

Posterior Shoulder Instability

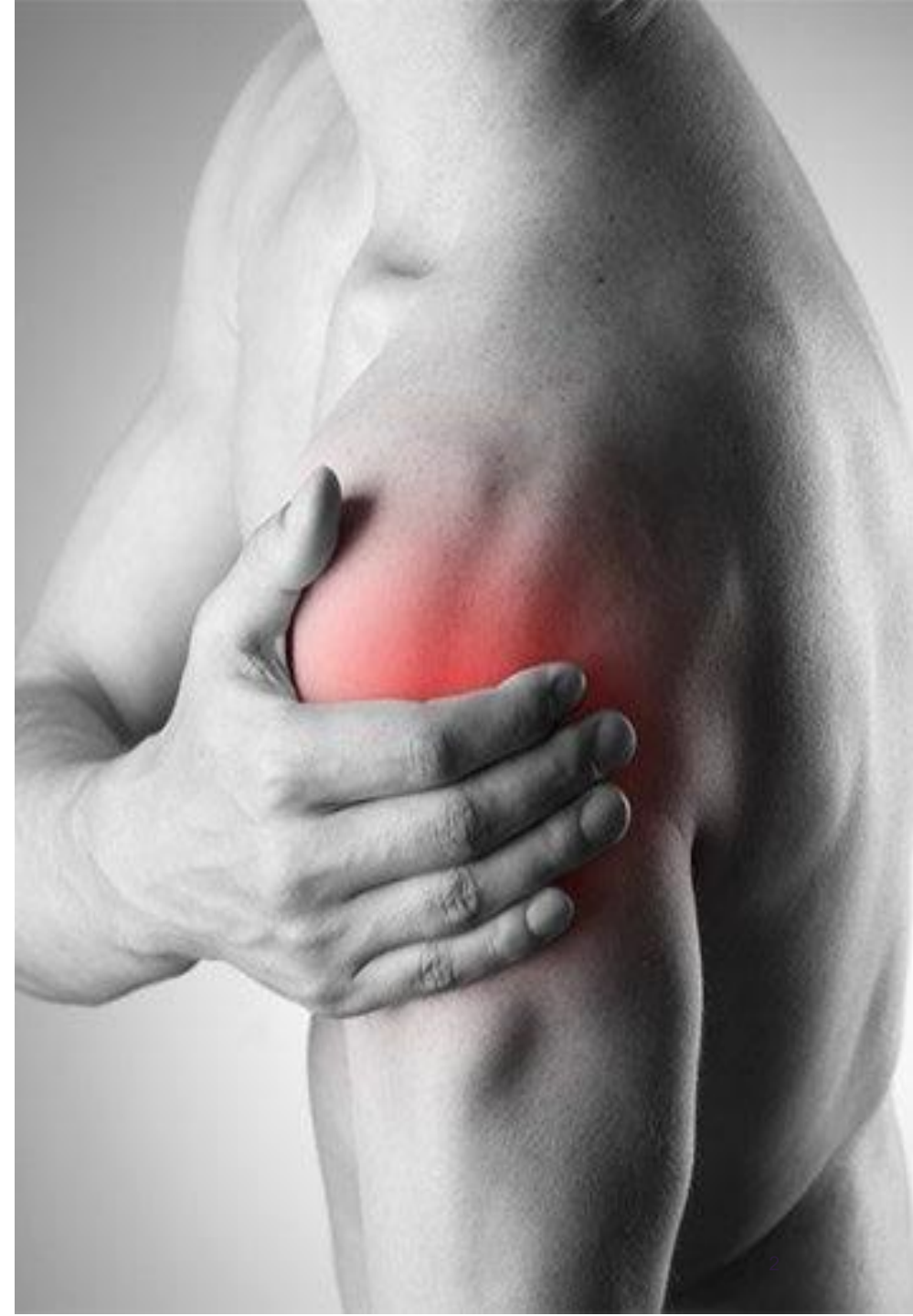
Less Common, But Not Uncommon

Anmol Maharaj

Senior MSOPD Physiotherapist – Townsville University Hospital

Posterior shoulder pain – must be the rotator cuff, right? Think again!

- Posterior shoulder instability is 20x less common than anterior instability.
 - 2-10% of all GHJ instability cases
- Represents a diagnostic challenge & often overlooked.
 - Missed in up to 79% of patients
- Initially considered as the counterpart to anterior instability, it is now recognised as a distinct clinical & pathoanatomical entity with different therapeutic targets.



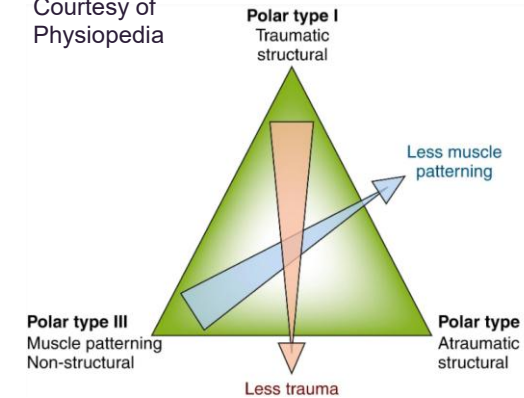
PSI: What is it?

Shoulder instability exists on a continuum : laxity ↔ dislocation.

Excessive translation that is not symptomatic = laxity.

