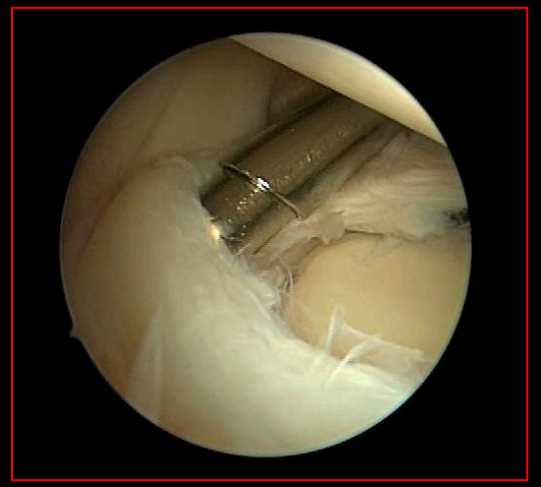
Posterior Shoulder Instability
- Diagnosis and Management



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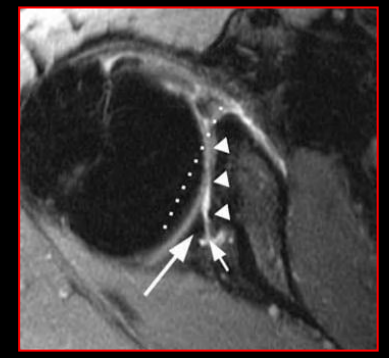
Introduction

- True posterior shoulder instability said to be relatively rare, with a reported incidence from 2 to 12%
  Owens et al. AJSM 2007; 35: 1168-1173
  Woodmass et al. JSES 2019; 28; 611-616

- Clinical presentation not as obvious as anterior instability and many patients often misdiagnosed (SLAP, internal impingement, RC disease)

<u>As a Result</u>

- Experience and understanding of posterior shoulder instability and its treatment relatively more limited



Presentation

- Few patients report a specific episode of posterior dislocation
  - shoulder adducted, forward flexed, internally rotated
  Robinson et al. JBJS (Am) 2005; 87: 883-892

- Relatively more patients will describe an episode of trauma without instability, especially in contact/collision athlete
  - incidence of posterior labral pathology in this group as high as 40%
  - directly related to number of athletic exposures
  - pain and mechanical symptoms often primary complaint
  Lanzi et al. Am J Sports Med 2017; 45: 3315-3321

Presentation

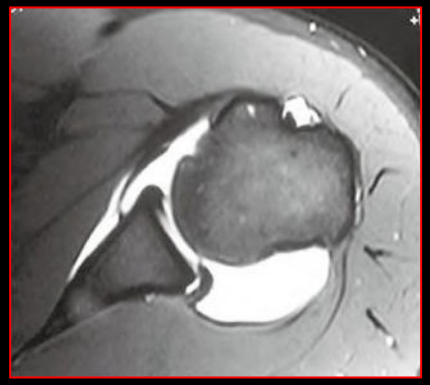
- Other patients will report the insidious onset of symptoms, usually from repetitive micro-trauma

  - rugby/rugby league, NFL, weight lifters, swimmers, throwers, volleyball
  Provencher et al. AJSM 2011; 39: 874-886

  - often manifest an inferior component to their instability

  - present with painful recurrent posterior ‘subluxation’
  (instability may not be appreciated by patient)

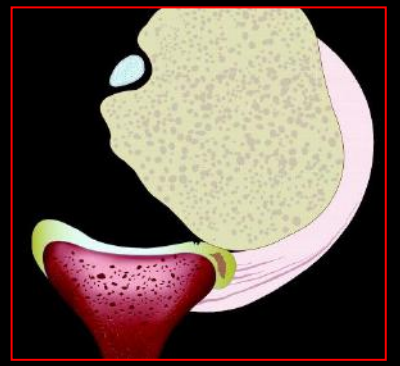
Pathology



- Most cases of <u>traumatic</u> posterior instability involve damage to the posteroinferior capsulolabral complex
  - symptomatic patients will usually have some degree of labral pathology

