

CASE 2

- **22 Y.O. tennis player**
- **6 month hx increasing soreness- shoulder, back**
- **Hard to serve, worse later in matches, tournaments**
- **Pop, click at ball impact**
- **Pain posterior shoulder joint, low back**



**How did this
injury/dysfunction
develop**

“Cascade to injury”

**From the history and
exam, what pathologies
have created the
dysfunction**

**What are the
expectations for
rehabilitation to allow
return to play**

Clinical prediction study

**Success/failure of non
operative treatment in
SLAP lesions**

Methods

- **Rotator cuff or labral injury**
- **15- 60 years of age**
- **Clinical exam (DLS, posterior pain, pop/click)**
- **MRI/other imaging**
- **Total N= 131, labral = 54**

Methods

- **Labral injury**
 - **3/4 clinical signs- (+) history, O'Brien's, anterior slide, DLS**
 - **(+) MRI/other imaging**
 - **+/- change with SRT**

Methods

- **Comprehensive evaluation**
 - **Strength, flexibility, arm motion, scapular position, kinetic chain**
- **Symptom onset/duration**
- **Functional scales**

Methods

- **Rehabilitation**
 - **Based on exam, deficits**
- **Kinetic chain**
 - **Hip/trunk**
 - **Scapula**
 - **Rotator cuff/GIRD**

RESULTS

- **Improved- I-** dec symptoms, inc function- no request for surgery- 50%
- **Not improved- NI-** continued symptoms, dec function, request surgery- 50%

PREDICTIVE FACTORS

- Painful arc of motion
 - 3.5 X to be in NI group
- Anterior scapula posture
 - Likelihood to be in NI increased 30% with each 1 cm of anterior posture

RESULTS

- **Significant differences I/NI**
 - Quick DASH- $p=.024$
 - Current VAS pain- $p=.01$
- **Significant trends ($<.2$)**
 - ASES- $p=.098$
 - Flexion, ER strength- $p=.1$

RESULTS

- **No significant differences**
 - **Range of motion- IR/ER, h- adduction**
 - **Duration/method of onset of symptoms**
 - **Clinical exam for injury**

CONCLUSIONS

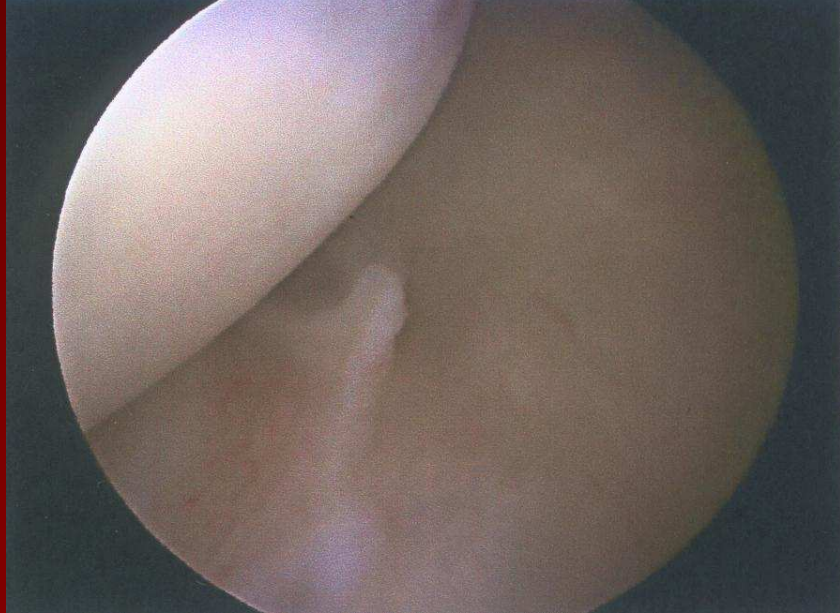
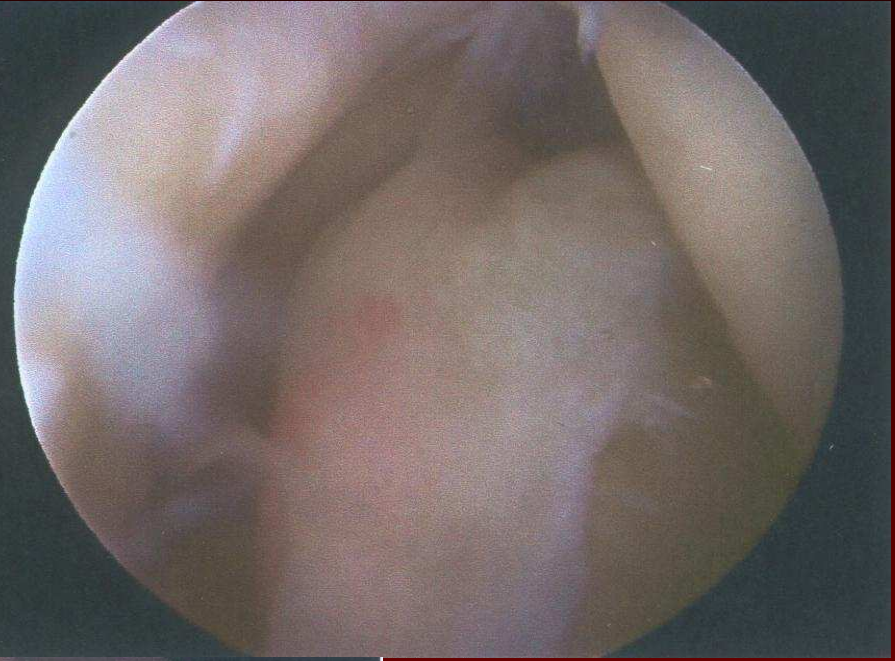
- **50% of patients with labral injuries do not need surgery**
- **Painful arc of motion/altered scapular posture predictive factors for need for surgery**
- **Need- comprehensive exam**

