Sports Medicine & Joint Center
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Glenoid Bone Loss: The Truth

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Disclosure

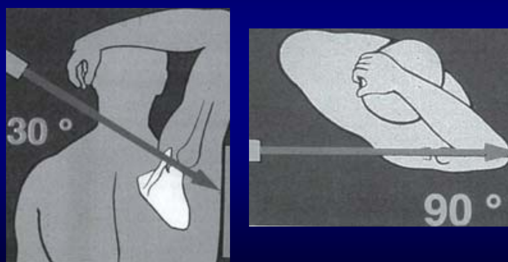
- Speakers bureau/paid presentations
  - *DepuySynthes; Smith&Nephew*
- Unpaid consultant
  - *DepuySynthes; Smith&Nephew ;Biomet*
- Orthopaedic publications editorial
  - *Journal of Shoulder and Elbow Surgery*

Anterior Instability

- Glenoid rim lesions
  - » *Bigliani, AJSM, 1998*
  - Bony Bankart lesion
  - Glenoid erosion
- Prevalence variable: 8-73%!!!
  - » *Itoi et al, JBJS 82A, 2000*
  - Imaging not easy

Bernageau Method

- Fluoroscopic control



Bernageau et al, Rev. Chir Orthop, 1976

Bernageau Method

- Osseous glenoid lesion
  - ➢126 of 160 shoulders (79%)
  - ➢Disadvantage
    - ✓Use of fluoroscopy

      X-ray exposure!!

Edwards, et al, Arthroscopy, 2003

Our X-ray Method

- “Modified” Bernageau method
  - ➢No fluoroscopy
  - ➢TV watching “relaxed” position

Sugaya, AANA Advanced Arthroscopy: The Shoulder, 2010

"TV Watching" View

- "Modified" Bernageau method
  - ➢No fluoroscopy
  - ➢TV watching "relaxed" position
  - ◆Reproducible
  - ✓Not applicable for some patients

Sugaya, AANA Advanced Arthroscopy: The Shoulder, 2010

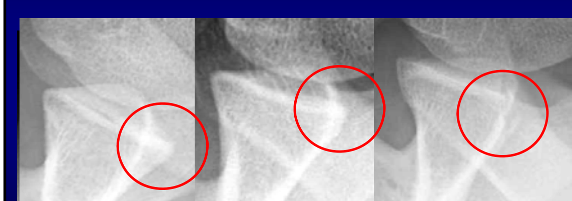
"TV Watching" View

- As a routine X-ray method @ initial patient visit

Sugaya, AANA Advanced Arthroscopy: The Shoulder, 2010

"TV Watching" View

"Modified" Bernageau View



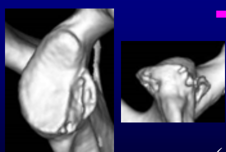
Normal Erosion Bony Bankart

Sugaya, AANA Advanced Arthroscopy: The Shoulder, 2010

“TV Watching” View

- Limitations
  - ➢Learning curve
  - ➢Difficult to detect exact morphology
  - ➢Difficult to measure bone loss

➔3DCT



✓ Sugaya, et al, JBJS, 2003
✓ Sugaya, et al, JBJS, 2005
✓ Chuang, et al, Arthroscopy, 2007
✓ Huijsmans, et al, JSES, 2008
✓ Provencher, et al, ASES Specialty Day, 2011

3DCT w/ HH Subtracted

- Exact shape of glenoid bony morphology

“Intuitive” understanding!

Sugaya, et al, JBJS 85A, 2003 & 87A, 2005

3DCT w/ HH Subtracted

- Exact shape of glenoid bony morphology

“Exact” measurement possible!

Sugaya, et al, JBJS 85A, 2003 & 87A, 2005

3DCT w/ HH Subtracted

- Exact shape of glenoid bony morphology

Shape & size of the fragment

Sugaya, et al, JBJS 85A, 2003 & 87A, 2005

Glenoid Morphology

- Typical 3 subtypes

Normal | Bony Bankart | Erosion

Sugaya, et al, JBJS 85A, 2003

What Does the Glenoid Morphology Mean?

