The definition of dislocation in any joint, is that two articular surfaces which are normally in communication have become completely separated.

Shoulder dislocation is a common injury. In around 90% of cases the shoulder dislocates anteriorly. This is generally caused by a fall on the hand but is occasionally due to direct trauma.

Posterior dislocations are less common and are more often missed. In contrast to anterior dislocation this injury is generally caused by forced internal rotation of the abducted arm or by a direct blow on the front of the shoulder. Posterior dislocation is also seen in patients who have had a seizure or been electrocuted.

Very occasionally the shoulder dislocates inferiorly, a condition referred to as luxatio erecta, which is characterised by the patient’s arm lying fixed and abducted.

Anatomy of the Shoulder

The primary joint of the shoulder is the glenohumeral joint (GHJ). This is a shallow joint allowing for a large range of movement. This also makes the joint relatively unstable and it relies heavily on the surrounding soft tissues for stability. The shoulder girdle is attached to the rest of the skeleton by the acromioclavicular (ACJ) and sternoclavicular (SCJ) joints via the clavicle.

Anterior Dislocation

This is the most common type of dislocation of the shoulder, accounting for around 90% of cases. The history is often one of a fall onto the hand rather than direct trauma to the shoulder.

Examination

On examination, there is a flattening of the deltoid and squaring of the shoulder. A bulge is visible anteriorly in thinner patients caused by the humeral head which may also be palpable at the front of the shoulder. The patient will usually be in significant pain unless they have recurrent dislocations and will be unable to allow movement either actively or passively.

It is important to document nerve function before attempting reduction, as if it is deficient after reduction it is not clear if it has been injured during the reduction. The axillary nerve supplies sensation over the lateral aspect of the shoulder (regimental badge area) and this should be tested in any shoulder dislocation as nerve injury is common.
**Imaging**

Accurate diagnosis requires 2 radiographs; an AP and an axillary lateral or scapula Y view (a lateral view of the scapula). Anterior dislocations are usually readily visible on x-ray and further imaging is rarely needed acutely. The following image shows an anterior dislocation. The coracoid can be hard to see on the lateral when the joint is dislocated as it usually lies behind the humeral head.

The articular surface of the humeral head is indicated by the white dots and the glenoid by black dots. It is clear that there is no communication between the two on either the AP or lateral view.

**Hill Sachs Lesion**

The Hill-Sachs lesion is a cortical depression in the posterosuperior aspect of the humeral head. It is caused by impaction of the humeral head against the anteroinferior glenoid rim when the GHJ is dislocated.

In the image above you can see a lateral x-ray of a dislocated GHJ on the left. The humeral articular surface is shown by the white dotted line and the glenoid by the black dotted line. The postero-superior humeral head can be seen pressed against the glenoid. The image on the right shows the joint reduced, but there is a clear persisting divot shown by the arrow. This is the Hill-Sachs lesion.

This can cause instability depending on the size of the lesion. When the shoulder is externally rotated far enough the lesion can be brought back into contact with the glenoid and jump back into a dislocated position. This is called an engaging Hill-Sachs lesion and this almost always requires surgical intervention.

**Bankart Lesion**

The Bankart lesion is an injury to the anteroinferior glenoid labrum which may be associated with a bony defect. The labrum is a fibrocartilaginous rim around the glenoid which increases contact with the humeral head and therefore stability. It can be thought of as the corollary lesion to the Hill-Sachs lesion on the glenoid. The following image shows a 3D CT reconstruction of a reduced GHJ showing a bony Bankart lesion after an anterior dislocation.

The arrow shows the two bone fragments which have fractured off the glenoid long with the torn labrum. The labrum itself is not visible on CT scans. The Bankart lesion can contribute to instability, whether soft tissue or bony.

When there is a bony Bankart lesion this will lead to glenoid deficiency (the anterior aspect of the glenoid is smaller than normal). The image above shows a glenoid deficiency demonstrated by the arrow on an MRI scan in the transverse plane (denoted by the black line on the AP x-ray inset).

**Treatment**

The initial management of anterior GHJ dislocation is prompt reduction. This is usually done under conscious sedation by giving the patient morphine and incremental doses of midazolam. Midazolam is a benzodiazepine and great care must be taken when administering it not to give the patient an overdose which can lead to respiratory depression. It is shorter acting than other benzodiazepines such as diazepam. Particular care must be taken when giving it to elderly patients as they take much longer for the effects to wear off. Its antidote flumazenil should be at hand so if the patient is oversedated its effects can promptly be reversed.
There are many techniques described for manipulation of the glenohumeral joint. They all have varying success rates and relative risks and benefits. Commonly known techniques include Kocher’s method and the Hippocratic method. The primary risks of shoulder manipulation are proximal humerus or glenoid fracture, rotator cuff tear, nerve injury, failure of reduction or early re-dislocation. For reduction to be safe and complications minimised, it is important that pain is well controlled and the patient is completely relaxed.

