BEYOND THE BASIC BANKART.

Arthroscopic Treatment of Bony Lesions and HAGLs

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Beyond the Labrum…

- Contributors to instability
  - Labrum
  - Capsule
  - Bony anatomy
  - Joint vacuum
  - Dynamic stabilizers
- Previously under appreciated
  - Glenoid loss
  - Large Hill Sachs
  - HAGL
Glenoid Bony Defects: Classification

- Acute fractures (bony bankarts)
- Chronic: (impaction/erosion)
Acute Glenoid Defect (Bony Bankart) Classification:

- **Type 1:** 0-12.5%
- **Type 2:** 12.5-25%
- **Type 3:** >25%
Glenoid Defect Diagnosis

Pre op:

- West Point Axillary
  - 25 deg ant-sup, sup-med
  - Pad under shoulder (elevate 8 cm)
- CT
- MRI
Arthrosopic Evaluation for Bony Defect of Glenoid

- Bare Spot is key
- Lies in geometric center of inferior aspect of glenoid
- Use to determine glenoid deficiency
Arthroscopic Measurement of Glenoid Bone Loss:

\[
\frac{\text{posterior length} - \text{anterior length}}{\text{posterior length}} \times 2 = \%
\]

\[
\text{Normal} \quad \text{PL} = \text{AL}
\]

\[
\text{Bone Loss} \quad \text{PL} \neq \text{AL}
\]
Arthroscopic Measurement cont.

- Glenoid bone loss equals \( \frac{\text{posterior length} - \text{anterior length}}{\text{posterior length} \times 2} \)

\[
\frac{15-8}{15 \times 2} = \frac{7}{30} = 23\%
\]
Bony Bankart: Treatment

- Type 1 (0-12.5%)
  - Bony Bankart
    - Excise fragment
    - standard capsulolabral repair
Bony Bankart: Treatment

• Type 2 (12.5-25%)
  • Bony Bankart
    • Acute: suture anchor repair of bone and labrum
Bony Bankart: Treatment

- Type 3 (>25 %)
  - Bony Bankart
    - ARIF with screw(s)
Video: suture repair bony bankart
Arthroscopic Bony Bankart: Results of ARIF

  - 25 patients acute traumatic dislocations
  - All with defects > 25 % glenoid
  - No recurrences
- Sugaya et al: JBJS Am 2005;87:1752-60
  - 42 patients with recurrent instability
  - Mean bone loss 24.8 %
  - 5% recurrence

So.... *If at all possible fix type 2 & 3 bony Bankarts* !!!
Chronic Glenoid Bone Loss: Treatment Options

• **Soft Tissue**
  - Advance labrum
  - Capsulloraphy: Limit ER

• **Bone Block…**
  - Traditional
    - Laterjet (in vogue)
    - Bristow
    - ICBG
  - Experimental
    - Arthroscopic bone graft
    - Arthroscopic Laterjet
Glenoid Defects: Soft Tissue… Bankart Alone

- Results of Standard Arthroscopic Bankart Repair with Significant Bone Loss
  
  Burkhart Debeer, Arthroscopy 2000 (194 pts. 27 mo f/u)

- Recurrence rate with no bony defect 4%
- Recurrence with signif. bony defect 67%
- Contact athletes with signif. defects 80%

Note: No Capsulloraphy! NO attempt to limit ER
Chronic Glenoid Bone Loss: The Inverted Pear ...

- Burkhart: (Arthr. 2000)
  - Antero-inferior bone loss
  - Cadaver study: requires >28.8% bone loss (>7.5mm) (Arth. 2004)

- Itoi JBJS Am 2000; 82:35-46
  - Cadaver:
    - osteotomies of the anteroinferior glenoid + Bankart
  - No increase in instability in ER/ABD

  + Instability in IR/Abd w >21% defect of glenoid (6.8mm)
On the Other Hand...

Success with Soft Tissue (Capsulo-Labral) Reconstruction

- **Rowe JBJS 1978:**
  - *No sig. difference* in recurrence with standard capsulo-ligamentous reconstruction up to 1/3 loss of glenoid surface! (2% vs overall 3.5%)

- **Mochizuki AAOS 2007:**
  - *no difference* in outcome/recurrence with glenoid bone defect 25% or >!

