Update on Shoulder Instability

Presented by: Andrea Herzka, MD
Date: 4/23/16
Disclosures

• none
Shoulder Instability

- Can we predict the success of non-operative treatment?
- If surgery is indicated, what kind?
  - Open vs arthroscopic vs bony augment?
Epidemiology

• Glenohumeral joint is most common major joint dislocation:
  – 45% of all joint dislocations
  – 90% anterior
  – 23.1/100,000 people/year
    • Dodson et al, Orthop Clin North Am 2008
  – High School Rate = 0.63/10,000 athletic exposures
    • Robinson et al, Pediatrics 2014
Definition

- Instability: Symptomatic laxity
Categorize:

**TUBS vs. AMBRII**

- **Traumatic, unidirectional, bankart lesion, surgical stabilization**

- **Atraumatic, multidirectional, bilateral, rehab, inferior capsular shift, interval closure**

– Thomas and Matsen *JBJS* 1989
Categorize

- **degree**
  - dislocation, subluxation, apprehension
- **frequency**
  - acute, primary, chronic, recurrent
- **origin**
  - traumatic, atraumatic
- **direction**
  - unidirectional anterior, posterior, inferior multidirectional
- **laxity**
Traumatic first time dislocation
History- the event

- Mechanism of injury
  - predict direction of instability and whether traumatic or atraumatic
- Location and direction
  - location of pain, direction of dislocation
- Severity
  - could they finish the practice or game or did they go to ER
- Chronicity
  - Acute vs. recurrent
- Setting
  - practice, games, activities of daily living, while asleep, in-season, off-season, playoffs
- Exacerbating or relieving factors
- Associated manifestations
  - arm dominance, night pain, weakness, numbness, tingling, stiffness, other loose joints or dislocations-EDS
History- Predictors for Failed Conservative Therapy

- Age at first dislocation
- Mechanism of dislocation
- Need for manual reduction
- Duration of joint dislocated
- History of prior instability events
- Timing between events
  - >5 hours additive time dislocated more likely to need latarget
- Provocative activities
Exam

- Cervical ROM
- SC joint
- AC joint
- GH AROM/ PROM
- Shoulder strength- cuff tear?
- Neuro check (3-35% axillary nerve injury)
- Beighton score
- Anterior apprehension- relocation
- Mid arc apprehension and instability (suggests bone loss)
- Load shift
- Sulcus
- Jerk.Kim/ Circumduction
Hypermobility: Beighton score

- elbow hyperextension,
- knee hyperextension
- thumb-to-forearm,
- Small finger MCP joint greater than 90-degree extension
- placing hands flat on floor with straight legs while standing
Clinical Evaluation

Load shift testing
Clinical Evaluation

Apprehension- Relocation Test
Imaging

- XRAY
  - Grashey, Supraspinatous outlet, axillary, +/-Westpoint,
  - (AP IR + stryker notch= 92% Hill-Sachs detection)

- MRI
- MRI arthrogram
- 3D CT
- Arthroscopy
3D CT with humeral head subtraction: Quantify Glenoid bone Loss

Imaging: bony bankart
Common Instability Findings

- Bankart
- Osseus Bankart
- Reverse Bankart
- Perthes
- ALPSA
- GLAD
HAGL: Humeral Avulsion of the Glenohumeral Ligament

discontinuity of the IGHL attachment on the humerus
Perthes Lesion: Detachment of the anteroinferior labrum (3-6 o'clock) with medially stripped but intact periosteum.

Bankart: the Bankart lesion is an anterior labroligamentous avulsion of the inferior glenohumeral ligament's anterior band from the anterior glenoid rim.
Full Thickness Rotator Cuff Tear and Bankart Injury

<table>
<thead>
<tr>
<th>First time acute dislocation</th>
<th>% FTRTC tear</th>
<th>% Bankart</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age 14-25</td>
<td>8.7</td>
<td>75-90%</td>
</tr>
<tr>
<td>40-55</td>
<td>41%</td>
<td>40%</td>
</tr>
<tr>
<td>56-70</td>
<td>71%</td>
<td>15%</td>
</tr>
</tbody>
</table>
Imaging

Hill-Sachs
Engaging Hill-Sachs Lesions

Two types of engaging Hill-Sachs lesions (dotted lines):
A) a wide and large Hill-Sachs lesion
B) a narrow but medially located Hill-Sachs lesion

Yamamoto et al. JSES, Volume 22, Issue 9, 2013, 1285–1289
Arthroscopic Remplissage
popularized by Dr. Eugene Wolf
Treatment for first time dislocator

- Natural History for the first time dislocator
- Risk Stratification for recurrent instability
Risk of recurrent instability after first time dislocation

