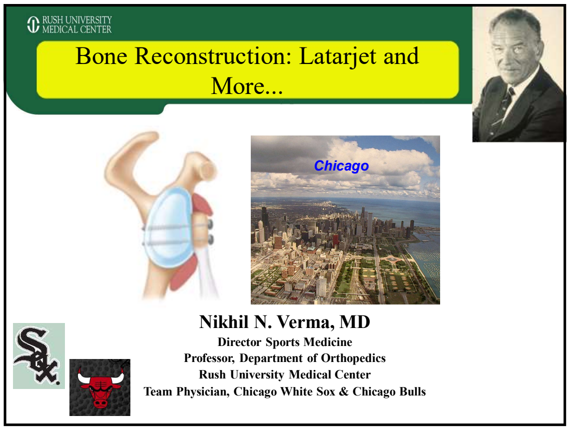
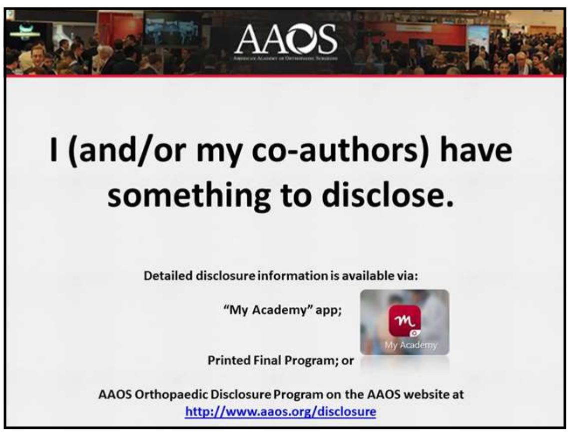
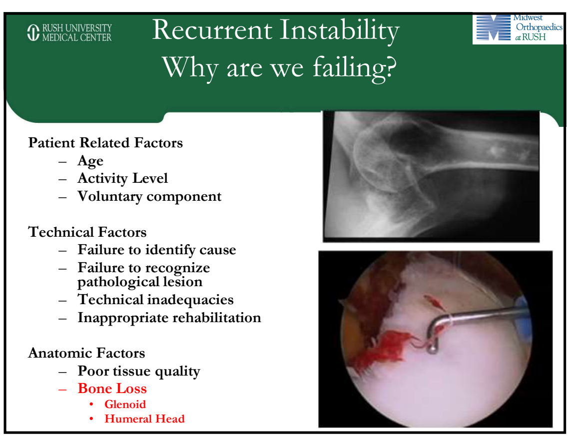
AANA Masters Experience
Shoulder Course #107
April 27-29, 2012

Latarjet: Scope and Open Indications and Results







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Indications and Results

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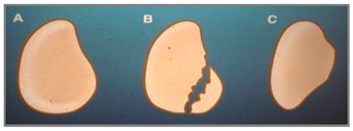
Bony Defects - The Problem…

- 194 patients (1992 - 98) arthroscopic Bankart repair with suture anchors
- Significant bone defects in <u>21 patients</u>
  - Inverted-pear glenoid (18 patients)
  - Engaging Hill-Sachs lesion (3 patients)



11 % recurrence overall

No bone defect
4% recurrence

Bone defect
<u>67% recurrence</u>

Inverted Pear
<u>61% recurrence</u>

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Review Article

Glenoid Bone Deficiency in Recurrent Anterior Shoulder Instability: Diagnosis and Management

Dana P. Piasecki, MD
Nikhil N. Verma, MD
Anthony A. Romeo, MD
William N. Levine, MD
Bernard R. Bach, Jr, MD
LCDR Matthew T. Provencher, MD, MC, USN

Figure 6

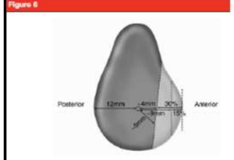

Table 1

Conversion of Anterior-posterior Defect Widths to Surface Area Percentages*

Anterior-posterior Defect Width (mm)	Anterior-posterior Width (% of inferior glenoid circle diameter)	Circular Segment Area (% of inferior glenoid circle)
Insignificant		
2.8†	12	6
3.6‡	15	9
Borderline		
5§	21	15
6ǁ	25	20
Significant		
6.6¶	28	23
7.5*	30	25
8.6**	36	32

