ePoster #30

Distance-to-Dislocation Predicts Recurrent Dislocation & Return-to-Sport Following Latarjet

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Disclosures

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- Stryker: Paid Consultant/IP
- Arthrex: Paid Consultant/IP
- American Academy of Orthopedic Surgeons: Committee or board member
- American Shoulder and Elbow Surgeon: Committee or board member
- American Orthopedic Society for Sports Medicine: Committee or board member
- ISAKOS: Committee or board member
- Knee Surgery, Sports Traumatology, Arthroscopy: Editorial or governing board
- Journal of Arthroscopy and Related Surgery: Editorial or governing board
- JISAKOS: Editorial or governing board
- Annals in Joint: Editorial or governing board
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Background

- Recurrent anterior shoulder instability can be a difficult problem to manage. Optimal management is driven by a detailed patient history, physical exam, and diagnostic imaging to determine the best possible treatment course

- When considering bone loss, recent studies have considered the glenoid track concept as a more continuous risk measure that goes beyond the traditional binary on- versus off-track concept. Thus, introducing distance to dislocation (DTD) as a new concept

Shah et al. JBJS 2016 *Li et al. JBJS 2021* *Yamamoto et al. AJSM 2020*

Background

- Many studies have identified factors that increase the odds of failure after primary shoulder stabilization surgery. These risk factors include:
    - *younger age*
    - *male sex*
    - *contact sports*
    - *delayed surgical treatment*
    - *increased joint laxity*
    - *Increased bone loss severity*

- Risk of recurrent instability and return-to-sport following a Latarjet as it relates to DTD, however, is unknown.

Barrow et al. AJSM 2022 *Fox et al. Arthroscopy 2023* *Ahmed et al. JBJS 2012* *Boileau et al. JBJS 2006* *Robinson et al. JBJS 2006*

Study Objective

Aim:

- The purpose of this study was to determine if DTD is a predictor of recurrent dislocation and return-to-sport/work (RTS).

Hypothesis:

- We hypothesized higher DTD values would correlate with lower failure rates and higher rates of RTS.

Methods

- We retrospectively identified all consecutive patients between 15 and 40 years of age who had undergone the Latarjet procedure between January 2013 and December 2021.
- Patients who met inclusion criteria were:
  - ❖ diagnosed with anterior instability
  - ❖ underwent a primary Latarjet
  - ❖ had an MRI within six-months of surgery
  - ❖ minimum of two-years follow-up
- Patients who met exclusion criteria were:
  - ❖ connective tissue disorder
  - ❖ concomitant rotator cuff injury
  - ❖ poorly controlled epilepsy
  - ❖ missing data

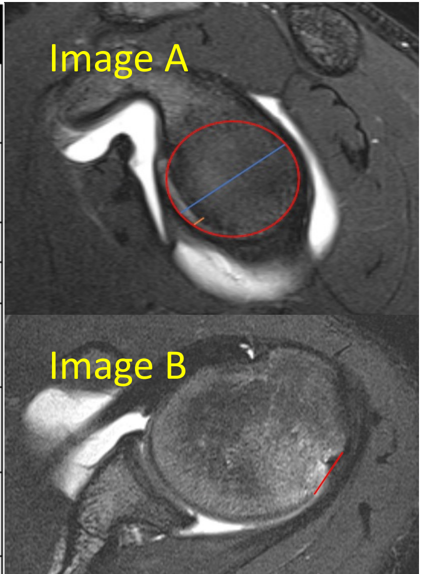
Methods

- Postoperative failure was defined as recurrent instability following primary Latarjet surgery
  - Recurrent instability was defined as recurrent dislocation or subjective feeling of instability following index operation
  - Additionally, successful RTS clearance was defined as RTS clearance within one-year of index operation. Furthermore, RTS clearance was only assessed among individuals who engaged in organized athletics

Methods

DTD, which defines how far a lesion is from being considered off-track, calculates the difference between the glenoid track and the Hill-Sachs interval.

