Rehabilitation of the Thrower’s Shoulder

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Objectives
- Review pertinent anatomy
- Discuss appropriate evaluation
- Manual therapy techniques
- Exercise prescription
- Returning to throw

Anatomy Review
- Bony Anatomy
- Ligamentous/Capsular Structures
- Upper extremity involvement with throwing
Shoulder Complex Bony Anatomy

- Shoulder Complex
  - Acromioclavicular Joint
  - Sternoclavicular Joint
  - Glenohumeral Joint
  - Scapulothoracic Joint

Shoulder Capsule and Glenoid Labrum

- Fedoriw et al; AJSM '14
  - Non-surgical: 40% RTP, 22% RPP
  - Surgical: 48% RTP, 7% RPP

- Reinold et al; IJSP '13
  - Microinstability in overhead athletes
  - Precursor to other injuries?

Pertinent Musculature

- Rotator Cuff
  - Supraspinatus
  - Infraspinatus
  - Teres Minor
  - Subscapularis

- Posterior Musculature
  - Mid and Lower Trapezius
  - Triceps
  - Latissimus Dorsi
  - Rhomboids

- Anterior Musculature
  - Pec Major/Minor
  - Serratus Anterior
  - Bicep
Phases of Throwing and Muscle Activation

- Seryer et al; Sports Health 2010
- Calabrese; J SPT 2013

Clinical Examination

- Subjective History
- Range of Motion
- Joint Mobility
- Strength
- Scapular Control
- Special Tests / Diagnostic Imaging
- Lower Extremity / Core

Subjective History

- Location/length of symptoms?
- At what point during the throwing motion does pain begin?
- Previous injury/rehab?
- Pre/post pitching routine?
- Difficulty warming-up?
- Volume of sport activity?
Range of Motion Assessment
- Is there more to ROM assessment than GIRD???
  - >20 deg diff; Morgan et al '03
  - Manske et al; J SPT '13
- Total Arc = ER + IR
  - 2.3x inc. for injury when > 5 deg deficit (Wilk et al.)
  - 130 ER + 30 IR = 160
  - 105 ER + 55 IR = 160
- Shoulder flexion w/ stabilized scap
- Elbow and Wrist Assessment

Joint Mobility Assessment
- Assessment of GH Joint Mobility
- Load and shift test
  - Stabilize scap
  - Approximate HH into glenoid fossa and translate Ant/Post.
  - 90% Sensitivity; 85% Specificity (Cleland; J Ortho Exam '05)
- Thoracic Mobility
  - Prone posterior-to-anterior mob

Strength Assessment
- Test pertinent muscles involved in phases of throwing and compare bilaterally
  - RTC, Med/lower trap, serratus anterior, etc.
- Manual muscle testing
- Hand-held dynamometry
  - Hayes et al. 2002
  - Donatelli et. al 2000; JOSPT
Scapular Control/Position

- **Scapular Control**
  - Forward flexion assessment
  - Identify scapular dyskinesis with concentric and eccentric phase
  - Kibler et al; J Am Acad Ortho Surg '03

- **Scapular Position**
  - More protraction and anterior tilt vs. non-dominant scapula
  - Wilk, Reinold et. al; CSM '07

Special Tests / Diagnostic Imaging

- **Special Tests**
  - >158 Special Tests; Magee, Dj
  - Corroborate with multiple tests and clinical exam

Imaging of the Throwers Shoulder

- DelGrande et al; JCAT '16
  - 66% Tendinopathy
  - 32% Partial Supraspinatus Tear
- Lesniak et al; AJSM '13
- Miniaci et al; AJSM '02
  - 90% Abnormal shoulder cartilage

Lower Extremity and CORE Assessment

- **ROM Assessment**
  - Inc. IR stance hip; Inc. ER stride hip
  - MuCuloch et al; Ortho J Sports Med '14

- **Neuromuscular control**
  - Chaudhari et al; AJSM '14
  - LE muscle strength
  - Abdominal strength
Manual Therapy Techniques