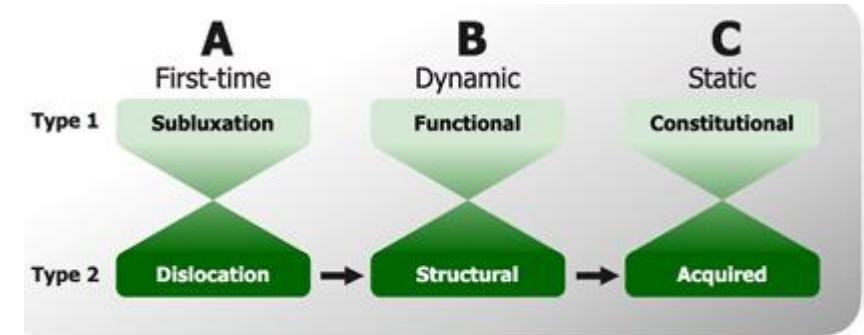
PSI = excessive GHJ posterior translation that leads to symptoms.

Courtesy of Physiopedia



Stanmore has been widely used with shoulder instability.

ABC Classification:
(Moroder, 2024)



Delphi Consensus (Sadi, 2020)

Acute Trauma

Traumatic posterior or posteroinferior GHJ dislocation.

Less common with PSI

Microtrauma

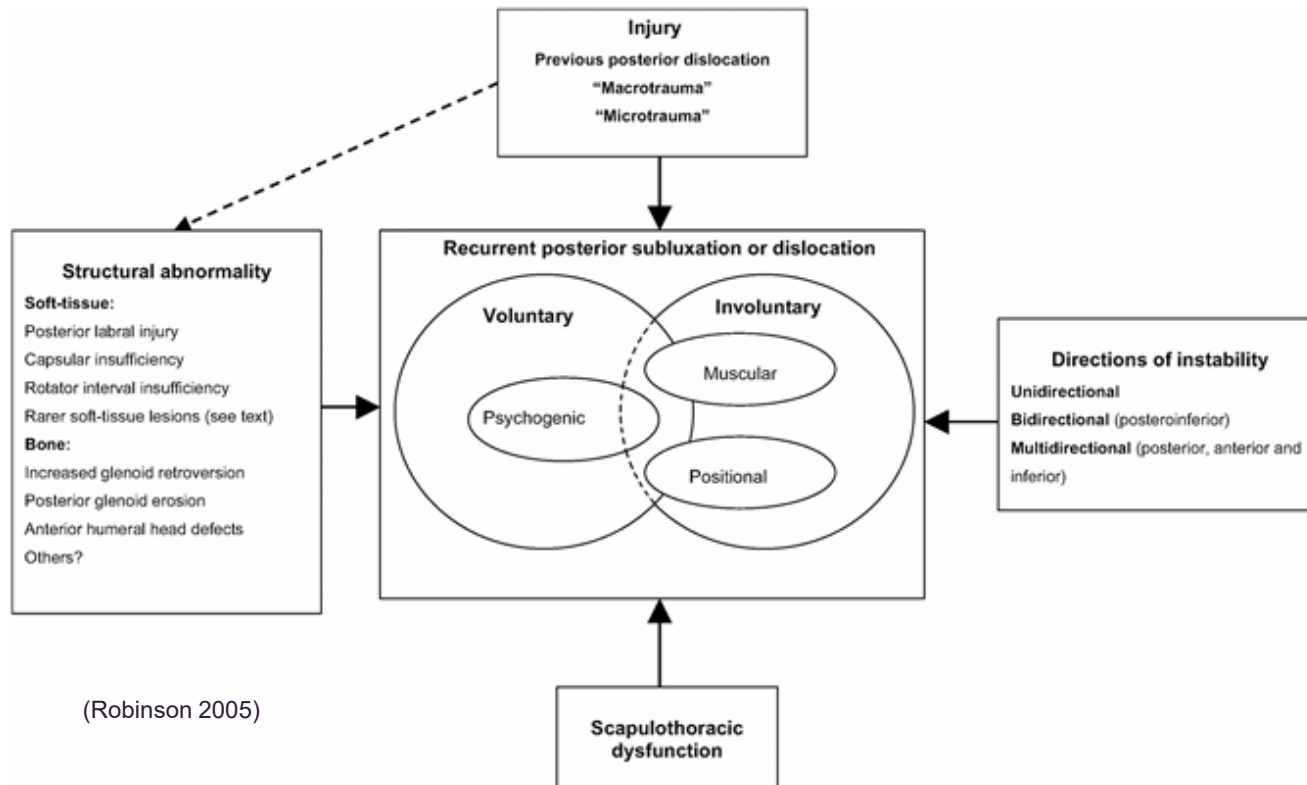
Repetitive microtrauma of posterior capsulolabral structures.

Most common with PSI

Non-traumatic

Bi- or multi-directional GHJ subluxation due to innate factors (e.g. global laxity).

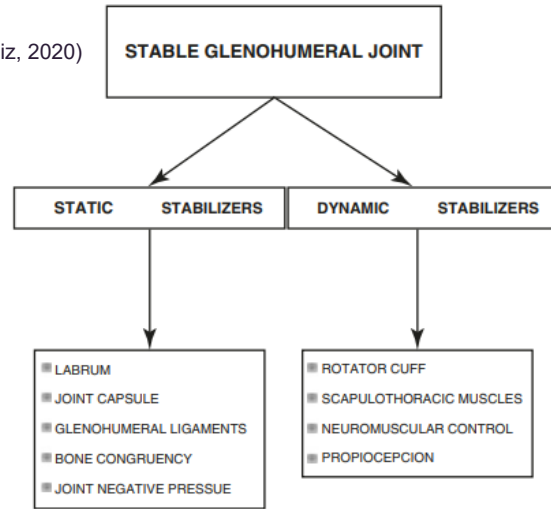
Least common



(Robinson 2005)