Steps for Calculating "Distance-to-Dislocation" (DTD)	
1.	Identify sagittal MRI cut that shows entire glenoid face (**Image A**)
2.	Place circle that matches posterior inferior glenoid from 5 o'clock to 9 o'clock position (red circle)
3.	Measure diameter (**D**) of glenoid (light blue line)
4.	Measure width (**d**) of glenoid bone loss (orange line)
5.	Calculate the width of the glenoid track (GT). **GT = (0.83*D) - d**
6.	Identify axial MRI cut with widest length of Hill-Sachs lesion (**Image B**)
7.	Measure the Hill-Sachs Interval width from medial edge of lesion to cuff insertion (**HSI**) (red line)
8.	Calculate DTD. **DTD = GT – HSI**



Barrow et al. AJSM 2022

Results

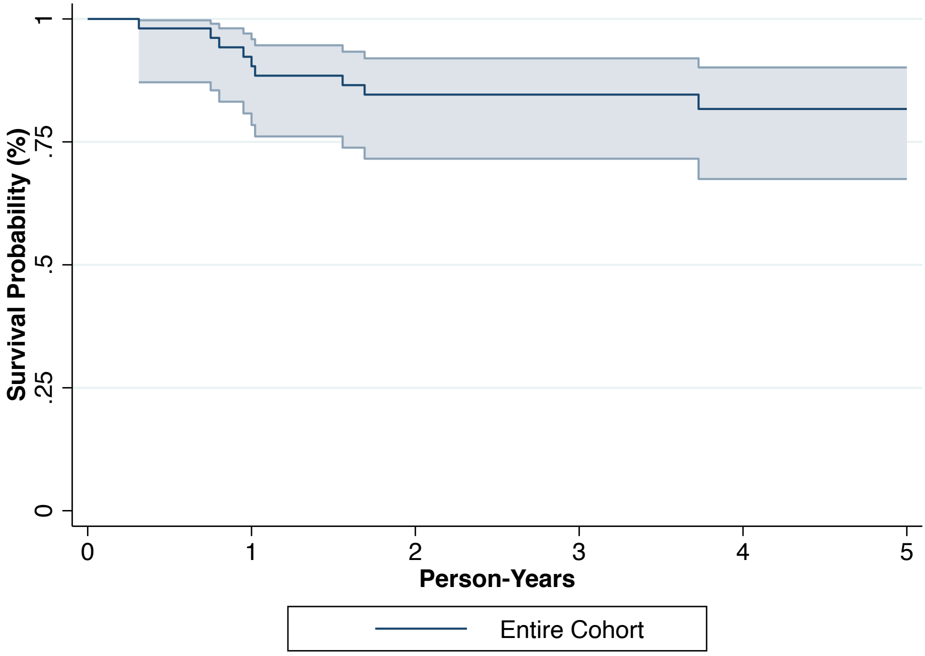
- 75 patients who met inclusion criteria.
  - ❖ 4 patients (5.3%) excluded for poorly controlled epilepsy
  - ❖ 19 patients (25.3%) excluded for insufficient follow up
- The final cohort was comprised of 52 patients
  - ❖ 43 Males | 9 Females; 33 Athletes| 19 Non-athletes
  - ❖ average age of 23.3 ± 6.4 years (range: 15.8 – 40.0)
  - ❖ average follow up of 4.7 ± 2.0 years (range: 2.0 – 8.8)

Results – Recurrent Instability

- Overall, 9 patients (17.3%) experienced recurrent instability
  - ❖ Recurrent instability rate of 4.2 cases per 100 person-years (95% CI: 0.02 – 0.08)

- **Figure 1** illustrates Kaplan-Meier survival plots for the overall cohort over a five-year period

