

SHOULDER INSTABILITY

The shoulder is the commonest joint dislocated.

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This article addresses the more recent concepts that influence management decisions in the treatment of shoulder instability.

Fifty per cent of all joint dislocations presenting to the emergency unit involve the glenohumeral joint, with an incidence of 1.7% in the general population. Understanding the pathoanatomy and knowledge of the natural history are prerequisites to the management.

Pathoanatomy of first-time dislocation

Studies have shown that more than 90% of patients who have sustained an anterior dislocation tear the anterior labrum, which is the fibrocartilagenous tissue that connects the capsule and ligaments to the bone of the glenoid. This tear is called a Bankart lesion (Figs 1 and 2). In addition to this, more than 80% have a Hill-Sachs lesion, which is an impression fracture of the posterior aspect of the humeral head (Figs 3 and 4).¹ Glenoid bone loss is found in as many as 41% of first-time dislocations and this increases to 81% in patients with a recurrence.² Humeral avulsion of the glenohumeral ligament (HAGHL) has a varying percentage reported and is probably about 5 - 15%. In this injury the capsule is pulled off the humeral side rather than the glenoid, but both can occur together. Rotator cuff tears are rare in the younger patient, but as a rule of thumb 40% have a tear by 40 years of age and 70% by the age of 70 (Fig. 5). Clinically detectable neurological injuries are seen in 5% of cases and this percentage increases with age and severity of injury.

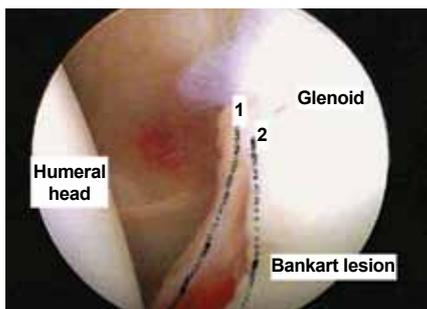


Fig. 1. Arthroscopic view of a Bankart lesion. Line 1 is the edge of the avulsed labrum. Line 2 is the edge of the anterior glenoid.

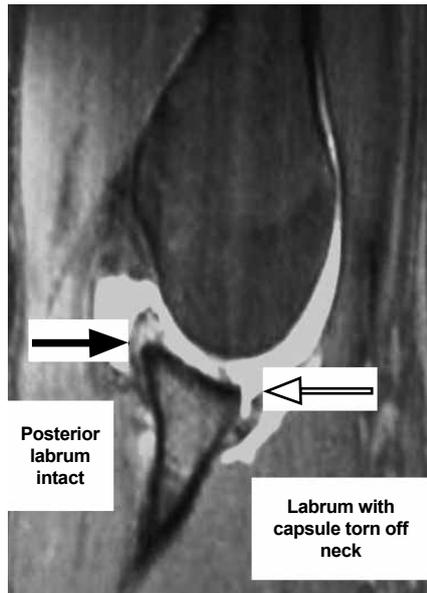


Fig. 2. MRI showing Bankart lesion.



Fig. 3. Arthroscopic view of the posterior humeral head showing the impression fracture called a Hill-Sachs lesion.

Studies have shown that more than 90% of patients who have sustained an anterior dislocation tear the anterior labrum.



Fig. 4. X-ray, modified axillary view showing the Hill-Sachs lesion.



Fig. 5. Arthroscopic intra-articular view of a small supraspinatus tear with sutures.

Natural history of anterior shoulder dislocations

Recurrent dislocation following a first-time dislocation is age-dependent. In teenagers and patients in their early twenties the recurrence rate is >90%. In Hovelius's long-term follow-up of 25 years the recurrence rates were 72% in patients aged 12 - 22 years, 56% in those patients aged 23 - 29 years and 27% in patients older than 30 years.³

Immobilisation of the shoulder

Immobilisation in the traditional position of internal rotation in a sling bandage or collar and cuff following an anterior dislocation has not been shown to alter recurrence rates.⁴ More recently, however, immobilisation in external rotation (Fig. 6) has reduced recurrence rates by approximately 50%. It is based on cadaver and MRI studies that

have shown reduction of anterior labral tears (Bankart lesion) to a more anatomical position when the arm is in external rotation, thus allowing the tissue to heal in the correct position. In the study by Itoi, the main proponent of this immobilisation, there was a relative reduction of 46%.⁵ The immobilisation must be worn for at least 3 weeks and started within 24 hours of injury, but may be taken off for washing.



Fig. 6. External rotation brace.

While most studies support immobilisation in external rotation, two recent studies refute these findings.⁶ Despite these, there are several ongoing studies to evaluate the real benefit of external rotation immobilisation. This is an attractive treatment programme to offer patients who do not wish to have surgery following their first dislocation. If current long-term studies find that this mode of treatment does halve the rate of surgery it will be a boon for public health care institutions where there are long waiting lists for surgery.

Treatment of first-time dislocations

First-time dislocations are no longer being viewed as benign events because of the high recurrence rates. This has led to a more aggressive approach with several papers showing better shoulder scores and quality of life in those patients who have been surgically stabilised.⁷ They not only have fewer dislocations, but have less apprehension and are far more likely to participate in sport again.