<u>However</u>

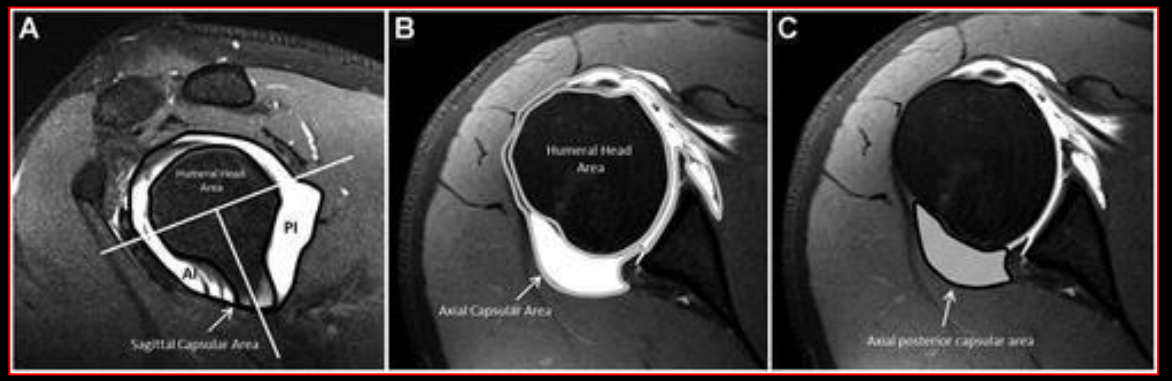
- Labral lesions can be un-displaced or minimally displaced and may not always be evident on imaging
- Reverse Hill-Sachs lesions often indistinct
- May manifest as concealed lesion of labrum (Kim lesion)
  Kim et al. Arthroscopy 2004; 20: 712-720
- Concomitant pathology not uncommon (40% - 80% patients)



Pathology

- Pathogenesis of atraumatic posterior instability remains controversial, but most reports emphasise increased retroversion of both bony and chondrolabral elements
  Bradley et al. AJSM 2006; 34: 1061-1071

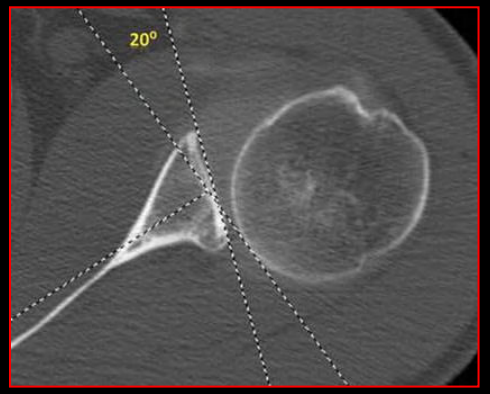
- Recent study also demonstrated that increased posterior capsular area on MRA can be associated with posterior labral tears and symptomatic posterior shoulder instability
  Galvin et al. AJSM 2016; 44: 3222-3229



Overall

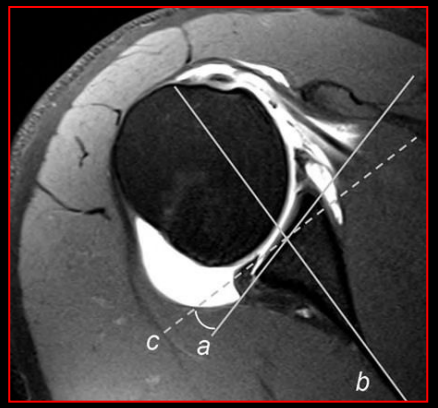
- Most significant risk factor for posterior instability is increased glenoid retroversion and/or glenoid dysplasia
  - 17% increase in risk for every degree of increased retroversion beyond the average of 5 to 10 degrees

  Owens et al. AJSM 2013; 41: 2645–2649



- Atraumatic onset of posterior shoulder instability associated with higher degrees of glenoid retroversion

  Katthagan et al. Arthroscopy et al. 2017; 33: 284-290



- Subtle forms of glenoid dysplasia more common than previously thought

  Eichinger et al. JBJS (Am) 2016; 98: 958-968

Assessment

- Because posterior instability can be difficult to diagnose, mechanism of injury and activities that are provocative essential to history
- Patients often present with vague complaints (pain, crepitus, weakness)

- Physical examination aims to reproduce symptoms
  - sulcus test, hyperlaxity, load and shift, jerk test, Kim test, apprehension test

