Stiff Shoulder & Cuff Tear

• Stiff shoulder associated with rotator cuff tears

• Management
  • Shoulder Stiffness after rotator cuff repair
  • Cause
  • Management

Idiopathic Frozen Shoulders

• Frequently associated with rotator cuff lesions

• Cuff lesion can be a cause??
  ✓ Watson L, JSES, 2000
  ✓ Rundquist PJ, Clin Biomech 2004
  ✓ Yoo JC, Orthopedics 2009

Idiopathic Frozen Shoulders

• Criteria of ROM loss
  ➢ No standardized criteria!!
  ➢ Variable according to authors
  ✓ Robinson CM, 2012 Abd<90° some limits in IR & ER
  ✓ Yoo JC, 2009 FF<100° ER<10° IR<Th12
  ✓ Watson L, 2000 Abduction<120° ER<50%

► Pain can affect ROM!!

ROM Measurement

• Measurement in standing or sitting position unreliable!

• Pain often restricts the motion!
Our Criteria

• ROM measurement
  - FF $\leq 100^\circ$
  - ER @ side $\leq 10^\circ$
  - IR $\leq L5$

Severe & Global Loss!

Subjects

• Prospective Level IIa study
  
  **July, 2012 - July, 2013**

  ◆ 2185 shoulders in 2052 patients
  ◆ Age: 35 years and older
  ◆ Shoulder pain associated with ROM deficit

Subjects

• Prospective Level IIa study
  
  **June, 2012 - July, 2013**

  ◆ 2185 shoulders in 2052 patients
  ◆ 379 shoulders in 367 patients
  ◆ 162 males & 205 females
  ◆ Mean age: 61 years (range, 35-83)

Subjects

• Prospective Level IIa study
  
  **July, 2012 - July, 2013**

  ◆ Exclusion criteria
    ✓ Diabetes mellitus
    ✓ Evident traumatic event
    ✓ Calcific deposit
    ✓ Osteoarthritic change

Subjects

• Prospective Level IIa study
  
  **June, 2012 - July, 2013**

  ◆ 2185 shoulders in 2052 patients
  ◆ 379 shoulders in 367 patients
  ◆ 162 males & 205 females
  ◆ Mean age: 61 years (range, 35-83)

Grouping by Severity & Pattern

• ROM measurement
  - FF, ER @ side, IR

• Grouping
  ◆ Severe & global loss group
  ◆ Severe, but not global group
  ◆ Mild & moderate group

Grouping by Severity & Pattern

• ROM measurement
  - FF $\leq 100^\circ$
  - ER @ side $\leq 10^\circ$
  - IR $\leq L5$

⇒ Severe & global loss!
⇒ Frozen shoulder
⇒ Adhesive capsulitis
Grouping by Severity & Pattern

- ROM measurement
  - FF ≤ 100°
  - ER @ side = 30°
  - IR ≤ L5

⇒ Severe, but not global!

Grouping by Severity & Pattern

- ROM measurement
  - FF = 110°
  - ER @ side = 20°
  - IR = L4

⇒ Mild & moderate loss!

379 Stiff Shoulders

- 89 Severe & global loss
  - 26 males, 63 females
  - Average age: 57 (35-80) years
- 111 Severe, but not global loss
  - 56 males, 55 females
  - Average age: 60 (38-83) years
- 179 Mild & moderate loss
  - 82 males, 97 females
  - Average age: 63 (35-83) years

Results: Rotator Cuff Lesions

<table>
<thead>
<tr>
<th></th>
<th>Intact</th>
<th>PTT</th>
<th>FTT</th>
</tr>
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<tbody>
<tr>
<td>Severe &amp; global</td>
<td>91%</td>
<td>9%</td>
<td>0%</td>
</tr>
<tr>
<td>(n=89)</td>
<td>(81)</td>
<td>(8)</td>
<td>(0)</td>
</tr>
<tr>
<td>Severe, but not</td>
<td>44%</td>
<td>17%</td>
<td>39%</td>
</tr>
<tr>
<td>global (n=111)</td>
<td>(49)</td>
<td>(19)</td>
<td>(43)</td>
</tr>
<tr>
<td>Mild &amp; Moderate</td>
<td>35%</td>
<td>16%</td>
<td>50%</td>
</tr>
<tr>
<td>(n=179)</td>
<td>(62)</td>
<td>(35)</td>
<td>(89)</td>
</tr>
</tbody>
</table>

