Posterior Shoulder Instability

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Declaration of Interest

I declare that in the past three years I have:

- Held shares in - nil
- Received royalties from - nil
- Done consulting work for - Arthrex, Wright Medical, LIMA
- Given paid presentations for - Arthrex, Wright Medical, LIMA
- Received research support from - Arthrex, DePuy Synthes

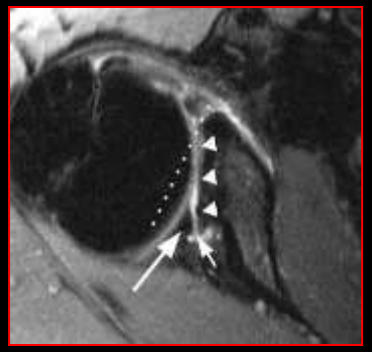
Signed: Craig M Ball

Introduction

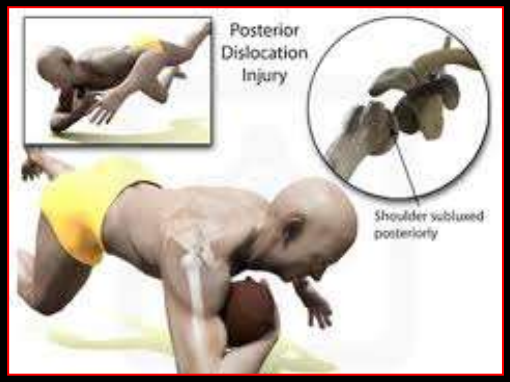
- True posterior shoulder instability relatively rare
  - reported incidence 2 to 12%
  Owens et al. AJSM 2007; 35: 1168-1173

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

- Experience and understanding of management 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 athlete
  - pain often primary complaint
  Kaplan et al. AJSM 2005; 33: 1142-1146

Presentation

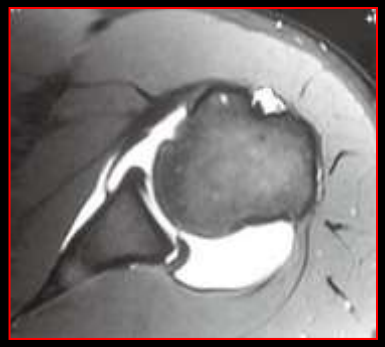
- Other patients will report insidious onset of symptoms, usually from repetitive micro-trauma

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

  - often manifest an inferior component to instability

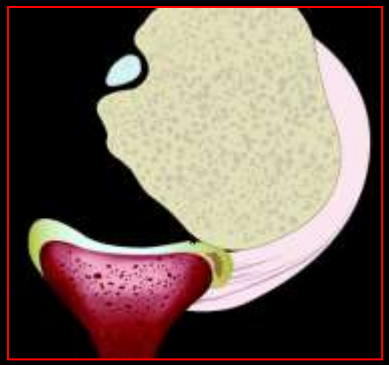
  - present with *painful* recurrent posterior ‘subluxation’
  (instability may not be appreciated by patient)

Pathology

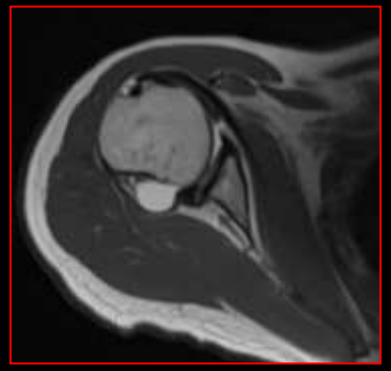


- Most cases of *traumatic* posterior instability involve damage to posteroinferior capsulolabral complex - symptomatic patients will usually have some degree of labral pathology, even if not evident on imaging
- Posterior labral lesions generally un-displaced or minimally displaced
- Reverse Hill-Sachs lesion usually indistinct

