

## Current Concepts in the Management of Shoulder Instability

### Abstract

Shoulder instability ranges from subtle instability to frank dislocation. Our understanding on the subject is getting better. Patient lifestyle, increased awareness/expectations, better availability of information, improved imaging modalities, and increased awareness about the previously less known concepts in instability all add to the challenges of managing the problem. History and clinical examination without over reliance on imaging remain essential. We used Embase, PubMed, Medline, CINAHL, Cochrane Library, Scottish Intercollegiate Guidelines Network and Google Scholar search for published literature in English. We used various combinations of the keywords, namely, human shoulder instability, sports injuries, dislocation, surgery, Latarjet, glenohumeral, glenoid, and arthroscopy from 1980 to March 2017. The systematic search captured 310 publications. After applying initial exclusion criteria, 41 abstracts were assessed for eligibility. Of these, we selected 20 full-text articles with the majority of focus primarily on surgical management of traumatic shoulder instability. A tailor-made approach for the management of the individual patient is essential and should involve shared decision making. In this article, we have tried to simplify and present the current evidence in the management of traumatic shoulder instability, particularly in sportsperson.

**Keywords:** Shoulder, glenohumeral, instability, dislocation, arthroscopy, Latarjet

**MeSH terms:** Surgical procedure, arthroscopy, glenohumeral dislocation, upper extremity

**Suresh Srinivasan,  
Radhakant Pandey**

Upper Limb Unit, Department of Trauma and Orthopaedic Surgery, Musculoskeletal Directorate, Leicester General Hospital, University Hospitals of Leicester NHS Trust, Leicester LE5 4PW, UK

### Introduction

The Shoulder joint constantly balances the need to remain stable while providing the necessary three-dimensional mobility. It depends on a complex interplay between static soft tissue and dynamic muscular stabilizers, negative pressure with “suction cup mechanism” and bony anatomy to lend it stability.

Shoulder instability causes pain and dysfunction in young active patients, more so in athletes. The optimal management of shoulder instability is challenging in the young adult as well as the professional sportsperson. There has been an increase in the numbers of shoulder dislocation being identified and managed in the last two to three decades due to increasing in people lifestyles and expectations, better imaging facilities and surgeons having a better understanding of arthroscopy and open stabilization procedures.

As new evidence keeps emerging on this subject, this article is an update on the management of traumatic shoulder

instability in young adults with particular emphasis on sportspersons.

### Materials and Methods

We used Embase, PubMed, Medline, CINAHL, Cochrane Library, Scottish Intercollegiate Guidelines Network and Google Scholar search for published literature in English. We used various combinations of the keywords, namely, human shoulder instability, sports injuries, dislocation, surgery, Latarjet, glenohumeral, glenoid, and arthroscopy from 1980 to March 2017. The systematic search captured 310 publications. After applying initial exclusion criteria including duplication, non traumatic shoulder dislocations, dislocation in children (age <16), 41 abstracts were assessed for eligibility. Of these, we selected 20 full-text articles with the majority of focus primarily on surgical management of traumatic shoulder instability. This was by consensus with the senior author. The article will be presented under the following sections- etiopathogenesis, classification, evaluation, management (nonoperative and operative, anterior instability, decision

### Address for correspondence:

Mr. Radhakant Pandey,  
Leicester General Hospital,  
University Hospitals of Leicester  
NHS Trust, Gwendolen Road,  
Leicester LE5 4PW, UK.  
E-mail: montypandey@hotmail.com

### Access this article online

Website: [www.ijonline.com](http://www.ijonline.com)

DOI:  
10.4103/ortho.IJOrtho\_224\_17

### Quick Response Code:



**How to cite this article:** Srinivasan S, Pandey R. Current concepts in the management of shoulder instability. Indian J Orthop 2017;51:524-8.

This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

For reprints contact: [reprints@medknow.com](mailto:reprints@medknow.com)

making in chronic anterior instability, multidirectional, posterior instability), rehabilitation, summary.

### Etiopathogenesis

The true incidence of shoulder instability is unknown in patients in India. Western literature quotes traumatic anterior dislocation rate of 23/100,000 person years.<sup>1</sup>

Although traumatic shoulder instability is predominantly observed in young sporty, physically active male patients, it follows a bimodal age distribution. The redislocation rate in the adolescent population has been reported in the literature to be as high as 92%.<sup>2</sup>

Apart from trauma, uncontrolled epilepsy and symptomatic hyperlaxity are considered other etiologic factors.