Normal Anatomy for Posterior Shoulder Stability

(Daiz, 2020)

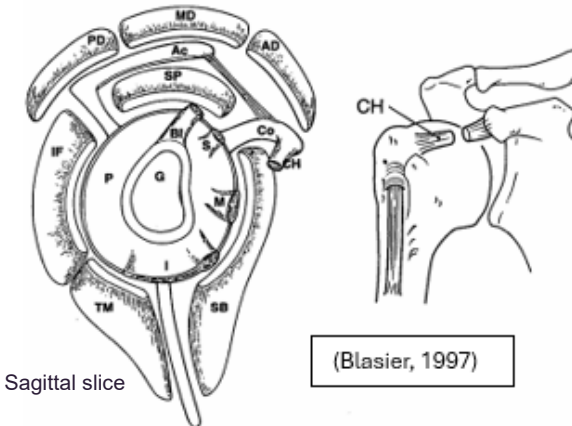


STATIC STABILISERS

Glenoid retroversion	Normal retroversion with respect to scapular body 0-7deg
Posterior labrum complex	Labrum increases GHJ depth by 50% and contact by 2mm (horizontally) & 4.5mm (vertically). Increases intra-articular negative pressure enabling a "suction cup" effect. Insertion point for ligaments and capsule.
Posterior capsule (PIGHL)	Posterior capsule is less robust than the anterior capsule & prone to repetitive microtrauma. PIGHL: primary stabilizer to posterior load in FLEX + IR positions (due to A-P orientation).

DYNAMIC STABILISERS

Rotator Cuff	All RC muscles provide a concavity-compression effect. Greater load required to translate HH.
Subscapularis	Particularly important role as a restraint to posterior GHJ translation. A biomechanical cadaver study of 8 shoulders: • Incisions made at specific sites with subsequent force applied. • Subscapularis provided 3x greater efficiency. • Potentially explained by the redirected subscapularis tendon around the glenoid rim.

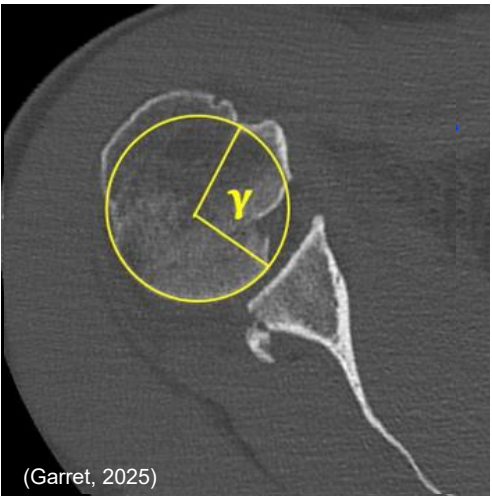


Sagittal slice

(Blasier, 1997)

Pathoanatomy

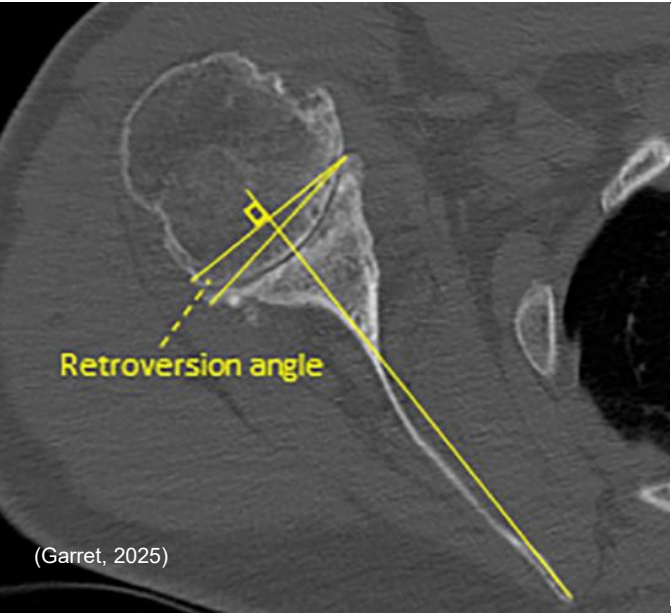
Osseous	
Glenoid	Dysplasia Retroversion Bone loss: Traumatic: osteochondral #, reverse bony Bankart Repetitive microtrauma: attritional
Humeral Head	Reverse Hill-Sachs lesion
Acromion	High & flat



Circle of best fit for glenoid bone loss (Pico method)

Gamma angle > 90deg indicative of engagement

A high flat acromion is strongly associated with recurrent PSI.
The odds of PSI is 39x greater in those with PAH >22mm
“Swiss chalet roof” morphology virtually excludes PSI.