- May also manifest as concealed lesion of posteroinferior labrum (Kim lesion)
  Kim et al. Arthroscopy 2004; 20: 712-720

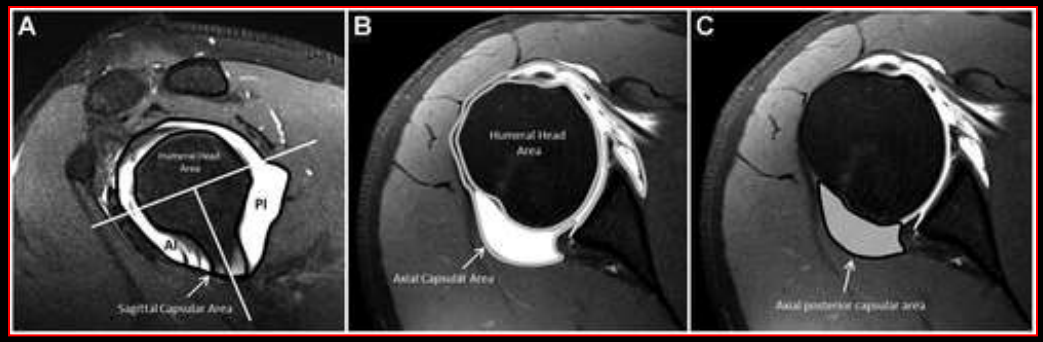


Pathology



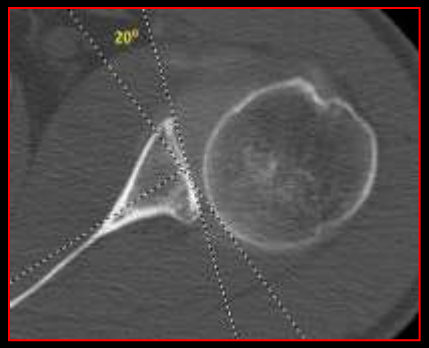
- Pathogenesis of *atraumatic* posterior instability controversial, but most reports emphasise retroversion of bony and chondrolabral elements
  Bradley et al. AJSM 2006; 34: 1061-1071

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



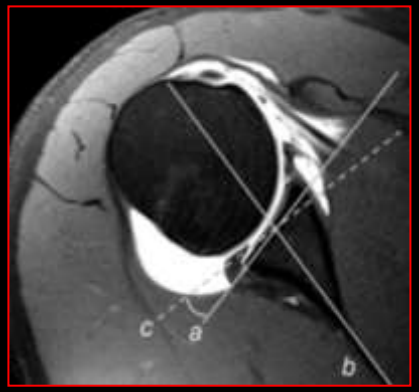
Overall

- Most significant risk factors for posterior instability are increased glenoid retroversion and glenoid dysplasia
  Owens et al. AJSM 2013; 41: 2645–2649
  - 17% increase in risk for every degree increased retroversion beyond the average of 5 to 10 degrees



<u>Remember</u>

- 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)

- Physical examination aims to reproduce symptoms of patient and should include specific tests for posterior instability
  - sulcus test, hyperlaxity, load and shift, jerk test, Kim test, apprehension testing

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

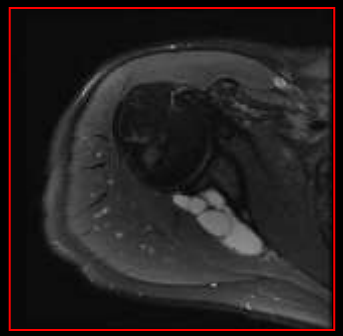
Remember

- Clinical assessment must differentiate multidirectional from less common unilateral posterior instability (can overlap in diagnosis, presentation, management)
  Bradley et al. AJSM 2006; 347: 1061-1071

- Patients who voluntarily create instability (habitual non-structural muscle patterning pathology) should be approached with caution
  Provencher et al. AJSM 2005; 33: 1463-1471