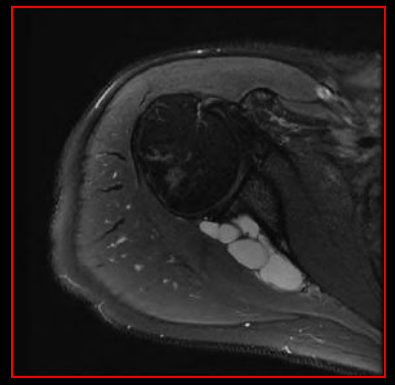
  Kim et al. AJSM 2005; 33: 1188-1192

- Must differentiate MDI from unilateral posterior instability
- Patients who voluntarily create instability (habitual non-structural muscle patterning pathology) should be approached with caution

Imaging

- Standard radiographs important but usually not diagnostic

- CT essential for assessment of version and presence of bone loss
- MR arthrography essential for assessment of capsulolabral pathology and identification of concomitant injuries



<u>Remember</u>

- High index of suspicion as posterior labral lesions can be subtle or negative
- Posterior shoulder pathology rarely an isolated event

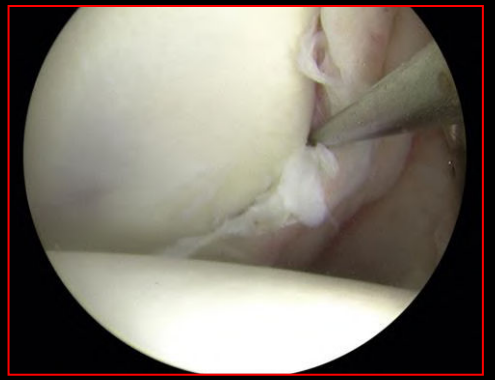
Management

- Initial treatment always non-operative, especially in those with minimal pain on provocative testing
  McIntyre et al. Phys Ther Sport 2016; 22: 94-100

<u>However</u>

- Recent 1-year prospective outcome study of 51 patients with symptomatic posterior shoulder instability reported superiority of operative over non-operative treatment
  Cruz-Ferreira et al. Orthop Trauma Surg Res 2017; 103: S185-S188

- Ultimately, 70% of patients diagnosed with posterior shoulder instability eventually go on to surgical intervention
  Woodmass et al. Arthroscopy 2019; In Press



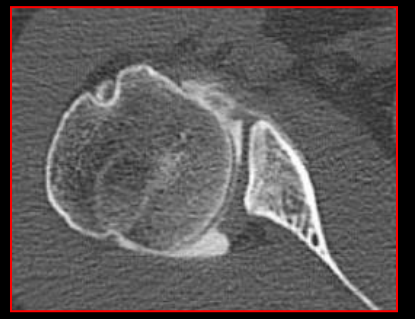
Surgery

- Lack of consensus remains regarding surgical management of posterior shoulder instability, primarily because of lack of understanding of its pathomechanical basis
- Preoperative imaging vital to surgical planning

- Surgery more likely to be successful in patients with labral pathology
- Surgery more likely to be successful in patients with traumatic instability
  Katthagan et al. Arthroscopy et al. 2017; 33: 284-290

- Significant increase in rate of surgical intervention for posterior shoulder instability over the last 20 years
  Woodmass et al. JSES 2019; 28; 611-616

Surgery



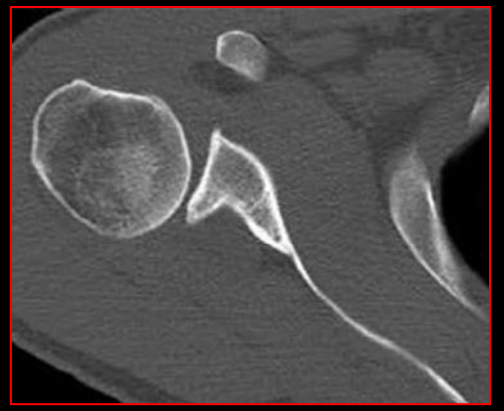
- 2 broad approaches to surgical management:
  1) soft tissue procedures
  2) glenoid and/or humeral head bony procedures