Habermeyer *et al.*<sup>3</sup> have staged the evolution of intraarticular findings in patients with posttraumatic shoulder instability progressing successively from isolated lesion to a quadruple lesion [Table 1]. Lesions such as humeral avulsion of glenohumeral ligament (HAGL) and anterior labral periosteal sleeve avulsion (ALPSA) may be difficult to detect but can lead to instability or failure of treatment if not addressed.

### Classification

The etiologies are multifactorial representing the spectrum of Stanmore Triangle<sup>4</sup> [Figure 1]. It replaces the previously used acronyms - TUBS (traumatic, unilateral, bankart, and surgery) and AMBRI (atraumatic, multi-directional, bilateral, rehabilitation, and inferior) with the third aspect of the triangle represented by muscle patterning instability.

The main stay of muscle patterning instability remains physiotherapy. However, it is important for the treating surgeon to recognize that there may be a spectrum of structural abnormalities coexistent with the muscle patterning, which might need addressing after carefully evaluating the patient in a multidisciplinary setting.

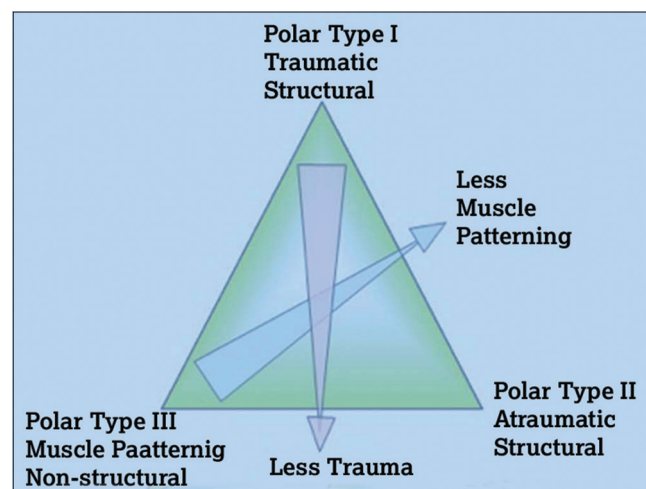
### Evaluation

A comprehensive understanding of the patient's history, including the type of sport, injury mechanism, the number of dislocation/instability episodes and prior treatment helps understand the problem and chronicity. Sportspeople involved as weight lifters, throwers, racket sports, rugby players and swimmers are at higher risk. Many of these athletes have inherently lax shoulders, which although advantageous for their sport, renders them prone to instability. They receive repetitive trauma to their shoulders, which can lead to chronic instability. Clinical examination, including laxity, apprehension, and special tests in conjunction with thorough evaluation of imaging techniques is key to successful management of the patient. Kim's test<sup>5</sup> has high specificity and sensitivity for detecting posterior inferior instability.

**Table 1: Stages of evolution of pathological lesion in post traumatic anterior instability**

Stage	Lesion	Pathology
1	Isolated Bankart lesion	Labral attachment rupture
2	Double lesion (Perthes)	IGHL attachment rupture
3	Triple lesion (ALPSA)	Subglenoid rupture, fibrous adhesion
4	Quadruple lesion	Triple lesion + labral degeneration (fibrous scar, distension, HAGL)

IGHL=Inferior glenohumeral ligament, ALPSA=Anterior labral periosteal sleeve avulsion, HAGL=Humeral avulsion of glenohumeral ligament



**Figure 1: Stanmore triangle**

Plain radiographs-true anteroposterior (AP) and axillary view are informative and indicated after a shoulder dislocation. Additional views like AP of shoulder with external rotation and AP of the glenoid to look at bone loss could form a part of evaluation protocol as suggested by Balg and Boileau.<sup>6</sup>

Larribe *et al.*<sup>7</sup> suggest advanced imaging such as computed tomography (CT) arthrograms and magnetic resonance arthrogram (MRA) for recurrent shoulder dislocation (we prefer MRA in our unit). They give detailed information about the soft tissue lesions (labral tear, ALPSA, HAGL, superior labral anterior posterior, Perthe's lesions, and cuff tears) and also bony pathology such as the extent of Hill-Sachs lesion, glenoid rim fractures/bone loss, and glenoid version. This may also help the surgeon to decide between arthroscopic and open procedures (Latarjet).

Yamamoto *et al.*<sup>8</sup> who have espoused the "Glenoid Track" concept recommend considering the Hill-Sachs and glenoid bone loss together rather than in isolation.

