Shoulder Instability
Introduction

- Most commonly dislocated major joint in body (1.7%) general population
- Higher incidence in athletes/sports
- NCAA injury surveillance '89-'04: 4,080 instability events
- 0.12 per 1000 athletic exposures
- Greater rates in collision sports

Collision Sports ▶ Active Sports

Shoulder Instability
Goals of Presentation

- When can an athlete return to play following shoulder instability episode?
  - non-operative treatment
  - post-operative treatment
  - specific sports
  - anterior vs. posterior stabilization
- Discuss return to play criteria &/or time following shoulder stabilization

Return to Play ???

Shoulder Instability
Return to Play

- What is return to play?
- What does that mean?
- Is play – practice or competition?
- Need to be clearly defined
  - Often open to interpretation
  - Coaches
  - Athletic trainers
  - Player & parents

Faculty Disclosure:

- Theralase Laser – Medical Advisory Board
- LiteCure Laser – Consultant
- AlterG – Medical Advisory Board
- Intelliskin USA – Medical Advisory Board
- Zerotz Medical – Medical Advisory Board
- Throw Like A Pro – Co-Owner
- Dr PRP – Rehab Advisor
- Educational Grants:
  - Empi Medical
  - Joint Active System
  - ERM
  - Bauerfeind Brace
- Book Royalties:
  - CV Mosby, Lippincott, Human Kinetics
Return to Play Criteria

**Assess Shoulder PROM**
- PROM Shoulder Joint
  - Supine 90/90 Position
  - ER: 125-130°
  - IR: 50-55°
  - TROM: 180-185°
  - Horz Add: 40-45°
  - No apprehension
  - No pain at end range
  - Wilk et al: CORR '12
  - Wilk et al: AJSM '14, '92, '11

**Assess Muscular Strength**
- **Biodex - Isokinetics**
  - ER / IR ratios
    - 72 - 76%
  - ER / ABD ratios
    - 68 - 73%
  - Torque / BW ratios
    - ER 18 - 23%
    - IR 26 - 32%
  - Bilateral comparison
    - ER 95-100%; IR 115%
  - Wilk et al: AJSM '93
  - Wilk et al: AJSM '95

**Appropriate Rehab Progression**
- **Plyometrics**
  - Pain free 2 hand throwing
  - Pain free 1 hand throwing
  - Pain free throws with 1 lb
- **Dynamic stabilization drills**
  - RS drills at 90/90
  - Prone ball drop test

**Ball Drop Test**
- Dynamic stabilization tests
  - Prone ball drops
    - 30 sec test
    - Prone on plinth
    - Number of releases/catches
    - 2 pound plyoball
    - Compare Dom to Non Dom
    - Score: %
    - Goal: 90% >
    - Expectation: 110% >
**Ball Drop Test**

- Single leg squat test
- Floor or 8 in step
- 10 reps on each leg
- Assess depth
- Assess valgus/varus
- Assess lateral trunk movement
- Assess trunk flexion
- Looking for symmetrical motion with no pain &/or dysfunction

**Return to Play Criteria**

**Single Leg Squat**

- Single leg squat test
- Floor or 8 in step
- 10 reps on each leg
- Assess depth
- Assess valgus/varus
- Assess lateral trunk movement
- Assess trunk flexion
- Looking for symmetrical motion with no pain &/or dysfunction

**Return to Play Criteria**

**Appropriate Rehab Progression**

- Subjective Shoulder Questionnaire & Scoring System
- KJOC

**The Development and Validation of a Functional Assessment Tool for the Upper Extremity in the Overhead Athlete**

- Appropriate Rehab Progression
- Subjective Shoulder Questionnaire & Scoring System
- KJOC

**Nonoperative and Postoperative Rehabilitation for Glenohumeral Instability**

- Clin Spine Med '13

**Shoulder Instability: A Comprehensive Approach**

- Provancher Romeo

**Nonoperative Rehabilitation for Traumatic and Atraumatic Glenohumeral Instability**

- Clin Spine Med '13
**Case Presentation #282011**

- 24 yr old star running back (best player on team)
- Dislocation of ND shoulder during the second pre-season game while making a tackle
- MRI indicates Bankart lesion from ~7:00 to 9:00
- No Hill Sachs, no GLAD lesion
- 2+ laxity anterior, posterior normal
- Treatment: Surgery or Non-Op Rehab?

