**SPORTS MEDICINE UPDATE: COMMON ORTHOPAEDIC PROBLEMS**

Brian Feeley, M.D.
Anthony Luke, M.D.
Department of Orthopedic Surgery
UCSF

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**Goals**

- Cover ‘most common’ sports medicine injuries of the shoulder and knee
  - Diagnosis
    - Physical Exam
    - Imaging
  - Treatment
    - Non-operative
    - When to operate

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**Question 1**

What is the most common cause of shoulder pain in patients 40-55 years of age?

1. A. Arthritis
2. B. Impingement Syndrome
3. C. Shoulder Dislocations
4. D. Cervical spine pain
5. E. Biceps Tendonitis
**Impingement/Rotator Cuff Tears**

- Very common in middle age people
  - Insidious onset of pain
  - Pain with overhead activities
  - Pain at night (can’t sleep on that side)
  - Difficulty doing some, but not all ADLs
  - No weakness

**Impingement Syndrome**

- Key questions to ask:
  1. Do you have pain at night?
  2. Do you have pain with reaching over your head?
  3. Do you have difficulty with putting on a jacket?

**Mechanism**

- Impingement under acromion with flexion and internal rotation of the shoulder
- Rotator cuff, subacromial bursa and biceps tendon
Shoulder--Ddx

- Impingement Syndrome
- Rotator cuff tears
- SLAP Lesion
- Calcific tendinopathy
- “Frozen” shoulder (adhesive capsulitis)
- Acromioclavicular joint problems
- Scapular weakness
- Cervical radiculopathy

Good history + Complete physical exam
= Correct diagnosis in 95% of cases

2 steps
- Patient history
- Physical examination
  - (Radiographs)
  - (Advanced imaging)

Shoulder Basics

- Shoulder pathology by age
  - <30—think instability
  - 30-50—impingement/SLAP tears
  - >50—RTC tears/adhesive capsulitis
  - >70—OA

Shoulder Basics

- Shoulder pathology by symptoms
  - Night pain—impingement
  - Weakness—RTC tear
  - Instability/popping—Labral tear
  - Stiffness—OA/Adhesive Capsulitis
  - Pain past elbow—Cervical spine
Shoulder—Physical Exam

- Look
  - Asymmetry
- ROM
  - Active and Passive
- Test for Impingement
  - Neer’s/Hawkins
- Test for Cuff Tears
- Test for Labral Pathology

Shoulder—Physical Exam

- Look
  - Asymmetry

Axillary nerve injury after football tackle

Not in syllabus—no cheating!

Shoulder Physical Exam

External rotation

Internal rotation

Impingement Signs

Hawkins test
- Flex shoulder to 90°
- Flex elbow to 90°
- Internally rotate
- Positive - reproduce shoulder pain

Sens = 88 %
Spec = 43 %
PPV = 38 %
NPV = 90 %

Park, et al. JBJS 2005

**Impingement Signs**

*Neer’s Test*
- Passive full flexion
- Positive is reproduction of shoulder pain

Sens = 83%  
Spec = 51%  
PPV = 40%  
NPV = 89%  


**Rotator Cuff strength testing**

*Supraspinatus*
- Empty can
- Thumbs down abducted to 90º
- Horizontally adduct to 30º

For tendonitis  
Sens = 77%  
Spec = 38%  
For tears,  
Sens = 19%  
Spec = 100%


*Infraspinatus/teres minor - External rotation*
- Keep elbows at 90º

For tendonitis,  
Sens = 57%  
Spec = 71%  
For tears,  
Sens = 36%  
Spec = 95%

**Rotator Cuff strength testing**

*Infraspinatus/teres minor - External rotation*
- Drop Arm sign
Rotator Cuff strength testing

Subscapularis – Internal rotation / Lift-off test

Bear Hug Test (upper subscap)

For lesions,
Sens = 50 %
Spec = 84 %

For tears,
Sens = 50 %
Spec = 95 %


Rotator Cuff strength testing

Subscapularis – Internal rotation / Lift-off test

Bear Hug Test (upper subscap)

For lesions,
Sens = 50 %
Spec = 84 %

For tears,
Sens = 50 %
Spec = 95 %


Rotator Cuff strength testing

Subscapularis – Internal rotation

Bear Hug Test (upper subscap)

Patient gives themselves a ‘hug’

Positive test:
Cannot hold arm on self

Rotator Cuff strength testing

Cuff Tear vs Impingement?

