

견관절의 이학적 검사

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박형빈

I. Basic Principles

- A. Examine joint above (neck) and below
- B. Undress the patient
- C. Compare sides
- D. Do a neurovascular exam
- E. Know anatomy

II. The basic exam

A. Inspection

- 1. Winging—do it now: arms straight out usually enough
- 2. Shrugging
- 3. Muscle atrophy
- 4. Cervical excessive lordosis
- 5. Thoracic excessive kyphosis, scoliosis

B. Range of motion

Active (Shrugging, painful arc, etc) then passive

- 1. Elevation
 - a. max is really 170 degrees
 - b. must externally rotate to get full elevation
- 2. Flexion
- 3. Abduction (drop arm sign)
- 4. Rotations:
 - a. ninety degrees elevation
 - 1. external rotation
 - 2. internal rotation
 - a. GIRD (Glenohumeral Internal Rotation Deficit)
Overhead athletes
Postulated to increase risk of injury
Controversial: Cause or Result of pain?

- b. arm at side—external rotation
 - 1. keep elbow in
 - 2. look for lag sign—arm falls into internal rotation means big cuff tear or nerve injury
- c. internal rotation up the back
 - 1. wide range of normal
 - 2. landmarks: C7, mid-scapula, inferior scapula, L5-S1, pocket, hip

C. Palpation

- 1. SC joint
- 2. AC joint
- 3. Tuberosities
- 4. Anterior and posterior joint line
- 5. Biceps
 - a. external rotation 10°
 - b. flex and extend elbow to feel tendon
- 6. Rent test
 - a. transdeltoid palpation of rotator cuff tear

D. Manual muscle testing

- 1. Abduction
 - a. Jobe's test [1]
 - Position: standing
 - Maneuver: resistive abduction,
abducted 90 degrees, horizontally flexed 20-30 degrees,
thumb down position
 - Positive test: muscle weakness with or without pain
 - Interpretation: supraspinatus muscle weakness
 - b. Yocum's test [2]
 - Similar to Jobe's test
- 2. External rotation
 - Position: standing
 - Maneuver: resistive external rotation arm at side, elbows in tight
(don't let them abduct)
 - Positive test: muscle weakness with or without pain
 - Interpretation: infraspinatus muscle weakness
- 3. Internal rotation
 - Position: standing

Maneuver: resistive internal rotation, arm at side
 Positive test: muscle weakness with or without pain
 Interpretation: weakness of pectoralis and of subscapularis, not specific for any one muscle

4. Rotator cuff integrity tests

a. lift off test of Gerber [3]

Position: standing

Maneuver: lift one's hand off one's back at full extended and internal rotated arm position

Positive test: unable to lift off

Interpretation: subscapularis tendon rupture

b. "belly press" test [4]

Position: standing

Maneuver: press abdomen with maximal internal rotation

Positive test: elbow drops back behind trunk

Interpretation: subscapularis tendon rupture

c. External rotation lag sign [5]

Position: sitting

Maneuver: elbow flexion 90°, 20° elevation of shoulder in scapular plane with maximal external rotation actively maintain external rotation

Positive test: lag or angular drop

Interpretation: supraspinatus or infraspinatus tendon rupture

d. Drop sign [6]

Position: sitting

Maneuver: arm elevation 90° with scapular plan, elbow flexion 90°, Maximal external rotation. Then, release the wrist while supporting the elbow

Positive test: lag or "drop"

Interpretation: infraspinatus tendon rupture

e. Hornblower's sign [6]

Position: standing

Maneuver: arm by the side, bring hand to the mouth

Positive test: unable to do this without abduction

Interpretation: teres minor tendon rupture

(massive posterior rotator cuff tear)

5. Others—gets all peripheral nerves

a. Musculocutaneous — biceps

- b. Radial — triceps
 - c. Ulnar — intrinsic
 - d. Median — opponens pollicis
 - e. Axillary — deltoid
- Swallow-tail sign [7]
Deltoid extension lag sign [8]