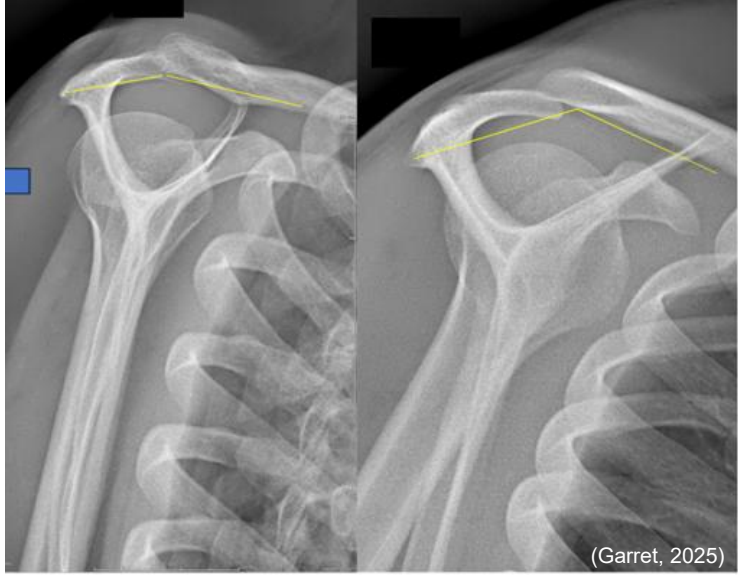
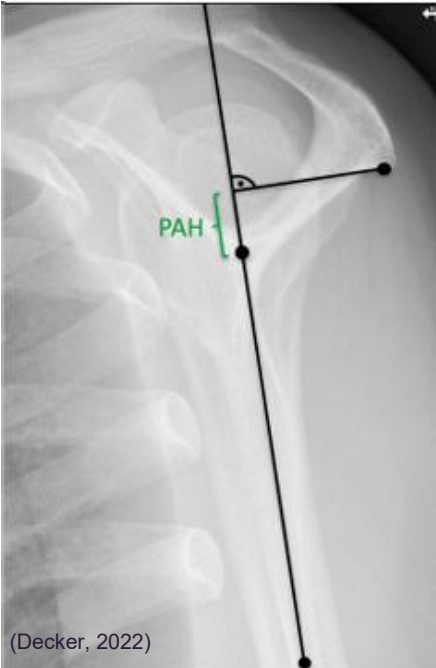


Friedman’s Line
Perpendicular line
Glenoid A & P points
= “alpha” angle

Typically utilised on CT

>10deg = risk factor
Every 1deg increase, increases the risk of posterior instability by 17%.

Primary risk factors in large prospective cohort study of 714 patients over 4 years.

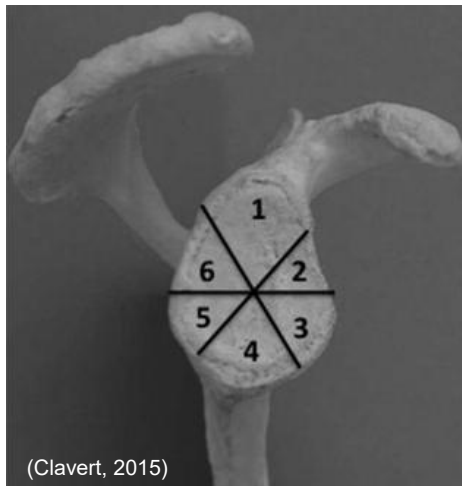
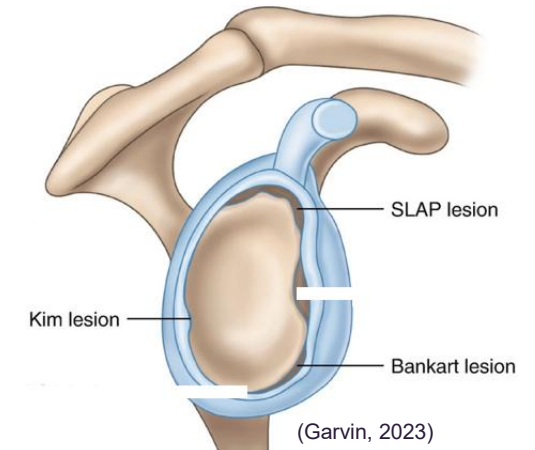


High flat acromion (“flat roof”) promoting posterior translation of the humeral head and posterior instability

“Swiss chalet roof” acromion, reducing risk of posterior translation of the humeral head

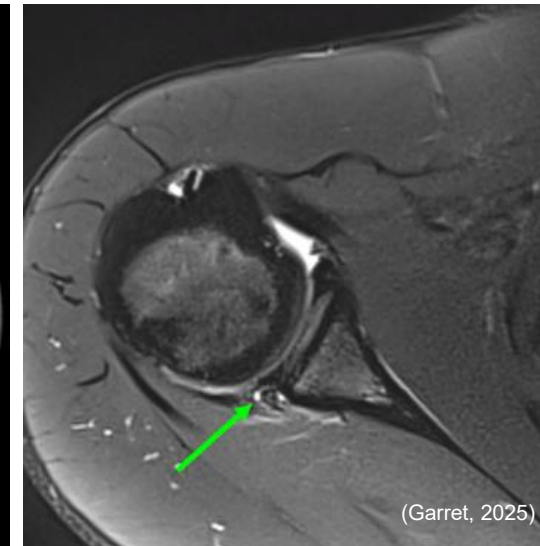
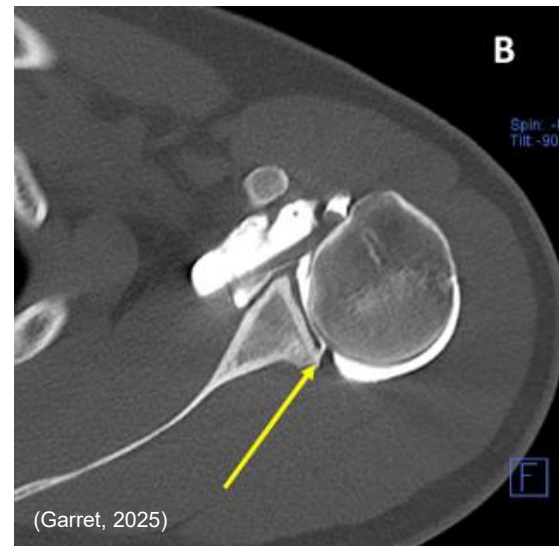
Pathoanatomy