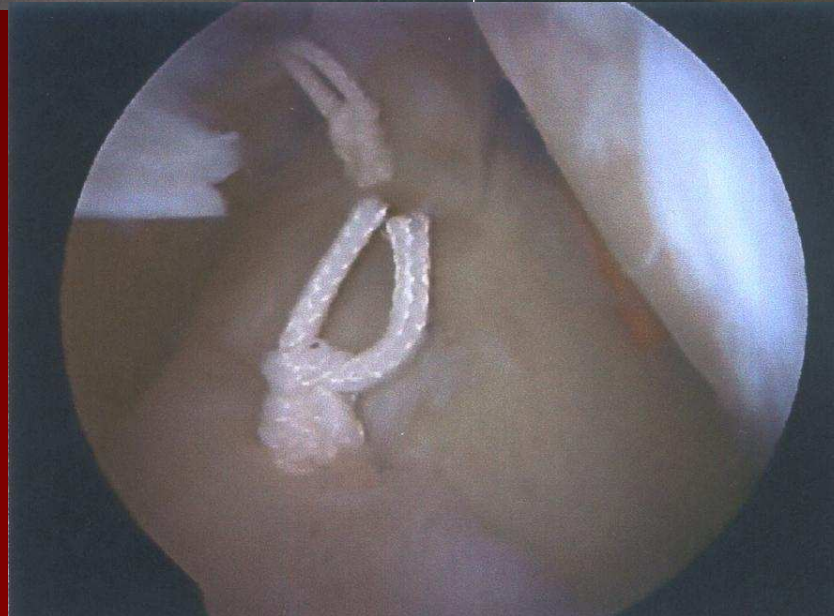
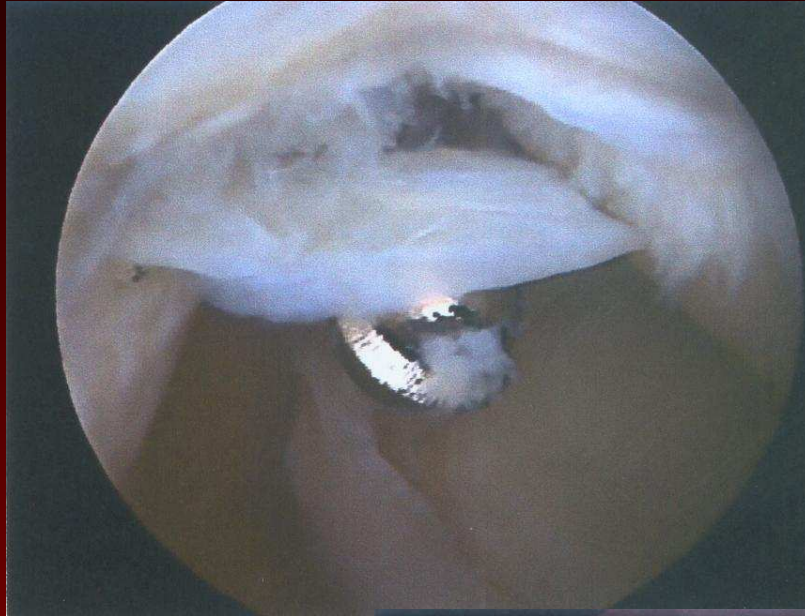
CONCLUSIONS