Various studies report magnetic resonance imaging (MRI) sensitivity from 91% to 100% for anterior instability. However, Song *et al.*<sup>9</sup> in their recent retrospective correlation study of MR and arthroscopy findings have

cautioned against over reliance on MRI findings. They recommend a high degree of suspicion to detect combined instability, especially in the young and active patients.

## Management

### Nonoperative management

Physiotherapy is the main-stay of managing Stanmore Triangle Polar Type III instability, arising from muscle patterning. It should probably be advocated in all first time dislocators. The physiotherapy should be targeted and done by specialized physiotherapist. It has also got a role in the initial management of multidirectional instability (MDI) and in patients not keen on operative management. Warby *et al.*<sup>10</sup> in their systematic review have observed the lack of high-quality intervention studies to evaluate the role of exercise in MDI.

### Operative management

#### (a) Anterior instability

The first time dislocator and sports persons.

Shared decision-making between the patient and surgeon is crucial. The key factors to consider would be the age of the patient (under 20 years), the activity of the patient (e.g., overhead or contact sportsperson, active military personnel, climbers, etc.) and patient expectations. There is some argument for performing a Bankart's stabilization in this carefully selected cohort from the perspectives of return to sports as well as cost effectiveness,<sup>11</sup> particularly in the elite sportsmen.

Generally accepted wisdom is to treat first-time dislocations nonoperatively. Even if patients opt for conservative treatment, it is important to stress that they need to seek prompt attention if a second instability/dislocation episode happens.

#### (b) Decision making in chronic anterior instability

In the management of chronic anterior instability the two key questions, which should be asked are-what is the problem? (soft tissue, bony, or both) and if bony-where is the problem? (glenoid or humerus or both).

If in doubt about the quality of soft tissue and bony defect and based on intraoperative assessment, a Latarjet procedure described by him in 1954,<sup>12</sup> would more reliably stabilize the joint particularly in contact sportsmen.

The current standard of care for anterior instability with a Bankart lesion is arthroscopic Bankart repair named after the person who first described open anterior stabilization in 1923<sup>13</sup> Regardless of open or arthroscopic technique, it is essential to address the pathology. There are pros and cons of either approach depending on the experience, skill and facilities available to the surgeon. In the arthroscopic approach, usually, two to three anchors should be sufficient as long as good repair with adequate

capsular and ligamentous shift is achieved. Arthroscopic stabilization works well in most low-level sportsmen and general population even with some bone loss from glenoid (around 15%). However, the surgery should be tailored to individual needs.

Latarjet procedure<sup>12</sup> involves coracoid osteotomy and transferred anterior to the glenoid rim for instability due to glenoid bone loss. The literature recommends Latarjet procedure for osseous defects of >25% in the glenoid. Critical to the technical success of the Latarjet procedure are two large surface areas of contact between coracoid and anterior glenoid, bicortical purchase, with two screws of 4 mm diameter achieving good compression and well placed in two views (i.e., not intraarticular, coracoid not lateralized).

There is recent evidence supporting modified congruent arc Latarjet procedure developed by de Beer,<sup>14</sup> in athletes predominantly Rugby players with recurrent anterior instability. Colegate *et al.*<sup>15</sup> reported complication rate was only 7%, and 89% of the patients were able to return to competitive sport at the preinjury level at a mean of 3.2 months, without episodes of recurrent instability. Bessiere *et al.*<sup>16</sup> performed a matched retrospective comparative study of arthroscopic Bankart and open Latarjet procedures of 93 patients each for posttraumatic anterior recurrent instability. Mean followup was for 6 years. Incidence of recurrent instability favored Latarjet group (odds ratio 0.39, 95% confidence interval 0.17–0.91). Although the reoperation rate and return to sports were no different, the mean Rowe score was higher in Latarjet group (78 vs. 68  $P = 0.018$ ).

The bipolar bone loss has emerged as a concept, taking the Hill–Sachs lesion also into consideration. Hence in the surgical treatment of recurrent shoulder instability, the surgeon should adopt a strategy to appropriately address both osseous defects.

Bankart and Hill–Sachs lesions should be considered in combination as a continuum of the spectrum. Yamamoto *et al.*<sup>8</sup> introduced the concept of the glenoid track. This has led to the further understanding of bipolar bone loss in shoulder instability, which is seeking to replace the previous concept of engaging versus nonengaging Hill–Sachs lesion. This takes into account glenoid width with or without bone loss, and the amount of glenoid articulation with the capsule and humeral head. This helps the surgeon in predicting and correct planning of right surgery for the right indication, i.e., a la carte surgery.