* On a circle, a marginal defect can be described by a width (measured from the outer rim) that corresponds with a circle segment area. When applied to the glenoid, such a segment defect represents a percentage of the inferior glenoid circle's surface area. With this understood, relevant anterior-posterior defect widths can be converted to surface area percentages.
† Corresponds with "9%" resection (anterior-inferior) of Itoi et al
‡ Corresponds with 15% anterior-posterior width
§ Corresponds with 20% anterior-posterior width measurement
ǁ Corresponds with 25% anterior-posterior width of Bigliani et al
¶ Corresponds with "21%" resection (anterior-inferior) of Itoi et al
* Corresponds with cadaveric pear glenoids of Lo et al
** Corresponds with clinical pear glenoids of Lo et al

JAAOS 2009

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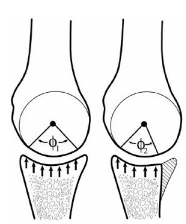
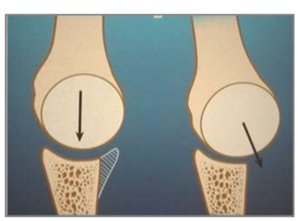
Inverted Pear Glenoid

Less shear resistance
Shortens the "safearc" through which the glenoid can resist axial forces





Lo and Burkhart *Arthrosc* 2004

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Latarjet: Scope and Open
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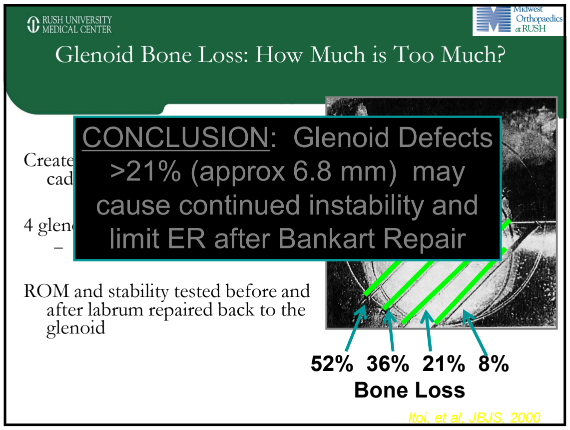

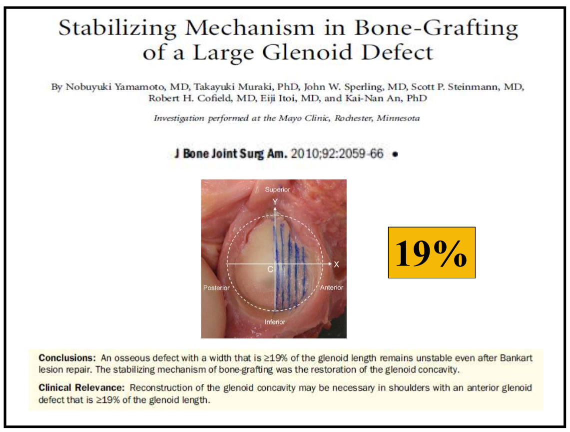

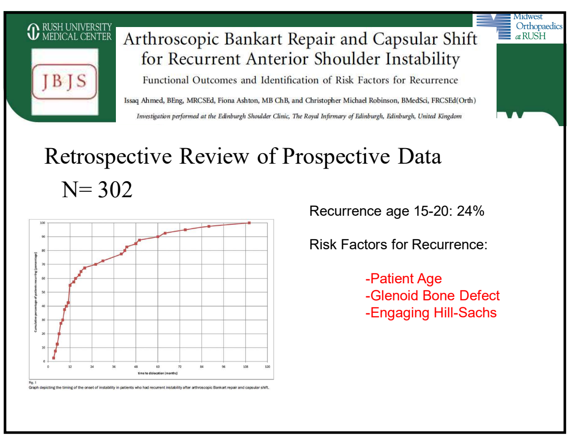

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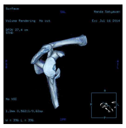
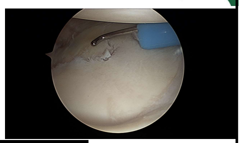
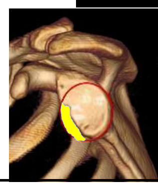
What Kind of Bone Loss?

