

CURRENT CONCEPTS REVIEW**Traumatic First Time Shoulder Dislocation: Surgery vs
Non-Operative Treatment**

Ioannis Polyzois, MD; Rupen Dattani, MD; Rohit Gupta, MD; Ofer Levy, MD; A Ali Narvani, MD

*Research performed at Rowley Bristow Unit, Ashford & St Peters NHS FT (Surrey) & Fortius Clinic (London), UK**Received: 20 August 2015**Accepted: 12 September 2015***Abstract**

Management of first shoulder dislocation following reduction remains controversial. The two main options are immobilisation and arthroscopic stabilisation. The aim of this article is to highlight some of the issues that influence decision making when discussing management options with these patients, including natural history of the first time dislocation, outcomes of surgery and non-operative management particularly on the risk of future osteoarthritis (OA), the effects of delaying surgery and the optimal method of immobilisation.

Extensive literature review was performed looking for previous publication addressing 4 points. i) Natural history of primary shoulder dislocation ii) Effect of surgical intervention on natural history iii) Risk of long term osteoarthritis with and without surgical intervention iv) Immobilisation techniques post reduction.

Individuals younger than 25 years old are likely to re-dislocate with non-operative management. Surgery reduces risk of recurrent instability. Patients with recurrent instability appear to be at a higher risk of OA. Those who have surgical stabilisation do not appear to be at a higher risk than those who dislocate just once, but are less likely to develop OA than those with recurrent instability. Delaying surgery makes the stabilisation more demanding due to elongation of capsule, progressive labro-ligamentous injury, prevalence and severity of glenoid bone loss. Recent studies have failed to match the preliminary outcomes associated with external rotation braces.

Defining the best timing and type of treatment remains a challenge and should be tailored to each individual's age, occupation and degree of physical activity.

Keywords: Dislocation, First time, Immobilisation, Stabilisation

Introduction

In the human body, the glenohumeral joint has the greatest range of motion of all the joints. To achieve this increased mobility the stability of the joint is sacrificed making the glenohumeral joint susceptible to dislocation. Of the large joints the glenohumeral joint is the most common to dislocate with an incidence of 11.2/100,000 per year and an estimated prevalence of 2% to 8% in the general population (1-3).

The majority of first time shoulder dislocations are anterior traumatic dislocations occurring with the arm in an abducted and externally rotated position. Following a dislocation the primary stabilisers of the shoulder will invariably be damaged and may render the joint unstable. The management of a patient with a first time dislocation remains controversial. There are a number of questions that a clinician managing patients with a primary shoulder dislocation must answer.

These include: (i) what is the natural history following a primary shoulder dislocation; (ii) does surgery change this natural history; (iii) do patients who are treated non-operatively have a higher risk of developing future osteoarthritis (OA) of the glenohumeral joint? Does surgical stabilization following a first time dislocation influence the risk of future OA?; (iv) what are the risks of surgical stabilization?; (v) does delaying surgery influence outcome? and (vi) which method of immobilisation is best if non-operative management is chosen? The objective of this review article was to address these questions.

Natural History

Following an initial traumatic anterior shoulder dislocation, the incidence of recurrent instability ranges from 14% to 100%. The risk of recurrent dislocations is influenced by the age at the time of initial dislocation. In

Corresponding Author: A Ali Narvani, Rowley Bristow Unit, Ashford & St Peters NHS FT, Fortius Clinic, London, UK
Email: alinarvani@shoulder-elbowsurgery.com



THE ONLINE VERSION OF THIS ARTICLE
ABJS.MUMS.AC.IR

patients <20 years old the rate of recurrent instability is 72–100%, in those aged between 20–30 years it is 70–82% and in patients >50 years old it is 14–22% (4–11). Hovelius et al. reported on the results of a 25-year follow-up study of non-operatively treated anterior shoulder dislocations and found a recurrence rate of 72% in patients aged 12–22 years, 56% in those aged 23–29 years and 27% in patients older than 30 years (12). In patients aged between 12–25 years, 38% required surgical stabilisation for recurrent instability and an additional 12% who did not have surgery continued to have symptoms of instability. Twenty per cent of patients aged 12–22 years with recurrent instability became stable 15–25 years after the initial injury and this led the authors to draw the conclusion that 30–50% of patients would undergo unnecessary surgery. Recently, Robinson et al. have reported similar results with an 87% incidence of re-dislocation in patients <20 years and 30% rate in those >30 years of age (13).

