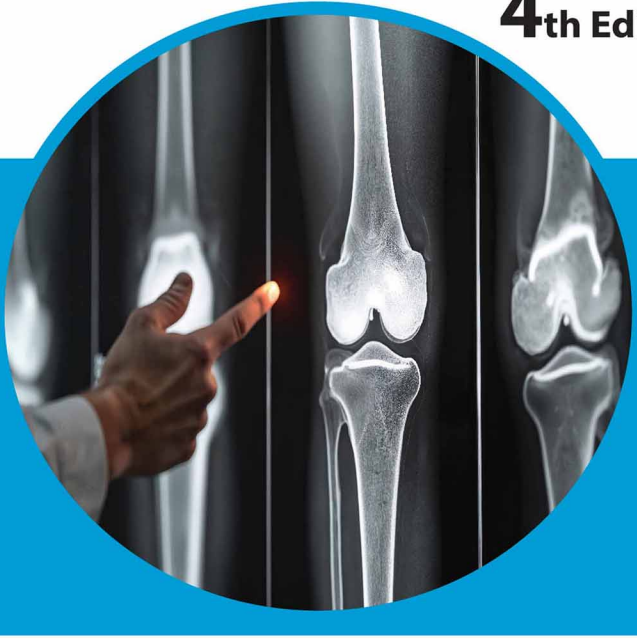
Practical Orthopedic Examination Made Easy®

4th Edition



Manish Kumar Varshney

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Contents

5

Shoulder

INTRODUCTION

For most of the candidates, the shoulder joint will be an unexpected case and for this reason, most are not required to know a lot about the same. An unfortunate DNB candidate is "at risk" of getting one and will be expected to know at least some important points. This chapter gives a very comprehensive examination schema of the joint (more than enough for all) and a brief review of concepts for cases.

Read times: 6–10 times (DNB candidates, MS candidates may either skip or read 2–3 times). This is a difficult case (difficult both to understand and present, especially the unstable shoulder).

EXAMINATION POINTS FOR SHOULDER CASE

HISTORY TAKING

- *Pain*:
  - *Onset*: Acute (infective and traumatic) and insidious [inflammatory, subacute, and chronic infections like tuberculosis (TB)]
  - *Duration*: Protracted course in inflammatory process, adhesive capsulitis and TB
  - *Radiation*: To back of shoulder, axilla, and outer aspect of upper arm
  - *Aggravating factors*: Movements aggravate most of the painful conditions
  - *Character*: Severe throbbing in pyogenic infections and traumatic conditions

  - *Relieving factors*: Rest, massage, and analgesics (duration of relief and complete and incomplete relief should be specifically asked.)
  - *Relation to trauma*: Dislocations, fractures, and fracture dislocations may be a cause of recurrent instability (also enquire treatment given and duration of immobilization and postinterventional physiotherapy to judge the stiffness and instability).
  - *Movements*: The movements that aggravate pain [early abduction—supraspinatus tear; painful arc—supraspinatus; flexion—biceps; and internal rotation (IR) (reaching back)—subscapularis]
  - *Fever*: Association is helpful for infective conditions
- *Swelling*: Spontaneous onset (infective, pigmented villonodular synovitis (PVNS), reactive effusion, inflammatory, hemophilia, degenerative, etc.) or related to trauma (hemarthrosis)
- *Limitation of movements*: Onset (spontaneous over a period—adhesive capsulitis and subacute infections), treatment-related (post-traumatic and postsurgical)
- *Lack of power*: Recurrent subluxation/dislocations and dead arm syndrome
- *Instability*: Voluntary/involuntary, associated with movement, direction, frequency, onset and duration, and associated neurological injury/weakness

Also ask for causes of radiating pain (gastric/duodenal affections, diaphragmatic affections, and cardiopulmonary and mediastinal disorders) and polyarthralgia.

Past history: Diabetes, hypertension, neurological disorders (epilepsy), hematological disorders, and TB.

EXAMINATION

General for ligamentous laxity *(Case II; Question 11)*.

Inspection

The inspection involves the following:

- *Attitude (carriage/posture)*:
  - *Anterior dislocation of shoulder*: Elbow kept away (abduction) and slightly in front and external rotation (ER) with support of the opposite hand

- *Posterior dislocation*: Adduction and IR
- *Deltoid contracture*: Abducted arm and drooping of shoulder
- *Klippel–Feil syndrome*: High webbed neck
- *Sprengel shoulder*: Scapula higher than uninvolved side
- *Lateral scapular slide (in throwing athletes)*: Scapula of dominant side drawn away from midline
- *Prescapular abscess*: Shoulder kept in flexion and abduction (away from irritating pus)
- *Pyogenic arthritis*: Flexion mild abduction and slight ER

Inspect from different sites:

- *From front (compare from other side)*: Sternal notch, sternoclavicular joint, clavicle and its contour, supra/infraclavicular fossae, acromioclavicular (AC) joint, preglenoid fossa, anterior axillary fold, coracoids prominence, deltoid mass and shoulder contour, pectoral muscle, sternocleidomastoid muscle, and alignment of chin to suprasternal notch
- *From behind*: Midline and alignment of nape of neck to both shoulders, trapezius, medial border of scapula (winging due to serratus anterior weakness or sometimes due to rhomboids and trapezius also), spinous process of scapula, angle of scapula, supra/infraspinatus fossae, posterior axillary fold, "soft spot" (1 cm medial and 2 cm inferior to angle of acromion) to look for swelling
- *From top*: AC joint and contour of shoulder
- *From medial aspect*: Swelling of lymph nodes and sebaceous gland infection

  At all the sites, examine the skin for (SEADS)—swelling, erythema, atrophy (of appendages), discoloration, and suppuration (scars and sinuses).

Palpation

Note for temperature rise and superficial tenderness then proceed to regional and deep palpation as follows:

- *Anteriorly*: Sternoclavicular joint, clavicle, AC joint, acromion (for os acromiale), subacromial bursa (tenderness just anterior to acromion), long head of biceps (for tendinitis—palpate along 1–4 cm in front of acromion anteriorly with 10° IR of shoulder), myositis mass, pectoralis major tendon (by pressing

both palms together), supraclavicular fossa (for brachial plexus injury and "burners/stingers" due to mild involvement of plexus)
- *Lateral aspect*: For deltoid mass and step deformity due to inferior subluxation of shoulder
- *Posterior aspect*: Soft spot for swelling
- Medial aspect for pulsations of axillary artery

Movements

- *Anterior flexion (forward flexion)*: Normally up to 160–180°
- *Abduction*: Look for scapulohumeral rhythm while patient does abduction, after 90° abduction, patient externally rotates the arm. Shrugging of shoulder with abduction often indicates chronic rotator cuff insufficiency. Note for painful arc where abduction is relatively painless in the initial few degrees of abduction and the pain is reported during further arc and may again abate in terminal degrees (suggests supraspinatus impingement/partial tear). Inability to initiate abduction is due to supraspinatus insufficiency while inability to maintain abduction denotes deltoid insufficiency.
- *Adduction*: Ask patient to take the limb forward and also compare the cross-chest adduction.
- *IR in 0° abduction and 90° abduction (normal = 45°)*: "Apley scratch test" is more functional to evaluate IR although it also requires some extension (normal IR is up to 80°). In Apley scratch test, ask the patient to try and reach back and note the IR in terms of the spinal level reached with thumb (normal = T7 for women and T9 for men).
- *ER in 0° abduction and 90° abduction*: In abduction the "neutral position" is when the forearm is pointing directly in front with elbow flexed (normal ER is up to 90°).
- *Total active elevation*: The patient is instructed to raise the arm "in plane of scapula" which is some 20–30° from sagittal plane.
- *Scapular protraction*: Ask patient to bring forward scapulae in "hunched position" by shrugging the shoulders forward.
- *Scapular retraction*: Ask patient to pull back the shoulders in "attention attitude": Alternate retraction and protraction may elicit "snapping scapula" syndrome.

Test for muscle power: Latissimus dorsi (climbing rope maneuver or hanging on beam maneuver), serratus anterior (push against wall—winging of scapula), deltoid (palpate the shoulder contour while asking patient to actively abduct shoulder), trapezius ("shrugging shoulder"—*one does it many times in examinations*), rhomboids ("attention attitude"), pectoralis major (asking patient to press both the palms together in front).

Measurements

- Apparent length [from seventh cervical spine to radial styloid (patient standing)]
- Arm length (from angle of acromion to lateral epicondyle)
- Mid-arm circumference
- Anterior and posterior axillary folds
- *Palpate pulses* (radial, ulnar, brachial, and axillary).

SPECIAL TESTS

- *Rotator cuff pathology*:
  - *Neer's impingement sign*: Passively do maximal forward flexion of shoulder, which reproduces the pain due to approximation of anterolateral acromion with rotator cuff and greater tuberosity **(Fig. 1)**.

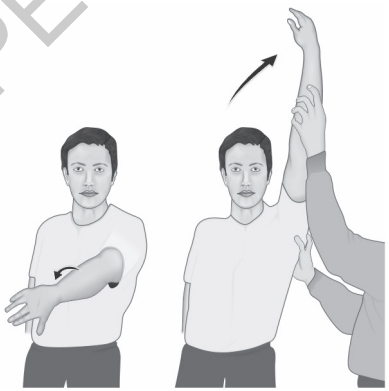

Fig. 1: Neer's impingement sign and test.