Bony Bankart?

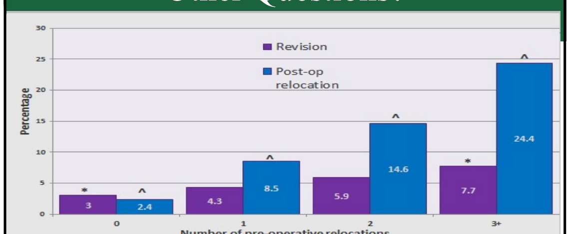




Bone Attrition



Decision Making: Other Questions?



Predictors of Dislocation and Revision After Shoulder Stabilization in Ontario, Canada, From 2003 to 2008

David Wasserstein, MD, MSc, FRCSC, Tim Dwyer, MBBS, FRCSC,

Am J Sports Med 2013 41: 2034

Bone Loss Estimate

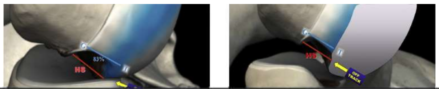
XR, CT, MRI
Arthroscopy?

0 to 15%	15% to 25%	> 25%
-**Arthroscopic Repair** -Incorporate Bony Fragment -Liberal use of anchors -Consider posterior repair (contact athletes)	Arthroscopic Repair CAUTION! (>20%) -Best with bony fragment that is incorporated -**Open procedures ± bone augmentation**	**OPEN bone Augmentation procedures**

Provencher et al.
J Bone Joint Surg Am. 2010 Dec

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

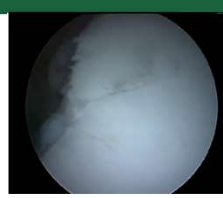
Giovanni Di Giacomo, M.D., Eiji Itoi, M.D., Ph.D., and Stephen S. Burkhart, M.D.



Grey Area:
Poor Evidence to support treatment decision and mostly expert opinion based on confounding factors.

Confounding Variables…

- Patient Age and Activity Level
- Bone Fragment
- Combined Defects
  - Glenoid Defect
  - Humeral Defect
- Tissue Quality
- Revision Procedures



Bone Loss?
Consider Coracoid Transfer

- **Glenoid Based**
- **Humeral Based (<10%)**
- **Both**

Glenoid Based Reconstruction!

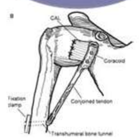
Management Of Bone Loss

Glenoid

- Arthroscopic Repair
- Latarjet
- Iliac Crest Bone Graft
- Fresh Allograft

Humeral

- Remplissage
- Fresh Allograft
- Limited Resurfacing



Most Defects are combined and can be managed on the Glenoid side…

Options in this Patient?

If your goal is to minimize risk of recurrent instability……

Biomechanical and Clinical Data is clear:

BONE RECONSTRUCTION

Why Open Latarjet

- Single Cosmetic Incision
- Defined Muscular Interval
- Avoid Graft Harvest Morbidity

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Rush University Medical Center
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Introduction

Latarjet 1st described technique in 1954
- Horizontal coracoid graft placed on anterior-inferior glenoid with a **single** screw
- Subscapularis takedown

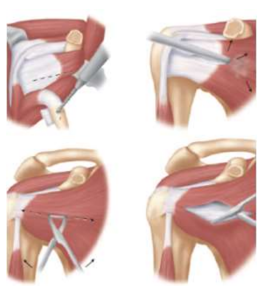
Since then, multiple modifications
- Open with multiple screws
- Subscapularis split
- Arthroscopic

Principles of Latarjet Stabilization

1. Bone effect by increasing AP diameter of glenoid
2. Conjoint tendon as a sling in abduction-external rotation
3. Repair capsule to the stump of the coracoacromial ligament

