

ORIGINAL PAPERS

ANCHOR FAILURE FOLLOWING SHOULDER STABILISATION: DELAYED DIAGNOSIS AND POTENTIAL CONSEQUENCES.

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Introduction

Operative stabilisation is the treatment of choice for recurrent shoulder instability. This most commonly involves repair of the avulsed labral attachment from the anterior glenoid rim (Figure 1). Both open and arthroscopic methods are accepted methods of stabilisation in the high demand population such as the military personnel [1]. Suture anchors are routinely used in both arthroscopic and open stabilisation. Anchors provide secure attachment of avulsed soft tissues to bone and this has been shown to be as strong as transosseous tunnelling [2] which has been considered previously to be the "gold standard" method. Modern suture anchor techniques have been shown to result in a better outcome after shoulder stabilization, with fewer complications and lower recurrence rates, than the transglenoid repair [3] and are the preferred method for arthroscopic shoulder stabilization surgery. Suture anchors are broadly described as non-absorbable (metal) or bioabsorbable.



Figure 1. Appearance after standard Bankart repair

The senior author (JC) is a specialist shoulder surgeon and has implanted both metal and bioabsorbable anchors in open and arthroscopic stabilisation for traumatic shoulder instability. We have seen 3 instances of intraarticular migration with the metal anchors and 1 with a bioabsorbable anchor. All displaced metal anchors were associated with severe articular cartilage damage in contrast to the bioabsorbable anchor, which had minimal damage. The aim of this study is to highlight the potential to severe articular cartilage damage caused by the delayed displacement of metal anchors. Of particular concern is the absence of a relevant history in some patients leading to a delay in diagnosis.

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Case Reports

Case 1

A 44 year old army signals warrant officer underwent open shoulder stabilisation for traumatic instability using two 3.0 mm metal anchors. His symptoms of instability resolved after the operation. A year later, he started developing symptoms of impingement. Plain radiographs did not show any loosening or migration of the anchors. Following failure of conservative management, he was planned for an elective arthroscopic subacromial decompression. At the time of glenohumeral arthroscopy, the inferior labral repair was intact but the anterior labrum was detached. The superior anchor was found to be loose and prominent with no attached suture. The humeral head had widespread grade 2 articular damage. The anchor was removed and he had a revision Bankart's repair using a single bioknotless anchor. This improved but did not resolve his symptoms. A year later, a repeat arthroscopy was carried out. At this time, he was noted to have grade 1 to 2 osteoarthritis on the top of head but no deep lesion. This had not progressed over the past year. The anterior labrum had healed and the shoulder was stable. The rotator cuff was inflamed but intact. A subacromial decompression was carried out and he subsequently made a full functional recovery with complete resolution of all symptoms.

Case 2

A 34 year old Senior NCO had undergone open shoulder stabilisation using two 3.5 mm metal anchors. His shoulder had been stable after the operation and his symptoms resolved. Five years later, as he was lifting a box, he felt his shoulder sublux and developed pain. Subsequently, he could feel a grating sensation inside his shoulder, but ignored it for 8 months. Radiographs showed a loose anchor. He underwent an urgent arthroscopy which showed a loose intra-articular metal anchor (Figure 2) and widespread grade 1 to 2 osteoarthritic changes in the humeral head. He underwent a revision stabilisation with 2 bioabsorbable anchors, and has returned to full duties with minimal aching after exercise.

Case 3

A 22 year old private underwent open shoulder stabilisation using three 3mm metal anchors. He failed to comply with any post-operative instructions and had been playing football against medical advice. By six months following stabilisation, he had developed symptoms of instability. He underwent an elective shoulder arthroscopy, which showed 2 failed intra-articular anchors with widespread humeral head softening. He underwent an open revision stabilisation using 2 bioabsorbable anchors, and has been lost to follow-up, having attended only his 8 week post-operative appointment.

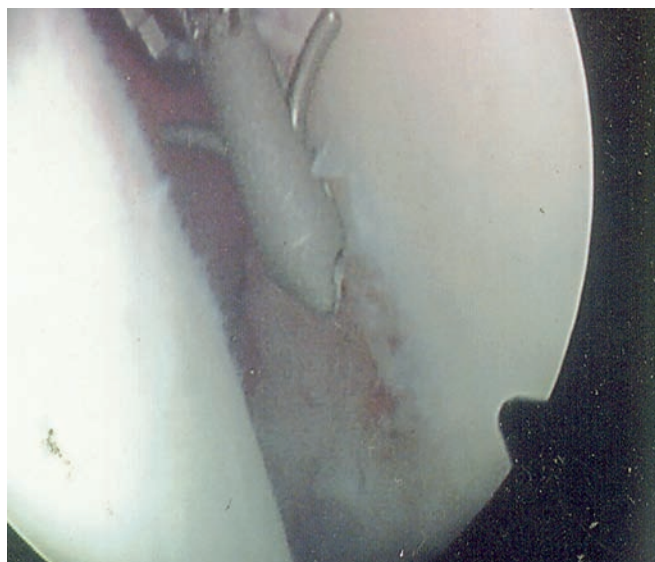


Figure 2. Arthroscopic retrieval of a loose metal anchor

Case 4

A 21 year old boxer underwent arthroscopic shoulder stabilisation using 3 bioabsorbable anchors. His shoulder improved after the procedure but he had persistent instability symptoms. He was a high level boxer; therefore a decision was taken to re-arthroscope his shoulder. This revealed a failed anchor but there was no evidence of chondral damage. He underwent an open revision stabilisation using 3 bioabsorbable anchors resulting in complete relief of symptoms. He has returned to work and full sporting activities and was discharged after 1 year follow-up.