PTT: Partial-thickness tears, FTT: Full-thickness tears

Summary

- Shoulder stiffness associated with rotator cuff tears
  - Severe and global loss
    - Intact
    - Partial-thickness tears
    - Full-thickness tears
  - Mild and moderate loss

Management

- Severe and global loss
  - Intact or partial-thickness RCT
  - Conservative Tx
  - AS pan-capsular release only
    - No need to repair P-T RCT!!
    - Cuff repair may cause further stiffness

Ueda, Sugaya, et al. JBJS Am, 2015
**Management**

- **Full-thickness tears**
  - Mild and moderate loss
  - **Manipulation & Repair!**
    - Comparative outcome can be expected with no stiffness & repair
    - Preop physio may be unnecessary
      - Sabzevari, et al, JSES, 2017

**Stiff Shoulder & Cuff Tear**

- Stiff shoulder associated with rotator cuff tears
- **Management**
- Shoulder Stiffness after rotator cuff repair
- Cause
- Management

**Stiffness after Cuff Repair**

- Very common!!
  - Normally motion recovers with time
    - Resolves within 6-12 months
    - Quick recovery may lead to failure
    - Slow recovery or stiffness more likely to heal!
      - McNamara, Murrell, et al, JBJS Am, 2016

**Stiffness after Cuff Repair**

- Moderate & severe stiffness
  - Relevant factors
    - Preop stiffness
    - Diabetes
    - Worker’s comp
    - Surgery rarely required
      (less than 1%)

**Severe & Refractory Stiffness**

- **After rotator cuff repair**
  - Possible causes
    - Poor surgery
    - Poor postop management
      - Arm position
      - Pain control
  - Prolonged postop pain!!

**Severe & Refractory Stiffness**

- **After rotator cuff repair**
  - Prolonged postop pain
    - Adhesion @ RI
    - Capsular shrinkage
    - SAB adhesion
    - Global stiffness
Post-Surgical Stiff Shoulder

- **After Instability repair**
  - Selective loss of ER @ side
    - Homogeneous scar formation @ RI and anterior capsule
    - Limits transverse motion of the SSC tendon
  - AS “RATS (Restoration of Anterior Transverse Sliding)” procedure

**Arthroscopic RATS!!**

<table>
<thead>
<tr>
<th>Case</th>
<th>Age</th>
<th>Sex</th>
<th>Original Procedure</th>
<th>Afflicted Side</th>
<th>Unafflicted Side</th>
<th>Constant Score</th>
<th>UCLA Score</th>
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<td>1</td>
<td>20 M</td>
<td>L</td>
<td>ARB+CAP+IRIC</td>
<td>T10</td>
<td>175 T15 T15</td>
<td>91 26</td>
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<tr>
<td>2</td>
<td>10 F</td>
<td>R</td>
<td>Rep. ARB+IRIC</td>
<td>T11</td>
<td>175 T15 T15</td>
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<tr>
<td>3</td>
<td>10 F</td>
<td>R</td>
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<td>175 T10</td>
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<td>L</td>
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<td>Mean</td>
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<td></td>
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<td>142 1.3</td>
<td>175 15.7 8.6</td>
<td>81 24</td>
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Selective Loss of ER

- **After instability repair**
  - Longer immobilization?
  - Surgical procedure itself?
  - Prolonged postoperative pain
  - Scar & adhesion restricts transverse sliding of the SSC

AS “RATS” Procedure

1. Remove scar tissue @ RI
2. Resume transverse sliding of the SSC
3. Release cranial portion of IGHL

**Arthroscopic RATS!!**

<table>
<thead>
<tr>
<th>Case</th>
<th>Age</th>
<th>Sex</th>
<th>ER after</th>
<th>FF</th>
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<td>T8</td>
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<td>95.1</td>
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RefRACTory Stiffness after RCR

- **Management**
  - Global stiffness
  - Almost pain free
  - Poor rotator cuff function
    - Physiotherapy
      - Resume cuff function...difficult
      - FF can improve, but ER difficult
Refractory Stiffness after RCR

- Management
  - Global stiffness
  - Almost pain free
  - Poor rotator cuff function
    - Surgery
      - RATS & global release
    - Postop physio!