- Difficulty lifting
  - Pain vs weakness ?
- Drop arm sign
- Fail conservative Tx
- Tears uncommon < 40 y.o.

Sens = 10 %
PPV = 100 %

Treatment of Impingement

- Rest, avoid offending activities
- Physical therapy (6-12 weeks)
  - Rotator Cuff Strengthening
  - Active/Passive ROM
  - Periscapular exercises
  - Upper extremity proprioception
- NSAIDS
- Consider steroid injection
- Surgery

When to Operate for Impingement?

- Impingement
  - Moderate pain with activity
    - Wakes pt. up
    - NSAIDS
    - PT
  - Not Better
    - MRI
    - MRI to evaluate for cuff tear
    - Consider injection
    - Surgery if not better
  - Better
    - Home Exercise Program
    - Better
    - Home Exercise Program

MRI

How good for full thickness tears?
- 69 to 100 percent sensitive
- 88 to 100 percent specific

X-ray Lateral Scapula

Normal
Large acromial spur
Outcomes of Impingement

- Non-operative
  - Cummins, et al. JSES 2008
    - 100 consecutive patients
    - At 2 years, shoulder score 56-95
    - 80% did not require surgery, but 30% still had pain
- Operative
  - Henkus, et al. JBJS-Br 2009
    - 2.6 year follow-up
    - 93% good to excellent results

Rotator Cuff Tears

- Similar exam to impingement
  - More weakness than pain
  - Will often have a decrease in pain vs. impingement
  - Difficulty with overhead activities continues
  - Night pain continues

Full Thickness Rotator Cuff Tears

- Management
  - Initial—trial of physical therapy
  - Limited use of corticosteroid injections
  - Surgery—arthroscopic
    - Evaluate joint
    - Subacromial decompression
    - Acromioplasty
    - Fix Cuff Tear

Question 2
What is the #1 predictor of outcome following surgery for rotator cuff tears?

1. Age of the patient
2. Medical co-morbidities
3. Size of the tear
4. Location of the tear (muscle vs. tendon)
Full Thickness Rotator Cuff Tears

- Rationale for early treatment of symptomatic rotator cuff tears
  - Smaller tears do better
    - Better muscle quality (no atrophy, no fatty infiltration)
    - Lower rate or rerupture
    - Easier rehab
    - Easier for me to do

Pearls for rotator cuff pathology

- Impingement, PT-RCT, FT-RCT are a spectrum of degenerative pathology to the shoulder

- Early signs: pain with overhead activity, night pain

- Weakness: worry about cuff tear

- Consider early surgical management with full thickness tears

Question 3 22 year old gymnast with one month shoulder pain after ‘accident’ vaulting. Has ‘popping’ in the shoulder. Pain with gym activities, pull ups. Diagnosis?

1. A. Rotator Cuff Tear
2. B. Occult Fracture
3. C. SLAP tear
4. D. Shoulder dislocation
5. E. Biceps tear

SLAP tears

- S Superior
- L Labrum
- A Anterior
- P Posterior
Anatomy - Labrum
- Fibrocartilaginous structure
- Deepens glenoid
- Glenohumeral ligament attachments

Anatomy – Superior labrum
- Biceps tendon origin
- Labrum has loose attachment superiorly
- “Meniscoid”
- Superior and middle glenohumeral ligament attachments

SLAP TYPE I AND II

Mechanism of Injury
- Throwers: biceps contributes to large deceleration forces during follow-through
- Observed arthroscopically the lift-off of the labrum with electrical stimulation of biceps
  - Andrews, AJSM 1985
Clinical Presentation

- Pain, typically with overhead activities
- Catching, popping, grinding
- Throwers: “Dead arm”