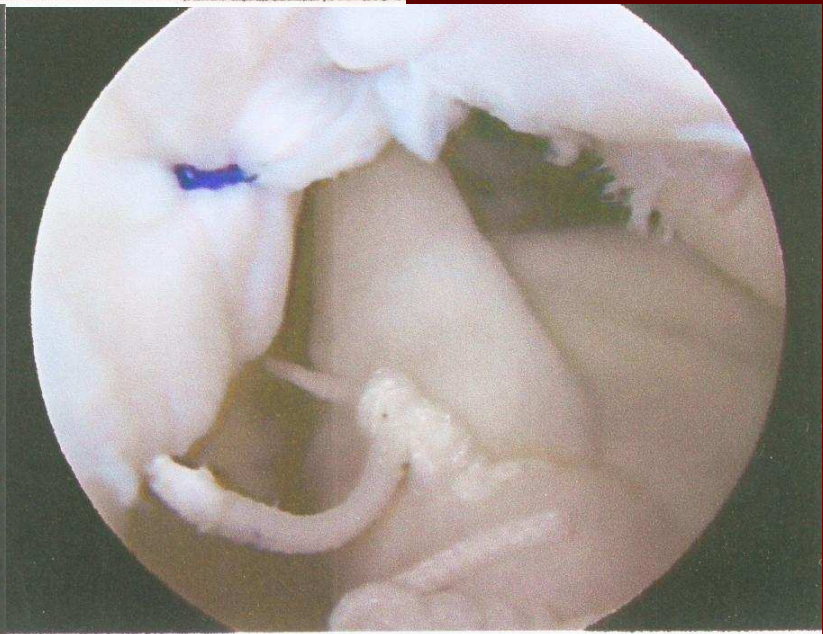
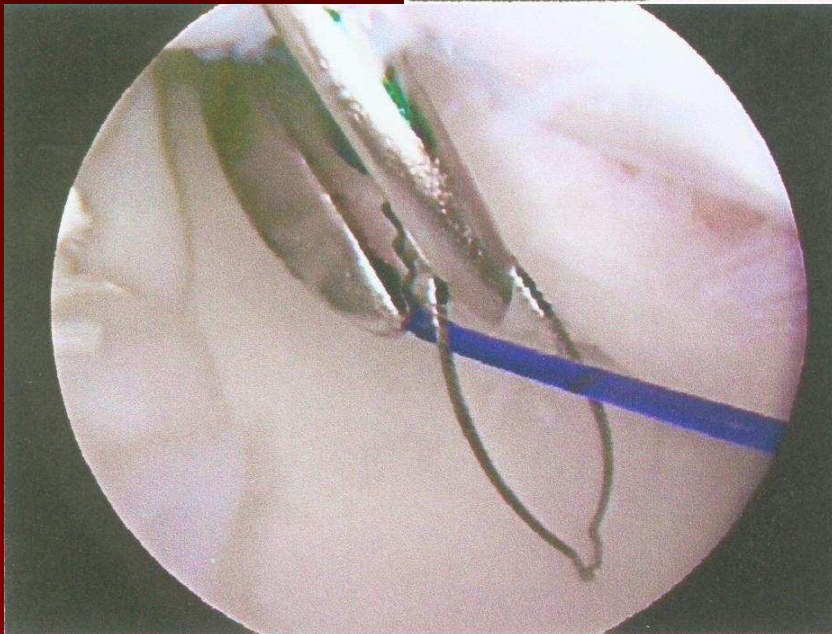
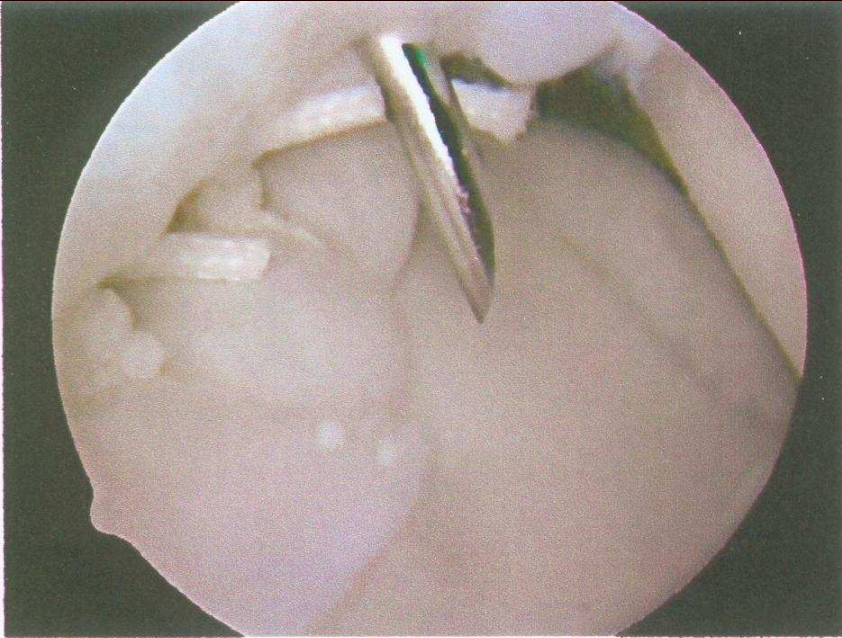
- **GIRD, (+) DLS distinguish SLAP, not need for surgery**
- **GIRD helps create the anatomic labral injury**
- **Altered shoulder function is reason for need for surgery**