<u>Important</u>

- Treatment outcomes vary depending on presence of pre-existing bone and/or cartilage lesions
  Garret et al. Orthop Trauma Surg Res 2017; 103: S199-S202

- Main predictor of treatment outcome is presence of cartilage damage, where inappropriate stabilising surgery may worsen the condition (and the patient)

Walch B0 Glenoid



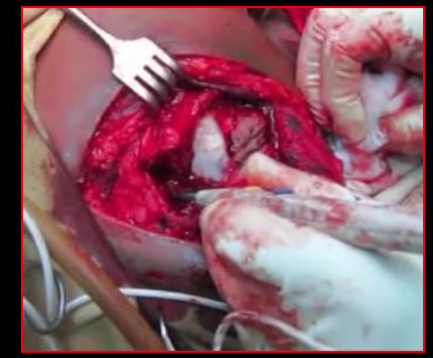
- Pre-osteoarthritic posterior subluxation of humeral head
  Walch et al. JSES 2018; 27: 181-188
- Most likely starts as functional decentering of the humeral head at the extremes of motion, but evolves with time into static posterior subluxation
- Origin unclear
- Patients may describe feeling of instability, with painful but negative apprehension test results
- Likely related to pre-osteoarthritic symptoms (posterior subluxation in context of OA) rather than instability
  Walch et al. JSES 2002; 11: 309-314

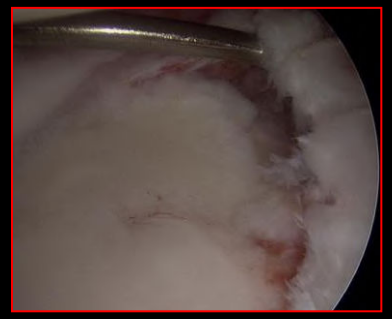
Soft Tissue Pathology

- Arthroscopic repair using suture anchors in traumatic posterior instability uniformly successful and remains the current surgical gold standard
  Bradley et al. AJSM 2013; 41: 2005-2014
  Katthagan et al. Arthroscopy 2017; 33: 284-290



- Arthroscopy superior to open surgery in terms of recurrence rate, likelihood of returning to sport at any level, subjective impression of stability, and patient satisfaction
  DeLong et al. AJSM 2015; 43: 1805-1817
  - outcomes for open procedures overall have not been consistent



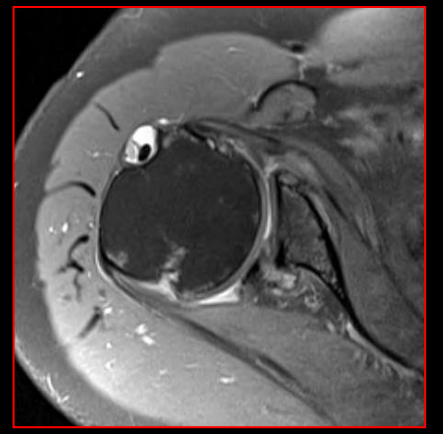


Note

- One recent study reported that increased glenoid retroversion <u>did not</u> significantly influence overall clinical outcomes
  Mauro et al. AJSM 2016; 44: 941-947
- Increased glenoid width significantly associated with better pain and ASES scores and decreased risk for failure

- Another study reported that mean clinical outcome scores were not influenced even by the presence of glenoid dysplasia
  - not influenced by amount of retroversion, posterior humeral head subluxation, and posterior capsular area
- Overall outcomes were worse than previous studies
  Galvin et al. JSES 2017; 26: 2103-2109

Glenoid Dysplasia



- More severe forms of glenoid dysplasia represents a risk for failure with soft tissue procedures, and some authors recommend that bony procedures should be considered

<u>However</u>

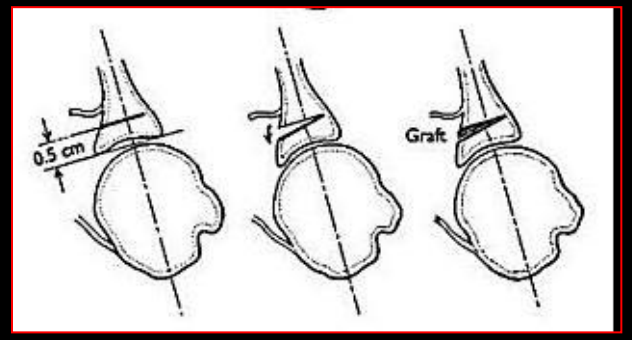
- Given paucity of robust outcome studies, the technical difficulty of bony procedures, and the associated potential risks, caution must be exercised in considering bony surgical options for symptomatic glenoid dysplasia
  Eichinger et al. JBJS (Am) 2016; 98: 958-968

