Treating the Thrower's Shoulder

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The Thrower's Shoulder

Introduction

• Common site of injury
  » Repetitive forces / stresses
• Tremendous joint forces
  » Anterior shear forces 1-1.5 X BW
  » Distraction forces 75-100% X BW
• High velocities (7,265 °/sec)
• Tremendous mobility
  » Repetition & fatigue
  » Arm fatigue & injury patterns
  » Number of pitches

The Thrower's Shoulder

Motion and Laxity

• Common findings
  » Excessive ER
  » Limited IR
• Anterior laxity
• Posterior tightness


• Examined ROM in 1200+ professional baseball players
• ER @ 90 deg abduction:
  » Dominant: 129 ± 10 deg
  » Non-Dom: 121 ± 9 deg
• IR @ 90 abduction:
  » Dominant: 61 ± 9 deg
  » Non-Dom: 68 ± 8 deg
• Total Motion: 190 ± 14

Total Motion Equal Bilateral !!!
Total Motion Concept
Wilk et al AJSM 2002

ER + IR = Total Motion

Causes of Loss of IR Motion
Humeral Retroversion

• Several studies have shown retroversion of the humerus
  » Crocket AJSM 2002
  » Reagan AJSM 2002

Causes of Loss of IR Motion
Posterior Capsule Contracture

• Borsa, Wilk, Reinold: AJSM 2005
• Examined GH translation in 43 professional baseball pitchers
  » Anterior: 2.81 mm
  » Posterior: 5.38 mm
    • Significantly greater posterior translation
    • No differences between D and ND
  » No correlation between IR ROM and posterior translation
**Causes of Loss of IR Motion**

*Posterior Muscular Contracture*

- **Reinold: AJSM '08**
- ROM Before & After Throwing
- Measure PROM before and after pitching in 117 professional baseball players
- Significant decrease in:
  - IR: -8.5°
  - TM: -9.5°
  - Elbow extension: -2.4°
- Changes still present at 24 hours

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**Range of Motion After Throwing**

**Course of a Season**

- **Reinold & Gill: '06-'08**
  - Studied ROM characteristics over course of a season
  - Cumulative decrease in ROM over season
    - Players GAIN IR by ~5-10 degrees
    - Players that do not stretch lose IR and elbow extension
  - Efficacy of our stretching programs
    - Still analyzing but interesting!!

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**Principles of Shoulder Care**

- Stretching
- Strengthening
- Dynamic Stability

- I am not sure that the posterior capsule is the cause of the changes in IR in overhead athletes
  - I have not seen this to be common in the healthy or the injured athlete
- IR is supposed to be less in the throwing arm, amount depends on retroversion
  - Throwing causes acute loss of IR, can become cumulative
- Assess, DON'T ASSUME!
**Stretching the Thrower’s Shoulder**

**Principles**

- Prevent cumulative loss of motion
- Maintain total motion
- Pitching with loss of total motion results in greater chance of injury
  - Ruotolo: JSES '06
  - Myers: AJSM '06

**The Thrower’s Shoulder**

**Unique Characteristics**

- Not all pitchers are the same!
- Assess each player individually
  - Range of motion
  - Shoulder laxity
  - Collagen deficiency

**The Thrower’s Shoulder**

**Unique Characteristics**

- Collagen deficiency – “loose shoulders”
  - Large total motion
  - Laxity exam
- Maintain motion
  - Avoid aggressive stretching
  - Insufficient static stability
  - Worried about dynamic stability
  - Injuries occur when “tired”

**Stretching the Thrower’s Shoulder**

**Principles**

- If performed routinely, motion should not be a problem
- Shouldn’t have to resort to aggressive stretching
- Player’s want to feel it on their “spot”
**Stretching the Thrower's Shoulder**

**Principles**
- Goal is to avoid aggressive stretching while maintaining total motion
  - Perform "stretching" frequently
  - "Feel" player – assess motion & end feel
  - Assess response to workload
- Nourish joint, cartilage, tendon
- Pump out eccentric damage

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**Shoulder Exercises**

**Introduction**
- Recent advances in the knowledge of shoulder function
- Evolution of shoulder treatment
  - Development of rehabilitation programs

*Less theory, more scientific proof*

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**What's the Best Exercise for ER?**

*Reinold et al: JOSPT '04*

- Side 62-67%
- ER Scapular Plane 53-55%
- ER@90 48-50%

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**What about the “empty can” exercise?**
Full Can Vs. Empty Can
Reinold et al: J Athl Train ‘07

- EMG 64% supraspinatus
  » FC, EC, P. HABD
- Significantly less deltoid with full can
  » 84% FC
  » 119% Prone
  » 124% EC

Scapular Position

- Static resting position of scapula is protracted and anterior tilted
  » Reinold, Wilk, Bastan: APTA ‘06
  » 71 Professional baseball pitchers
- These positions have strong correlation with decreased serratus and lower trapezius strength
  » Thigpen, Reinold, Gill: APTA ‘08
  » 50 Professional baseball pitchers

Static Shoulder Stabilization

- Baseball pitchers inherently have poor static stability
  » Require precise interaction of the dynamic stabilizers

The KEY to treating the overhead athlete

- Train the rotator cuff to be strong & SMART

Key Points

- Understand:
  » Shoulder – Pitcher - Pathology
- Principles of Treatment
  » Stretching
  » Strength / dynamic stability
- Specific pathology
  » Settle down inflammation
  » Regain total motion / dynamical stability