- **Rhee: (Int Orthop. 2006 Sep 28;)**
  - *No difference* in recurrence btw glenoid defect and no defect except loss of ER
Results of Open Bone Block… Beware Deg OA !!!


- 58 shoulders
- 14 year f/u

- No recurrent dislocations! BUT ….
- 62% Deg OA!!
One hundred eighteen Bristow-Latarjet repairs for recurrent anterior dislocation of the shoulder prospectively followed for fifteen years: study II-the evolution of dislocation arthropy.


- 98% “satisfied” BUT....
- Deg OA (mod-sev) 14 %
- Deg OA (mild) 35 %
- Deg OA (total) 49% !
Other Complications of Bone Block Procedures:

- **Loss of ER**
  - (13 deg ... Yamashita Acta Orthop Scand. 2002)

- **Screw Complications**
  - (4.7-14 %, Schroder 2006 AJSM)

- **Non union**
  - (28% fibrous, 16% non union Hovelius 1983 JBJS)

- **Subluxation**
  - (21 % ... 6/41 return to same level of throwing Hill, Lombardo, Kerlan Jobe AJSM 1981)

- **NV injury**
  - rare
So.. Beware the Consequences of Your Actions...
New (unproven) Arthroscopic Bone Block Techniques

- **Arthroscopic Bone Graft**
  - Arthroscopic Autologous
  - Bone Graft With Arthroscopic Bankart Repair for a Large Bony Defect Lesion Caused by Recurrent Shoulder Dislocation. Yu Mochizuki, Hirosima In Press..Arthroscopy

- **Arthroscopic Laterjet**
Chronic Glenoid Defects: Our Approach

Arthroscopic Alternative...

• Capsulo-Labral advancement
• Limit ER
• Plus..... ?
  • Treat associated Hill Sachs
    • Fill, Reduce defect
Summary: Glenoid Defect

- **Acute**
  - Fix significant (type 2-3) bony Bankarts primarily when possible

- **Chronic**
  - <25%: treat with capsulolabral advancement
  - >25%
    - Bankart alone doesn’t work
    - Consider:
      - Arthroscopic capsulolabral advancement
      - Treat Hill Sachs
      - Bone Block predictable stability but concern about Deg OA, ER other…

- **Our approach:** Limit Laterjet to revision cases

- **Future…. Arthroscopic Laterjet/ BG ?**
Hill Sachs

• Incidence:
  • First time dislocators
    • 47% (15/32) Dx Scope (Uribe 1989 Arthroscopy)
      • Only 2/32 were large
    • 48% (12/25) MRI study (Suder JSh Elbow 1995)
  • Recurring dislocators – before repair
    • 73% by x-ray (Edwards Arthroscopy 2003)
  • Recurring dislocators - failed repair
    • 76% Hill Sachs (Rowe JBJS 1984)
Hill Sachs: Which Ones are Significant?

• Need to treat: *Chen, et al: AJSM 2005*
  
  • Size
    • <20% leave alone
    • 20-40%: grey zone
    • >40% : need to treat

• Engaging *Burkhart (Arthr 2000)*
  
  • Defect parallel to glenoid
  • Engages in functional position
Hill Sachs: Evaluation

- **Pre Op**
  - X-ray: Stryker Notch
  - CT, MRI

- **Intra-op**
  - No good method described
  - Ant-sup view…
    - % arc?
    - Depth?
  - Dynamic testing (engaging?)
Hill Sachs: Treatment Options

- Limit ER
  - Capsulectomy
  - Osteotomy
- Fill defect
  - Allograft
  - Infraspinatus
  - OBI?
- Reduce defect
Limit ER: Capsulo-labral Reconstruction

- **Success:**
  - **Neer, C. S., II:** Shoulder Reconstruction, pg. 329. Philadelphia, W. B. Saunders, 1990
    - “Rather than doing one of the bone graft procedures, I shorten the capsule to partially restrict ER ..To date I have had no difficulty” with hanging up of the head defect.
  - **Rowe:**
    - recurrence for mod- large Hill Sachs 5% vs 3.5 % overall !
  - **Ungersbock A. J Shldr Elbow Surg 1995**
    - “The presence and magnitude of a Hill-Sachs lesion did not influence the frequency of recurrence “