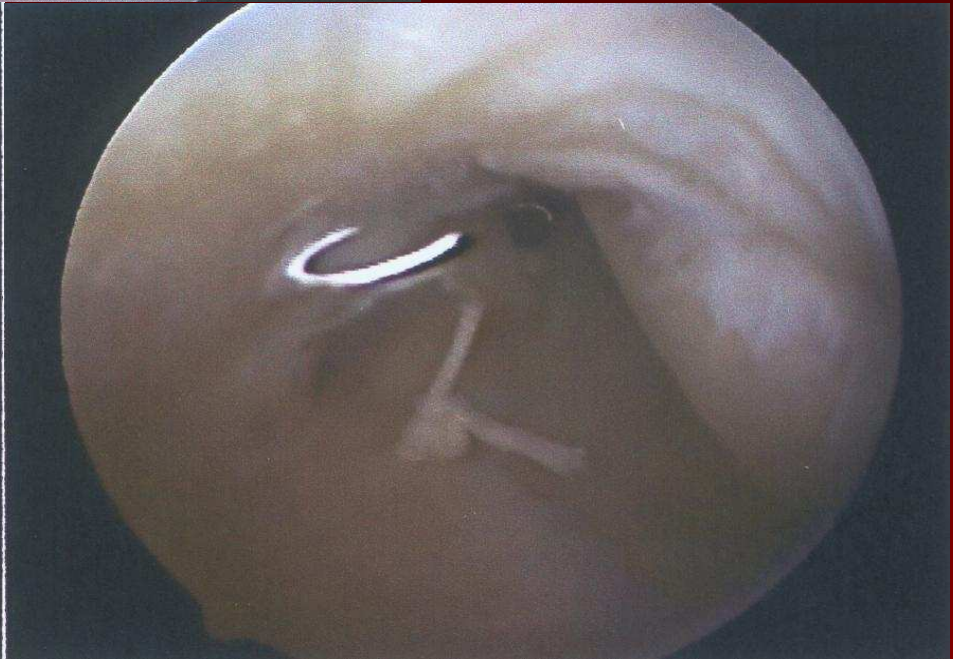
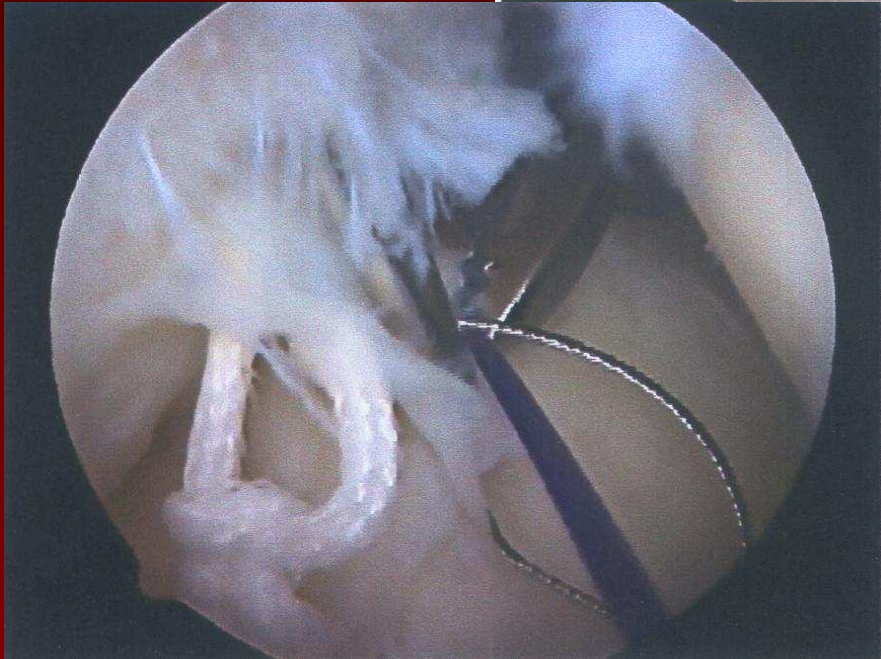
**Length of time for
rehabilitation,
indications for surgery**