However, the glenoid track and bipolar bone loss study are based on cadaveric modelling. It relies on the use of dedicated CT scan sequences and software to overlap the humeral head defect to the glenoid bone loss to determine on track and off track lesion.

In instability due to large Hill–Sachs lesion, there is a role for arthroscopic remplissage procedure (French-to “fill up”).



This involves using the capsule and infraspinatus to fill up a large engaging Hill–Sachs defect usually in combination with anterior Bankart repair. It makes the defect extra articular so that it does not engage against the glenoid edge.

Balg and Boileau<sup>5</sup> in their prospective case–control study looked at causes of recurrence after Bankart repair in 131 consecutive unselected patients at a mean of 31 months. The factors for recurrence were age <20 years, contact or forced overhead activity, competitive versus recreational sport, hyper laxity, Hill–Sachs lesion on AP view in external rotation and glenoid bone loss on AP view.

The instability severity index score (ISIS)  $\leq 6$  points meant an acceptable rate of 10% instability recurrence and potentially good candidates for Bankart procedure. Phadnis *et al.*<sup>17</sup> independently confirmed the utility of the ISIS as a useful preoperative tool. In their case control study of 141 patients, they found a 70% risk of failure of arthroscopic anterior stabilization if the ISIS  $\geq 4$  versus 4% risk if score <4.

#### *Multidirectional instability*

The treatment of choice is open or arthroscopic plication and capsular shift if conservative management fails. Longo *et al.*<sup>18</sup> in their systematic review have reported no difference in open or arthroscopic management. They based their observations from 24 studies with a mean age of 24 years and mean followup of 4 years in a patient population of 790 with 861 shoulders. Thermal capsular shrinkage has not found favor according to the authors.

Mohtadi *et al.*<sup>19</sup> recently compared the results of electrothermal arthroscopic capsular shrinkage versus open inferior capsular shift based on a level two multicenter randomized control study. However, the results in this study should be cautiously interpreted, due to the lack of long term followup and sample size of study not being achieved.

#### *Posterior instability*

This problem could be encountered in collision athletes or a similar mechanism. It is difficult to diagnose clinically as it is subtle. Patients often do not present with typical history and could describe the posterior joint pain and/or clicking. They are also likely to be missed on scans unless specifically looked for. Principles of management and surgical stabilization are the same as anterior instability, i.e., if there is posterior soft tissue injury, then capsular shift and posterior labral repair is indicated. Antoniou and Harryman<sup>20</sup> reported successful achievement of stability for posterior inferior instability using their techniques of arthroscopic posterior capsulolabral repair and shift. For bony injuries, McLaughlin procedure has been described historically. The posterior bone block could be considered in very carefully selected cases.

## **Rehabilitation**

Rehabilitation aims are to return the patient to the previous level of functional status before injury or to the previous level of the sport as quickly and safely in case of an athlete. Healing and recovery of sportspersons/athletes may be much quicker due to better muscle conditioning, motivation, facilities with therapy input and compliance, as compared to nonathletes.

Conventionally, a time-based approach has been used by most surgeons in the postoperative rehabilitation phase. For example, in our unit, we protect the repair with the arm in a sling, for 3 weeks avoid rotations, especially external rotation and taking the arm backwards. After 3 weeks, progressive mobilization is started till 6 weeks when sling comes off and active mobilization along with strengthening commences.

For sportspersons, rehabilitation should be tailored to the patient needs bearing in mind the age, type of sport, quality of repair, and progress with the achievement of stage specific goals. Communication is vital between the surgeon, coaching staff, the patient and the therapist, so that progress is ensured and monitored without discomfort and apprehension. Return to the sport usually involves evaluation of health risk and risk of participation by the player, apart from decision modifiers.

## **Summary**

Shoulder instability requires a meticulous and systematic management plan. All aspects of instability should be sought for and thoroughly assessed. Investigations (MRA, CT scan) are adjuncts to a comprehensive history, examination, and good diagnostic arthroscopy. This article summarizes the current strategies in a discipline where new evidence is constantly emerging. While it is intended to aid clinicians in their decision-making, each patient requires a tailor made approach.

## **Financial support and sponsorship**

Nil.

## **Conflicts of interest**

The authors do not have any conflicts of interest to declare.