Imaging

- Contrast MRI is imaging method of choice
  - 89% sensitivity
  - 91% specificity
  - 90% accuracy
- Significant false-positives (ie. sublabral recess)

Bencardino, Radiology 2000

Physical Exam—Best Test

O’Brien’s Test

Variable accuracy:
63-99% sensitive
11-98% specific
Hegedus, et al. JBJS Br 2008

Treatment of SLAP tears

- Initial Management
  - Rest, ice, physical therapy
  - No evidence in literature non-operative management works in literature.
  - Often works for Type I SLAP
Indications for surgery

- SLAP Debridement/Repair Indications
  - Persistent pain with overhead activities
  - Pain with throwing/serve/golf
  - No or transient improvement with PT course
  - Positive O’Brien’s test
  - Positive MRI

Arthroscopic Debridement

- Funk, et al. 2007
  - 105 procedures, 73 throwing athletes, avg. f/u
  - 13.5 mos.
    - 73% excellent
    - 15% good
    - 4% fair
    - 8% poor
    - 88% return to throwing sports

Arthroscopic Repair

SLAP tears--Pearls

- Younger patients tend to do less well with PT
  - Often require surgery to return to play
- ALL MRI >age 40 will have Type I SLAP
  - Interpret with caution
- Be wary of AC joint injuries and SLAP tears
  - 10-20% of AC joint injuries will have associated SLAP tear
Knee pain

- 56 year old active man, 5 year history of gradual knee pain
- Former college basketball player (Stanford)
  - Bilateral ACL tears in college, no surgery
  - Worse with activity, better with rest
  - Localizes pain medially
  - Walking 5-6 blocks before taking a break
  - Occasional NSAIDS, no other treatment

Knee pain

- 56 year old active man, 5 year history of gradual knee pain
- Physical exam
  - 6'3", 160 lbs
  - Varus
  - Slight limp
  - Full ROM
  - Minimal crepitus
  - Diffuse JLT medially

Knee Pain

- 56 year old active man, 5 year history of gradual knee pain

Question 4

What is the most likely diagnosis?

1. ACL tear and instability
2. Osteoarthritis
3. Meniscus tear
4. IT band bursitis
5. Lumbar radiculopathy
Early to Moderate OA

- Non-operative treatment
  - Exercise
  - Bracing
  - Meds
  - Injections
  - Weight Loss
- Arthroscopy/Debridement
- Unicompartmental Knee Replacement
- Total Knee Replacement

PT for Knee OA

  - Exercise better than nothing for early/moderate OA
  - 439 community ambulators >60 yo
  - Randomized to aerobic, resistive exercises vs. nothing
  - Outcomes with pain, daily function scores
  - Conclusion:
    - Modest but significant improvement in daily outcome measurements and knee pain scores with either exercises

Treatment Options

- Does non-operative management help people with OA of the knee?
  - YES!

Bracing

- Function
  - Reduces biomechanical load on affected side of the joint
  - Reduces patient’s perception of instability
- Indications
  - Symptomatic
  - Passively correctable disease
  - Unicompartmental
- Does it work?
  - Probably in the right indications
Viscosupplementation

- Improves viscosity
  - Increases molecular weight and quantity of HA synthesized by the synovium
- Decrease pain (mechanism uncertain)
- Decrease cytokines: Interleukin 1, PGE$_2$, MMP
  - Altman et al., J Rheumatol, 1998
- HA decreases free radicals

Viscosupplementation

- 76 RCT of viscosupplementation were selected (single, double blind, placebo based, comparative studies)
- F/U ranged between day of last injection and eighteen months
- 40 trials hyaluronan/hylan vs. placebo (saline, arthrocentesis)
  - 10 trials compared to steroid
  - 6 trials vs. NSAID
  - 3 trials vs. PT
  - 2 trials vs. arthroscopy
  - 15 vs. other viscosupplements

Viscosupplementation

- N=63 studies, poor quality
- Improvement from baseline 11-54% for pain, 9-15% for function at 5-13 weeks
- More prolonged effects than corticosteroids
When is it time for surgery?