**Non-Operative Rehab Shoulder Instability**

- Elite Athletes Rehabilitation
  - Initial period to calm tissue down
  - Early light & gradually motion
  - No aggressive stretching (ER & elev)
  - Dynamic stabilization drills
  - More than strengthening
  - Proprioception drills
  - Perturbations drills
  - Sport specific movements
  - Plyometrics
  - Brace return to play in 12 days

**Case Presentation #7182016**

- 16 yr old high school QB
- Non dominant shoulder Bankart repair performed 8 weeks post-op
- 3 anchors utilized - (9:00, 7:30 & 6:00)
- Normal ROM, good strength, excellent stability
- Wants to be back to participant in spring practice and summer camps
- “it’s my non throwing shoulder & I just want to do hand offs to the left only”

**Non-Operative Rehab Shoulder Instability**

- The Weekend Warrior
  - Immobilization 2-4 wks
  - Reduce pain & inflammation
  - Conservative rehabilitation
  - Easy motion at 2-4 wks
  - Gradual strengthening program
  - Emphasize scapular control
  - Proprioception drills
  - What are they going back to?
  - Lower expectations levels

**Case Presentation #7182016**

- 20 yr old college D1 linebacker
- Dominant shoulder Bankart repair performed 5 months post-operative
- 5 anchors utilized: (3:00, 4:30, 6:00, 7:30 & 9:00)
- ROM: ER: 95°, Flex: 165°, IR: 58°
- Strength: ER: 4+/5, IR: 5/5, Abd: 5/5
- Stability testing: excellent with no apprehension sign
- “when can he lift with other players? When can he return to practice?”

**Non-Operative Rehab Shoulder Instability**

- Weekend Warrior Rehab
  - Immobilization 2-4 wks
  - Reduce pain & inflammation
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Shoulder Instability

Introduction

✓ ~10% of all players at NFL Combine had shoulder instability
  Brophy et al: MSSE '07
✓ 4th most common procedure seen on FB players at NFL Combine
  Brophy et al: MSSE '07
• College players- 2nd most common shoulder injury in FB players (overall 4th most common procedure performed)
  Kaplan et al: AJSM '05

Rehabilitation Shoulder Instability

Return to Play Criteria

✓ 3 P Program:
  ✓ Performance
  ✓ Practice
  ✓ Play

Performance Training:
- performance training – sport specific drills
- plyometrics
- agility drills
- speed drills
- sport specific drills (throwing, catching, hitting)
  (contact sports: hitting a bag, wall pushes, shadow)

Practice situations:
- control practice
- gradual increase time, intensity, reps
- lower intensity to begin gradually increase intensity
  50-60% → 75% → 80-90% → 100%
- return to practice game (game simulation)

Play:
- return to competition
- game situation
- 100% effort

BJSM '16
Rehabilitation Shoulder Instability
Return to Play Criteria – (Non-Op)
✓ Appropriate time from injury
✓ Full sport specific non painful ROM
✓ Strength which meets the criteria (objective tests)
✓ Excellent stability
✓ No painful special tests
✓ Successfully has completed rehab program
✓ Appropriate rehab progression completed
✓ Satisfactory functional scoring

An Objective Criteria is Important

Can An Athlete Perform Effectively Following An Episode of Shoulder Instability???

Reactive Neuromuscular Shoulder Testing
Shoulder Instability
In–Season Injuries

Buss et al: AJSM 2004
- 30 athletes dislocation/subluxation
- Rehab & Brace
  - 27/30 players returned avg 10.2 days
  - 3 required surgery (in-season)
  - 37% experienced recurrence in season
  - 16 surgery @ end of season
  - 20/30 (66%) required season within 6 mos

Functional Shoulder Braces

Dickens et al: AJSM ‘14
- NCAA athlete study (2 yr study, 45 contact athletes – prospective study)
- 73% of the athletes able to return to sports at a median of 5 days following injury
- 36% did not experience episodes of recurrence
- 30% had recurrences but completed season
- 33% had recurrence & couldn’t complete season
- Subluxation players were 5.3 x more likely to return to sports than those that dislocated
- Return to play criteria -

Taylor, Arciero: AJSM’97
- 116 first time anterior shoulder dislocations in 112 men & 4 women (mean age 19.6 yrs)
  - 53 chose non-op treatment
  - 63 elected to have surgery
  - 97% patients surgery complete detachment capsulolabral complex
    - 1 patient HAGL & 1 interstitial tear capsule intact labrum
  - 53 patients treated non-operatively – 90% developed recurrent instability
  - 4 weeks immobilization
  - Supervised rehab & no athletic participation 4 months