**Criteria for return to
play, prevention of
future injury**

Case 4

- **28 Y.O. thrower**
- **Acute on chronic pain**
- **Inability to throw**
- **Pain at cocking > ball release**
- **Previous injured knee**
- **Point tender, slight swelling**



**What is the
pathophysiology in this
injury**

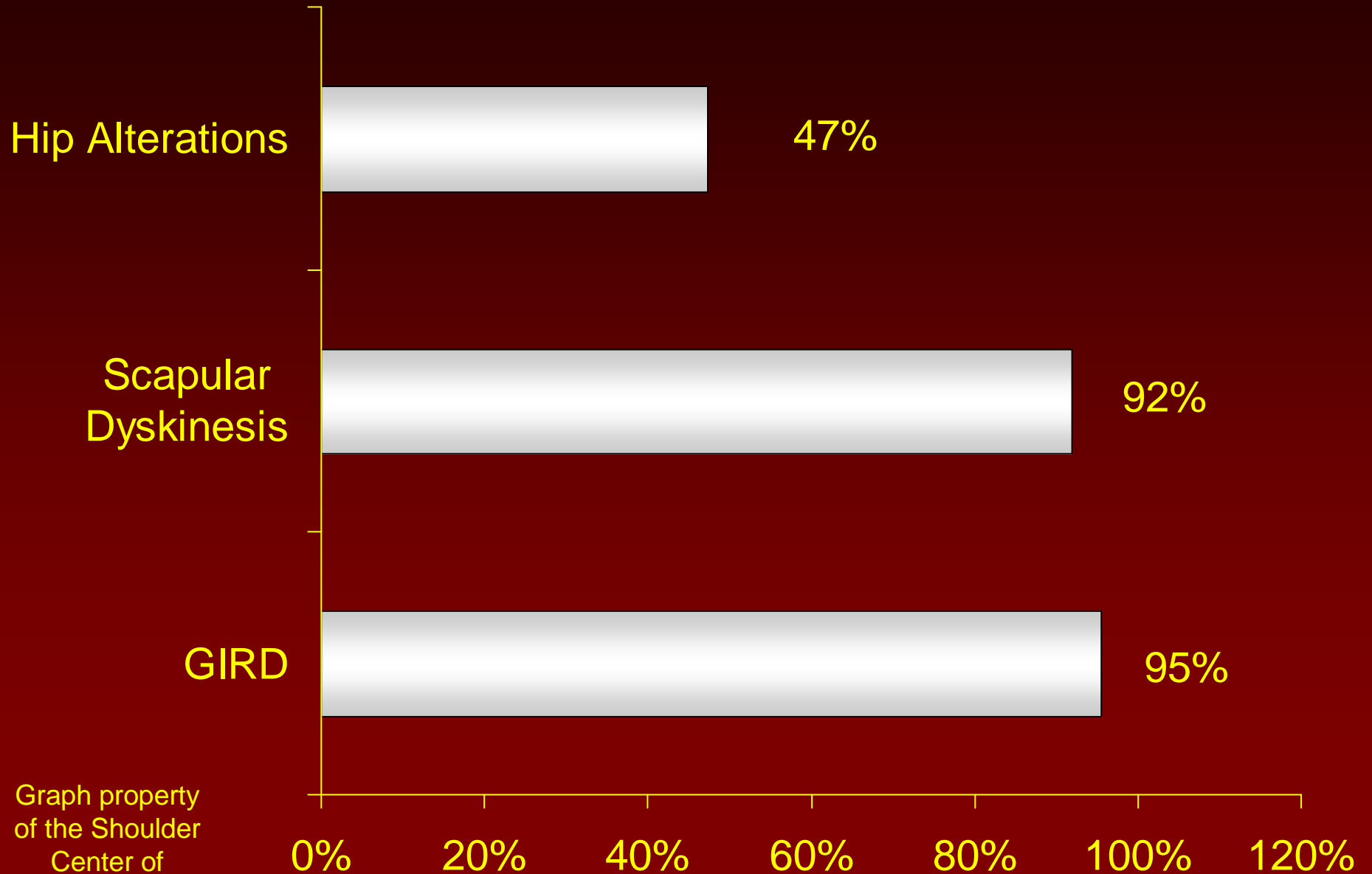
Medial “epicondylitis”