E. Sensory testing

1. Light touch only
2. All dermatomes and peripheral nerves
3. Have some scheme

F. Reflexes

- C5—biceps
- C6—brachioradialis
- C7—triceps

G. Vascular Examination

- Adson's maneuver
- Wright's maneuver

III. Provocative tests

A. Subacromial impingement

1. Neer impingement sign [9]
 - Position: standing or sitting
 - Maneuver: passively forward elevate the arm during stabilizing scapula
 - Positive test: complaint pain
 - Interpretation: Jamming of the greater tuberosity against the anteroinferior border of acromion

2. Hawkins impingement sign [10]
 - Position: standing or sitting
 - Maneuver: forward elevates arm to around ninety degrees and then forcibly rotates internally
 - Positive test: complaint pain
 - Interpretation: Jamming of the supraspinatus tendon against coracoacromial lig.

3. Painful arc sign[11]

Position: standing

Maneuver: The patient actively abduct the arm in the scapular plane until full elevation is reached and then bring the arm down in the same arc.

Positive test: pain or painful catching between 60 and 120° of abduction.

Interpretation: Jamming of the supraspinatus tendon against acromion, CA lig. and under surface of AC joint, etc.

B. Coracoid impingement

1. Coracoid impingement test [12]

described by Gerber [12]

Position: standing or sitting

Maneuver: Flex arm, internally rotate and adduct

Positive test: aggravate shoulder pain or clicking

Interpretation: impingement of humeral head or supraspinatus tendon to coracoid process

C. Internal impingement

1. Jobe's apprehension-relocation test [13]

Position: supine

Maneuver: apprehension-arm abducted and externally rotated until pain or instability

relocation- push posterior on humeral head

Positive test: disappear pain or instability

Interpretation:

A) Pain goes away; then "internal impingement" or occult instability

B) Sense of instability goes away; instability

D. Biceps tests

1. Speed's test [14]

Position: sitting

Maneuver: arm flexed 90 degrees and 10 degrees horizontal abduction, then resisted elevation

Positive test: pain during forward elevation

Interpretation: Biceps long head problem

(tendonitis, subacromial impingement, SLAP)

2. Yergason's test [15]

Position: sitting

Maneuver: resisted supination of elbow

Positive test: pain localized on the bicipital groove

Interpretation: biceps tendon problem

3. Ludington's test [16]

Position: sitting

Maneuver: clasps both hand top of or behind of head, alternatively contracts and relax the biceps tendon

Positive test: impossible to feel biceps tendon

Interpretation: rupture of biceps tendon

4. Biceps instability test [17]

Position: sitting

Maneuver: palpation biceps in the groove while taking the arm from an abducted external rotated position to a position of internal rotation

Positive test: palpable or audible painful click

Interpretation: subluxation or dislocation of biceps tendon

5. Others

DeAnquin's test:

Lippmann's test:

E. SLAP tests

1. Compression-rotation test [18]

Position: Supine or lateral position

Maneuver: arm abducted 90 degrees and grind— idea is to capture labral fragment (McMurray's of the shoulder)

Positive test: pain or a click

Interpretation: sensitive for labral tears, not specific for SLAP

2. Crank test [19]

Position: Supine or standing

Maneuver: arm elevated 160° in the scapular plane, humerus loaded axially with maximum internal and external rotation

Positive test: pain with or without click

reproduction of symptoms during activity

Interpretation: glenoid labral tears, not specific for SLAP lesions

3. Active compression test [20]

Position: standing

Maneuver: arm forward flexed 90° with elbow extended, arm adducted 10 to 15°, maximum internal rotation (thumb down position), examiner applies resisted downward force to arm, patient then maximally supinates arm and the maneuver is repeated

Positive test: either a click or pain

Pain should decrease with palm up.

Interpretation: SLAP, AC arthritis

4. Anterior slide test [21]

Position: standing

Maneuver: hand on hip, axial load along arm to create shear

Positive test: should produce click or pain

Interpretation: SLAP

5. Biceps Load test [22]

Position: supine

Maneuver: Arm abducted 90°, externally rotated, with the elbow flexed 90°, and the forearm supinated. Apprehension test is performed. Apprehension appears, and then performs resisted elbow flexion.