Wilk - Rehabilitation of Shoulder Instability
2017
Non-Operative Treatment Instability
4 Phase Programs

- Acute Phase:
  - Sling for comfort
  - Gradually restore non painful ROM
  - Reduce pain & muscle spasms
  - Prevent muscular atrophy & initiate activation ex
- Subacute Phase:
  - Enhance dynamic stabilization
  - Improve GH & ST joint strength & proprioception abilities/skills
  - Gradually restore non painful functional ROM

Non-Operative Rehabilitation Shoulder Instability

6. Perturbation training
   - End range stability
   - Postural/positional disturbance
   - Critical rehab goal
   - Necessary component allowing athletes to return to overhead sports

Critical Skill to Return to Sports

Non-Operative Rehabilitation of Shoulder Instability
2017

Non-Op Traumatic Instability
Anterior Dislocation

- Four Phased Approach:
  - Acute Phase
  - Stabilization Phase
  - Dynamic Stabilization Phase
  - Return to Activity Phase


Non-Op Treatment Instability
4 Phase Programs

- Advanced Strengthening Phase:
  - Improve strength, power & endurance
  - Enhance neuromuscular control
  - Enhance dynamic stabilization & reaction stability (perturbation drills)
  - Prepare athlete for gradual return to sports
- Return to Play Phase:
  - Maintain optimal level of strength, power & endurance
  - Progress to full level of sport participation
Non-Operative Rehabilitation Shoulder Instability

8. Functional Sport Specific Drills
   » Plyometrics
   » Sport specific drills
   » Gradual progression
   » Two hand drills → one hand drills
     • mid-range drills – full/end range drills

Rehabilitation Following Shoulder Stabilization Surgery

Milchteim, Tucker, Darin, Andrews: Arthroscopy '16

• 94 shoulders arthroscopic Bankart in Athletes
  » Professional athletes 23%
  » College athletes: 30%
  » High school athletes: 31%
• Mean 5 yr. follow up. (3-8.8 yrs)
• 71% multiple dislocations, 93% sports related
• 82.5% returned to same level of sports
• ASES 91.5/100, VAS 8/10, satisfaction 8.8/10
• 6.4% recurrence rate

Rehabilitation Shoulder Instability

Return to Play Criteria (Post-Op)

✓ Appropriate time from surgery (post-op timeframe)
✓ Full sport specific non painful ROM
✓ Strength which meets the criteria (objective tests)
✓ Excellent stability
✓ No painful special tests
✓ Successfully has completed rehab program
✓ Appropriate rehab progression completed
✓ Satisfactory functional scoring (ASES, Rowe)

An Objective Criteria is Important

Goal: Return to Sports 7-9 mos
Rehabilitation Following Shoulder Stabilization

Rules of the Road

- Program must match the surgery
- Program must be based on patient’s unique tissue qualities
- Program must be adaptable to host tissue’s response
- Gradual progression is key
- Ultimate goal is dynamic / static stability

Restore Normal Full Pain-free Function

SHOULDER INSTABILITY
Numerous Surgical Procedures

- Bankart procedure open or arthroscopic
- Capsular shift procedure
- Plication procedure
- Capsulolabral reconstruction
- Laterjet procedure
- Remplissage
- Concomitant posterior capsule repair?

REHABILITATION FOLLOWING ARTHROSCOPIC BANKART
Precautions

- No overhead motions for 4-6 weeks
- Sling for 4 weeks
  - Sometimes longer for specific patients
- Sleep in brace for 4 weeks
- No excessive ER or extension or horizontal abduction
  Precautions dependent on extent of lesion & surgical technique

Range of Motion

- Immediate motion in scapular plane
  - ER / IR @ 30 deg abduction
  - Flexion to 90 degrees only
    (for first 4 weeks)
- At week 5, gradually progress ROM
  - ER / IR at 90 degrees ABD
  - Flexion > 90 degrees – gradual↑
- At week 7 – 8: full ROM
  What Does Full ROM Mean?