- Joint Mobilizations
- Passive ROM/Stretching
- Soft tissue techniques

Glenohumeral Joint Mobilizations

Ant. Mob for Inc. ER
Inf. Mob for Inc. IR
Post. Inf. Mob for Inc. Flexion

Shoulder Passive ROM/Stretching

- Prone External Rotator Stretch
  - Stabilize scapula
  - Distract humerus
  - Downward pressure on forearm
**Shoulder Passive ROM/Stretching**
- McClure et al; JOSPT '07
  - RCT comparison of stretching techniques for post. shoulder tightness (n=30; 10 deg loss IR)
  - Compared sleeper stretch to cross-body to control
  - Sig. improvement in IR in cross-body group
- Moore et al; JOSPT '11
  - RCT comparison of stretching techniques in Div 1 baseball pitchers
  - MET Horiz Add vs MET for GH ER vs control
  - Immediate inc. in GH adduction and IR following MET Horiz Add stretch

**Soft Tissue Techniques**
- Bailey et al; J Sports Health '17
  - Effectiveness of manual therapy and self-stretching for ROM deficits
  - Sig. decrease in ROM risk factors for man. therapy + stretching
Self-Stretching/Mobility Exercises

- **Sleeper Stretch**
  - Consider modified stretch position
  - Wilk et al; JOSPT '13
  - Scapular plane - better stretch for posterior capsule
  - Decreased reports of symptoms associated w/ sub-acromial impingement
  - Communicate and education on location of appropriate stretch
  - AVOID ANTERIOR "PINCHING" !!!!!

Self-Stretching/Mobility Exercises

- **Supine thoracic extension over 1/2 foam roller**
  - Inhale / raise arms
  - Exhale / lower arms
  - Spend more time at segment(s) that feel stiff/tight

Self-Stretching Techniques

- **Supine Pec Stretch on Foam Roller**
**Self-Stretching/Mobility Exercises**

- Numerous tools/foam rollers available
- Educate your patients!!
  - More is not always better
  - Tissue damage
  - Lasting pain response

**Exercise Prescription**

- Implement based on physical exam findings
- Rotator cuff/Periscapular muscular strengthening
  - OKC and CKC
- Neuromuscular stabilization
- Upper Body Plyometrics
- Core / Lower Extremity

**Rotator Cuff Strengthening/Activation**

- Appropriate muscle activation is key!!!
- Verbal and Tactile Cues
- E-Stim (Russian)
- Modify exercise
- USE A TOWEL ROLL!!
- Optimal line of force production for mm.
- Adduct humerus w. ER (Grächen et. al)
  - Inc. EMG activity of cuff
  - Inc. sub-acromial space
Periscapular Muscle Strengthening

- "I-W-Y" Exercise
  - Challenging scapular strengthening/stabilization exercise
  - 2 for 1 --- Engages CORE

Periscapular Muscular Strengthening

- Prone Horizontal Abd. w/ ER
  - Focus on scapular control
  - Progress by inc. lever arm
  - Progress to rotating humerus at end-range

Neuromuscular Stabilization

- Role in dynamic shoulder stability
  - Wilk et al.; JOSPT '97
  - Wuelker et al.; J Biomech '95
Closed Kinetic Chain Exercises

Plyometric Exercises - Double Arm
- Progression to plyos
- Full/Pain-Free ROM
- Asymptomatic w. Tex
- Appropriate strength
- Double-Arm Exercises
  - Chest Pass
  - Overhead Toss
  - Side-to-side (close and away from body)

Plyometric Exercises - Single Arm
Returning to Throw

- Full, non-painful ROM
- Appropriate strength
  - RTC, Mid-trap, Low-trap
- Asymptomatic with upper body plyometrics
- Improvement in kinetic chain impairments found during exam

Implementation of Throwing Progression

- Gradual throwing progression for return to full-activity
  - Incorporate appropriate rest
  - Modify progression based on subjective reporting and objective measures
- Modify arm care program to account for increased activity
- Identify/assess setbacks in throwing program

Points of Discussion at Discharge

- Importance of individualized maintenance program
- Stretching/mobility work
- Arm care program
- Lower extremity/CORE
  - Pre/Post Pitching Routine
- Download period following season(s)
- Appropriate volume of activity

I WILL LOOK FOR YOU. I WILL FIND YOU.
AND I WILL MAKE YOU DO YOUR EXERCISES!
Summary

- Perform thorough assessment
- Develop comprehensive TEx program focused on more than RTC
- Implement manual therapy
- Re-Assess to determine appropriateness to progress

THANK YOU!