Influence of Surgery on Recurrence Rate

In order for the orthopaedic surgeon to discuss surgery with a first-time dislocator it is important to answer the question “would surgical intervention in the form of surgical Bankart repair change this natural history?” Sachs et al attempted to identify the cohort of patients who would most benefit from surgical stabilisation after an initial traumatic anterior shoulder dislocation (9). The authors evaluated 131 patients over 5 years and showed that the strongest predictors of recurrent instability were age <25 years, patients who participated in a contact or collision sport and patients who used their arm at or above chest level in their occupation.

In a randomised control trial comparing long-term results after surgical and conservative treatment of first-time traumatic anterior shoulder dislocation, Jakobsen et al. found a significantly higher incidence of recurrent instability in the conservatively treated group compared with the surgical group. At 2 years' follow-up 54% of the conservatively treated patients had recurrent instability compared with 3% after open surgical repair. After 8 years 74% of patients in the non-operatively treated group had an unsatisfactory outcome as assessed by the Oxford shoulder score. In contrast, in patients who underwent surgery, 72% had a good or excellent result after 10 years. The authors concluded that because primary stabilisation yields superior results to conservative treatment, surgery should be recommended in active patients to reduce the risk of recurrence (14).

Numerous studies have evaluated different operative techniques for the management of acute traumatic shoulder dislocations. Prior to the popularization of shoulder arthroscopy, open stabilization was the mainstay of treatment for patients with recurrent glenohumeral instability. Open surgery still remains an acceptable option especially when the pathology cannot be adequately addressed arthroscopically such as in cases of recurrent anterior instability in the setting of bone and soft-tissue loss and in revision surgery (15). However, with advances in arthroscopic techniques most authors would now advocate arthroscopic treatment in

management of recurrent shoulder instability without significant bone loss.

The use of arthroscopic lavage has been shown to reduce joint effusion which in-turn may allow healing of the detached labrum. In a prospective multicentre randomised study Wintzell et al. compared the outcome of arthroscopic lavage (within 10 days of initial dislocation) with non-operative treatment (sling immobilisation for up to a week) for traumatic anterior shoulder dislocation in 30 consecutive patients (11). At a two year follow-up the re-dislocation rate was 3/15 (20%) in the lavage group and 9/15 (60%) in the non-operative group. These findings were particularly more pronounced in those aged <25 years with a re-dislocation rate of 65% in the conservatively treated group compared with 12% in the lavage-treated group. However, another study evaluating the efficacy of arthroscopic lavage in the treatment of first-time dislocation found no reduction in the overall instability rate over a 5-year follow-up period (10).

The arthroscopic Bankart repair is much more commonly undertaken today than the above described arthroscopic technique. This procedure is now regarded by most surgeons to be the treatment of choice for anterior glenohumeral instability offering good objective long-term outcomes with a high degree of patient satisfaction (4). A level one study comparing the outcome of arthroscopic Bankart repair with arthroscopic lavage in the management of primary traumatic anterior shoulder dislocation found the rate of recurrent instability was significantly lower in the arthroscopic Bankart repair group (7% vs 38%) (16). The cohort of patients undergoing arthroscopic repair also had significantly better functional outcome scores, higher satisfaction scores and lower treatment costs. Although there was no difference between the two groups with respect to returning to sport and timing of return, there was a 3.4 fold increased risk of discontinuing contact sports within the first 2 years after a primary dislocation in the lavage group. The authors concluded that there was a significant benefit of primary arthroscopic repair in the treatment of a Bankart lesion compared with arthroscopic lavage alone. These results have been supported by a recent meta-analysis of 4 randomized trials assessing the efficacy of anatomic Bankart repair in patients with a first-time shoulder dislocation. The rate of recurrent instability was found to be significantly lower among patients undergoing anatomic Bankart repair compared with those undergoing either immobilization or arthroscopic lavage. The study concluded that there was evidence to recommend anatomic Bankart repair in young patients with a first-time shoulder dislocation with the goal of lowering the rate of recurrent instability over the long-term and improving short-term quality of life.

Numerous authors have compared clinical outcomes after open and arthroscopic Bankart repair and found them to be comparable (1). A meta-analysis of 501 patients operatively treated for anterior shoulder instability using suture anchors (234 arthroscopic and 267 open) found similar rates of recurrent instability (6% versus 6.7%) and need for revision surgery (4.7% and 6.6%) (17). The main drawback of open Bankart repair

compared with arthroscopic stabilisation was found to be a greater loss of external rotation therefore patients participating in activities where performance could be compromised by loss of external rotation may achieve a superior functional outcome with an arthroscopic Bankart repair. Wang et al. compared the cost of arthroscopic versus open Bankart repair and showed that arthroscopic Bankart repair as same-day surgery had a lower overall cost than open repair although this difference would have been negligible if all patients went home immediately after surgery (18).