Non-osseous	
Capsule	Excessive capsular laxity - congenital (<i>think Ehlers-Danlos</i>) or acquired (<i>think gymnast</i>)
Labral	Reverse Bankart lesion: detachment of posterior labrum Kim's lesion: tear between posterior labrum & glenoid cartilage without complete detachment of labrum. → microtrauma rather than frank dislocation. → failure to identify & address this may result in persistent posterior instability
Muscular	Loss of dynamic stabilisation: RC deficits & scapular dyskinesia



In PSI, labral lesions are in sectors 5 & 6
→ reverse Bankart lesion

Can be associated with glenoid defect/erosion or bony Bankart



Kim's lesion:
Incomplete & concealed tear of the posteroinferior labrum.

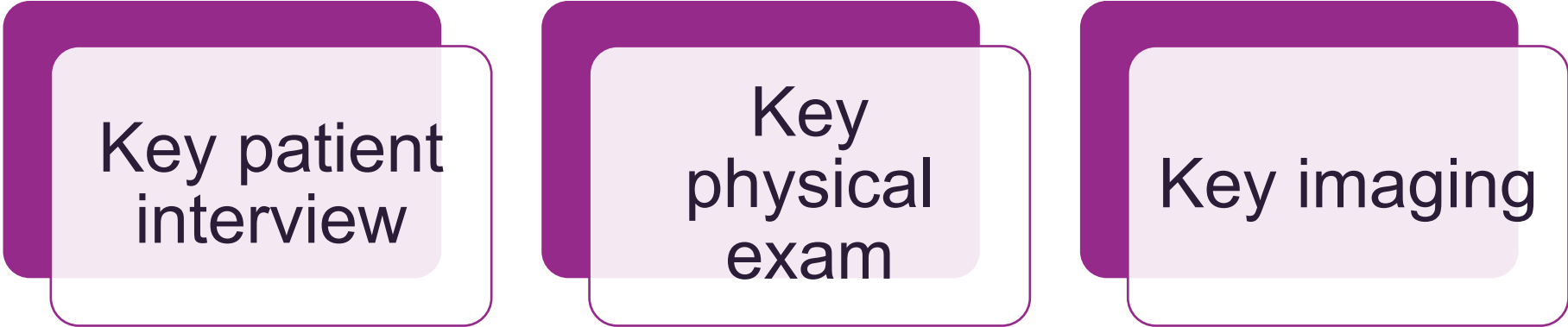
MRI: no loss of continuity between the glenoid cartilage and the labral joint surface.

The Diagnostic Challenge



- Much higher prevalence than previously thought, in specific cohorts – up to 24% in isolation & 40% combined.
- Posterior instability symptoms typically vaguer, often with no reported instability → therefore missed.
- Routine awareness & assessment skills for posterior instability is lacking.
- Anterior instability easier to pick up with symptoms of instability & testing.
- MRI / MRA commonly miss pathology when compared to arthroscopy at time of surgical management.

So how is it diagnosed?



Key patient
interview

Key
physical
exam

Key imaging

The Typical Patient

Incidence of PSI
4.64 - 23.9 per 100,000 a year generally
vs
~32 per 100,00 in young, active cohort
&
6-fold increase in 14-19yo men vs women

- Young athletic male
 - Specific athletic cohort
 - weightlifting (bench press, overhead)
 - military (pushups, pullups, overhead lifting)
 - contact sport
 - rock-climbing
 - swimming (catch & pull phase)
 - batting
- Essentially any activities that place excessive stress on posterior structures of GHJ.
- Typically, repetitive activities that place the shoulder in F/Add/IR.



Key Patient Interview Findings

History

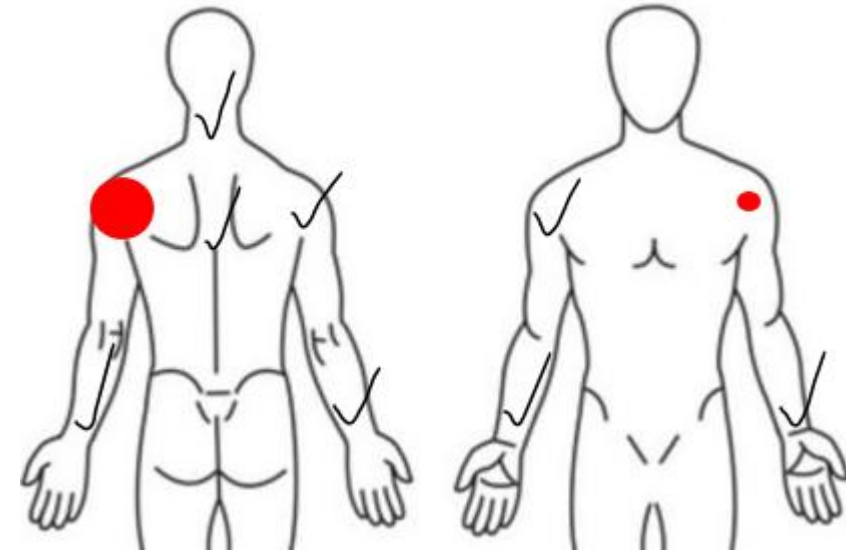
- Traumatic event not common
- Repeated microtrauma (work or sport) rather than a frank dislocation