- *Neer's impingement test*: Inject local anesthetic in subacromial bursa and repeat the test, pain disappears.
- *Hawkins impingement reinforcement test (Hawkins and Kennedy)*: Passively forward flex the shoulder to 90° and then internally rotate while maintaining the shoulder position **(Fig. 2)**. Pain produced indicates rotator cuff pathology or subacromial bursa involvement and is due to rotation of greater tuberosity and subacromial bursa into the acromion and coracoacromial ligament arch. Similar pain can be produced due to rare coracoids impingement.
- *Drop arm test*: Passively abduct the arm to fullest and then ask the patient to slowly bring the arm down **(Fig. 3)**. After few degrees of retrieval, the arm suddenly drops down like a dead limb. Positive in extensive rotator cuff tear and deltoid paralysis.
- *Subscapularis liftoff test of Gerber (lumbar liftoff test)*: Ask patient to reach his back and try to lift the hand away from back. Pain produced in this maneuver at lesser tuberosity suggests subscapularis tendinitis and inability to perform this test or weakness suggests subscapularis inefficiency.

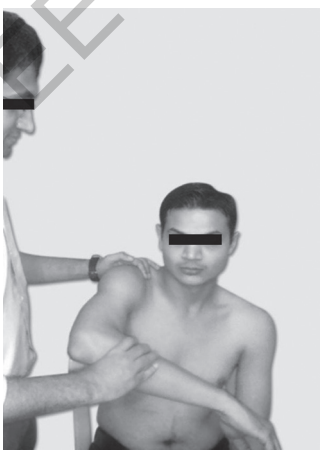

Fig. 2: Hawkins–Kennedy test.

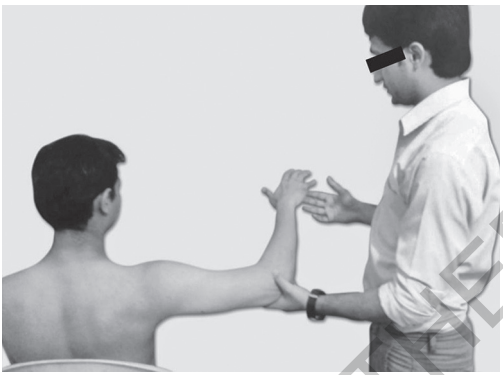

Fig. 3: Drop arm test.

- Belly press maneuver for subscapularis if patient cannot internally rotate shoulder.
- *Jobe's test*: For supraspinatus, ask patient to abduct arm to 90° and then bring it in 30° forward flexion (from coronal plane) followed by IR (like "emptying a can of water"). This maneuver produces pain in supraspinatus tendinitis. Further in the test, power of muscle can be tested by asking patient to push the elbow to ceiling and examiner actively resisting it.
- *Passive rotation test*: Passively rotate the shoulder through full range of ER and IR in 90° abduction while palpating the front area of shoulder. Popping sensation can be felt in hypertrophied subacromial bursa and torn irregular rotator cuff.
- *Test for infraspinatus and teres minor*: Ask patient to forcefully externally rotate while arm is by the side of the body, resistance to this maneuver can be applied and may produce pain at the greater tuberosity in tendinitis of these muscles.

- *Tests for shoulder instability*:
  - *Anterior instability (provocative tests)*: It is good to remember the sequence in which these tests are done (apprehension test → augmentation test → relocation test → release test) as this is a continuous array of tests that should be done in a single sitting. *Note, however, should be made that the position for*

performing this array of test is supine and not sitting/standing as had been advised discretely for individual tests.

- *"Apprehension test" (originally given by Rowe and Zarins and renamed by Silliman and Hawkins)*: Patient *supine*—abduct (90°), externally rotate the shoulder, feeling of giving way (apprehension) is taken as positive **(Fig. 4)**.
- *"Augmentation test" of Silliman and Hawkins*: To above test, apply anteriorly direct force, i.e., extend shoulder if previous test does not elicit apprehension—positive if patient resists or "apprehends".
- *Relocation test (of Jobe)*: If the previous maneuver produces pain instead of apprehension then apply a posteriorly directed force, if it relieves pain (indicates instability), this can be further tested.
- *Release test of Silliman and Hawkins*: Release the posterior force that relieved pain—patient again complains of pain/apprehension in a positive test.
- *Load-shift test*: Load the glenoid with humeral head and do anteriorposterior (AP) shift to assess laxity.

– Anterior and posterior instability:
  - *Drawer test "shoulder Lachman test" of Gerber and Ganz*: With patient supine, hold proximal humerus in mild

Fig. 4: Apprehension test and relocation test.

abduction and pull and push it forward and backward after stabilizing scapula with other hand and grade the instability. Grade "0" = no translation, "1" = translation up to glenoid rim but not over it, "2" = translation beyond rim with spontaneous reduction, and "3" = dislocation and locking of head **(Fig. 5)**.