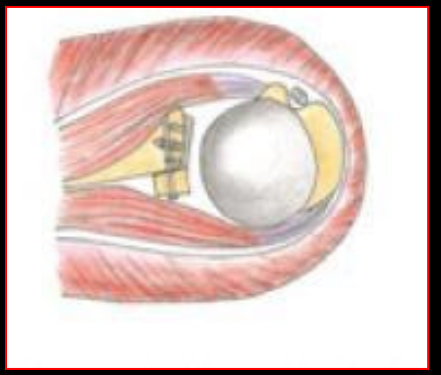
- Different to acquired posterior glenoid bone loss when bony defects > 20% likely to be significant and can be reliably addressed
  Nacca et al. AJSM 2018; 46: 1058-1063

Bony Procedures

- Two main procedures have been described for restoring posterior glenoid stability in patients with fractures, glenoid dysplasia, or excessive glenoid retroversion
  - posterior opening wedge osteotomy
  - posterior bone block procedure

  Robinson et al. JBJS (Am) 2005; 87: 883-892

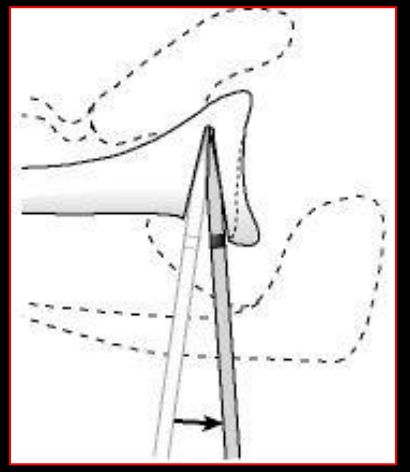




<u>Remember</u>

- Relatively little data to guide surgical indications and treatment decisions
- Both recently fallen out of favour as first line treatment options
- Typically reserved for those who fail a soft tissue procedure or have significant bone loss or deficiency

Opening Wedge Osteotomy

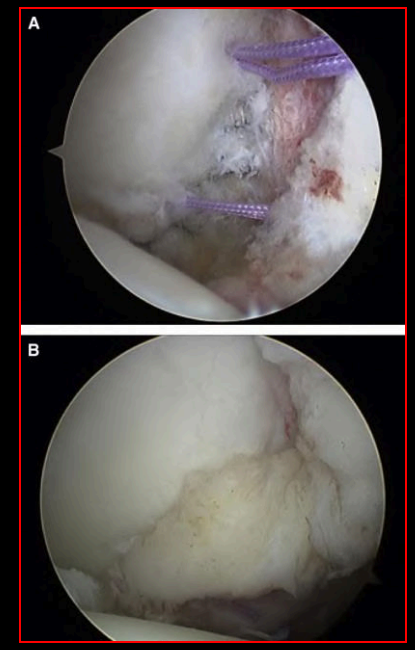


- An option in cases of glenoid dysplasia and retroversion > 15 to 20 degrees
  Walch et al. JSES 2002; 11: 309-314
  - osteotomy at posteromedial glenoid neck 1cm medial to joint
  - leave anterior cortex intact
  - wedge of bone graft to provide predetermined amount of correction

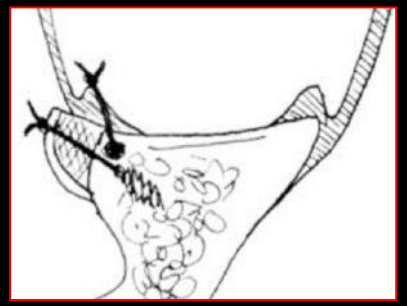
<u>However</u>

- Procedure fraught with complications and progression to arthrosis, and tendency for humeral head to sublux anteriorly
  Gerber et al. CORR 1987: 70-79
  Graichen et al. Int Orthop 1999; 23: 95-99