- McLaughlin and Cavallaro *Am J Surg* 1950
  - <20 yo 90% redislocation rate
  - 20-40 yo 60% redislocation rate
  - >40 yo 10% redislocation rate

- Rowe et al 1956
  - <10 yo 100% redislocation rate
  - 10-20 yo 94% redislocation rate
  - 20-30 yo 79% redislocation rate
Nonoperative Treatment of Primary Anterior Shoulder Dislocation in Patients Forty Years of Age and Younger

A Prospective Twenty-five-Year Follow-up

By Lennart Hovelius, MD, PhD, Anders Olofsson, MD, Björn Sandström, MD, Bengt-Göran Augustini, MD, Lars Krantz, MD, Hans Fredin, MD, PhD, Bo Tillander, MD, PhD, Ulf Skoglund, MD, Björn Salomonsson, MD, Jan Nowak, MD, PhD, and Ulf Sennerby, MD

JBJS 2008

• 257 shoulders divided into 3 groups based on immobilization duration
  – group 1: Immob 21 days min
  – group 2: immob until comfortable
  – group 3: all others (non-compliant, alcoholic, epilepsy, left dislocated >24 hrs etc.)
Patients ages 12-25 yo: 38% underwent surgery for redislocation
Patients ages 26-40 yo: 18% underwent surgery for redislocation
Duration of sling had no effect
GT fx associated with low risk of recurrent dislocation
Histogram showing the percentages of shoulders that had no or only one recurrent dislocation or subluxation, those that had a recurrence leading to operative treatment, those that were classified as still recurrent, and those that had a recurrence but stabilized


©2008 by The Journal of Bone and Joint Surgery, Inc.
After twenty-five years, *half* of the primary anterior shoulder dislocations treated nonoperatively in patients with an age of twelve to twenty-five years had not recurred or had become stable over time.

On the basis of these findings, it is our opinion that routine, immediate surgery for the treatment of all first-time dislocations in patients twenty-five years of age or younger will result in a rate of unnecessary operations of at least 30%, or possibly 50%, if one considers the number of shoulders that became stable over time.
Itoi et al *JBJS* 2005 and 2007

- 46% relative risk reduction for recurrent shoulder dislocation using ER sling
- 66% RRR in patients under 20
Age and Sex-Specific Estimated Probability of Recurrent Instability within the First Two Years After a Primary Glenohumeral Dislocation

<table>
<thead>
<tr>
<th>Age (yr)</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>0.86</td>
<td>0.54</td>
</tr>
<tr>
<td>16</td>
<td>0.84</td>
<td>0.51</td>
</tr>
<tr>
<td>17</td>
<td>0.81</td>
<td>0.48</td>
</tr>
<tr>
<td>18</td>
<td>0.78</td>
<td>0.45</td>
</tr>
<tr>
<td>19</td>
<td>0.75</td>
<td>0.42</td>
</tr>
<tr>
<td>20</td>
<td>0.72</td>
<td>0.40</td>
</tr>
<tr>
<td>21</td>
<td>0.69</td>
<td>0.37</td>
</tr>
<tr>
<td>22</td>
<td>0.66</td>
<td>0.34</td>
</tr>
<tr>
<td>23</td>
<td>0.62</td>
<td>0.32</td>
</tr>
<tr>
<td>24</td>
<td>0.59</td>
<td>0.30</td>
</tr>
<tr>
<td>25</td>
<td>0.56</td>
<td>0.28</td>
</tr>
<tr>
<td>26</td>
<td>0.53</td>
<td>0.26</td>
</tr>
<tr>
<td>27</td>
<td>0.50</td>
<td>0.24</td>
</tr>
<tr>
<td>28</td>
<td>0.47</td>
<td>0.22</td>
</tr>
<tr>
<td>29</td>
<td>0.43</td>
<td>0.20</td>
</tr>
<tr>
<td>30</td>
<td>0.41</td>
<td>0.19</td>
</tr>
<tr>
<td>31</td>
<td>0.39</td>
<td>0.17</td>
</tr>
<tr>
<td>32</td>
<td>0.36</td>
<td>0.16</td>
</tr>
<tr>
<td>33</td>
<td>0.34</td>
<td>0.15</td>
</tr>
<tr>
<td>34</td>
<td>0.31</td>
<td>0.14</td>
</tr>
<tr>
<td>35</td>
<td>0.29</td>
<td>0.13</td>
</tr>
</tbody>
</table>
First Time Dislocator: Factors that influence surgical vs nonop treatment

- Risk of recurrent instability
  - Age
  - Gender
  - ? Hypermobility
  - Sport/Activity Level
More treatment considerations

• Evidence emerged that recurrent instability has a significant negative long term prognostic value

• Every dislocation counts and the time left dislocated counts as well
Predictors of functional outcomes and recurrent shoulder instability after arthroscopic anterior stabilization.