Latarjet Open Technique

- Deltopectoral approach
- Subscapularis split
- Coracoid harvest
- Flush graft placement
- Two bicortical solid screws
- Extraarticular placement
- Capsular repair



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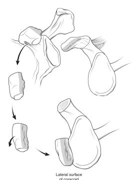
Chicago, IL

Lateral Coracoid Positioning – Most Common

Coracoid rotated 90 degrees and passed through a Subscap split

Alternatively, upper half of the subscapularis is detached and coracoid passed over the inferior portion of tendon

3.5 mm screws used for fixation

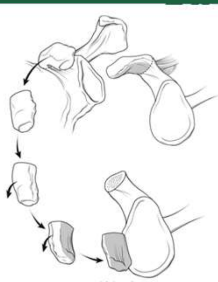


Inferior Coracoid Positioning (Congruent Arc Modifcation)

Coracoid is rotated such that its inferior aspect becomes the face of the glenoid.

Capsulolabral complex is fixed posterior to the bony block with suture anchors.

By making coracoid extra-articular, one can limit the effect of humeral head abrasion



Burkhart et al 2002

The effect of capsular repair, bone block healing, and position on the results of the Bristow-Latarjet procedure (study III): long-term follow-up in 319 shoulders

Lennart Hovelius, MD, PhD[a,b,*], Björn Sandström, MD[b], Anders Olofsson, MD[b], Olle Svensson, MD, PhD[a], Hans Rahme, MD, PhD[c]

- 319 shoulders
- 5% sustained one or more dislocations; 1% revision surgery
- 13% reporting subluxations, worst outcomes in group with 2 or more subluxations (16 patients)
- Bony healing in 83%
- 5 of 6 with graft positioned >1cm medial had redislocations
- 96% satisfied/very satisfied at final follow-up

JSES 2011

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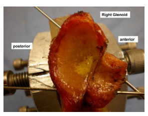
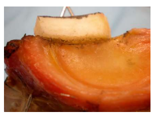
Why Degenerative Changes?

Normalization of Glenohumeral Articular Contact Pressures After Latarjet or Iliac Crest Bone-Grafting

By Neil Ghodadra, MD, Aman Gupta, BS, Anthony A. Romeo, MD, Bernard R. Bach Jr., MD, Nikhil Verma, MD, Elizabeth Shewman, PhD, Jordan Goldstein, MD, and Matthew T. Provencher, MD, CDR, MC, USN

- ICBG restored contact pressure to 116%, 120% with Latarjet-INF, and 137% when Latarjet-LAT was used.
- When proud: contact pressure increased 250% normal in anteroinferior quadrant and 200% increased contact pressure posterosuperior
- When recessed: High amount edge loading observed

Flush Graft Placement is Preferred!

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Latarjet Coracoid Transfer

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SPORTS MEDICINE & SHOULDER

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Rehabilitation

0 – 4 Weeks: Sling Immobilization, Passive ROM FE to tolerance, ER per Repair

4 – 8 Weeks: Progress to Active ROM, Light End Range Stretching, Scapular/Cuff Isometrics and Re-activation

8 – 16 Weeks: Progress Strengthening and Plyometrics

RTS: 16 – 24 Weeks

Latarjet Outcomes

REVIEW ARTICLE

Complications and re-operations after Bristow-Latarjet shoulder stabilization: a systematic review

Michael J. Griesser, MD[a], Joshua D. Harris, MD[b], Brett W. McCoy, MD[a], Waqas M. Hussain, MD[a], Morgan H. Jones, MD[a], Julie Y. Bishop, MD[b], Anthony Miniaci, MD, FRCSC[a,*]

Level IV
45 Studies, 1904 Patients

2.9% Re-dislocation open, 5.8% Arthroscopic

30% Overall Complication Rate

Journal of Shoulder and Elbow Surgery

Short-Term Complications of the Latarjet Procedure

Anup A. Shah, MD, R. Bryan Butler, MD, James Romanowski, MD, Danny Goel, MD, Dimitrios Karadagli, FRCS, and Jon J.P. Warner, MD