- **Problem- excessive repetitive supination**
- **Location- anterior/distal to epicondyle- pronator teres**
- **Occasional ulnar symptoms**

Medial “epicondylitis”

- **Proximal deficits**
 - **GIRD- 76- 94%**
 - **Scap dyskinesia- > 80%**
 - **Hip weakness/inflexibility-
49% (non surgical)-
76% (surgical)**

Injured Population (199)



Graph property
of the Shoulder
Center of
Kentucky

MCL Patients (50)

Hip Alterations

76%

Scapular
Dyskinesia

96%

GIRD

100%

0% 20% 40% 60% 80% 100% 120%

INTERACTIVE MOMENTS

- **Moments created by position/
motion of adjacent segments**
- **Force production- not at joint**
- **Joint stability- minimal size,
strength at joint**

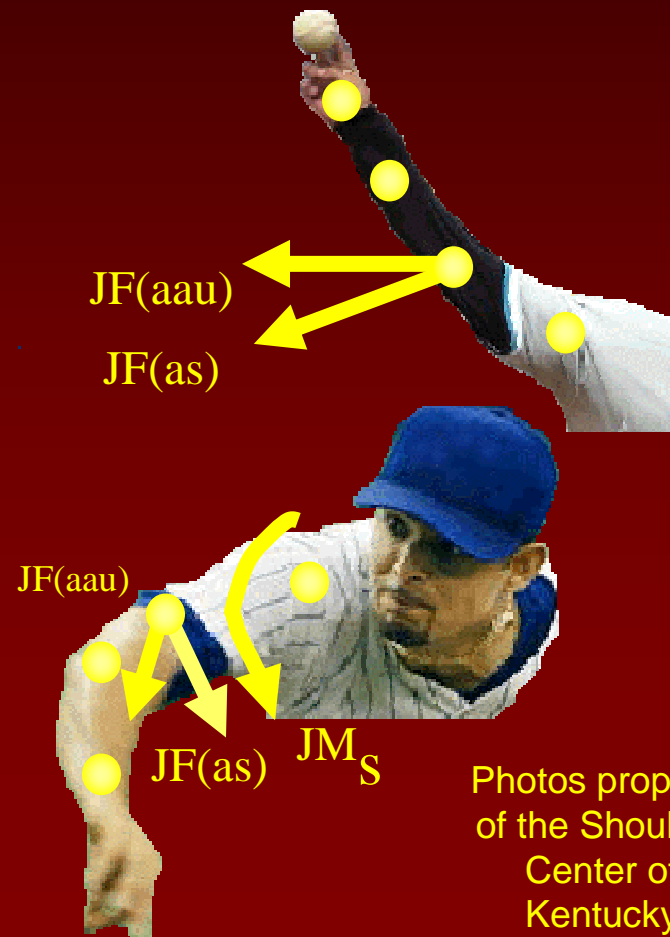
Interactive Moments

- Creates interactive moments
 - Forces from position/ motion of adjacent segments

Equation for the proximal segment:

$$\begin{aligned}
 & JM_{pp} \\
 & + (r_p M_p \sin\theta_p + l_p M_a \sin\theta_p + r_a m_a \sin\theta_d) A_{pp} \\
 & - (r_p m_p \cos\theta_p + l_p m_a \cos\theta_p + r_a m_a \cos\theta_d) A_{pp} \\
 & - (l_p^2 m_d + r_d l_p m_j \cos\theta) \theta_p \\
 & - r_d l_p m_a \sin\theta \theta_p^2 \\
 & - (r_d l_p m_d \cos\theta + l_{cd} + r_d^2 m_d) \theta_d \\
 & + r_d l_p m_d \sin\theta \theta_d^2 \\
 & - (r_p m_p \cos\theta_p + l_p m_d \cos\theta_p + r_d m_d \cos\theta_d) g \\
 & = (l_{cp} + r_p^2 m_p) \theta = l_{pp} \theta_p \\
 & = \text{Net moment on proximal segment}
 \end{aligned}$$

