

Review Article

Dislocation Of Shoulder Joint

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Introduction:

Dislocation means complete loss of contact of the articular surfaces of bony components of a joint. Shoulder joint is the most commonly dislocated large joint. Dislocation of shoulder joint has been recognized for centuries as an injury in both young and old.

Etiology

Dislocation occurs as a result of

- Severe trauma eg. Road - Traffic Accidents which may be associated with fracture - dislocation ranging from bony avulsion of tuberosities to fracture of head, surgical neck or glenoidal rim.
- Trivial injuries: in which usually indirect force causes abduction or hyperextension of shoulder especially in young age group including military personnel, athletes, wrestlers etc. For clear understanding of the problem anatomical consideration and factors responsible for stability of the shoulder joint should be taken into account.

Anatomical consideration:

Shoulder joint also called glenohumeral articulation is a synovial joint of ball and socket variety. The socket is the glenoid cavity of scapula and the ball is the head of the humerus. In no joint of the body are the movements so free and so varied as in the shoulder joint and the freedom of movement is provided for in two ways:

- By the large size of the head of the humerus, the articular surface of which is four times the area of glenoid.
- The great laxity of the capsule of the joint. The capsule is thin but fairly dense and attached medially to circumference of glenoid cavity beyond the glenoid labrum, include origin of the long head of the Biceps Brachii at the root of coracoid process and laterally attached to the

anatomical neck of humerus but descends on the medial side for more than 1 cm. So the capsule is remarkably loose and lax and the bones may be separated from each other for a distance of 2-3cm. [Fig.- 1]

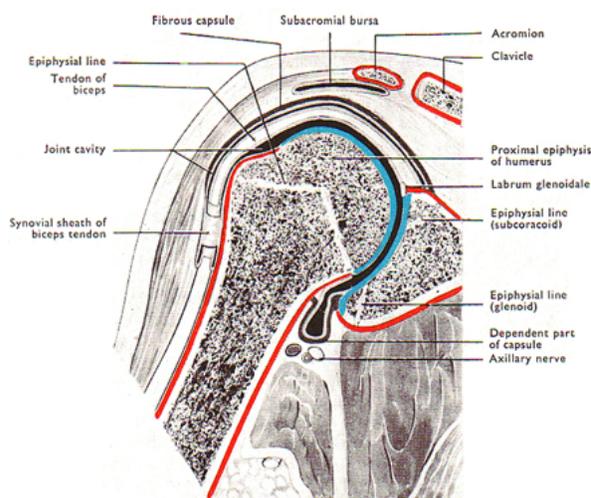


Fig- 1. Coronal section through the right shoulder joint. The parietal and visceral layers of the synovial sheath of the biceps tendon have been partially left in place. Red = periosteum. Blue = articular cartilage.

The fibrous capsule is not complete at all points. Its continuity is broken by usually two, occasionally three apertures. One is situated anteriorly below coracoid process and communicates between the joint and a bursa behind subscapularis. Another is placed between the tuberosities of humerus and gives passage to long head of the Biceps Brachii along with its synovial sheath. The third inconstant one is at the posterior part between the joint and a bursal sac under tendon of Infraspinatus. In fact the stability of the joint has been sacrificed to permit wide range of movements of flexion, extension, adduction, abduction (180°), medial rotation, lateral rotation and circumduction.

Stabilizing Factors:

However besides the capsular ligament, coracohumeral lig, superior, middle and inferior bands of the glenohumeral ligament (of the 3 bands of the glenohumeral ligament the inferior is the best stabilizer of the joint during 90° abduction and external rotation) and transverse humeral ligament, the joint is also supported by:

1. The powerful muscles which closely surround the joint and strengthen the capsular ligament:

Above: by Supraspinatus

Behind: by the tendon of Infraspinatus and Teres Minor

Infront: by the tendon of Subscapularis.

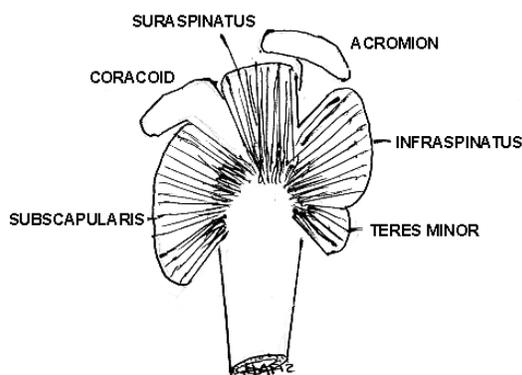


Fig. - 2 : Rotator cuff

All these muscles blend with the capsule and the fused mass is called "Rotator Cuff," Below the capsule is otherwise unsupported by muscles and in ordinary dependent position of the limb it bulges downwards as a fold. When the arm is abducted the fold is obliterated and the head of the humerus rests on the inferior part of the capsule which receives partial support from long head of the Triceps and Teres major which stretches under it. Frequently dislocation of the head of the humerus occurs downwards through the weakest part of the capsule into axilla and sometimes the circumflex vessels and axillary nerve may be injured as they are close to the capsule.