Glenoid vs. Joint Laxity

- 200 anterior instability
  - ✓Average age: 25y (range, 15-63)
  - ✓147 males, 53 females
  - ✓93 dislocators
  - ✓107 subluxators
  - ➢EUA on the normal side
  - ➔Constitutional joint laxity

Sugaya, JJSS, 2003; Sugaya, AANA Advanced Arthroscopy, 2010

EUA on Both Sides

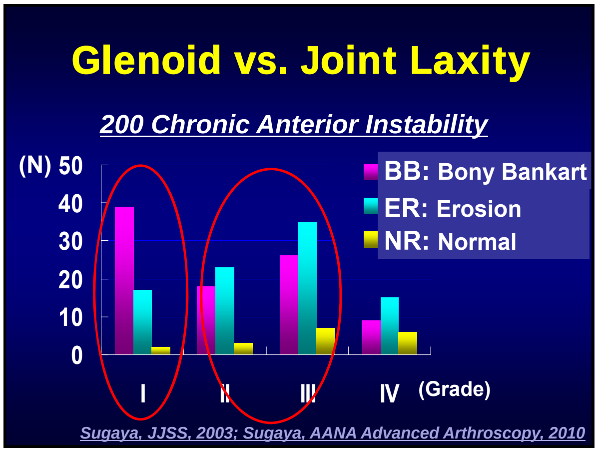

☆*Arm @ 90 deg ABD with neutral rotation*

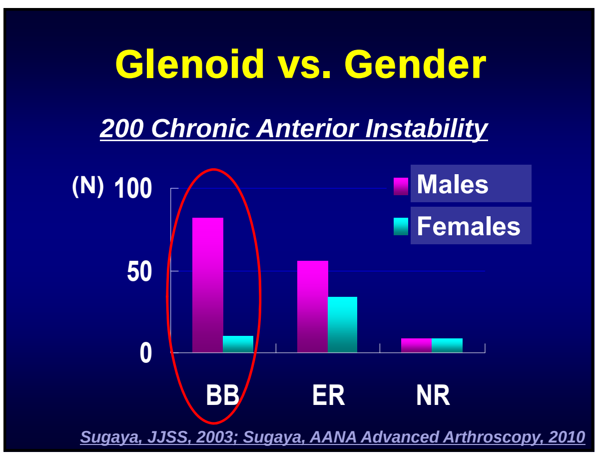
Sugaya, JJSS, 2003; Sugaya, AANA Advanced Arthroscopy, 2010

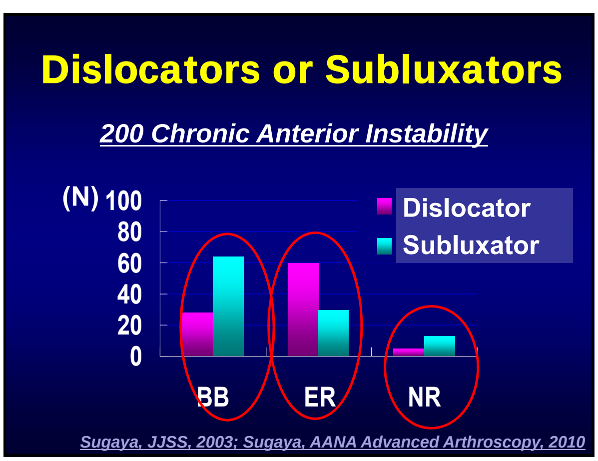
Constitutional Laxity

- Assessed by contralateral side
  - ➢Grade I (tight) → IV (loose)
    - ✓58 Grade I
    - ✓44 Grade II
    - ✓68 Grade III
    - ✓30 Grade IV

Sugaya, JJSS, 2003; Sugaya, AANA Advanced Arthroscopy, 2010


Glenoid vs. Joint Laxity
200 Chronic Anterior Instability
(N) 50
40
30
20
10
0
BB: Bony Bankart
ER: Erosion
NR: Normal
I
II
III
IV
(Grade)
Sugaya, JJSS, 2003; Sugaya, AANA Advanced Arthroscopy, 2010


Glenoid vs. Gender
200 Chronic Anterior Instability
(N) 100
50
0
Males
Females
BB
ER
NR
Sugaya, JJSS, 2003; Sugaya, AANA Advanced Arthroscopy, 2010


Dislocators or Subluxators
200 Chronic Anterior Instability
(N) 100
80
60
40
20
0
Dislocator
Subluxator
BB
ER
NR
Sugaya, JJSS, 2003; Sugaya, AANA Advanced Arthroscopy, 2010