Gasparini G1, De Benedetto M2, Cundari A1, De Gori M1, Orlando N2, McFarland EG3, Galasso O4, Castricini R2.

- 143 patients underwent anterior stabilization surgery
- Average age 25 yo
- F/u 80 months median
• 23% recurrent instability

• There was a statistically significant lower risk of failure \((p = 0.027)\) for patients who had a surgical procedure after only one episode of shoulder dislocation

• Patients treated after the second or further episode of shoulder dislocation exhibited a mean odds ratio for failure of 3.8
The patient population for this study included all in-season, competitive contact intercollegiate athletes at 3 NCAA Division I athletic departments during the 2011 to 2012 academic years.

Thirty-three of 45 (73%) athletes returned to sport for either all or part of the season after a median 5 days lost from competition.

Only Twelve athletes (27%) successfully completed the season without recurrence.

Twenty-one athletes (64%) returned to in-season play and had subsequent recurrent instability including 11 recurrent dislocations and 10 recurrent subluxations.

Of the 33 athletes returning to in-season sport after an instability event, 67% (22/33) completed the season.
Decision making

• Must stratify risk of recurrent instability
  – Young
  – Male
  – High demand
  – ? hypermobility
• Discuss/ explain
• Individualize treatment plan
Non Operative Treatment

- Sling X 1 week
- ROM as tolerated after 1 week
- Once ROM full, strengthening focusing on scapular stabilization
Open vs. Arthroscopic Bankart Repair

• Open = “Gold Standard”
• Rowe et al. reported 3.5% redislocation rate
Arthroscopic Repair: Can we Predict Failure?

- Risk factors for failure:
  - Burkhart and De Beer, *Arthroscopy* 2000:
    - lack of recognition of bony Bankart
    - Engaging Hill-Sachs
    - Anteroinferior glenoid bone loss “inverted pear”
  - Boileau et al. *JBJS* 2006
    - Bone loss (glenoid compression fx or large hill-sachs)
    - Inferior hyperlaxity
    - 3 or fewer anchors
Arthroscopic vs. Open

- Risk factor for recurrent dislocation with arthroscopic stabilization
  - Patient <20 yo
  - Overhead athlete
  - Competitive level play
  - Bony glenoid loss
  - Hyperlaxity
  - Hill Sachs- Occupancy ratio
<table>
<thead>
<tr>
<th>Prognostic factors</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at surgery (yrs)</td>
<td></td>
</tr>
<tr>
<td>≤ 20</td>
<td>2</td>
</tr>
<tr>
<td>&gt; 20</td>
<td>0</td>
</tr>
<tr>
<td>Degree of sport participation (pre-operative)</td>
<td></td>
</tr>
<tr>
<td>Competitive</td>
<td>2</td>
</tr>
<tr>
<td>Recreational or none</td>
<td>0</td>
</tr>
<tr>
<td>Type of sport (pre-operative)</td>
<td></td>
</tr>
<tr>
<td>Contact or forced overhead</td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
</tr>
<tr>
<td>Shoulder hyperlaxity</td>
<td></td>
</tr>
<tr>
<td>Shoulder hyperlaxity (anterior or inferior)</td>
<td>1</td>
</tr>
<tr>
<td>Normal laxity</td>
<td>0</td>
</tr>
<tr>
<td>Hill-Sachs on AP* radiograph</td>
<td></td>
</tr>
<tr>
<td>Visible in external rotation</td>
<td>2</td>
</tr>
<tr>
<td>Not visible in external rotation</td>
<td>0</td>
</tr>
<tr>
<td>Glenoid loss of contour on AP radiograph</td>
<td></td>
</tr>
<tr>
<td>Loss of contour</td>
<td>2</td>
</tr>
<tr>
<td>No lesion</td>
<td>0</td>
</tr>
<tr>
<td>Total (points)</td>
<td>10</td>
</tr>
</tbody>
</table>

Boileau et al. JBJS Br Nov 2007
Boileau et al.

- ISIS $\geq 7$ had a 70% recurrence rate with arthroscopic stabilization
- Initially recommended arthroscopic stabilization for patients with ISIS $\leq 4$
- More recently changed criteria to $\leq 3$
Open vs. Arthroscopic

• Need to assess risk of recurrent instability with arthroscopic technique
• In France latarget for ISIS>3
  – Bessiere et al. *CORR 2014*
• In US 90% arthroscopic stabilization procedures are arthroscopic
  – Zhang et al. *Arthroscopy 2014*
Thank You

QUESTIONS?