Imaging

- Standard radiographs important but usually do not provide diagnosis
- CT essential for assessment of version and bone loss
- MR arthrography essential for assessment of capsulolabral pathology and concomitant injuries



<u>Remember</u>

- Need 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

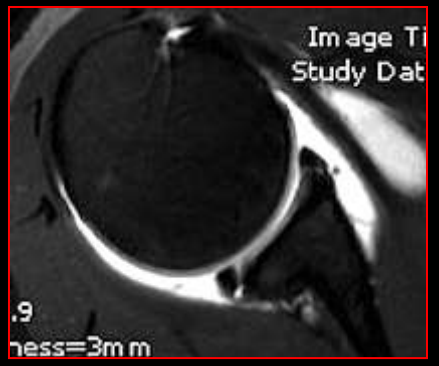
<u>However</u>

- 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

Surgery

- Lack of consensus regarding surgical management, primarily because of lack of understanding of pathomechanical issues leading to posterior instability

- Preoperative diagnostic imaging vital to surgical planning
  - more likely to be successful in patients with ‘traumatic’ posterior instability
  - more likely to be successful in patients with labral pathology on MRI



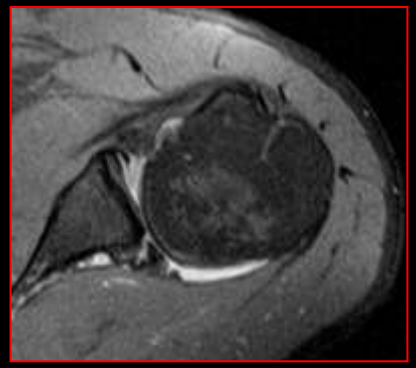
- Must also consider associated pathology

Surgery

- 2 broad categories of surgical management:
  - 1) soft tissue pathology
  - 2) glenoid and/or humeral head bony pathology

<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)



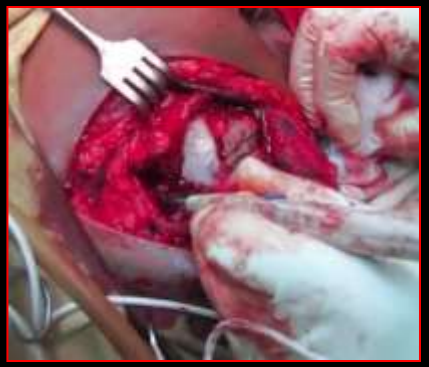
Walch B0 Glenoid

- Pre-osteoarthritic posterior subluxation of humeral head
  Walch et al. JSES 2018; 27: 181-188
- Most likely starts as functional decentering of shoulder at 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
  Bradley et al. AJSM 2013; 41: 2005-2014

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



Arthroscopic Repair

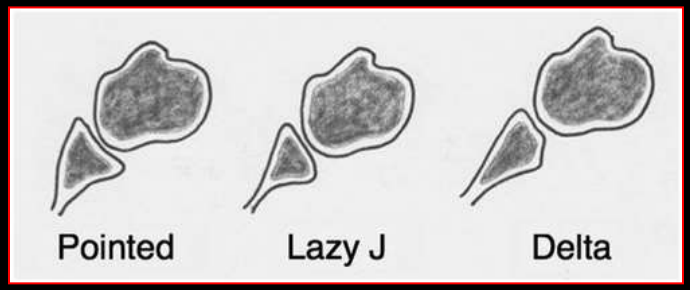
- Most pathologies can be treated with arthroscopic soft tissue procedures, but subsequent stretching of thin posterior capsule remains an important problem

- Use of suture anchors shown to be safe and produces stronger construct in comparison to anchorless plication, with improved return to sport and lower failure rates
  Bradley et al. AJSM 2013; 41: 2005-2014