## **References**

1. Leroux T, Wasserstein D, Veillette C, Khoshbin A, Henry P, Chahal J, *et al.* Epidemiology of primary anterior shoulder dislocation requiring closed reduction in Ontario, Canada. *Am J Sports Med* 2014;42:442-50.
2. Postacchini F, Gumina S, Cinotti G. Anterior shoulder dislocation in adolescents. *J Shoulder Elbow Surg* 2000;9:470-4.
3. Habermeyer P, Gleyze P, Rickert M. Evolution of lesions of the labrum-ligament complex in posttraumatic anterior shoulder instability: A prospective study. *J Shoulder Elbow Surg* 1999;8:66-74.
4. Lewis A, Kitamura T, Bayley JI. The classification of shoulder

- instability: New light through old windows! *Orthop Trauma* 2004;18:97-108.
5. Kim SH, Park JS, Jeong WK, Shin SK. The Kim test: A novel test for posteroinferior labral lesion of the shoulder – A comparison to the jerk test. *Am J Sports Med* 2005;33:1188-92.
  6. Balg F, Boileau P. The instability severity index score. A simple preoperative score to select patients for arthroscopic or open shoulder stabilisation. *J Bone Joint Surg Br* 2007;89:1470-7.
  7. Larribe M, Laurent PE, Acid S, Aswad R, Champsaur P, Le Corroller T. Anterior shoulder instability: The role of advanced shoulder imaging in preoperative planning. *Semin Musculoskelet Radiol* 2014;18:398-403.
  8. Yamamoto N, Itoi E, Abe H, Minagawa H, Seki N, Shimada Y, *et al.* Contact between the glenoid and the humeral head in abduction, external rotation, and horizontal extension: A new concept of glenoid track. *J Shoulder Elbow Surg* 2007;16:649-56.
  9. Song DJ, Cook JB, Krul KP, Bottoni CR, Rowles DJ, Shaha SH, *et al.* High frequency of posterior and combined shoulder instability in young active patients. *J Shoulder Elbow Surg* 2015;24:186-90.
  10. Warby SA, Pizzari T, Ford JJ, Hahne AJ, Watson L. The effect of exercise-based management for multidirectional instability of the glenohumeral joint: A systematic review. *J Shoulder Elbow Surg* 2014;23:128-42.
  11. Crall TS, Bishop JA, Guttman D, Kocher M, Bozic K, Lubowitz JH. Cost-effectiveness analysis of primary arthroscopic stabilization versus nonoperative treatment for first-time anterior glenohumeral dislocations. *Arthroscopy* 2012;28:1755-65.
  12. Lafosse L, Lejeune E, Bouchard A, Kakuda C, Gobezie R, Kochhar T. The arthroscopic Latarjet procedure for the treatment of anterior shoulder instability. *Arthroscopy* 2007;23:1242.e1-1242.e5
  13. Bankart AS. Recurrent or habitual dislocation of the shoulder-joint. *Br Med J.* 1923; 2 (3285):1132-1133.
  14. de Beer JF, Roberts C. Glenoid bone defects – Open Latarjet with congruent arc modification. *Orthop Clin North Am* 2010;41:407-15.
  15. Colegate-Stone TJ, van der Watt C, de Beer JF. Evaluation of functional outcomes and complications following modified Latarjet reconstruction in athletes with anterior shoulder instability. *Shoulder Elbow* 2015;7:168-73.
  16. Bessi re C, Trojani C, Carles M, Mehta SS, Boileau P. The open Latarjet procedure is more reliable in terms of shoulder stability than arthroscopic Bankart repair. *Clin Orthop Relat Res* 2014;472:2345-51.
  17. Phadnis J, Arnold C, Elmorsy A, Flannery M. Utility of the instability severity index score in predicting failure after arthroscopic anterior stabilisation of the shoulder. *Am J Sports Med* 2015;43:1983-8.
  18. Longo UG, Rizzello G, Loppini M, Locher J, Buchmann S, Maffulli N, *et al.* Multidirectional instability of the shoulder: A systematic review. *Arthroscopy* 2015;31:2431-43.
  19. Mohtadi NG, Kirkley A, Hollinshead RM, McCormack R, MacDonald PB, Chan DS, *et al.* Electrothermal arthroscopic capsulorrhaphy: Old technology, new evidence. A multicenter randomized clinical trial. *J Shoulder Elbow Surg* 2014;23:1171-80.
  20. Antoniou J, Harryman DT 2<sup>nd</sup>. Posterior instability. *Orthop Clin North Am* 2001;32:463-73, ix.