2. The fibrocartilaginous glenoidal labrum deepens the articular cavity and protects the edges of the bone , so fracture of the labrum results dislocation.

3. Acromion process, coracoid process together with the

coraco-acromial ligament forms an arch which overhangs the joint and forms so-called secondary socket for the head of the humerus. It thus prevents upward displacement of the head of humerus.

4. Area of glenoid cavity is about 1 square inch and an atmospheric pressure of 15lb is available to prevent distraction of the bones.

5. Other supporting factors include:

a. long head of the Biceps Brachii which is attached to the supraglenoid tubercle give strong support over head of the humerus and also prevent the head of the humerus from being pressed up against the acromion when the Deltoid contracts.

b. Long head of Triceps attached to infraglenoid tubercle is important during abduction and give stability.

Factors responsible for injury:

1. The injury is produced by forced extension and external rotation of the abducted arm. In the abducted position the head of the humerus presses against lower less supported part of capsular ligament so there occurs initially a subglenoid dislocation which later may become subcoracoid.

2. In may be mentioned that subscapularis is prime stabilizer of the joint during movement in all directions but during 90° of abduction and beyond it no longer covers inferior portion of the joint cavity.

3. In recurrent dislocation of shoulder there is loss of anterior support of the head of the humerus, either the capsule is torn from the glenoidal labrum or labrum itself is detached from the bone and associated with it there may be stripping of the capsule from front of scapular neck and so the head of the humerus can slip forward to subcoracoid position.

Types of Dislocation:

(A) According to position taken by the head of humerus:

- I. Subglenoid
- II. Subcoracoid
- III. Subclavicular
- IV. Posterior or Dorsal
- V. Luxatio Erecta:

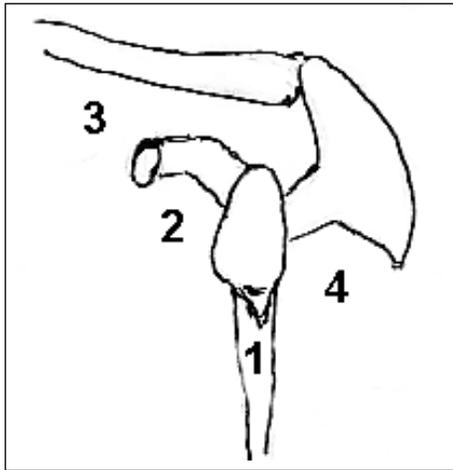


Fig.-3: Types of Dislocation

Luxatio Erecta: a rare type of subglenoid variety. This variety is under 1%. Here the head of the humerus displaced into subglenoid position but the arm is fixed in extreme abduction. Of the above types, subcoracoid variety is the commonest. Posterior dislocation is also rare (1.5%) and can be classified into 3 types:

- a. Habitual - occur in children and is unilateral
- b. Traumatic- e.g. by direct blow.
- c. Obstetric - this variety may be complicated by neurological injury of newborn.

(B) According to nature of dislocation:

- a. Unreduced (chronic) - very rare
- b. Acute: i. Anterior - common
ii. Posterior - rare
- c. Recurrent: I Anterior - common
II. Posterior - rare
- d. Pathological: I. Anterior
II. Posterior
III. Superior migration

Clinical Features:

In any dislocation there is obvious deformity and pain. Pain in dislocation appears to arise mainly in three tissues:

- a. The capsule and ligaments of the joint
- b. The bones of the joint
- c. Muscles acting on the joint. Cartilage of the joint is not innervated and hence insensitive to pain.

Patient comes supporting the limb with the hand of the opposite side and arm holding in a position of slight abduction. The patient should be stripped to waist for the purpose of examination and he or she should stand

against good light. Shoulder should be compared for the contour i.e. roundness, bony-arch. Subcoracoid variety is easily diagnosed by observing:

- a. Flattening of normal roundness of shoulder. Normally roundness is caused by outward projection of greater tuberosity beyond acromion process. Prominence of acromion in dislocation is not an infallible sign as it may occur in paralysis of circumflex nerve with flattening and wasting of Deltoid muscle. Therefore circumflex nerve should be tested to determine whether it is damaged or not. Patient is asked to abduct the arm but this may not be possible not only in case of damaged nerve but also in case of dislocation. So, the correct procedure is to feel the Deltoid and to observe whether it contracts during effort to abduct the shoulder against resistance. In case of paralysis of circumflex nerve the contraction will be absent.
- b. Absence of head of humerus below acromion.
- c. Fullness or bulge over deltopectoral groove by the displaced head of the humerus. This can be confirmed by rotation of the bone.
- d. Anterior axillary fold is lowered (Bryant's test)
- e. Elbow is often displaced away from the body and axis of dislocated humerus runs towards the middle of the clavicle.
- f. **Duga's test:** Due to abduction of the lower end of the humerus, it is not possible to place the hand of the affected side on the opposite shoulder of the patient i.e. Duga's test becomes positive.
- g. The arm of the dislocated side appears to be longer than the normal one.
- h. All active and passive movements are lost.
- i. **Hamilton's Ruler test:** This test becomes positive. Normally a straight ruler cannot be made to touch the acromion and lateral epicondyle of the humerus simultaneously. But this is possible in dislocation of shoulder.

