Internal impingement

Internal impingement

- **DEFINITION**: A process by which there is repeated contact between the undersurface of the rot cuff tendons and the posterosuperior glenoid that leads to injury and dysfunction.
- It is essentially an **overuse** injury associated with overhead athletes

Internal impingement

- Typically symptoms are present only while playing, but no symptoms with activities of daily living.
- It represents about 80% of the problems seen in the overhead athletes

Internal impingement was first described by Walsh in 1992

- internal impingement is caused by the repetitive contact and micro trauma that occurs to the posterior labrum and the undersurface of the rot cuff musculature during the throwing motion
- Some contact between these structures is physiologic but repetitive contact with altered shoulder mechanics is pathologic

Normally in external rotation there is obligate posterior translation of the humerus that allows for more motion and less contact between the greater tuberosity and the posterosuperior glenoid rim

Internal impingement

- The inferior glenohumeral ligament and anterior capsule are static restraints to forward translation of the humeral head
- The subscapularis muscle is dynamic restraint

- Fatigue of the subscapularis due to repetitive overhead motion leads to less support and gradual stretching of the capsule
- Increased anterior movement of the humeral head exuberate the contact between the rotator cuff and the posterior glenoid

- Posterior capsule tightness may also develop in throwers
- Posterior tightness is due to capsular contracture and leads to a decrease of the needed posterior translation of the humeral head during abduction external rotation

- In the repetitive abducted external rotation position there is a torsional stress to the biceps tendon that peels of the posterosuperior labrum from the glenoid and producing a SLAP II lesion and pseudolaxity

The end result is a posterosuperior transition of the humeral head that in combination to the rotation stress to the cuff itself leads to cuff failure

Internal impingement

- SLAP lesions are not caused by internal impingement, they are rather the result of excessive torsional stress to the biceps anchor
- Once produced SLAP lesions may increase the anterior translation of the humeral head up to 6 mm and the strain to the inferior glenohumeral ligament up to 100%

- So the rot cuff tendons come in traumatic contact with the glenoid rim while they are subjected to excessive torsional strain working in excess due to the failure of the static restraints
- It is not strange that they fail

Differential diagnosis

- Rot cuff tendinosis:
  - Diffuse pain after exertion and not during, described as deep soreness
  - Inability to raise the arm
  - Improves with NSAID in a few days
- Throwers exostosis Bennett's lesion
  - posterior inferior pain

Differential diagnosis

- SLAP lesions

  mainly anterior pain

  O'Brien test positive

  SLAPrehension test positive

  Relocation test negative
- Isolated posterior labrum tears

History

- Insidious onset of pain
- Steadily increasing pain during the season and worsening from season to season
- Initially physical therapy and NSAID help but with time they became less effective
- Pain located in the posterior aspect of the shoulder
- The late cocking phase is the most painful
- Loss of control and velocity are usually present

Clinical examination

- Pain in the posterior joint line
- Full range of motion excessive external rotation ,some loss of internal rotation in 90 degrees of abduction
- The anterior joint is not painful
- The O’Brien test is negative

The relocation test of Jobe

- Pain in the posterior joint line when the arm is brought in abduction external rotation with the patient supine that is relived when a posterior directed force is applied to the shoulder

Laxity in the overhead athlete

- 2+anterior laxity
- 1+posterior laxity
- 1+inferior laxity

Strength testing negative

- Symetrical strength of
  - supraspinatus
  - infraspinatus
  - subscapularis

Treatment

- Complete cessation from throwing or overhead motion is the critical first step
- Physical therapy aiming
  1. Improve dynamic stability
  2. Improve posterior flexibility
  3. improve the strength of rot cuff
  4. improve throwing mechanics

Subacromial decompression

- 22% of throwing athletes returned to the same level of participation after subacromial decompression

  Tibone ,Jobe. CORR 1985

Arthroscopic debridement

- 36 athlete, 22years old, 13 months fu
  76%excelent result
  Andrews. Arthroscopy 1985
- 40 athletes, 25 years old, 43 months
  fu. 7% relief of symptoms
  Altchek AJSM 1992

Arthroscopic debridement yields only temporal results

Arthroscopic or open anterior capsulolabral reconstruction

- 25 overhead athletes. 72% returned to the previous level of competition

  68% excelent, 24% good results, 39 months f.u.

  Jobe, Kvite A.J.S.M 1991
- 32 overhead athletes. 81%return to the previous level of competition

  Montogomery,Jobe A.J.S.M 1994

Articular side tears

- Fewer arteriolars
- Greater stiffness
- Less favorable stress-strain curve