Bankart Repair for Adolescent Anterior Shoulder Instability:

Clinical and Radiographic Predictors of Revision Surgery and Instability

Crystal Perkins, MD; Anthony Egger, MD; Sam Broida, BS;
Michael Busch, MD, Cliff Willimon, MD

Children's Healthcare of Atlanta

Disclosures are available on the AAOS website.
I have no disclosures pertinent to this research.

Background

- Adolescents are at high-risk for recurrent instability following arthroscopic bankart repair
  - Numerous authors citing failure rates of 10 – 47%
- Glenoid bone loss is a well established risk factor for recurrent instability
- Humeral bone loss secondary to a hill-sachs defect has gained increasing attention as a potential contributor to recurrent instability
- The “off-track” concept describes the interaction of humeral and glenoid bone loss and may better describe the dynamic interactions that contribute to instability
  - Higher incidence of off-track lesions in adolescents (24%) v adults (3%) Pandya Arthroscopy 2017

Risk Factors for Recurrent Instability

The instability severity index score

A SIMPLE PRE-OPERATIVE SCORE TO SELECT PATIENTS FOR ARTHROSCOPIC OR OPEN SHOULDER STABILISATION

Balg & Boileau *JBJS Br* 2007

#1 **Age** at surgery < 20 yo
- 31% vs 4%

#2 **Contact** or Forced-overhead Sports
- 33% vs 13%

#3 **Competitive** vs Recreational
- 50% vs 15%

#4 **Hyperlaxity** vs No Hyperlaxity
- 19% vs 5%

#5 **Hill-Sachs Lesions**
- **10%** vs 5%

#6 **Glenoid Bone Loss**
- No lesion or avulsion fracture 11%
- Loss of sclerotic contour 37%

Risk of Recurrence by Score

</= 3 5% recurrence

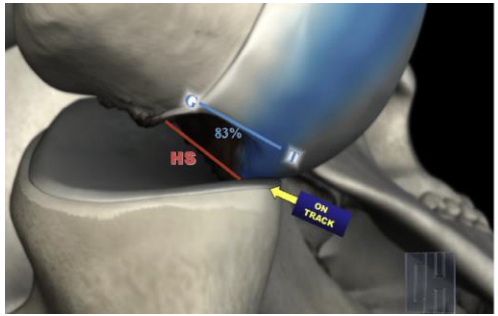
4-6 10% recurrence

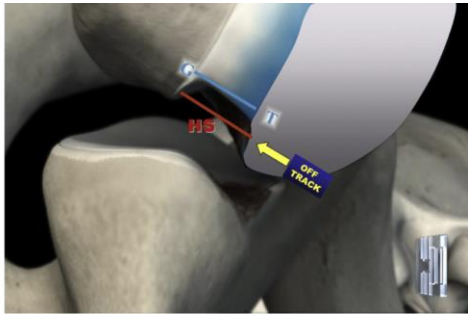
>6 70% recurrence

Evolving Concept of Bipolar Bone Loss and the Hill-Sachs Lesion: From "Engaging/Non-Engaging" Lesion to "On-Track/Off-Track" Lesion

Giovanni Di Giacomo, M.D., Eiji Itoi, M.D., Ph.D., and Stephen S. Burkhart, M.D.

Arthroscopy: The Journal of Arthroscopic and Related Surgery, Vol 30, No 1 (January), 2014:





Group	Glenoid Defect	Hill-Sachs Lesion	Recommended Treatment
1	<25%	On track	Arthroscopic Bankart repair
2	<25%	Off track	Arthroscopic Bankart repair plus remplissage
3	≥25%	On track	Latarjet procedure
4	≥25%	Off track	Latarjet procedure with or without humeral-side procedure (humeral bone graft or remplissage) depending on engagement of Hill-Sachs lesion after Latarjet procedure

Methods

- PURPOSE: To evaluate the outcomes of adolescent traumatic unidirectional anterior shoulder instability treated with arthroscopic bankart repair and assess for clinical and radiographic predictors of failure

- Does the presence of an “off track” lesion in an adolescent patient predict failure with arthroscopic bankart repair at minimum 2 year follow-up?