- *Modified drawer for posterior instability*: Forward flex the arm and apply axial load along humerus to subluxate the head out of glenoid—pain and palpable shift suggest posterior labral tear.
- *Jerk test*: With patient seated, abduct the arm to 90° and apply a downward force, then adduct the arm to the front of scapular plane when head may subluxate then abduct the arm behind scapular plane when head reduces with a jerk.
- *Circumduction test*: Perform circumduction in abduction while palpating the posterior aspect for subluxation of head.
- *Posterior apprehension test of O'Driscoll*: Arm positioned as in Hawkins test—produces pain and is relieved by injection of local anesthetic.
- *Posterior subluxation test of Clarnette and Miniaci*: Apply axially directed force along the arm in adduction, 70–90° flexion, and IR with the other hand feeling for posterior subluxation of head.

Fig. 5: Drawer test.

- Inferior instability:
  - *Feagin maneuver*: Place the abducted arm of patient on your shoulder and apply an inferiorly directed force to subluxate the head inferiorly.
  - *Sulcus sign "inferior drawer test" of Neer*: Pull the patient's arm downward while it is by the side of patient's body, formation of a sulcus beneath acromion suggests inferior laxity or multidirectional instability **(Fig. 6)**. Grade "1" = 1 cm, "2" = 2 cm, "3" = 3 cm; grade >2 indicates a capacious capsule and specific laxity of rotator interval.
- Multidirectional instability:
  - Compression rotation test for glenoid labrum
  - O'Brien's test for superior labral injuries
  - Snyder's biceps tension test
  - Sulcus sign >2

- *Tests for dislocated shoulder*:
  - *Hamilton ruler test*: Keep a straight ruler along lateral aspect of arm; in a normal person, it does not touch the acromion angle, but in dislocated shoulder it does. This will also be positive in any affection of head of humerus.
  - *Callaway's test*: Girth of shoulder is normally symmetrical—increases in effusion, suppuration, and dislocation of shoulder.

Fig. 6: Sulcus sign.

- *Duga's test*: The elbow cannot be brought to the midline of body.
- *Bryant's test*: In anterior dislocation of shoulder the anterior axillary fold is elongated.

- *Tests for thoracic outlet syndrome*:
  - *Adson's test*: Abduct the arm by 30° and ask patient to take a deep breath while palpating the pulse (feel the character and compare with other side), then ask the patient to tilt his head toward the same side—reduction or diminution of pulse suggests thoracic outlet syndrome.
  - *Wright's maneuver*: In the above test abduct the shoulder to 90° and externally rotate the arm.
  - *Roos test*: Abduct the arm and flex elbow to 90° then externally rotate the shoulder so that the hand faces up. Ask patient to clench and release fist 15 times. Paresthesia/pain/cramps/weakness suggest thoracic outlet syndrome.
  - *Halsted's test*: While patient standing with arm by the side ask patient to turn the head to other side and extend the neck. Give a downward traction and feel for diminution/obliteration of pulse.
  - *Hyperabduction test*: Abduct and hyperextend both the arms (behind the body) simultaneously. Feel for diminution of pulse on affected side.
- *Tests for biceps tendinitis*:
  - *Yergason test*: Arm by side and elbow flexed to 90°; patient is asked to flex elbow and pronate while examiner resists. Pain is felt on anterior aspect of shoulder.
  - *Speed test*: Forward flex the arm and extend the elbow fully. Supinate the upper limb and apply a downward force with patient resisting against it **(Fig. 7)**. Pain is felt in the region of bicipital groove.
- *Tests for superior labrum anterior to posterior (SLAP) lesion*:
  - *O'Brien's test*: Tested by asking patient to resist when their limb is in 90° flexion and 10° adduction with thumb pointing down. Production of pain is positive, which relieves with thumb pointing up.

Fig. 7: Speed test.

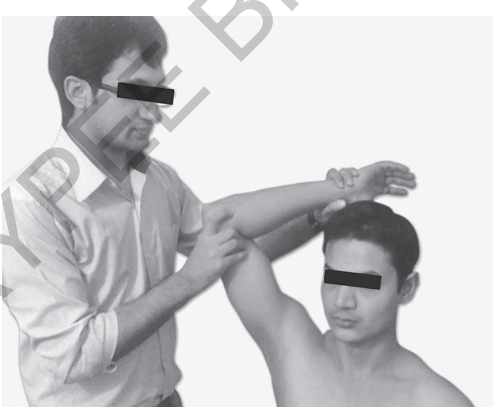

Fig. 8: Crank test.

- *"Crank test" of Liu et al.*: With arm in 160° of abduction in scapular plane apply an axial force with forced IR and ER (*like Apley's grinding test for menisci*) **(Fig. 8)**.

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