Symptoms

- Pain is the leading symptom – can be vague, generalised posterior shoulder pain
- Infrequently report sensation of instability
- Additional complaints: muscle weakness, fatigue, decline in athletic performance, clicking, popping
- Typically aggravated by or patients that participate in repetitive activities that place shoulder in extremes (F/Add/IR)

Remember to screen for:

- Hypermobility: “have you dislocated any joints previously?”, “are you generally very flexible?”
- Voluntariness: history of painless dislocation - onset often in childhood
- Reproducibility – at rest (non-positional) or positional (F/Add/IR)



Key Physical Exam Findings

Visual inspection & palpation

- Possible posterior GHJ tenderness
- Possible posterior GHJ dimple

Assess joint ROM for signs of instability

- Beighton's score: 5/9 positive
- Sulcus sign. Multi-directional drawer
- ER $\geq 85^\circ$ in neutral
Bilaterally

Motor system i.e. dynamic stabilisation

- Screen for scapular dyskinesia with potential formal testing
- RC strength testing (for concavity-compression)

Specific tests

Jerk test

- Intent: to stress posteroinferior labrum (posterior bias)
- Positive test: 'jerk'/clunk, with or without pain
- Clinical utility: SEN 73%, SPEC 98%

Kim test

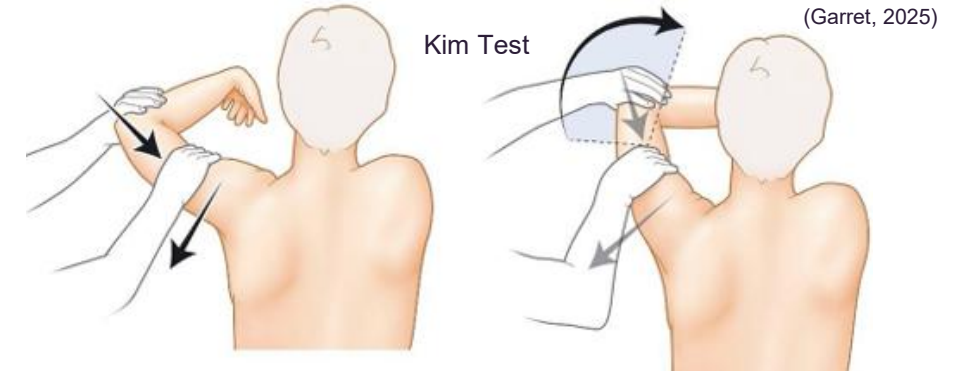
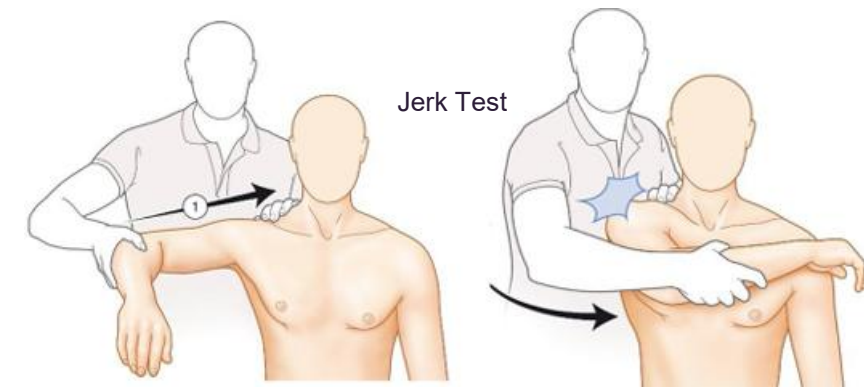
- Intent: to stress posteroinferior labrum (inferior bias)
- Positive test: sudden onset pain regardless of click/clunk
- Clinical utility: SEN 80%, SPEC 94%

→ TWO TESTS TOGETHER = SEN 97%

Posterior Apprehension Test

Recent mention of Thumb Test

- Posterior block with forward flexion & neutral adduction
- SEN & SPEC yet to be assessed
- Possible TDT (e.g. to support taping)

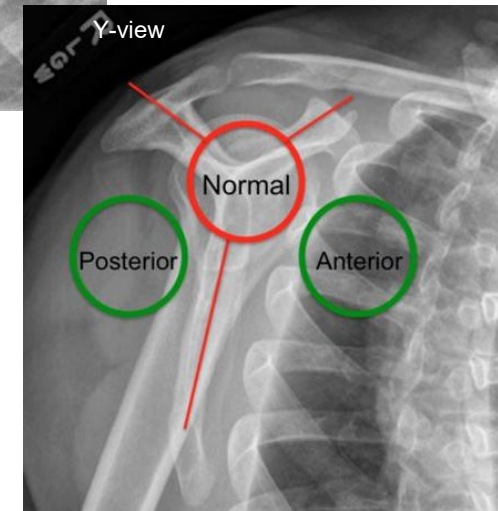


Video courtesy of
Fitness Pain Free
(Youtube)

Imaging

XR

- Initial work-up
- Grashey view (true AP), IR & ER, Scap Y view, Axillary view
- To identify dislocation, glenoid rim #s or bone loss & humeral head impaction #s