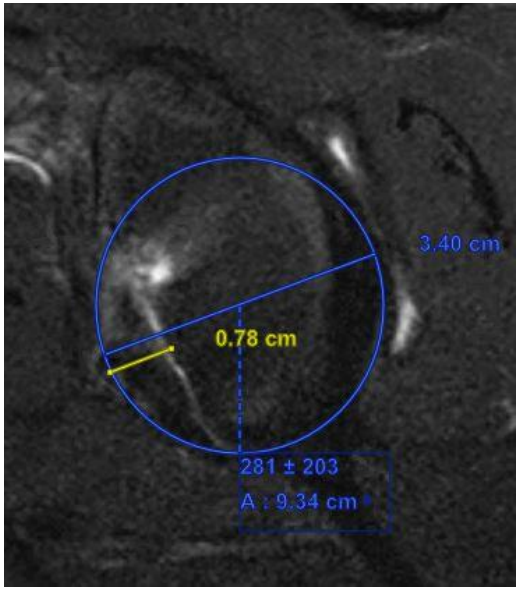
- Inclusion criteria:
  - < 19 years of age with unidirectional anterior shoulder instability
  - Isolated arthroscopic anterior labral repair
  - Pre-operative MRI
  - Minimum 2 year follow-up

Methods

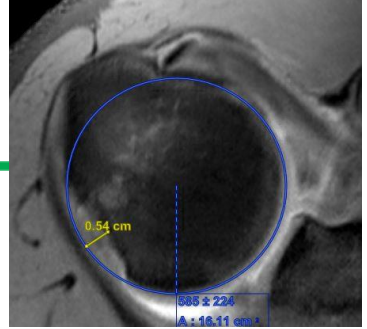
- Demographics and Pre-Operative Characteristics
  - Sex, Age, Height, weight, BMI
  - Sports
  - Dominant arm
  - # of dislocations
- Primary Outcomes
  - Revision surgery for recurrent instability
  - Subjective instability without revision surgery
- Patient Reported Outcomes
  - PASS
  - SANE
  - Tegner (pre-op, highest post-op, current)

Methods

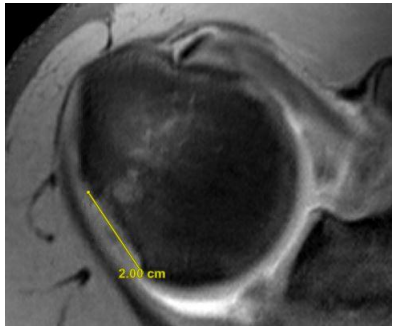
- Radiographic Assessment
  - Glenoid track
    - Glenoid diameter
    - Ant glenoid bone loss



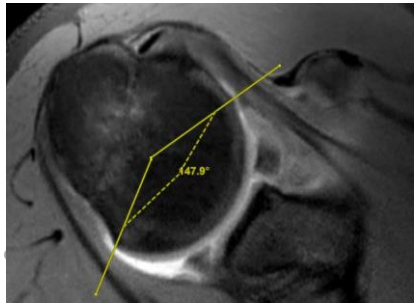
  - Hill-Sachs depth



  - Hill-Sachs interval



  - IAAA



Results

- 59 patients
  - 78% male
  - Median age 16 years [15, 17]
  - 71% played contact sport (42% football)
  - Age, gender, contact sport did NOT predict revision/instability
- 10 patients (17%) had revision surgery for recurrent instability
- 8 patients (14%) had subjective instability without further surgery

Results

- Glenoid diameter was the only radiographic variable which was significantly different between revision/instability and no revision/instability patients
  - 31.5mm vs 28.0mm, p=0.002

- 5 patients (8.5%)measured “off track” (Hill-Sachs Interval : GT >1)
  - Not associated with increased risk of revision/instability

Results

- Subgroup analysis of 38 patients (64%) with a hill-sachs defect
- Similar rates of revision surgery (16%) and subjective instability (13%)

	Revision Surgery (n=6)	Subjective Instability (n=5)	No Revision or Subj Instab (n=27)	p-value
Hills Sachs Interval	20.9mm*	12.9mm	13.9mm*	0.001*
Hill Sachs Depth	6.8mm*	4.3mm	5.0mm*	0.031*

- 50% rate of revision surgery and subjective instability with HS interval >/= 15mm

Patient Reported Outcomes Measures

	Entire Cohort (n = 59)	Revision/ Instability (n = 18)	No Revision/ Instability (n = 41)	*P-value
Follow-up Duration (Months)	49 [37, 72]	60 [43, 72]	48 [36, 73]	0.401
PASS Score	94 [82, 100]	76 [61, 91]	98 [89, 100]	<0.001
SANE Score	90 [70, 100]	68 [50, 84]	98 [86, 100]	<0.001
Return to Same or Higher Level of Sport (Y)	38 (68%)	10 (56%)	28 (74%)	0.225

Conclusions

- Treatment of adolescent shoulder instability is fraught with high rates of recurrent instability and revision surgery (31%) and this is associated with inferior PROMs

- Off-track lesions in 8.5% of patients, but not an independent risk factor for recurrent instability
  - Pandya OJSM 2019, Edmonds OJSM 2018 support these findings

- Among patients with HS defect, greater HS interval and depth associated with revision surgery

- Evolution in treatment of adolescent unidirectional shoulder instability
  - Dynamic modeling study to assess interaction of Hill-Sachs and glenoid track
  - Evaluate the effect of remplissage on outcomes

Thank You

Crystal Perkins, MD
crystal.perkins@choa.org
404-414-6088