Glenoid Morphology

"Tight"

Bony Bankart

Erosion

Normal

"lax"

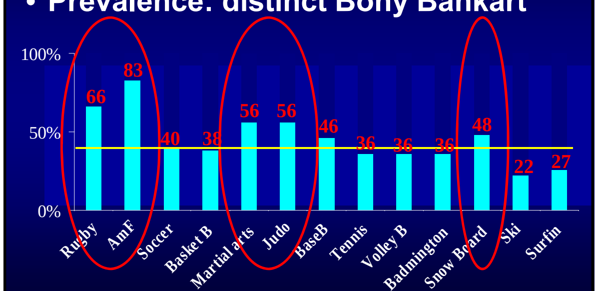
Males ↕ Females

Subluxators ↑ Dislocators ↓ Subluxators

Sugaya, JJSS, 2003; Sugaya, AANA Advanced Arthroscopy, 2010

558 Athletic Shoulders

- **Prevalence: distinct Bony Bankart**



Takahashi, Sugaya, et al, ICSES, 2013

Treatment Strategy

- **Bony Bankart**
  - ➢ **AS bony Bankart repair**
    - ✓ Since originally stable shoulder, promising outcome can be expected if properly performed
- **Erosion & Normal**
  - ➢ **Soft tissue Bankart repair**
    - ✓ Augmentation mandatory!!

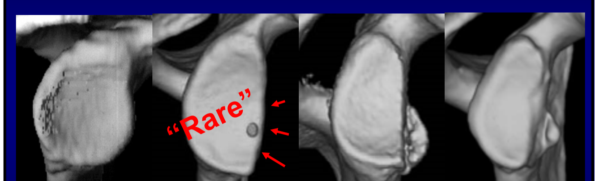
Sugaya, JJSS, 2003; Sugaya, AANA Advanced Arthroscopy, 2010

Severe Bone Loss

- Engaging Hill-Sachs lesion
- Inverted-pear glenoid

Large Glenoid Defect

- "inverted-pear" type glenoid



◆ Most of the "inverted-pear" type glenoid retains bony fragment!

Sugaya, AANA Advanced Arthroscopy: The Shoulder, 2010

Bony Bankart Lesion

- Chronic anterior rim fracture
- Fragment ligament junction intact!!

↓

- Can incorporate fragment into Bankart repair!!

Sugaya, et al, JBJS 87A, 2005; 88A, 2006

AS Bony Bankart Repair

- Short term outcome reports
  - ➢*Sugaya, et al., JBJS-Am, 2005*
  - ➢*Porcellini, et al., AJSM, 2007*
  - ➢*Mologne, et al., AJSM, 2007*
  - ➢*Park JY, et al., Arthroscopy, 2012*
  - ➢*Jiang CY, et al., AJSM, 2013…*
- ***These are favorable, but not yet popular procedure!!***

Recent Trends

- "Cons" to AS bony Bankart repair
  - ➢ Fragment gets smaller with time
    …Nakagawa, et al, AJSM, 2013
  - ➢ Poor reduction [illegible] poor outcome
    …Jiang, et al, AJSM, 201[illegible]
- Poor long-term outcome after soft tissue Bankart repair
  - ➢ 23% failure rate …Castagna, AJSM, 2010
  - ➢ 35% failure rate …Van der Linde, AJSM, 2011

A strong trends towards open or AS Latarjet!!

J Bone Joint Surg Am. 2015;97:1833-43 • http://dx.doi.org/10.2106/JBJS.N.01033

Clinical Outcome and Glenoid Morphology After Arthroscopic Repair of Chronic Osseous Bankart Lesions

A Five to Eight-Year Follow-up Study

Soichiro Kitayama, MD, Hiroyuki Sugaya, MD, Norimasa Takahashi, MD, Keisuke Matsuki, MD,

◆**Glenoid bone volume increases after AS bony Bankart repair**

✓**Ave. preop bone loss: 22.2%**

✓**Ave. fragment size: 4.7%**

✓**Ave. postop bone loss: -0.6%**

Summary: Glenoid Bone loss

- Bony Bankart is frequently seen in collision athletes
- Most of significant glenoid bone loss retains bone fragment
- AS bony Bankart repair can eventually restore glenoid morphology if properly performed