CT

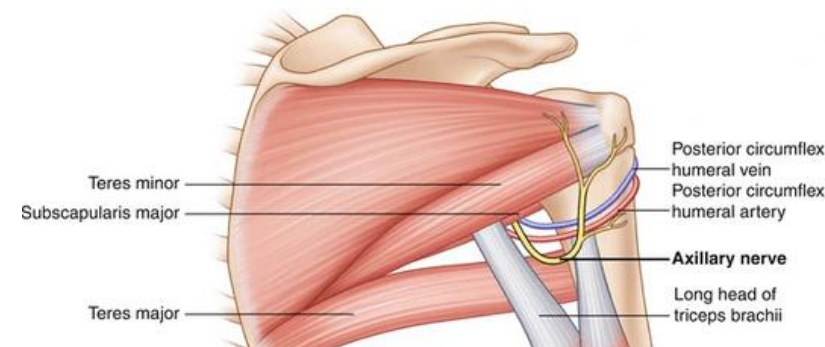
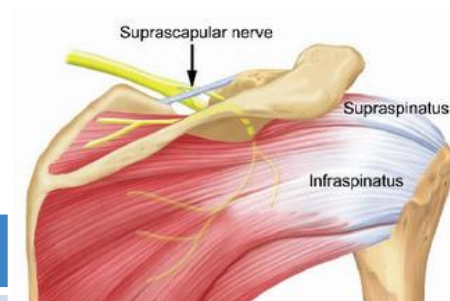
- Reserved for assessment of bony morphology (particularly for glenoid bone loss)
- Essential for operative planning

MRI or MRA

- MRA has been reported as gold standard for assessing capsule & labrum
- No expert consensus established on the need for arthrogram in advanced imaging in a 2025 Delphi consensus.
- Previous evidence to support that addition of contrast not statistically significant. Skill of radiologist matters more.
- MRI indicated if failed non-op mx, chronic pain (>3/12) following an instability event, and/or for consideration of surgery

Differential Diagnoses

Condition	Signs & Symptoms
SSN entrapment	Posterior Bankart pathology can be associated with a posterior paralabral cyst which can extend into the spinoglenoid notch with or without compression neuropathy of the SSN
Quadrilateral space syndrome	A rare disorder characterized by axillary nerve and posterior humeral circumflex artery compression within the quadrilateral space.
Bennett Lesion	Aka “thrower's exostosis” of the shoulder. Involves ossification of the posteroinferior glenoid & not uncommon in overhead throwing athletes
Tumour (osteosarcoma)	Rare type of primary malignant bone tumour, predominantly in males <20yo



Management: Non-op

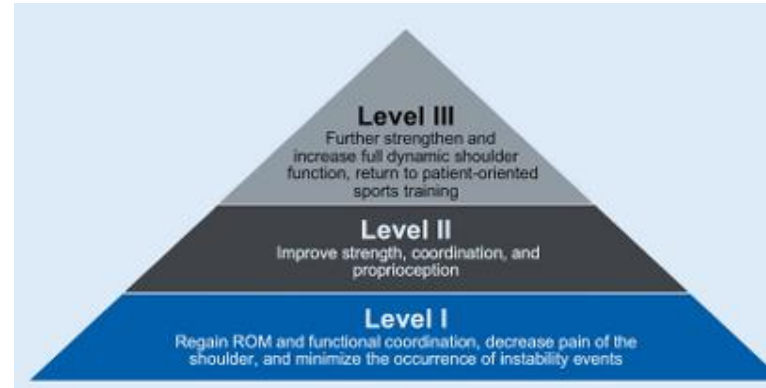
Non-operative = first-line care

Principles of management

- Reduce events of ongoing microtrauma: activity modification
- Support static structures: taping
- Restore dynamic stability: exercise therapy

Restore Dynamic Stability

- Scapulothoracic & GHJ proprioception + motor control
- Improve periscapular & RC (particularly subscap strength)
- Progress towards work- or sport-specific tasks



<i>Level I</i>	
1: Elevation with lateral resistance ("lateral wall slide")	100.0
2: Two-handed axial-loaded elevation	100.0
3: Prone retroflexion ("I")	100.0
4: Prone shoulder external rotation in 20° abduction ("W")	100.0
5: Isometric external rotation	100.0
<i>Level II</i>	
1: Elevation with resistance band	100.0
2: Prone horizontal external rotation ("L")	100.0
3: Prone horizontal abduction and external rotation ("T")	100.0
4: Concentric external rotation with trunk rotation	100.0
5: Concentric external rotation in 90° abduction	100.0
6: Standing one-handed row	100.0
7: Eccentric external rotation	100.0
8: Wall scapular push-up	100.0
9: Ball circles against wall	100.0
10: Contralateral arm raise with ipsilateral leg raise	100.0
<i>Level III</i>	
1: Plyometric exercises	100.0
2: Patient-oriented sports training (POST)	100.0
3: Reverse butterfly	100.0
4: Concentric low row	100.0
5: Diagonal external rotation	100.0
6: Scapular push-up	100.0

Outcomes

Low success rate (~20%) in traumatic PSI.

High success rate (~70-90%) in micro-traumatic & atraumatic PSI

Rate of spontaneous recovery with atraumatic shoulder instability is low (follow up 4yrs) – so we need to intervene.

Those with atraumatic instability have a low incidence of recurrent instability or progression to OA when treated non-op.

