwards  
Recurrent subluxations or dislocations with certain movements, positions, and activities  
Apprehension

*Acromioclavicular ligaments and fasciae involvement:*  
Trauma--a fall on the tip of the shoulder or a fall onto an outstretched arm  
Pain with reaching across body, with overhead activities and with weight bearing on elbows or sleeping on the injured shoulder

**Common Impairment Findings**  
- Related to the Reported Activity Limitation or Participation Restrictions:

*Glenohumeral ligaments and fasciae involvement:*  
Excessive glenohumeral accessory motion  
Apprehension at end range elevation, horizontal abduction, and external rotation (if anterior instability)
Acromioclavicular ligaments and fasciae involvement:
- If Grade II or III sprain - palpable and observable displacement between the clavicular and acromial articular surfaces
- Pain with accessory movement tests
- Pain with palpation/provocation of acromioclavicular ligament

Physical Examination Procedures:

Glenohumeral Accessory Movement Test
Humeral Posterior Glide

Performance Cues:
- Patient sits on end of table
- Ensure “loose packed position”
- Do not elevate scapula
- Allow the patient’s wrist to rest on your elbow
- Stabilize spine of scapula with palm
- Glide humerus (and thus, humeral head) posteriolaterally - in a direction parallel to the plane of the glenoid fossa
- OK to use weight shift of thorax to produce glide
Performance Cues:
Glide humeral head anteriomedially - in line with the treatment plane
Stabilize the clavicle with fingers or palm
Normal is an excursion that is less than one half of the width of the humeral head

A/C Joint Accessory Movement Test
Clavicular Anterior Glide

A/C Joint Accessory Movement Test
Clavicular Posterior Glide

Performance Cues:
Stand behind patient
Stabilize posteriorly via the spine of the scapula with you thumb and anteriorly via the
  glenoid fossa (hugging the humeral head into the fossa)
Grab the distal portion of the clavicle (it is OK to be somewhat medial to the A/C joint
  line - which may be tender), glide the clavicle anteriorly and posteriorly
Determine the amount of accessory motion and the patient’s response to this movement
  provocation

Shoulder Stability Deficits: Description, Etiology, Stages, and Intervention Strategies

The below description is consistent with descriptions of clinical patterns associated with the vernacular term
“Glenohumeral Instability”

Description: This condition is the excessive mobility in the glenohumeral joint in one direction
or more, where the humeral head slips out of the glenoid cavity or the patient feels that it is about
to dislocate.

Etiology: The cause of glenohumeral instability could be due to traumatic or atraumatic (e.g.,
idiopathic glenohumeral ligament laxity or RA) causes that lead to dislocation of shoulder. The
coracohumeral ligament is the primary restraint to inferior translation in adduction. The middle
glenohumeral ligament is the primary restraint to anterior instability at 45° of abduction. The
inferior glenohumeral ligament is the primary restraint to anterior instability from 45-90° of
abduction and secondary to posterior instability. The superior ligament prevents inferior
dislocation and stabilizes the shoulder during dependent positions. Instabilities are labeled
anterior, posterior, inferior, and superior depending on the direction of laxity. In addition,
dynamic stability is provided by the muscular action of the supraspinatus, infraspinatus, subscapularis, and deltoid muscles along with the tendon of the long head of the biceps. Classification of Glenohumeral Instability is derived from four factors:
1. Frequency (acute, recurrent, chronic)
2. Causes (traumatic, atraumatic including voluntary, repeated micro trauma)
3. Direction (anterior, posterior, inferior, multidirectional)
4. Degree (subluxation, dislocation)

**Acute Stage / Severe Condition:** Physical Examinations Findings (Key Impairments)

*ICF Body Functions code: b7601.3* SEVERE impairment of motor control/coordination of complex voluntary movements

- Patients with a recent ligament injury typically try to support the arm with opposite extremity and avoid using the injured arm
- Active shoulder movements are restricted and painful
- Passive and accessory movement testing reveals hypermobility of the glenohumeral joint
  