Positive test: The apprehension remains the same or the shoulder becomes more painful

Interpretation: superior glenoid labrum integrity in shoulders with recurrent anterior dislocation

6. Biceps Load test II [23]

Position: Supine

Maneuver: arm elevated 120°, maximum external rotation, elbow flexed 90°, forearm supinated, resisted elbow flexion

Positive test: pain during resisted elbow flexion

Negative test: no pain or pain unchanged or less by resisted elbow flexion

Interpretation: SLAP lesions specifically

7. Mimori's test [24]

Position: Sitting

Maneuver: arm abducted approximately 90 to 100°, examiner externally rotates shoulder and puts forearm in maximum pronation and then maximum supination

Positive test: pain provoked only when forearm is in pronated position

pain in pronation > pain in supination
Interpretation: superior labral tear

8. Biceps tension test [18]

Position: standing

Maneuver: resisted shoulder flexion with elbow extended and forearm supinated

Positive test: reproduction of patient's symptoms

Interpretation: Superior labral lesion

F. AC joint tests

1. Cross arm adduction stress tests (Horizontal adduction test) [25]

Position: Sitting or standing

Maneuver: Examiner passively forward flexes the arm 90° and then horizontally adducts the arm as far as possible.

Positive test: localized pain on AC joint

Interpretation: AC joint lesion, Posterior joint capsule tightness

2. Acromioclavicular resisted extension test [26]

Position: Standing

Maneuver: arm flexed 90 degrees, elbow bent, resist arm extension horizontal plane

Positive test: pain is created at AC joint

Interpretation: AC joint lesion

3. Active Compression test [20]

Please see SLAP

Pain should localize on AC joint

G. Laxity tests

1. Anterior and Posterior Drawer [27]

Position: supine

Maneuver:

A) Anterior drawer: One hands holds the patient's scapula firmly, other hand draws arm anteriorly, while the shoulder positioned 80° to 120° abduction, 0° to 20° forward flexion and 0° to 30° external rotation.

B) Posterior drawer: One hand holds arm 120° elbow flexion, shoulder 80° to 120° abduction, and 20° to 30° flexion initially.

Thumb of other hand push humeral head posteriorly during arm holding hand rotates the arm medially and flexes it 60° to 80°.

Grading systems:

- A) percent head diameters
- B) millimeters
- C) what you feel—modified Hawkins scale
 - I: to the glenoid rim, but not over glenoid edge
(or doesn't sublux)
 - II: goes over the rim but spontaneous reduction when the force was removed
 - III: locks out

2. Load and shift test [28]

Position: sitting or supine

Maneuver: One hand holds scapula. Other hand holds proximal arm and reduces humeral head concentrically in glenoid fossa. Then shifts humeral head anteriorly and posteriorly.

Grading system: same grading system of drawer test

3. Sulcus sign

Position: standing or sitting (best done sitting since relax better)

Maneuver: Grasps the patient's forearm below the elbow and pulls the arm distally.

Repeat with arm in external rotation.

Grading system:

- I: less than 1.5 cm
- II: 1.5~2.0 cm
- III: over 2.0 cm

Interpretation: a sign of inferior laxity, not inferior instability unless reproduces symptoms, if not decreased with ER then supposedly rotator cuff interval lesions

4. Generalized laxity signs

H. Instability tests

1. Anterior Instability

A) Crank test

Position: supine, Standing or Sitting

Maneuver: Abduction and external rotation.

push anteriorly on shoulder (fulcrum test)

Positive test: apprehension

Interpretation: anterior instability

Similar other tests: Andrews anterior instability test

Prone anterior instability test

Rowe test for anterior instability

Leffert's test

B) Apprehension-Relocation maneuver [13, 29]

a) Described by Dr. FW Jobe

b) Initially for "internal impingement" but great for anterior instability

Position: Supine

Maneuver: apprehension- arm abducted and externally rotated until pain or instability

relocation- push posterior on humeral head

Positive test: disappear pain or instability

Interpretation: a) Pain goes away, then "internal impingement" or occult instability

b) Sense of instability goes away, instability

C) Anterior release test [30]

Position: supine

Maneuver: The patient's arm is abducted 90° while the examiner places a posteriorly directed force on the patient's humeral head with his hand. The posterior force is maintained while the patient's arm is brought into extreme of external rotation. The humeral head then released.