Functional Posterior Instability = force imbalance provoking posterior translation of the humeral head

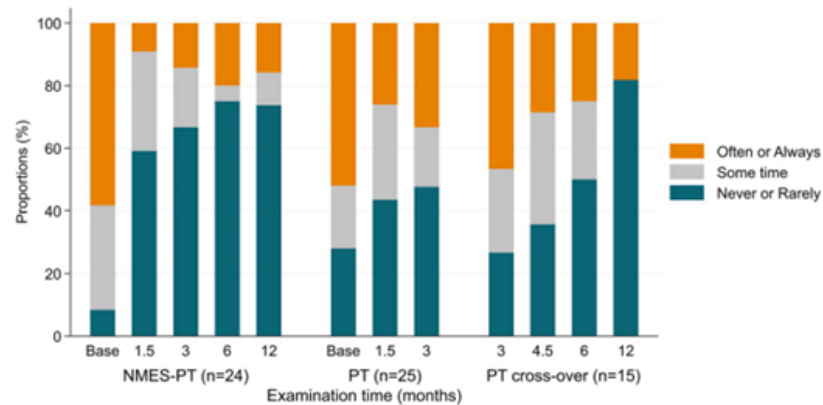
- Underactivity of external rotators & scapular muscles (including LT, SA, posterior deltoid)
- Resultant overactivity of internal rotators including lats, pec major & anterior deltoid

Moroder 2024

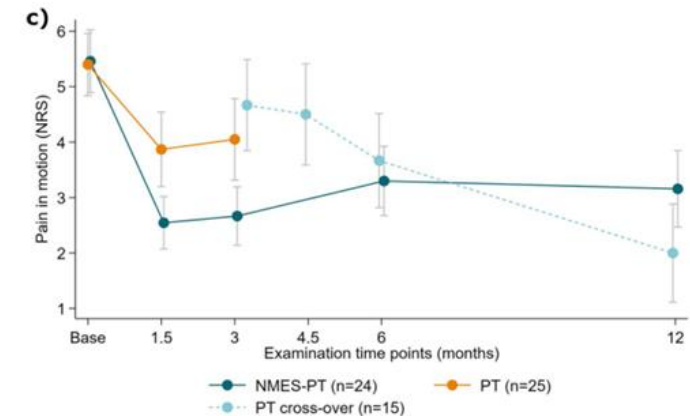
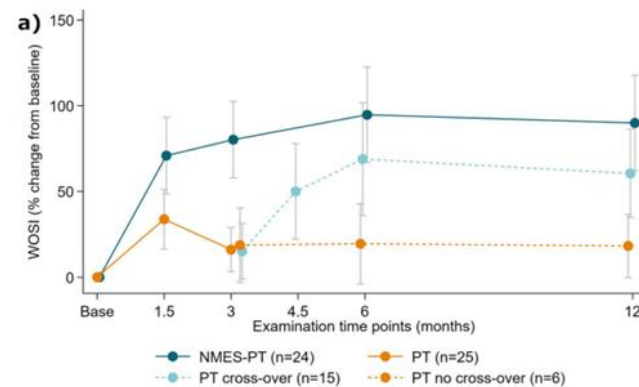
Multi-center RCT of 49 patients with functional posterior instability

18 sessions over 6 weeks

- Physical therapist protocol
- Physical therapist protocol + NMES (motion triggered)



Frequency of instability episodes



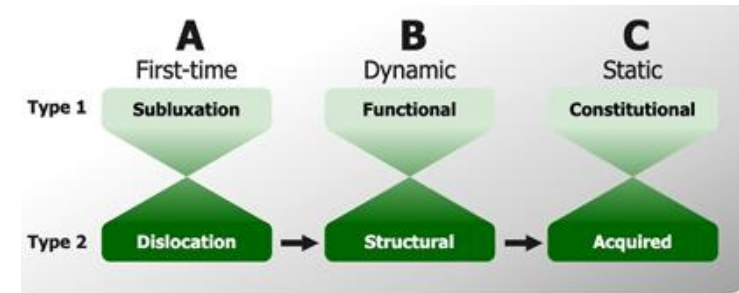
Management: Operative

Indications

- Unsuccessful non-op care after 3-6/12
- Acute traumatic dislocation in high-risk cohorts with structural lesions

Contra-indications:

- Functional dynamic instability
- Constitutional hyperlaxity
- Lack of a surgical target



Primary options

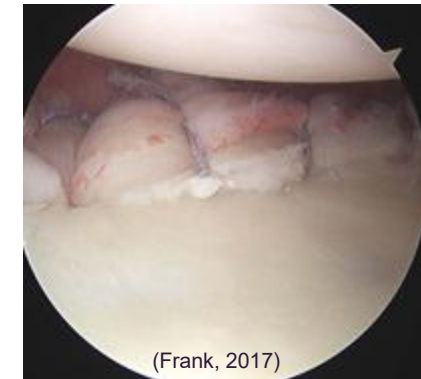
- Arthroscopic labral repair +/- capsule plication
- Posterior bone block – considered with >10% glenoid bone loss

Good outcomes for arthroscopic surgery in particular

- Return to play (~90%), return to previous level (68-78%)
- Low rate of complications (~2-6%), persistent instability (7%) & revision surgery (<4%)
- Improved outcomes when compared to open surgery

Post op rehab

- 4-6/52: sling with pillow for ER, pendulums & gentle PROM
- Progressive ROM, with progressive strengthening from 6-12/52
- Sport specific return from 4-6/12



Let's Recap:

- ❖ Posterior shoulder instability is often overlooked despite being more common than initially thought.
- ❖ Maintain a high degree of suspicion in young active males with posterior shoulder pain, even in the absence of frank trauma or perceived instability.
- ❖ Accurate diagnosis requires a combination of comprehensive history taking + key physical tests + imaging
- ❖ Non-operative and operative options exist for management. Knowing the underlying pathology is essential for appropriate management of a patient.



Thank you

Anmol Maharaj

Senior MSOPD Physiotherapist – Townsville University Hospital

anmol.maharaj@health.qld.gov.au

+61 420 808 542

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