The risk factors for failure of arthroscopic labral repair include male gender, young age at the time of first dislocation, the time from first dislocation to surgery, joint laxity, ALPSA lesions, engaging Hill-Sachs lesions and glenoid bone loss > 20% (15).

Do patients who are treated non operatively have a higher risk of developing future osteoarthritis (OA) of the glenohumeral joint? Does surgical stabilization following first time dislocation influence risk of future OA?

Hovellius and Saeboe reported the results of a prospective Swedish multicenter study including 229 shoulders in 227 patients with a first-time anterior shoulder dislocation (16). Radiographic analysis at 25 years showed mild arthropathy in 29%, moderate in 9%, and severe in 17%. In patients without recurrent instability 18% had moderate/severe arthropathy but this increased to 39% of shoulders that had recurrent instability (without surgery) and 26% for surgically stabilised shoulders. Age at primary dislocation, recurrence, participation in high-energy sports and alcohol abuse were factors associated with the development of OA.

In a retrospective analysis of 570 patients who underwent surgical stabilisation for anterior glenohumeral instability the preoperative incidence of arthritis was 9.2% (19). Risk factors for the development of arthritis were older age at the initial dislocation and at surgery, increased length of time from the initial dislocation until surgery, and the presence of osseous glenoid rim lesions. Postoperative arthritis in patients without any preoperative arthritis occurred in 19.7% and was correlated with older age at the initial dislocation and at surgery, increased number of dislocations, and longer follow-up. The authors concluded that as similar factors contributed to preoperative and postoperative arthritis in patients with anterior glenohumeral instability surgery may not affect the risk factors for arthritis. However, as the number of instability episodes correlated with the development of postoperative arthritis it could be postulated that early surgical stabilisation may prevent recurrent instability and thus reduce the incidence of arthritis.

Risks of Surgical Stabilization

The risk of nerve damage is reported to be 1-8% with open stabilization and <1% with arthroscopic stabilisation. The nerves most commonly damaged during both open and arthroscopic anterior shoulder stabilization procedures are the axillary and musculocutaneous nerves, because of

their proximity to the glenohumeral joint. Glenohumeral chondrolysis is a rare but serious complication that has been associated with anterior shoulder instability repair. The exact cause of chondrolysis after labral repair is not known but evidence suggests an association with thermal capsulorrhaphy or the use of an intra-articular pain pump after surgery (20-22). The risk of infection following open and arthroscopic stabilization ranges from 0-6% and 0.04-0.23% respectively. Other post-operative complications include stiffness, loss of motion, loss of strength and function, persistent pain, degenerative arthritis, infection, and subscapularis dysfunction (23).

Does delaying surgery influence outcome?

Grumet et al. systematically reviewed the evidence on the outcomes of arthroscopic repair for anterior shoulder instability in first-time dislocators compared with patients with recurrent instability (24). They found no difference in recurrence or complication rates amongst the two groups but because of the variation in the outcome measurement tools used within the studies evaluated functional outcome, quality of life, and ability to return to pre-injury could not be assessed.

Despite these findings however, authors have showed that stabilisation for recurrent dislocation is technically more demanding as a result of elongation of the antero-inferior capsule, progressive labro-ligamentous injury as well as prevalence and severity of glenoid bone loss (5, 25, 26).

Which method of immobilisation with non-operative treatment?

The traditional method for the treatment of primary anterior shoulder dislocation had been closed reduction followed by immobilization in internal rotation. When immobilized in this position, studies have shown no clinical advantage for immobilization for longer than one week (7). Hovellius et al. compared the rate of recurrent shoulder instability in 112 patients who used simple sling immobilization for 3-4 weeks with 104 patients who began to use the shoulder as early and as freely as possible (15). At the two-year follow-up, both groups showed an equal rate of recurrent shoulder instability.

In 2003 Itoi proposed that the healing of associated labrum injuries might be improved if the shoulder is immobilized in external rotation, providing better coaptation of the lesion and increasing shoulder stability (27, 28). In a prospective multicenter randomized clinical trial comprising 198 patients with a first-time dislocation the recurrence rate in the external rotation group (26%) was found to be significantly lower than that in the internal rotation group (42%). In the subgroup of patients who were aged 30 years or younger, the relative risk reduction was 46.1% (29). However, a recent meta-analysis comparing the position and duration of immobilization after primary anterior shoulder dislocation showed that although bracing in external rotation may provide a clinically important benefit over traditional immobilization, the difference in recurrence rates did not achieve significance with the numbers available (7). Other authors have found no significant difference in recurrence rates after immobilisation in

external and internal rotation in patients with a primary shoulder dislocation (30-32).