- **Advantage:**
  - Can be done arthroscopically
  - Often effective
  - Lower risk than most alternatives

- **Disadvantage**
  - Functional deficit , throwing athletes
  - Overtighten joint ? Deg OA ..
Fill Defect: “Reverse Mclaughlin”
Infraspinatus Transfer (tenodesis)
Infraspinatous Transfer: Open

- **Connolly JF.** Humeral head defects associated with shoulder dislocations: their diagnostic and surgical significance. *Instr Course Lect.* 1972;21:42–54
  - 10 patients Infraspinatous Tx + Anterior stabilization
  - No recurrences

- **Willis JB et al.** Infraspinatus transfer for recurrent anterior dislocation of the shoulder. Paper Presented AAOS 1981
  - 8 revision Bankarts + Infraspinatous Tx
  - No recurrences
“Remplissage” = Arthroscopic Infraspinatus Tenodesis

- Wolf: AANA Annual Mtg 2006
Remplissage: Results

- Wolf: AANA 4/07

Bankart + Remplissage
24 cases, 24 – 49 mo, 37 mo avg
2 of 23 failed (8% recurrence rate)
Remplissage : Video
Remplissage: F/U Video
Remplissage: Results

- ROM
Hill Sachs: Other Options…
Fill Defect with Allograft
(preserve ER..throwers)

- **Open allograft:**
  - custom fit wedge:
    - Miniacci 18 pts
    - no recurrences
    - 2 ptl collapse
  - Large plug
    - Kropf Case report
    - Nov 06 Arth on line

- **Arthroscopic OATS**
  - Chapovsksky case report
  - Arthroscopy 2005
Arthroscopic Oats : Reverse Hill Sachs
OBI Plugs
JD Kelly IV AANA 4/07

• Fill defect
• Easier to contour
• Subside? Incorporate? Soft?
Humeral Head Plasty:
(Impaction Fracture Elevation)
Kazel: cadaver study

Percutaneous Correction (Humeroplasty) of
Humeral Head Defects (Hill-Sachs) Associated With
Anterior Shoulder Instability: A Cadaveric Study
Kazel MD, Sekiya JK, Greene JA, Bruker CT. Arthroscopy. December 2005

14 cadaver specimens: All defects reduced to small lesions (p<.001)
Humeral Head Plasty
Richmond technique

A: drill
B: disimpact
C: graft
CASE EXAMPLE 1

Pre OP

1 Year Post Op

*Courtesy of John Richmond, MD
CASE EXAMPLE 2

Pre OP  1 Year Post Op

*Courtesy of John Richmond, MD
Richmond: Results

- Hill Sachs Reduction + capsulolabral rec.
- 9 patients
  - 6 revisions
  - 3 primary
- Follow up 20 months (range 3-36 months)
  - no recurrence
  - all patients functional ROM
  - returned to pre injury level of function

Paul Re and John Richmond (Arthroscopy 7-06 .. Update 2/07 personal communication)
HAGL LESIONS

- Define: Humeral Avulsion of the GH lig’s
- Incidence
  - $41/547$ (7.5%)  
    - Bokor DJ, J Bone Joint Surg Br. 1999
  - $6/64$ (9.3%)  
    - Wolf et al, Arthroscopy 1995
- Ant or post
HAGL : Diagnosis

• Usually arthroscopic surprise…
  • YOU MUST LOOK ANTERIORLY !!

• Occasionally on MRI (50% Bui-Mansfield AJR 2002)
POSTERIOR HAGL REPAIR: VIDEO
**Beyond the Basic Bankart.. Summary**

- Always check for HAGL and repair
- Fix significant acute Bony Bankarts
- Chronic glenoid loss
  - < 25 % Capsulolabral advancement
  - >25 %
    - Capsulolabral + treat associated Hill Sachs
    - Bone Block (Last resort..)
- **Hill Sachs**
  - Treat if “engaging”
    - Remplissage
    - Graft
    - Disempact
“Beware the ‘Simple’ Bankart..

- Not every shoulder dislocation is the same.
THANK YOU