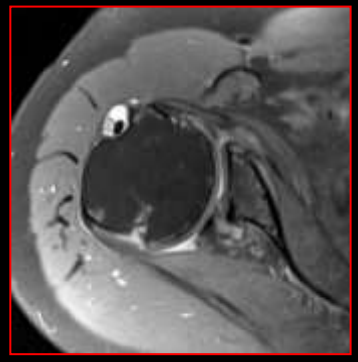


Note

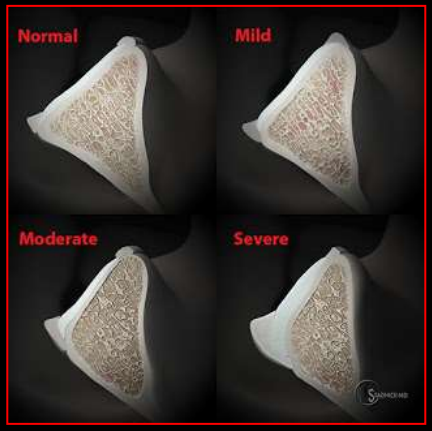
- One recent study reported that increased glenoid bone version did not influence overall clinical outcome
  Mauro et al. AJSM 2016; 44: 941-947
- Increased glenoid width, however, was significantly associated with better pain and ASES scores and decreased risk for failure after posterior labral repair
- Another study reported that mean clinical outcome scores not influenced by glenoid dysplasia
  - retroversion, HH subluxation, posterior capsular area (surgical outcomes were poorer than in previous studies)
  Galvin et al. JSES 2017; 26: 2103-2109



However

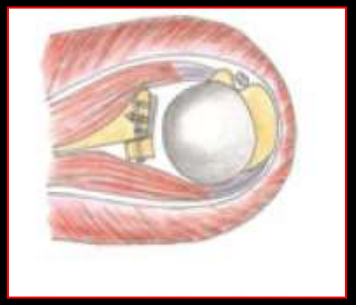


- More severe forms of glenoid dysplasia may represent a risk for failure with soft tissue procedures, and the role of bony procedures should be considered
- Given paucity of robust outcome studies, the technical difficulty of bony procedures, and the associated potential risks, caution must be exercised in considering surgical options for symptomatic glenoid dysplasia
  Eichinger et al. JBJS (Am) 2016; 98: 958-968



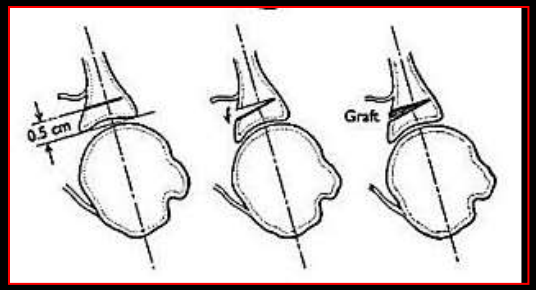
- Different for acquired posterior glenoid bone loss when osseous defect > 20% likely significant
  Nacca et al. AJSM 2018; 46: 1058-1063

Bony Pathology



- Two broad procedures described for restoring posterior glenoid rim in patients with fractures, dysplasia, or excessive glenoid retroversion
  - posterior opening wedge osteotomy
  - posterior bone block procedure

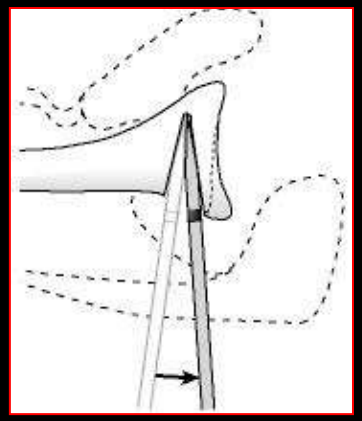
  Robinson et al. JBJS (Am) 2005; 87: 883-892