The management of first-time shoulder dislocation involves taking into consideration not only the incidence of recurrent instability but also quality of life and functional outcome. In most patients closed reduction and a brief period of immobilization is sufficient to achieve an adequate outcome. Arthroscopic Bankart repair remains a viable option in the management of recurrent anterior glenohumeral instability offering good objective long-term outcomes with a high degree of patient satisfaction especially in the at-risk group of less than 25 years of age. Glenohumeral osteoarthritis remains a significant complication especially with recurrent shoulder instability. There may be some benefit in early surgical stabilisation to prevent recurrent instability and thus reduce the incidence of arthritis. In summary, the method

of treatment should be tailored to the patients' age and functional demands and these issues must be discussed on an individual basis.

A Ali Narvani MD
Rowley Bristow Unit, Ashford & St Peters NHS FT
Fortius Clinic, London, UK

Ioannis Polyzois MD
Rohit Gupta FRCS (Orth)
Rowley Bristow Unit, Ashford & St Peters NHS FT, London, UK

Rupen Dattani MD
Chelsea & Westminster Hospital, London, UK

Ofer Levy MD
Reading Shoulder Unit, Reading, London, UK

References

1. Brophy RH, Marx RG. The treatment of traumatic anterior instability of the shoulder: nonoperative and surgical treatment. *Arthroscopy*. 2009; 29(3):304-310.
2. Kirkley A, Werstine R, Ratjek A, Griffin S. Prospective randomized clinical trial comparing the effectiveness of immediate arthroscopic stabilization versus immobilization and rehabilitation in first traumatic anterior dislocations of the shoulder: long-term evaluation. *Arthroscopy*. 2005; 21(1):55-63.
3. Kirkley A, Griffin S, McLintock H, Ng L. The development and evaluation of a disease-specific quality of life measurement tool for shoulder instability. The Western Ontario Shoulder Instability Index (WOSI). *Am J Sports Med*. 1998; 26(6):764-72.
4. Gill TJ, Micheli LJ, Gebhard F, Binder C. Bankart repair for anterior instability of the shoulder. Long-term outcome. *J Bone Joint Surg Am*. 1997; 79(6):850-7.
5. Griffith JF, Antonio GE, Yung PS, Wong EM, Yu AB, Ahuja AT, et al. Prevalence, pattern, and spectrum of glenoid bone loss in anterior shoulder dislocation: CT analysis of 218 patients. *AJR Am J Roentgenol*. 2008; 190(5):1247-54.
6. Hovelius L, Saeboe M. Neer Award 2008: Arthropathy after primary anterior shoulder dislocation--223 shoulders prospectively followed up for twenty-five years. *J Shoulder Elbow Surg*. 2009; 18(3):339-47.
7. Paterson WH, Throckmorton TW, Koester M, Azar FM, Kuhn JE. Position and duration of immobilization after primary anterior shoulder dislocation: a systematic review and meta-analysis of the literature. *J Bone Joint Surg Am*. 2010; 92(18):2924-33.
8. Rowe CR. Prognosis in dislocations of the shoulder. *J Bone Joint Surg Am*. 1956; 38-A(5):957-77.
9. Sachs RA, Lin D, Stone ML, Paxton E, Kuney M. Can the need for future surgery for acute traumatic anterior shoulder dislocation be predicted? *J Bone Joint Surg Am*. 2007; 89(8):1665-74.
10. te Slaa RL, Brand R, Marti RK. A prospective arthroscopic study of acute first-time anterior shoulder dislocation in the young: a five-year follow-up study. *J Shoulder Elbow Surg*. 2003; 12(6):529-34.
11. Wintzell G, Hovelius L, Wikblad L, Saebo M, Larsson S. Arthroscopic lavage speeds reduction in effusion in the glenohumeral joint after primary anterior shoulder dislocation: a controlled randomized ultrasound study. *Knee Surg Sports Traumatol Arthrosc*. 2000; 8(1):56-60.
12. Hovelius L, Olofsson A, Sandström B, Krantz L, Fredin H, Tillander B, et al. Nonoperative treatment of primary anterior shoulder dislocation in patients forty years of age and younger: a prospective twenty-five-year follow-up. *J Bone Joint Surg Am*. 2008; 90(5):945-52.
13. Robinson CM, Howes J, Murdoch H, Will E, Graham C. Functional outcome and risk of recurrent instability after primary traumatic anterior shoulder dislocation in young patients. *J Bone Joint Surg Am*. 2006; 88(11):2326-36.
14. Jakobsen BW, Johannsen HV, Suder P, Søjbjerg JO. Primary repair versus conservative treatment of first-time traumatic anterior dislocation of the shoulder: a randomized study with 10-year follow-up. *Arthroscopy*. 2007; 23(2):118-23.
15. Millett PJ, Clavert P, Warner JJ. Open operative treatment for anterior shoulder instability: when and why? *J Bone Joint Surg Am*. 2005; 87(2):419-32.
16. Chahal J, Marks PH, Macdonald PB, Shah PS, Theodoropoulos J, Ravi B, et al. Anatomic Bankart