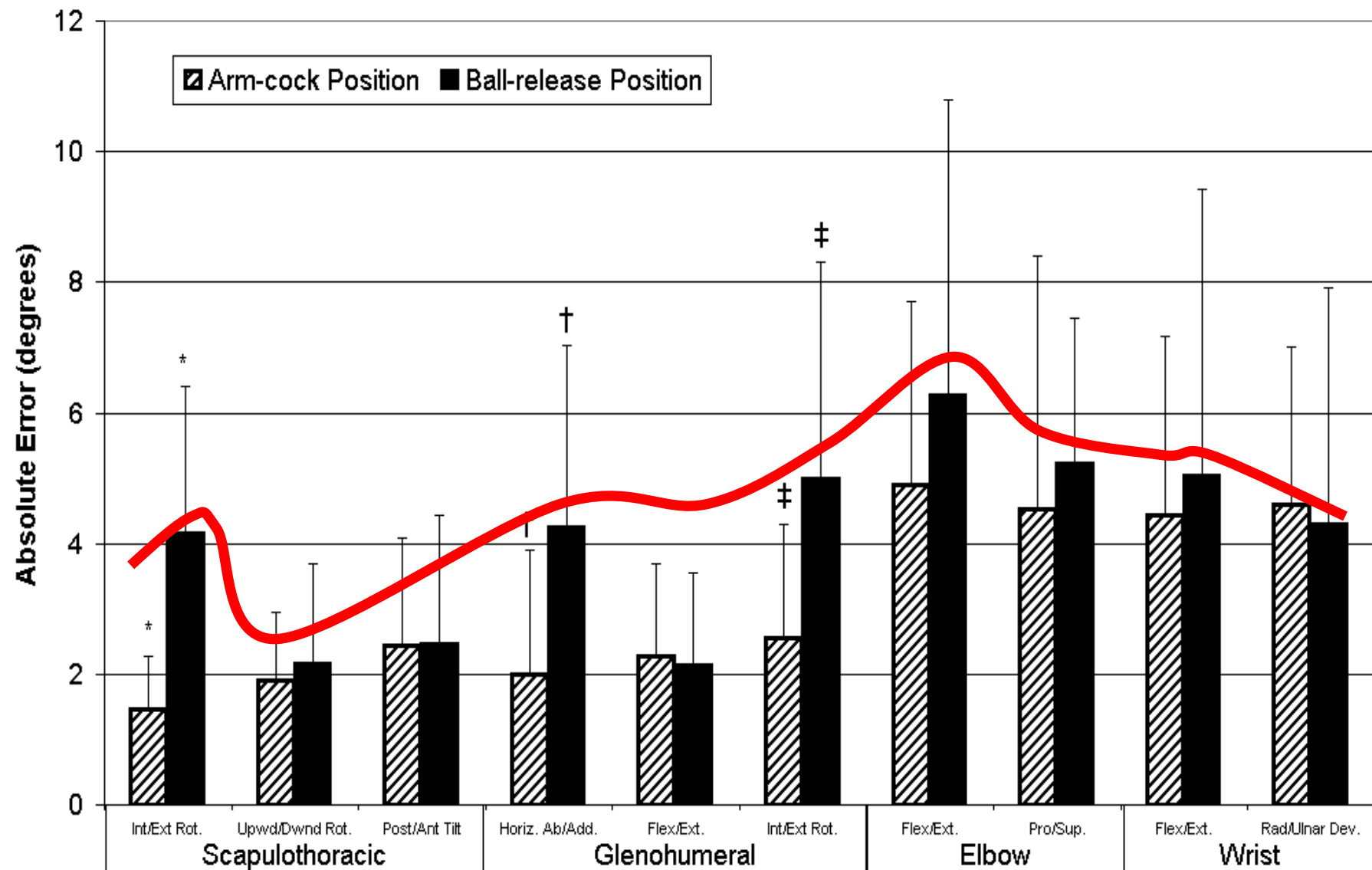
$IM_{p\ app}$
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Photos property of the Shoulder Center of Kentucky