Investigation performed at Massachusetts General Hospital/Harvard Medical School, Boston, Massachusetts

JBJS 2012

48 Latarjet procedures

Retrospective review

45 shoulders for follow-up (94%)

3 Groups of complications
- Infection
- Instability
- Neurologic injury

Overall rate = 25%
- **Infection: 6%**
- **Instability: 8%**
- **Neurologic: 10%**
  - **Only 2 were permanent**

Latarjet 90-Day Complications Rush Experience

133 patients (5 surgeons)
Average age 28.5 ± 11.8 years
Males: 105 (75%)
Prior surgery: 99 (70%)

Complications → **10 (7.5% complication)**
- 3 infections (2 required I&D)
- 1 MC nerve injury (required surgery)
- 1 arthritis progression (required surgery)
- 1 recurrent instability (required surgery)
- 1 pain and subjective “stiffness” (required surgery)
- 1 CRPS
- 1 hematoma (resolved without surgery)
- 1 transient ulnar neuritis (resolved)
- 1 additional superficial infection at 104 days

7/10 patients with complications with prior history of surgery

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Is There a Better Option: Historic Opposition to Allograft

Non-Load Bearing
Rapid Resorbtion

Type of Graft
Storage Method
Fresh vs. Frozen

"It's the orthopedist's parts department. Your knees are in."

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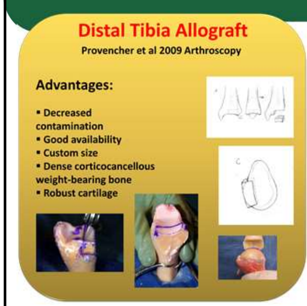
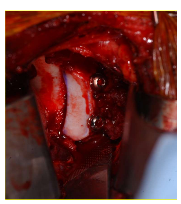
Distal Tibia





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Is There A Better Option?

Technical Note

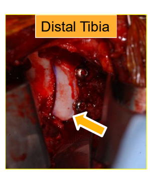
Anatomic Osteochondral Glenoid Reconstruction for Recurrent Glenohumeral Instability With Glenoid Deficiency Using a Distal Tibia Allograft

LCDR Matthew T. Provencher, M.D., MC, USN, Neil Ghodadra, M.D., Lance LeClere, M.D., MC, USN, CDR Daniel J. Solomon, M.D., MC, USN, and Anthony A. Romeo, M.D.

Arthroscopy 2009

-3 patients treated for anterior glenoid bone loss

-Glenoid reconstruction with distal tibia may improve joint congruity and cartilaginous articulation



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Clinical and Radiographic Outcomes of Distal Tibia Allograft (DTA) for Glenoid Bone Deficiency in Recurrent Anterior Shoulder Instability

Rachel M. Frank, MD; Petar Golijanin BS; Daniel Gross MD; Brian J. Cole, MD MBA; Nikhil N. Verma MD; Anthony A. Romeo MD; Matthew T. Provencher, MD

Department of Orthopaedic Surgery, Rush University Medical Center
Department of Orthopaedic Surgery, Massachusetts General Hospital

Results – Clinical Outcomes (n=20)

Statistically significant improvements in:
- ASES → 63 to 91, P<0.01
- SANE → 50 to 90.5, P<0.01
- WOSI → 46% to 11%, P<0.01

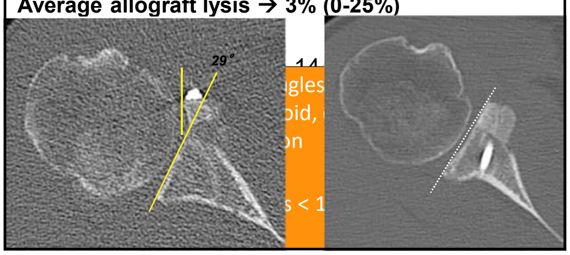
1 infection (5%) → superficial P. acnes
- Allograft removal
- Revision DTA reconstruction

No cases of recurrent instability

Results – CT (n=25, minimum 6 months)