Positive test: sudden pain, a distinct increase in pain, or reproduction of symptoms

Interpretation: Anterior instability

(actually, devised for occult instability)

D) Hyperabduction test [31]

Position: sitting

Maneuver: The forearm of the physician holds the shoulder girdle firmly in the lower. The other hand lifts the patient's arm up in the frontal plane. Measure the range of passive abduction (RPA).

Positive test: Positive of RPA > 105°

Interpretation: lengthening and laxity of IGHL

2. Posterior instability tests

A) Posterior apprehension or stress test

Position: Supine or sitting

Maneuver: arm flexed 90° at scapular plane, apply posterior force on elbow

Positive test: pain or apprehension

(pain is more sensitive than apprehension)

Interpretation: posterior instability

B) Jerk test

Position: Sitting or standing

Maneuver: initially 90° abduction and apply axial loading, then horizontal adduction return to initial 90° abduction position

Positive test: sudden jerk or clunk as the humeral head slides off and the back of glenoid

Interpretation: posterior instability

C) Push-pull test (32)

Position: supine

Maneuver: abducts arm 90° and flexes it 30°, one hand pushes down humeral head, other hand pulls up the arm at the wrist.

Positive test: pain or apprehension

Interpretation: posterior instability

3. Inferior instability test

A) Feagin test (33) (also Itoi et al. (34))

Position: standing

Maneuver: Arm abducted 90°, apply inferiorly directed force

Positive test: apprehension or sulcus above coracoid

Interpretation: Anteroinferior instability

4. Multidirectional instability

A) Rowe test for Multidirectional instability

Position: Patient leans forward

Maneuver: The humeral head is pushed anteriorly, posteriorly. Down ward traction is applied.

Positive test: reproduction of symptom

Interpretation: multidirectional instability when positive test in all

three directions

Without reproduction of symptom: laxity test

I. Evaluation of Scapulothoracic Articulation

1. Muscle strength

A) Scapular isometric pinch or Squeeze test [35]

Position: standing

Maneuver: Actively “pinch” or retract the scapulae together

Positive test: burning pain occurs in less than 15 sec.

Interpretation: weakness of scapular retractors

B) Wall pushup test [35]

Position: standing

Maneuver: arms length from wall, wall pushup 15 to 20 times

Positive test: scapular winging may be noted with 5 to 10 wall pushups

Interpretation: weakness of Serratus anterior

C) Lateral scapular slide test [35]

Position: standing or sitting

Maneuver: measure the distance from inferior angle of the scapular spine to the closest spinous process in three different positions: 1) arms at side, 2) arms abducted, approximately 10° shoulder extension, hands on waist, thumbs back, 3) arms abducted to 90°, thumbs down position

Positive test: asymmetry more than 1.5 cm

Interpretation: dysfunction of scapular stabilizer

2. Corrective tests

A) Scapular assistance test [35]

Purpose: to evaluate scapular and acromial involvement in subacromial impingement

Position: standing

Maneuver: One hand stabilizing clavicle and scapula and holds scapular retracted.

Other hand hold inferior angle of scapula, then, stabilizes and pushes the inferior medial border of the scapula up and laterally during the patient actively abducts or forward flexes the arm.

Positive test: elimination or modification of external impingement

symptoms

Interpretation: Serratus anterior and/or lower trapezius muscle weakness

B) Scapular retraction test [35]

Position: standing

Maneuver: manually stabilizing the scapula in a retracted position on thorax

Positive test: i. rotator cuff weakness: improvement in rotator cuff manual strength testing

ii. positive Jobe relocation test: decrease pain or impingement associated with relocation test

Interpretation: Trapezius and Rhomboids muscle weakness

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