<u>Note</u>

- Bony procedures 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



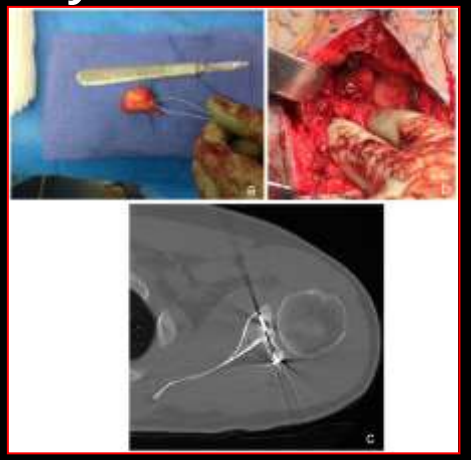
- An option in cases of glenoid dysplasia and retroversion > 15 degrees
  Walch et al. JSES 2002; 11: 309-314
  - osteotomy at posteromedial glenoid neck
  - leave anterior cortex intact
  - wedge of bone graft to provide predetermined amount of correction

<u>However</u>

- Procedure fraught with complications and progression to arthrosis, and tendency for humeral head to sublux anterior
  Gerber et al. CORR 1987: 70-79

Posterior Bone Block

- Can be performed open or arthroscopically
  Schwartz et al. JSES 2013; 22: 1092-1101
- Indicated for patients with recurrent traumatic posterior instability and bone defects (humeral or glenoid sided), as well as unintentional dislocators with glenoid dysplasia or hyperlaxity
- Aim to fix bone graft to posterior glenoid rim to recreate normal contour of glenoid



<u>However</u>

- High rate of complications, bone graft lysis, and progression of arthrosis limits indications

Results

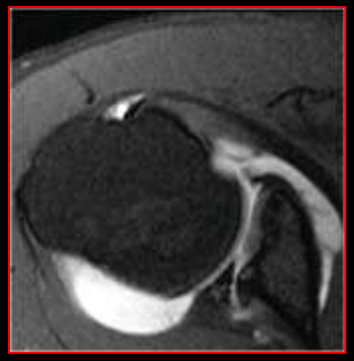
- Early reports on arthroscopic posterior stabilisation showed poor results with high recurrence rates
  - correlation between retroversion and failure
  Hurley et al. AJSM 1992; 20: 396-400
- Now preferred over open techniques and results in superior clinical outcomes regarding stability, recurrence, 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 athletes
  Arner et al. Arthroscopy 2015; 31: 1466-1471

Summary

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

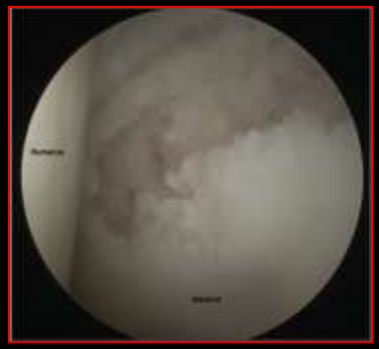


Summary

- Arthroscopic posterior labral repair, even in presence of glenoid dysplasia, remains an effective treatment method to treat symptomatic posterior shoulder instability
- 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

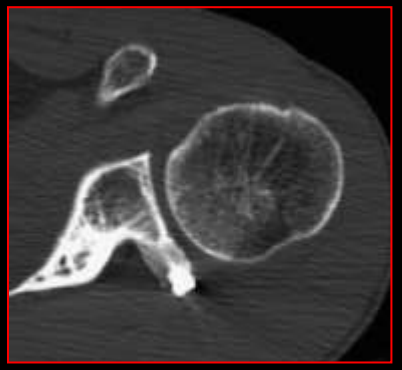
- Main preoperative predictor of treatment outcome is presence of cartilage damage
  - early shoulder OA with posterior subluxation (Walch BO)



- With bone loss or more severe forms of dysplasia risk of failure with soft tissue procedure and *may* be role for glenoid osteotomy or posterior bone block

<u>However</u>

- Predictable results have not been demonstrated and complication rates high



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