REHABILITATION FOLLOWING ARTHROSCOPIC BANKART
Range of Motion

- Gradually increase ROM based on patient’s healing response, tissue quality & end feel.
- Also based on patient’s desired activities
  Football ↔ Overhead Athlete
- 90 degrees of ER?
- Week 8-12: push throwers ROM

REHABILITATION FOLLOWING ARTHROSCOPIC BANKART
Strengthening Exercises

- Isometrics and rhythmic stabilization drills 2 weeks
- Progress to tubing ER / IR week 3
- Isotonic strengthening week 4 - 5
- Aggressive strengthening week 12 - 14
- Plyometric training week 14-16
REHABILITATION FOLLOWING ARTHROSCOPIC BANKART

Functional Activities

- Sport-specific training: initiated week 18 - 21
- Interval throwing program: initiate at week 16
- Return to contact sports: gradual at 6-7 months
- Return to overhead sports: 6 - 9 months

REHABILITATION FOLLOWING OPEN BANKART

Motion

- Immediate easy motion to tolerance with restrictions
  - ER / IR in scapular plane at 30 deg abd.
  - ER usually painful
  - IR not painful or tight
  - Flexion to tolerance (90)
  - Progress ER/IR motion to 45 deg abd. at 2-3 weeks

Motion

- Gradually ER/IR ROM to 90 deg abduction
- Gradually applying stretch on inferior capsule
  - ER at 90 deg progression:
    - At week 4-5: 45-50deg
    - At week 6: 65 deg
    - At week 8: 80 to 90 deg
    - At week 10/12: 85 –95 degrees

Motion

- Immediate isometrics, RS, RI, co-contractions
  - No IR for 2 weeks
- Initiate isotonics week 3
- Aggressive strengthening week 8 – 10
- Caution against high loads at excessive points of ROM
- Plyometric drills week 12

Motion

- Weight training 14 – 16 weeks
- Sport-specific training 3 - 4 months
- Contact sports: 6 months
- Collision sports: 6- mos
- Return to overhead sports (when able)
  - Interval throwing program week 16

Rehabilitation Following Anterior Laterjet

- Shoulder sling for 4 weeks
- Sleep in shoulder brace for 4 weeks
- Immediate restricted motion:
  - Flexion to 90 deg for 4 weeks
  - ER/IR @ 30 abd: ER to 20 deg for 2-4 wks
  - IR to 20-30 for 4 weeks
  - ER/IR @ 45 abd: ER to 25 deg,
  - IR to 45 deg
- Submaximal isometrics, scapular strengthening
Rehabilitation Following Anterior Laterjet

- Week 6:
  » Flexion to 145°
  » ER @ 45° abd: 45-50°
  » IR @ 45° abd: 55-60°
  » Isometrics, light isotonics, scapular strengthening
- Week 8: Gradually increase ROM
- Week 10-12: approximately full ROM
- Progress to isotonics week 12
- Sports specific training (restricted) week 16
- Return to sports: depends on type of sport 5-6 mos.

Rehabilitation Following Arthroscopic Plication

- Control forces for at least 6-8 weeks
- Gradually increase applied loads
  » Assists in collagen synthesis & alignment
- Immediate controlled restricted motion
  » Flexion to 70° week 1, 90° week 2
  » ER/IR @ 30° abd (15/30°) week 2
- Motion below 90° degrees for first 4 weeks
- Shoulder immobilizer (sleep) 4 weeks
- Isometrics, RS, scapular trn., & proprioception

Rehabilitation Following Arthroscopic Plication

- Gradually increase ROM
  » Week 4: motion above 90° degrees
  » Flexion to 125° (wk 4), then gradually increase
  » ER/IR @ 90° abd. (ER to 30-40°) week 5
- Week 6:
  » ER @ 90° abd. 70°*
- Week 8: Full flexion motion
  » ER @ 90° abd to 90
- Weeks 8-12: gradually increase to thrower’s motion 115° of ER

Rehabilitation Following Arthroscopic Plication

- Isometrics, dynamic stabilization drills wk1&2
- Active limited ROM week 3
- Light isotonics week 4
  » Use 1 lb.
  » Increase 1 lb/week
- Initiate weight training (gradually) week 10-12
- Plyometrics (2 hand drills) week 12
- Interval throwing program: week 16
- Interval hitting program: week 13-14
- Return to sports; contact 6-7 mos. Overhead 7-9 mos

RTP Following Shoulder Stabilization

Conclusions

- Shoulder instability is a common shoulder lesion
- Often surgery is required to restore functional stability
- RTP should be based on several factors:
  ✓ Time (healing constraints)
  ✓ Objective criteria (ROM, strength)
  ✓ Subjective criteria
  ✓ Rehab progression & NM control is critical factor
Thank You !!!