  Note: The direction of laxity typically corresponds to the label given to the instability (e.g., excessive anterior glide corresponds with an anterior instability)
- Positive apprehension (Crank) test
- Supraspinatus and infraspinatus weakness is common
- Palpatory abnormalities may be present (e.g., with an anterior instability the humeral head may palpable anteriorly and shows a hallow beneath the acromion posteriorly.
- Axillary nerve injury is most commonly associated with an anterior shoulder dislocation leading to altered sensation in an area of the lateral shoulder

**Sub Acute Stage / Moderate Condition:** Physical Examinations Findings (Key Impairments)

*ICF Body Functions code: b7601.2* MODERATE impairment of motor control/coordination of complex voluntary movements

As above with the following differences:
- Weakness is common to the dynamic stabilizers such as scapular upward rotators (trapezius, serratus anterior, rhomboids, and levator scapulae), and rotator cuff musculature (supraspinatus, infraspinatus, teres minor, and subscapularis) with contractions at end range of movement
- Now (when less acute) examine patient for co-existing upper quadrant impairments, such as upper thoracic and cervical pathologies, disorders of the acromioclavicular and sternoclavicular joints, muscle flexibility deficits such as tight pectoralis minor, pectoralis major, and/or serratus anterior and muscle strength deficits especially of the rotator cuff muscles and scapular upward rotators

**Settled Stage / Mild Condition:** Physical Examinations Findings (Key Impairments)

*ICF Body Functions code: b7601.1* MILD impairment of motor control/coordination of complex voluntary movements

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As above with the following differences:

- Shoulder symptoms are reproduced with repeated movements at end range

**Intervention Approaches / Strategies**

**Acute Stage / Severe Condition:**

Goals: Prevent further tissue damage
- Re-establish non-painful mid-range mobility and avoid unstable positions with the involved shoulder
- Retard muscle atrophy
- Decrease pain and inflammation

- **Physical Agents**
  - Ice pack or ice massage
  - Electrical stimulation

- **External Devices (Taping/Splinting/Orthotics)**
  - Application of a shoulder sling may reduce pain, protect the joint from further injury and prevent excessive muscle guarding following a glenohumeral ligament injury

- **Therapeutic Exercises**
  - Pendulum and wand exercises in painfree, mid ranges
  - Isometric rotator cuff exercises in painfree, mid ranges

- **Re-injury Prevention Instruction:**
  - Temporarily limit abduction, flexion, lateral rotation and overhead activities or behind back activities that aggravate patient's symptoms.

**Sub Acute Stage / Moderate Condition**

Goals: As above
- Regain and improve muscular strength and endurance
- Regain and improve proprioception and neuromuscular control

- **Therapeutic Exercises**
  - Strengthening exercises for the dynamic stabilizers such as rotator cuff and scapular muscles in order to increase stability with pain free active movements at mid as well as end ranges
  - Upper body endurance can improved through use of mid range aerobic exercises such as rowing machines or upper body ergometers

- **External Devices (Taping/Splinting/Orthotics)**
Taping procedures may be used to 1) assist stabilization, 2) aid proprioception, and 3) promote scapular alignment

- Neuromuscular reeducation
  Proprioceptive neuromuscular facilitation (PNF) patterns be used to facilitate neutral thoracic cage position, scapular posture, and shoulder proprioception
  Closed chain shoulder stabilization exercises can be used to facilitate coordination with rest of the shoulder girdle

- Ergonomic Instruction
  Promote efficient, pain free, motor control of the trunk, scapulae and arm with overhead activities
  Modify activities to prevent repetitive strains or re-injury

**Settled Stage / Mild Condition**

Goals: As above
- Increase power (Reaching 90% strength in the injured shoulder)
- Progress activity tolerance and endurance
- Increase neuromuscular control
- Prepare individual for functional activities
- Normalize upper quadrant posture, muscle flexibility, and muscle strength
- Pain free AROM with increased stability with repeated active movements at end range

- Approaches / Strategies listed above

- Therapeutic Exercises
  - Stretching exercises for muscles that may have flexibility deficits, such pectoralis major, pectoralis minor, and latissimus dorsi
  - Strengthening exercises as above with using increased resistance
  - Utilitize muscular endurance exercises to maximize muscle performance of the relevant trunk, scapulae, shoulder girdle muscles required to perform the desired occupational or recreational activities