- Tried all previous treatments and still not happy
  - Arthroscopy?
  - (Recent NEJM Study suggests it might not help…)
  - Tibial osteotomy
  - Unicompartmental Replacement
  - Knee replacement

Arthroscopy

- Arthroscopy for arthritis alone probably not effective
- May have a role of mild OA and meniscus tear

High Tibial Osteotomy

- Healthy cartilage
- Early Arthritis
- Advanced Arthritis
**Unicondylar Knee Replacement**

- Replace One Compartment
- Minimally Invasive
- Reliable Pain Relief
- Competitor surgery for tibial osteotomy

Results
- 87% - 98% @ 10 yrs

Fails due to:
- Excessive Poly Wear
- Progression of OA into Other Compartment

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**Total Knee Replacement**

Meta Analysis – 11 Series
- 3 – 18 yr f/u of 682 Knees
- 93% Good – Excellent
- 11% Complications
- 4% Revision
- 21% Radiolucent Lines
- Survivorship 90 – 95% @ > 10 – 15 yrs

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**Knee Pain**

- 52 yo lawyer, active, twisted and fell one month ago playing tennis.
  - Pain and swelling immediately after initial injury
  - Felt unstable at first, now mild pain only

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**Diagnosis of ACL injuries**

- History
  - Non contact, twisting
  - 70% hear a pop
  - Swelling within 1 hr
  - Did not return to play
Special Tests ACL

- Lachman’s test – test at 30°
  Sens 81.8%, Spec 96.8%
- Anterior drawer – test at 90°
  Sens 22 - 41%, Spec 97%*
- Pivot shift
  Sens 35 - 98.4%*, Spec 98%*

Malanga GA, Nadler SF. Musculoskeletal Physical Examination, Mosby, 2006

* - denotes under anesthesia

X-ray

- Usually non-diagnostic
- Can help rule in or out injuries
- Segond fracture – avulsion over lateral tibial plateau

MRI

ACL tear signs
- Fibers not seen in continuity
- Edema on T2 films
- PCL – kinked or Question mark sign

MRI

ACL tear signs
- Lateral femoral corner bone bruise on T2
- May have meniscal tear (Lateral > medial)

Sens = 64%
Spec = 95%
PPV = 58%
NPV = 96%

Similar to clinical exam!!

ACL tears in Middle Age

- Controversies
  - Do I treat it or not?
  - What graft should I use?

Normal ACL

Torn ACL

ACL injuries in Middle Age

<table>
<thead>
<tr>
<th>Reasons for ACL-R</th>
<th>Reasons for Non-op</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time for rehab</td>
<td>Easy rehab</td>
</tr>
<tr>
<td>Cutting/pivoting activities</td>
<td>Sedentary job/activities</td>
</tr>
<tr>
<td>?Delays progression of OA</td>
<td>No proof surgery is better in patients with minimal stresses on knees</td>
</tr>
</tbody>
</table>

ALLOGRAFT
- Faster, easier rehab
- Slower bone incorporation
- Slower revascularization
- Risk of infection/graft problems

AUTOGRAPH
- Own tissue, faster revascularization
- Longer rehab
**Question 5**
YOU have an ACL tear—what would you have done?

1. Sell the tennis racket, golf clubs, and skis. Time to buy a timeshare in Cabo and learn bridge
2. Rehab, rehab, rehab, and avoid surgery at all costs
3. ACL reconstruction with autograft tissue
4. ACL reconstruction with allograft tissue
5. I took ACLS last year, what was the question?

**ACL in Middle Age**

- 51 yo male with isolated ACL injury
  - Rehab, rehab, rehab
  - Focus on hamstring>>quad strength (goal 80% quad strength)
  - Discussion of desires of what patient wants to do
    - OK: running/biking/swimming/golf/doubles tennis
    - NOT OK: basketball/soccer/singles tennis
  - Not sure: skiing (I will brace them for skiing)
  - Allograft reconstruction to improve rehab course

**ACL tears in middle age**

- Age is relative—treat activity level and symptoms

**UCSF Orthopaedic Institute**

- Questions?
  - feeleyb@orthosurg.ucsf.edu
  - lukea@orthosurg.ucsf.edu