Allograft healing rate → 85% (60-100%)

Average allograft lysis → 3% (0-25%)



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Return to Sport Following Latarjet Versus Distal Tibia Allograft for Anterior Shoulder Instability: A Matched Cohort Analysis

Joseph N. Liu, Anirudh K. Gowd, Grant H. Garcia, Brandon C. Cabarcas, Gregory P. Nicholson, Brian J. Cole, Nikhil N. Verma, Anthony A. Romeo

- Matched-Cohort on age, BMI, gender, # prior surgery, participation in contact sports
- Average f/u: 59.6 ± 24.4
- Latarjet vs. DTA:
  - GBL: 15.5 ± 4.9% vs. 18.7 ± 6.7 DTA (p=0.075)
  - HBL: 2611.2 ± 2137.0mm^3 vs. 2453.4 ± 2310.5mm^3 (p=0.816)
  - Off-Track: 29.4% vs. 50.0% (p=0.631)
- Equivalence in RTS: 35/40 vs. 36/40
- Recurrence rate: 15.0% Latarjet (6/40) vs 27.5% DTA (11/40) (p=0.172)
- Latarjet had better RTS at same/better level competition (32/35 vs. 24/36, p=0.010) and RTS at same/better intensity (26/35 vs. 18/36, p=0.035)

	Latarjet (40)	DTA (40)	P-value
Age	28.2 ± 11.4	27.4 ± 8.1	0.711
BMI	26.8 ± 7.2	26.7 ± 5.3	0.907
Previous Procedures	1.0 ± 0.7	1.4 ± 1.2	0.079
Contact Sports	Y: 28 N: 12	Y: 28 N: 12	1
Gender	M: 32 F: 8	M: 37 F: 3	0.105

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Table 4. Return to Sports Sub-Analysis

	Latarjet	DTA	P-value
Return to Contact Sports			
No Contact	4/4 (100%)	5/5 (100%)	n/a
Limited Contact	3/3 (100%)	4/4 (100%)	n/a
Contact/Collision	26/29 (89.7%)	19/30 (63.3%)	**0.017**
Unclassified	4	1	
Return to Highest Level of Upper Extremity Demand			
Low Demand	5/5 (100%)	5/5 (100%)	n/a
High Demand	27/29 (93.1%)	28/32 (87.5%)	0.465
Not Upper Extremity	6	3	
Return to Throwing Sports			
Throwing Sport	9/17 (52.9%)	8/22 (36.4%)	0.298

Table 5. Change in Range of Motion Following Surgery

	Latarjet	DTA	P-value
Forward Flexion	15.6 ± 39.6	-3.7 ± 27.0	0.100
IR at 90°	-13.9 ± 26.4	-7.5 ± 19.4	0.566
ER at 90°	-12.8 ± 21.2	4.7 ± 9.8	**0.044**
ER at Adduction	-0.7 ± 20.3	-7.6 ± 19.3	0.334
Abduction	-2.7 ± 21.4	-2.4 ± 14.2	0.976

ER: External Rotation
IR: Internal Rotation

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Factors Influencing Post-Operative Instability after DTA

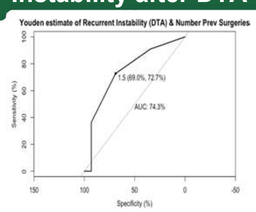

Figure 2. Stepwise Multivariate Regression on Factors Associated with Instability

	Multivariate (p-value)	Odds Ratio	95% Confidence Interval
Prior Procedures	0.043	1.127	1.01, 1.26

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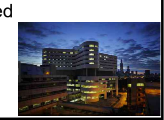
Summary

- Bone loss is a significant risk for recurrent instability following soft tissue stabilization
- Clinical Warning Signs
  - Multiple Recurrence/Revision
  - Mid-range, night-time instability
- Pre-Operative Quantification is critical in decision making
  - CT scan, 3D reconstruction
- Most Defects are Combined or Glenoid Based
- Latarjet is a repoducible option for glenoid bone reconstuction



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Thank you!

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