Once reduction is clinically attained the patient should have prompt repeat x-rays to confirm this and also to check for fractures which have become evident or been caused during reduction. These patients should be followed up once the initial trauma has settled to allow for formal assessment of any chronic instability which may develop (see following section).

**Posterior Dislocation**

Posterior dislocation of the GHJ is relatively uncommon compared to anterior dislocation. It can be caused by a direct blow to the front of the shoulder and is also seen in patients following a seizure or electrocution, due to spasm of the shoulder musculature. For this reason it often presents late, as the patient is acutely unwell and the shoulder can easily be overlooked. The condition is relatively harder to diagnose both clinically and radiologically. The shoulder contour looks quite normal. However, the patient will hold their arm immobile and not allow any active or passive internal or external rotation.

On an AP x-ray the changes of posterior dislocation are not obvious. The condition is readily visible on a lateral view but this is often very hard to obtain due to the relative immobility of the joint. If there is any question as to the diagnosis a CT scan should be obtained.

Inferior Dislocation

This is a rare pattern of dislocation which occurs when the acromion acts as a lever forcing the glenohumeral joint to dislocate inferiorly. It is referred to as *luxatio erecta.*

Instability

Once a patient has suffered a dislocation the recurrence rate varies. A crude method of remembering the re-dislocation rate is to subtract the patient’s age from 100 to give a percentage. Therefore a 20 year old has an 80% chance of re-dislocation whereas an 80 year old only has a 20% chance. Persisting instability may be due to the presence of a Hill-Sachs or Bankart lesion. However, it is important to remember that traumatic dislocations are not the only group of patients with instability. These patients are considered as having *traumatic structural* instability. Interestingly 25% of patients who have a traumatic dislocation of the shoulder have a family history of dislocation implying that an inherited configuration of the joint makes dislocation more likely.

When considering instability it is first important to distinguish between patients who have glenohumeral *subluxation* and *dislocation.* Dislocation involves complete separation of the humeral head and glenoid articular surfaces, as seen in the previous sections. Subluxation is a symptomatic separation of the joint without complete dislocation.

Apart from traumatic dislocations there are two more groups of patients who suffer from shoulder instability. The second are patients who do have a structural deficit but not as a result of trauma. This is seen in athletes who perform repetitive activities such as throwing or swimming. The instability can be in one or more directions and the mainstay of treatment is physiotherapy. Surgical intervention is only tried if prolonged therapy fails.

The third group are patients with no structural abnormality or trauma. Their instability comes from abnormal muscle patterning. Because of the lack of bony constraint the surrounding musculature gives a lot of stability to the GHJ. If
these muscles do not act in a coordinated way, it can result in instability. These patients are often young and the dislocations start as a voluntary ‘trick’. It can subsequently become involuntary. Surgery is not the answer for these patients and prolonged physiotherapy to re-pattern the muscles is required.

The above diagram shows the three groups according to the Polar classification. It is important to remember that the three groups are not mutually exclusive but are more of a continuum. Patients can slowly move from one group to another and so management can be very tricky.

**Examining for Chronic Instability**

Patients usually present to outpatient clinics with a history of instability following traumatic dislocation. Patients typically complain of apprehension when they are reaching overhead or in external rotation when they have had an anterior dislocation. This sensation may be described as a clunk, a sudden sharp pain or even the perception of dislocation (which is usually due to subluxation). In more severe cases, patients may complain of true recurrent dislocations which they relocate themselves.

There are two examination findings present in patients with anterior instability. The first is the drawer test as shown in the following picture.

It assesses the translation of the humeral head on the glenoid. Stabilise the shoulder with one hand by grasping the acromion and distal clavicle while with your other hand push and pull the humeral head forward and backward. The key is to examine for asymmetry between the sides, as up to 50% translation from neutral may be physiological.

The second is the apprehension test. In patients with anterior instability passively bring the shoulder into abduction and external rotation. Then slowly move it backwards into extension. If this causes pain or reproduces the patient’s usual feeling of ‘apprehension’ then the test is positive.

Jobe’s relocation test can be performed in patients with a positive apprehension test. The examiner applies a posterior force to the head of the humerus whilst performing the apprehension test again.

A decrease in pain and the ability to move the shoulder further into external rotation and extension is a positive finding suggestive of anterior instability.