Posterior Bone Block



- Can be performed open or arthroscopically
  Schwartz et al. JSES 2013; 22: 1092-1101
- An option for patients with recurrent traumatic posterior instability and bone defects (humeral or glenoid sided), as well as atraumatic dislocators with glenoid dysplasia or hyperlaxity
- Aim to fix iliac crest bone graft extra-articularly to posterior glenoid rim to recreate normal contour of glenoid, not to “block” the humeral head



However

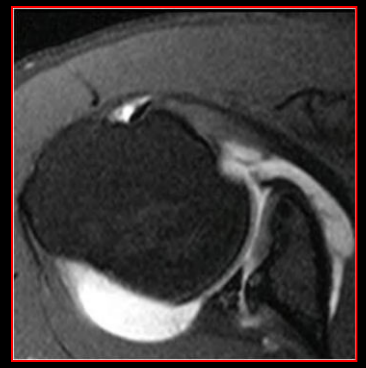
- Long-term results have demonstrated high rate of complications, persistent pain, bone graft lysis, and progression of arthrosis
  Meuffels et al. JBJS (Br) 2010; 2: 651-655
  Clavert et al. Orthop & Surg: Traum and Res 2017; 103: S193-S197

Results

- Early reports on arthroscopic posterior stabilisation showed poor results with high recurrence rates (correlation between retroversion and failure)
  Hurley et al. AJSM 1992; 20: 396-400
- Now preferred over open techniques and results in superior clinical outcomes regarding stability, recurrence, satisfaction, and return to sport, especially when instability unidirectional and non-voluntary
  DeLong et al. AJSM 2015; 43: 1805-1817
- Overhead athletes poorer outcomes and return to sport than contact/collision athletes
  Arner et al. Arthroscopy 2015; 31: 1466-1471
- Patients who undergo surgery at any time point have increased risk of radiographic progression of arthritis at minimum of 5 years of follow-up
  Woodmass et al. Arthroscopy 2019; In Press

Summary

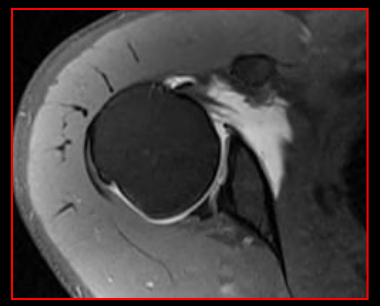
- Successful management of posterior shoulder instability relies firstly on making an accurate diagnosis
  - often misdiagnosed or with a delay in diagnosis



- Essential that surgeon has understanding of relevant pathoanatomy, with increased glenoid retroversion and increased capsular volume being recognized as important risk factors

- Higher degrees of glenoid retroversion, inferior clinical outcomes, and a trend toward lower rates of return to sport suggest that treatment of patients with atraumatic onset of posterior shoulder instability more challenging

Summary

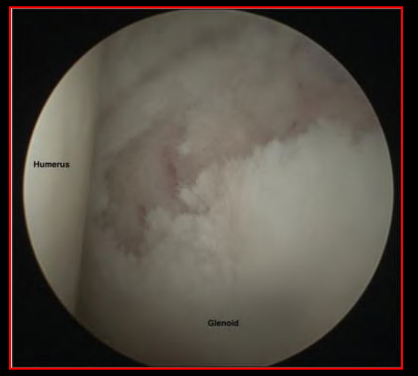


- Arthroscopic posterior labral repair, even in presence of mild forms of glenoid dysplasia, remains an effective treatment method to treat traumatic posterior shoulder instability when symptoms warrant

- With modern arthroscopic techniques using multiple suture anchors, treatment aimed at reducing capsular and ligamentous laxity can restore ‘balanced’ shoulder stability - important to restore tension in IGHL complex
- Do not underestimate degree of instability even in patients without discrete labral tears

Summary

- Main predictor of treatment outcome is the presence of cartilage damage
  - early shoulder OA with posterior subluxation (Walch BO)



- With bone loss or more severe forms of dysplasia risk of failure with soft tissue procedures is present and in select cases there may still be a role for glenoid osteotomy or posterior bone block

<u>However</u>

- Predictable results have not been demonstrated and complication and failure rates very high