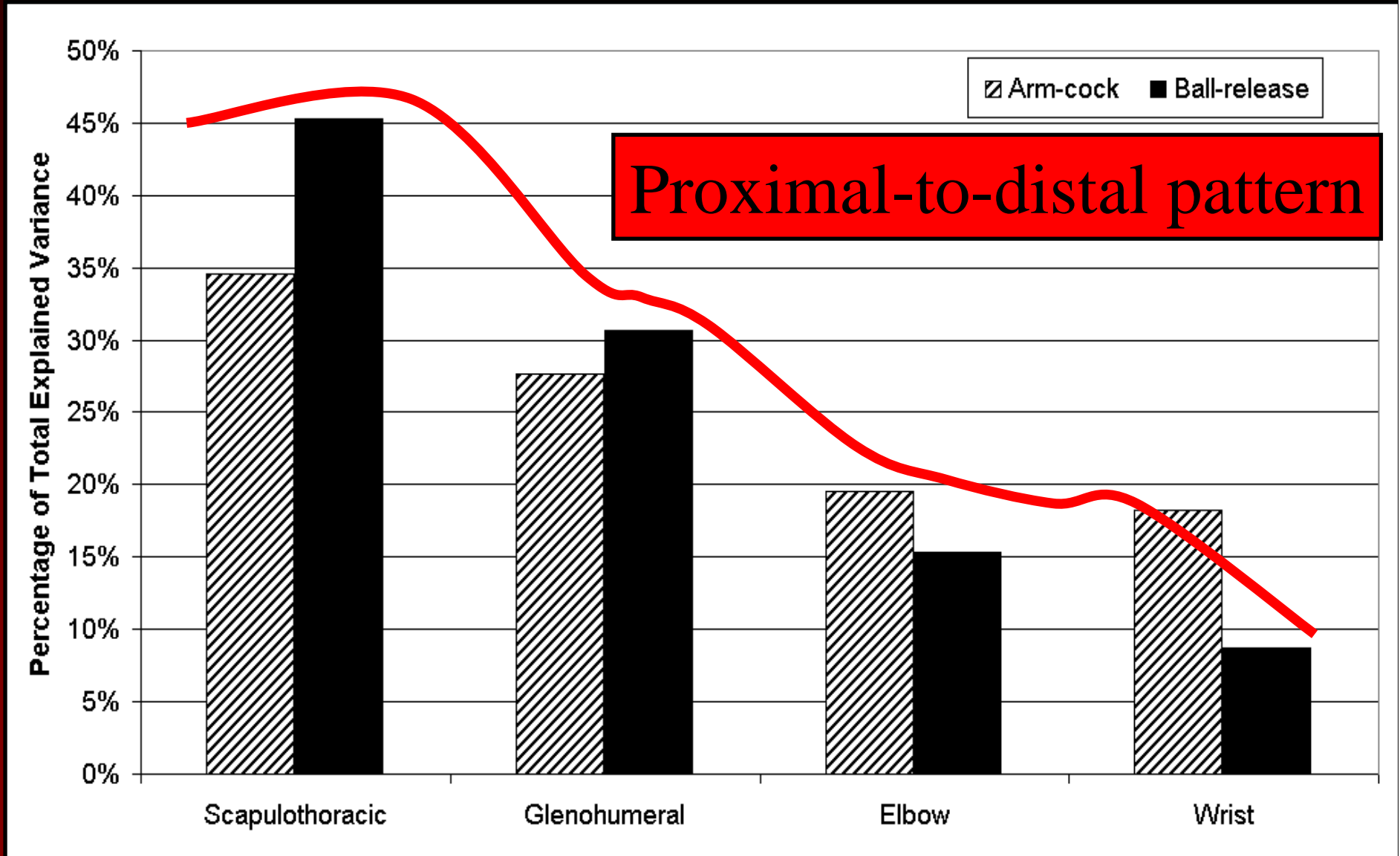
Graph courtesy of Brady Tripp, PhD ATC

Fatigue: overall task acuity



Graph courtesy of Brady Tripp, PhD ATC

Fatigue: overall task acuity



**What are the best
treatment guidelines**

Medial “epicondylitis”

- **Treatment**
 - Review mechanics- grip, serve/pitching motion, leg/foot position
 - Proximal restoration- hip/trunk, scapula/shoulder

Medial “epicondylitis”

- **Local treatment**
 - **Flexibility- flexors**
 - **Eccentric strength- arm**
 - **Cellular- TNG, ultrasound**
 - **? Injection, bracing**

Prevention strategies

- **Preventative considerations**
 - **Elbow is a downstream joint in the kinetic chain**
 - **Proximal maladaptations-susceptible athlete**
 - **Preparticipation exam for entire kinetic chain**