Investigations:

In fresh uncomplicated cases no other investigations are required except X-ray and clinical exam including Duga's test and Hamilton's Ruler test. But in old or chronic recurrent dislocation with complications in addition to x-ray of shoulder joint, x-ray chest, CBC, ESR, BT,CT, RA test and Fasting sugar of blood should be done.

X-ray is important before attempting reduction. This is of great help especially when shoulder is considerably swollen and poor information is obtained by clinical examination. Both antero-posterior and axillary view should be done. Anterior dislocation is easily diagnosed clinically and with A.P. view x-ray but posterior dislocation is difficult to diagnose clinically and A.P view. When axillary view is done it will clearly display the head of the humerus either lying anterior or posterior to glenoid.

Treatment:

After arriving of the patient time of injury and type of injury should be determined. Reduction of simple uncomplicated acute case should be done within first 3 hours. Reduction at this time can be done without muscle relaxant, analgesia or anaesthesia. If the surgeon is not skilled this will frighten the patient and he or she will not cooperate. However if the muscle spasm is very sever I.V injection of Valium 10mg can be given slowly. Under general anaesthesia , reduction is easy and good for new surgeon.

Complications:

Unskilled and overenthusiastic reduction can cause bony and soft tissue injures. This is more when reduction is delayed more than six hours. Most important of these complications are deep brachial vein thrombosis especially in patients over 50, Brachial plexus and Axillary nerve injuries and rupture of Rotator Cuff tendons in elderly patients mainly. However early atraumatic reduction can lead to permanent healing of the capsule.

Techniques of reduction:

There are various methods of reduction of simple, acute anterior dislocation of shoulder:

a. Kocher's method:

This method is 3000 years old and illustrated in an ancient painting that can be seen in the Metropolitan Museum, New York even to-day. The surgeon stands on the injured side of patient and grasps his elbow with surgeon's hand of same side. Traction is applied for 2 minutes in the long axis of the humerus.



Fig. 4: Kocher's method



Fig. 5 : Ancient Painting.

Now grasping patient's forearm by the opposite hand, the surgeon externally rotates it and flexes patient's elbow. The arm of the patient is now adducted and fully rotated internally to bring it across the front of the chest so that patient's hand lies on opposite shoulder. This manoeuvre reduces the dislocation and a clicking sound may be heard. The arm is then supported by use of collar and cuff for 3 weeks. The author prefers this old but time honoured method and reduced many acute dislocations without any anaesthesia.

b. Cooper's Method:

In this method the arm is flexed, slightly abducted and then elevated vertically, pressure being applied to the dislocated head. The procedure is preceded by 2-3 minutes traction.

c. Simpson's Method:

Here the patient lies prone or on his side and the arm is allowed to drop vertically over the side of the couch. Slight downward traction is applied to the arm and the humeral head is manipulated back into the glenoid.

d. Hippocratic Method:

In this method the patient lies supine and traction is applied by placing unbooted foot against the chest wall in axilla. Pull is maintained in a outward and downward direction on the forearm. If reduction does not occur by maximum pull then an external or internal rotation of arm while pulling will reduce it.

However this method should be abandoned due to possibility of damage to the axillary nerve.

After reduction a check x-ray of the shoulder should be done and radial pulse should be felt to see whether the circulation is ok. i.e. there is no compression of the axillary vessels

Conclusion:

Management of the unreduced anterior dislocation, recurrent anterior dislocation and recurrent posterior

dislocation requires specialized orthopaedic treatment and the patient should be referred to a orthopaedic unit of a renowned or academic hospital. Open reduction may be necessary in cases where time and again manipulative measures fail. Sometimes old people are quite comfortable with fibrous ankylosis in dislocated position and may not require surgery if they have recovered from painful symptoms of the original injury and hand is functioning. For obvious reasons this article has no scope to describe the procedures of operative repair of ruptured supraspinatus tendon, Putti - Platt operation for recurrent dislocation of the shoulder, Bankart's operation for detached labrum, Buttressing of glenoidal labrum in order to retain head of the humerus in its socket etc. Interested readers may please refer to standard book of operative surgery.

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