Discussion

Both open and arthroscopic methods have been shown to be highly successful procedures for the treatment of traumatic shoulder instability even in high demand population such as the military personnel [1]. Both these procedures have minimal morbidity and low incidence of complications [4]. The migration of pins, staples and screws used for shoulder stabilisation procedures has been documented extensively [5,6]. However, symptomatic hardware migrations appear to be an infrequent complication. Suture anchors may pullout for a variety of reasons including malposition and poor bone density [7]. Experimental studies have shown similar pullout strengths and failure rates with metallic and bioabsorbable anchors [8]. Similar functional outcome with the use of both types of anchors in shoulder stabilisation has been showed in a randomised study [9]. However, the exact incidence of pullout of anchors in clinical scenario is unknown.

The cases described above demonstrate a severe complication following the displacement of metal anchors. The disturbing facts are that these patients presented at variable time intervals following surgery and with varying clinical presentation. One of them had a failed metal anchor five years after undergoing stabilisation. He chose to ignore the symptoms, as it was relatively painless and continued to use his shoulder for 8 months before seeking attention. Lack of follow-up is a problem in military due to postings, operational tours and failure to attend.

Plain radiographs were not helpful in 3 of the 4 cases. 3 of these cases represent continuing damage to the articular cartilage due to displaced metal anchors, which were relatively painless. The single case of displaced bioabsorbable anchor did not have evidence of articular cartilage injury on arthroscopy. He developed symptoms in the first few weeks of stabilisation and underwent early diagnostic arthroscopy. The minimal damage caused by the bioabsorbable anchor may be due to early diagnosis in the postoperative rehabilitation and relatively softening of the anchor

due to degradation. However, it is important to realise that the rate of degradation for most of the suture anchors and tacks is unknown or has not been reported in peer-reviewed publications.

The severe chondral damage seen with displaced metal anchors may be due to their delayed presentation and hard surfaces. In metallic anchors, the surfaces tended to be rough with sharp edges (Figure 3), but the absorbable implants typically have smoother edges, which become softer with time. Chondral damage has been reported after malposition or migration of both absorbable and nonabsorbable devices and whether the procedure is done arthroscopically or via an open approach [5,6]. The patient with a malpositioned or migrated shoulder suture anchor may have symptoms of pain or catching in the postoperative period. A plain radiograph has been recommended for patients who have pain, catching or decreased motion after shoulder stabilisation [10]. In our series, plain radiographs were helpful only in 1 out of 4 cases. Computed tomography can be helpful if metallic devices have been used. MRI may be helpful for the patient with absorbable implants who has synovitis or mechanical symptoms.

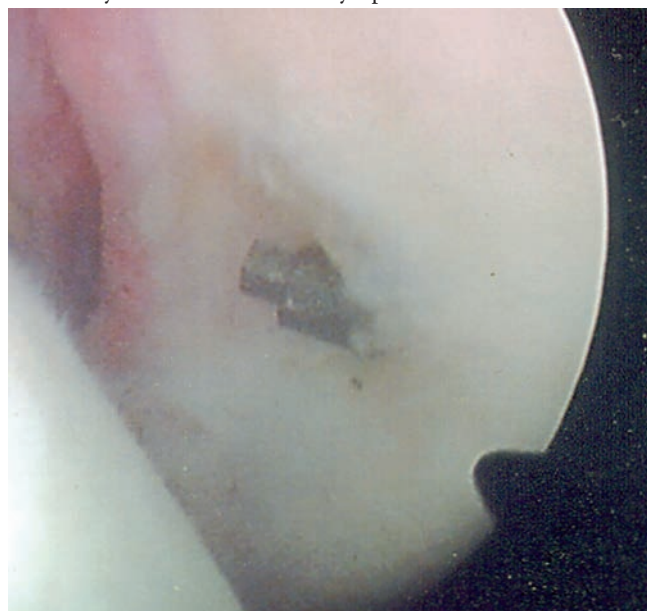


Figure 3. A prominent metal anchor causing chondral damage

The management of a displaced anchor is early removal and revision of the repair if needed. One paper has suggested that anchors in the axillary pouch that do not cause symptoms probably can be left in place [11]; however, there is possibility of continuing chondral damage and distant migration.

There are pros and cons of using a bioabsorbable anchors. The advantages cited are that they facilitate postoperative imaging and revision surgeries. Ideally, anchors will degrade as soft tissue healing progresses and gradually will allow more stress to be applied as the tissues can tolerate it. An absorbable anchor is useful in the revision arthroscopic labral repair, as it is possible to use the same anchor hole again. The disadvantage of bioabsorbable material is the reported incidence of polymer induced synovitis and possible osteolysis [12,13]. This is less of a problem with suture anchors as compared to suture tacks due to the very small amount of exposed surface with an anchor. Newer polymers have been reported to have very low incidence of symptomatic synovitis. Mitek has sold 186,195 Bioknotless anchors worldwide since its launch. They have received a total of 123 complaints (0.066%). There are only six reported complaints regarding synovitis, osteolysis, or articular cartilage damage (0.003%) [14].

Metallic anchors can impede postoperative imaging through artifact production. Their sharp edges are a reason for higher incidence of suture breakage on cyclical loading. Removal of malpositioned metal anchor is difficult and may need excavation using a burr causing bone loss and articular damage.

On the basis of these cases and findings, we have discontinued the use of metal suture anchors. We recommend that these devices not be used in the high demand population such as the military personnel who are at a higher risk of pull out of anchors even many years after implantation. Follow-up with appropriate imaging studies of all patients who have had these devices implanted should be considered, especially if they have symptoms. Patients presenting with delayed onset pain, stiffness, grating or catching sensation after shoulder stabilisation using anchors should be evaluated with early diagnostic arthroscopy to look for loose or prominent anchors. Such anchors should be removed to lessen the risk of articular damage.

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