- Manual Therapy
  - Soft tissue mobilization for myofascia that may exhibit flexibility deficits, such pectoralis major, pectoralis minor, and latissimus dorsi

- Neuromuscular Reeducation
  - PNF techniques to increase shoulder control and stability with repeated movements at the end range

**Intervention for High Performance / High Demand Functioning in Workers or Athletes**

Goal: Return to desired occupational or leisure time activities
Approaches / Strategies listed above

Selected References


Shoulder Stability Deficits: Description, Etiology, Stages, and Intervention Strategies

The below description is consistent with descriptions of clinical patterns associated with the vernacular term “Acromioclavicular Instability”

Description: Disruption of the ligamentous integrity of the acromioclavicular (also called A/C) joint. The acromioclavicular ligament may be damaged with excessive posteriorly directed translatory or rotatory force. The coracoclavicular ligaments (conoid and trapezoid) may be damaged with excessive superiorly or anteriorly directed forces.

Etiology: The cause of this injury is generally a traumatic incident such as a fall directly on the shoulder with the arm adducted or a fall on an outstretched hand.

Acute Stage / Severe Condition: Physical Examinations Findings (Key Impairments)

ICF Body Functions codes: b7150.3 SEVERE impairments of stability of a single joint

- Protective posturing (e.g., cradling the arm and stabilizing it against the body)
- Variable elevation of the distal clavicle relative to the acromion
- Pain limited active shoulder flexion
- Pain with reaching across the body (horizontal abduction)
- Weak and painful with resisted shoulder flexion and shoulder abduction
- Tenderness to palpation over the acromioclavicular joint
- Symptoms reproduced with palpation or provocation of the A/C ligament
- Localized swelling around the joint
- Positive A/C compression or shear tests

Sub Acute / Moderate Condition: Physical Examinations Findings (Key Impairments)

ICF Body Functions codes: b7150.3 MODERATE impairments of stability of a single joint

As above with the following differences:

- Pain with overhead activities
- Resisted shoulder flexion and abduction are now strong and painful

Settled Stage / Mild Condition: Physical Examinations Findings (Key Impairments)

ICF Body Functions codes: b7150.3 MILD impairments of stability of a single joint

As above with the following differences:

- Resisted tests are now strong and painful only with repeated shoulder flexion and abduction
- Pain with repetitive activities of the shoulder especially at end range
- Pain with sustained end ranges stresses to the A/C, such as with prone-on-elbows positions
Intervention Approaches / Strategies

Acute Stage / Severe Condition

Goals: Avoid movements that increase inflammatory reactions
Decrease pain with daily activities

- Physical Agents
  - Ice

- External Devices (Taping/Splinting/Orthotics)
  - Taping may be used to assist in stabilization and to reduce pain
  - A sling may be used – especially if splint immobilization aids pain relief and limits aggravation of the injury
  - Type II A/C sprains may benefit from a Kenny-Howard splint

- Therapeutic Exercises
  - Active or passive shoulder abduction to 90 degrees and external rotation to 30 degrees are initiated at 2 weeks if no internal fixation has been used
  - Sub-maximal isometric exercises to maintain scapular and glenohumeral strength

- Re-injury Prevention Instruction
  - Temporarily limit end range ROM stretches, avoid vigorous work, avoid overhead activities

Sub Acute Stage / Moderate Condition

Goals: Prevent re-injury of the AC joint
Restore full pain-free active and passive range of motion of the shoulder girdle
Restore strength of the muscles around scapula and glenohumeral joint

- Therapeutic Exercises
  - Progress mobility exercises to regain full pain-free range of motion
  - Progress strengthening exercises (e.g., Rotator cuff strengthening, closed chain exercises, progressive resistive exercises below 90 degrees of flexion)

- Manual Therapy
  - Joint mobilization of glenohumeral joint to prevent restrictions

Settled Stage / Mild Condition

Goals: As above

- Approaches / Strategies listed above
Re-injury Prevention Instruction
Progress activities to tolerance

Intervention for High Performance / High Demand Functioning in Workers and Athletes

Goal: Return to desired occupational or sport activities

Therapeutic Exercises
Progress exercises focusing on job/sport specific training program based on individual needs of patient.

Selected References