- repair compared with nonoperative treatment and/or arthroscopic lavage for first-time traumatic shoulder dislocation. *Arthroscopy*. 2012; 28(4):565-75.
17. Petrera M, Patella V, Patella S, Theodoropoulos J. A meta-analysis of open versus arthroscopic Bankart repair using suture anchors. *Knee Surg Sports Traumatol Arthrosc*. 2010; 18(12):1742-7.
 18. Wang C, Ghalambor N, Zarins B, Warner JJ. Arthroscopic versus open Bankart repair: analysis of patient subjective outcome and cost. *Arthroscopy*. 2005; 21(10):1219-22.
 19. Buscayret F, Edwards TB, Szabo I, Adeleine P, Coudane H, Walch G. Glenohumeral arthrosis in anterior instability before and after surgical treatment: incidence and contributing factors. *Am J Sports Med*. 2004; 32(5):1165-72.
 20. Gomoll AH, Kang RW, Williams JM, Bach BR, Cole BJ. Chondrolysis after continuous intra-articular bupivacaine infusion: an experimental model investigating chondrotoxicity in the rabbit shoulder. *Arthroscopy*. 2006; 22(8):813-9.
 21. Good CR, Shindle MK, Kelly BT, Wanich T, Warren RF. Glenohumeral chondrolysis after shoulder arthroscopy with thermal capsulorrhaphy. *Arthroscopy*. 2007; 23(7):797.e1-5.
 22. Hansen BP, Beck CL, Beck EP, Townsley RW. Postarthroscopic glenohumeral chondrolysis. *Am J Sports Med*. 2007; 35(10):1628-34.
 23. Kang RW, Frank RM, Nho SJ, Ghodadra NS, Verma NN, Romeo AA, et al. Complications associated with anterior shoulder instability repair. *Arthroscopy*. 2009; 25(8):909-20.
 24. Grumet RC, Bach BR Jr, Provencher MT. Arthroscopic stabilization for first-time versus recurrent shoulder instability. *Arthroscopy*. 2010; 26(2):239-48.
 25. 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(1):66-74.
 26. Urayama M, Itoi E, Sashi R, Minagawa H, Sato K. Capsular elongation in shoulders with recurrent anterior dislocation. Quantitative assessment with magnetic resonance arthrography. *Am J Sports Med*. 2003; 31(1):64-7.
 27. Itoi E, Sashi R, Minagawa H, Shimizu T, Wakabayashi I, Sato K. Position of immobilization after dislocation of the glenohumeral joint. A study with use of magnetic resonance imaging. *J Bone Joint Surg Am*. 2001; 83-A(5):661-7.
 28. Itoi E, Hatakeyama Y, Kido T, Sato T, Minagawa H, Wakabayashi I, et al. A new method of immobilization after traumatic anterior dislocation of the shoulder: a preliminary study. *J Shoulder Elbow Surg*. 2003; 12(5):413-5.
 29. Itoi E, Hatakeyama Y, Sato T, Kido T, Minagawa H, Yamamoto N, et al. Immobilization in external rotation after shoulder dislocation reduces the risk of recurrence. A randomized controlled trial. *J Bone Joint Surg Am*. 2007; 89(10):2124-31.
 30. Finestone A, Milgrom C, Radeva-Petrova DR, Rath E, Barchilon V, Beyth S, et al. Bracing in external rotation for traumatic anterior dislocation of the shoulder. *J Bone Joint Surg Br*. 2009; 91(7):918-21.
 31. Handoll HH, Hanchard NC, Goodchild L, Feary J. Conservative management following closed reduction of traumatic anterior dislocation of the shoulder. *Cochrane Database Syst Rev*. 2006; 3(1):1-24.
 32. Liavaag S, Brox JI, Pripp AH, Enger M, Soldal LA, Svenningsen S. Immobilization in external rotation after primary shoulder dislocation did not reduce the risk of recurrence: a randomized controlled trial. *J Bone Joint Surg Am*. 2011; 93(10):897-904.