Recurrent dislocation following a first-time dislocation is age-dependent.

Recurrent dislocations have also been shown to develop progressive tissue damage with the increasing number of dislocations. This potentially makes the surgery more difficult and may change the surgical procedure from a relatively easy arthroscopic labral repair (Fig. 7) to a more difficult non-anatomic bony procedure such as a modified Latarjet procedure (Fig. 8). Recurrent dislocations have a higher percentage of bone loss and tissue damage. This loss is associated with an

increased risk of developing osteoarthritis.⁸ This bone loss is also associated with higher failure rates of the arthroscopic Bankart repair and therefore a bony procedure may be necessary.

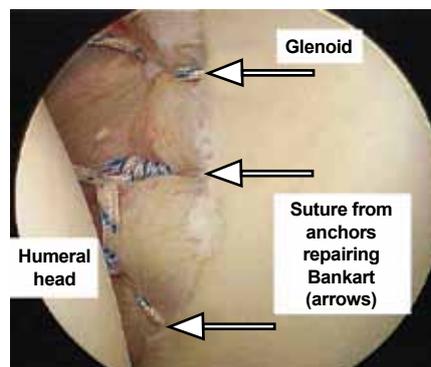


Fig. 7. Arthroscopic view of Bankart repair.

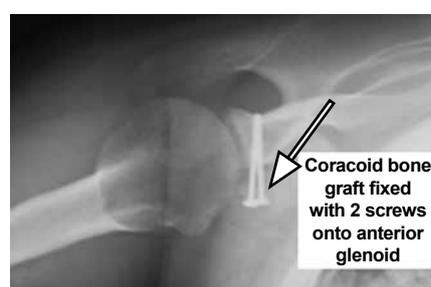


Fig. 8. X-ray, modified axillary view of modified Latarjet procedure, coracoid graft to anterior glenoid fixed with 2 screws.

A Cochrane review (for level I evidence) supports surgery for the first-time dislocator if they are in the high-risk group.⁹ Age, those under the age of 30, followed by participation in high-risk sports and then male gender are the most important criteria for recommending surgery. The same review stated there was a 75% reduction in relative risk of redislocation following surgery. The caveat to this is that the natural history and treatment options need to be discussed with patients to allow them to make an informed decision. Recommendations from recent meetings and the opinion of the authors is that this high-risk subgroup of patients should be offered surgery.

Depending on which surgery is performed, 3 - 9 months are necessary before the athlete can safely return to sport. Therefore careful consideration regarding the timing of the surgery is necessary as dislocations often occur in season and a layoff may profoundly curtail an athlete's opportunity to compete and earn money. Delaying the surgery to the off season may be a less disruptive approach, but this comes with the concern that there may be an increased risk of an additional injury.

A single paper gives guidance in dealing with this dilemma. Buss *et al.* treated 30 athletes who sustained a dislocation, allowing them to complete the season with a protective brace and rehabilitation. Eighty-seven per

cent completed the season, but 66% required surgery within 6 months. The recurrence rate was 1.4 dislocations per athlete in that season.

In the event of concomitant neurological injury a vigilant 'wait and see' policy is recommended, as more than 95% recover spontaneously, the majority by 3 - 5 months. Patients who have a dense deficit, i.e. complete sensory loss and 0/5 power, and those who show no signs of recovery by 6 weeks should be referred to a brachial plexus surgeon for evaluation and possible EMGs, as these are indicators that they are less likely to recover and earlier surgical intervention results in better outcomes. EMGs can be unreliable in the first 4 - 6 weeks.

Rotator cuff tears following trauma are best treated surgically, even in the elderly. The literature recommends surgery within 3 weeks of injury, as results tend to deteriorate after that. Therefore patients who have any suggestion of persistent pain and/or weakness following a dislocation should have an ultrasound as the minimum, if not an MRI, as these symptoms suggest a tendon tear or an occult fracture.

The natural history of a HAGHL injury is not known. The diagnosis is usually made on MRI or at the time of arthroscopy. It appears that the patients with symptoms generally require surgical repair.

Multidirectional instability

Instability must be distinguished from laxity/hyperlaxity. Generalised laxity is increased length and elasticity of ligaments allowing an increased range of motion and translation of the joint in all directions. This may be advantageous in certain athletes and has been shown to be more common in elite athletes such as swimmers.¹¹ It may also put these athletes more at risk of injury.

The definition of multidirectional instability is when symptoms are experienced by the patient due to the joint being unable to maintain its congruency due to the laxity and abnormal firing patterns of muscle. This results in pain or the feeling of instability. This feeling is generally one of a subluxation rather than a frank dislocation, which is in contrast to the first group of patients mentioned in this paper who have a capsulolabral disruption, very often with an osseous defect. Patients with hyperlaxity may also experience pain without instability and this may be due to impingement. This may be subacromial or internal impingement of the rotator cuff on the posterior superior glenoid.

Acquired hyperlaxity

The acquired group are usually athletes or people who do repetitive exercises or movements which gradually stretch out the capsule/ligaments. There is an equal incidence among males and females in the athletic group. Another cause for acquired laxity occurs in young female adolescents where hormonal influences around the growth spurt result in increased ligamentous laxity, and puts them at risk of instability. This resolves as they mature.

These patients are, however, not immune to traumatic injuries such as labral tears in addition to their loose capsule and ligaments. This has been shown in one study where there were approximately one-third of patients who had an abnormal MRI associated with their clinical multidirectional instability.

Congenital hyperlaxity

The congenital group encompasses the patients with Marfan's syndrome, Ehlers-Danlos syndrome, benign joint hypermobility syndrome, osteogenesis imperfecta and others where the disorder has documented collagen fibril changes. The majority of patients, however, do not have a named disorder but are born with the hyperlaxity.

There is controversy regarding the classification, which in turn produces difficulty when comparing treatments and outcomes of this difficult group of patients. Neer's classification which Matsen clarified into two broad groups, is probably the most widely used and easiest to remember.¹⁰ Unfortunately it is a little simplistic for those making surgical decisions in these patients, but it is more than adequate for first-line management.

TUBS and AMBRI are the acronyms, where TUBS stand for traumatic, unidirectional instability, Bankart lesion and surgery, which is the mainstay of the treatment. This is the group of patients discussed at the beginning of the article.

The AMBRI group are those patients with loose capsules who have an atraumatic dislocation which is multidirectional, the majority are bilateral and rehabilitation is required before any operative intervention which, if done, usually consists of an inferior capsular shift.

As mentioned, these patients may present with subluxation and/or impingement. Any young patient with impingement symptoms must be carefully examined to exclude subtle instability. They may complain of lameness or a 'dead' arm. There may be clicking or catching, especially if a labral tear has occurred. These patients also tend to sublux more easily in activities of daily living such as sleeping or carrying heavy objects. If the instability is mainly posterior, symptoms occur with the arm flexed up, such as bench pressing. It is very important to ask if they can voluntarily dislocate and whether it is painless as these associated symptoms usually preclude surgery. There often is a family history of instability.

Signs of generalised laxity must be looked for, although many patients exhibit them. These signs include hyperextension of elbows and knees, 90° of dorsiflexion of the index metacarpophalangeal joint, the thumb can touch the forearm and hyperdorsiflexion of the ankle. More importantly, the other shoulder is examined looking for a sulcus sign (Fig. 9), external rotation of more than 90° and a shift test of 3+ or more which suggests hyperlaxity.



Fig. 9. Sulcus sign showing inferior subluxation of humeral head.

X-rays are usually normal, but there may be hypoplasia. An MRI arthrogram will show a large capsular volume with possible atrophic labrum.

Treatment of instability in patients with hyperlaxity

Conservative treatment

Rehabilitation with physiotherapy is the mainstay of treatment and this consists of muscle repatterning, improvement of tone and proprioception, strengthening of the rotator cuff followed by the rest of

the shoulder musculature strengthening including scapula stabilisers.

Patients who have underlying psychological issues and those who are voluntary dislocators tend to do worse with this programme, but they also tend to do worse with surgery.¹² Patients who have secondary gain issues or other psychological issues should also not be operated on if at all possible. The initial treatment should entail referral to a psychologist. The other group of patients who do poorly with conservative treatment are those who have had an injury on duty or previous surgery. Studies with longer follow-up have shown that athletes who are involved in contact do not respond as well to conservative treatment.

Operative treatment

Patients who are still symptomatic after a physiotherapy programme of 6 - 12 months are offered surgery.

The surgical principle is to decrease the volume of the capsule posteriorly, inferiorly and anteriorly. The gold standard procedure is known as an open capsular shift, which umblicates the capsule and ligaments. This is usually done through an anterior approach, except in cases where the symptoms are predominantly posterior. Arthroscopic procedures are now producing similar outcomes in level III and IV studies. Surgical outcomes in selected patients are reported to have been successful in 80 - 90%.¹³

References available at www.cmej.org.za

IN A NUTSHELL

- First-time traumatic dislocations will result in a Bankart lesion and Hill-Sachs lesion in more than 80% of cases.
- People under the age of 30 and those who partake in high-risk sports have an extremely high risk of redislocation.
- Recurrence rates are reduced to 75% with surgery in first-time dislocators and shoulder scores, quality of life and ability to return to sports are improved with surgery.
- Recurrent dislocations predispose to further injury and increased risk of osteoarthritis.
- The redislocation rate is not reduced by regular immobilisation; there is, however, conflicting evidence that immobilisation in external rotation reduces this rate.
- The incidence of rotator cuff tears increases with age.
- Pain and weakness at 10 days should be investigated for a rotator cuff tear or occult fracture.
- Multidirectional instability may present with pain and impingement signs, without obvious feeling of instability.
- Mainstay of treatment for patients with multidirectional instability is physiotherapy.
- Surgery for multidirectional instability is a capsular shift.
- Surgery must be avoided, if possible, in patients who voluntarily dislocate or those who have psychological issues.