Kaplan-Meier Survival Plot



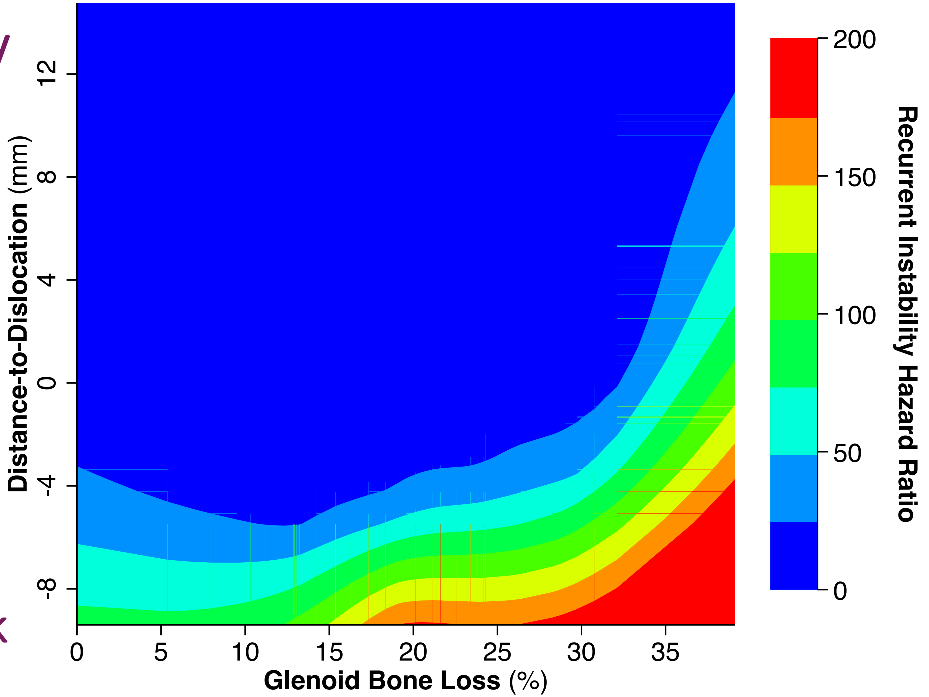
Results – Recurrent Instability

- Predictors of recurrent instability
  - ❖ Hill Sachs interval ($p < 0.001$)
  - ❖ % Glenoid bone loss ($p = 0.008$)
  - ❖ DTD ($p < 0.001$)

Note: No other significant predictors of recurrent instability

- **Figure 2** illustrates multivariate results adjusting for DTD and % glenoid bone loss as predictors of risk

Heat map of recurrent instability Hazard Ratio



Results – Recurrent Instability

Table I: Multivariate Predictors of Recurrent Instability Following Primary Latarjet Surgery			
Entire Cohort (n = 52)			
	Hazard Ratio	95% Confidence Interval	P Value
Percent Glenoid bone loss (%)	1.09	(1.00 – 1.19)	0.06
Distance-to-Dislocation (mm)	0.69	(0.56 – 0.84)	**<0.001**
Off-Track Cohort (n = 26)			
	Hazard Ratio	95% Confidence Interval	P Value
Percent Glenoid bone loss (%)	1.08	(0.99 – 1.19)	0.08
Distance-to-Dislocation (mm)	0.74	(0.58 – 0.94)	**0.012**
Critical Bone Loss Cohort (n = 29)			
	Hazard Ratio	95% Confidence Interval	P Value
Percent Glenoid bone loss (%)	1.09	(0.97 – 1.23)	0.15
Distance-to-Dislocation (mm)	0.72	(0.58 – 0.89)	**0.002**

- After adjusting for % glenoid bone loss and analyzing several subgroups within the Latarjet cohort:
  - A 1 mm increase in DTD corresponded with roughly a 30% reduction in rate of recurrent instability

Results – RTS Clearance

Secondary Surgery:

- Only five patients (9.6%) underwent subsequent reoperation.
- Rate of revision stabilization after primary Latarjet surgery was 2.4 revisions per 100 person-years (95%CI: 0.01 – 0.06).

RTS Clearance:

- Only 21 athletes (63.6%) were able to achieve RTS within 1 year of index surgery
- Our study identified no predictors of RTS Clearance within 1 year of index surgery

Discussion

- This study demonstrates distance-to-dislocation (DTD) as a strong prognostic indicator of recurrent instability among patients who underwent primary open Latarjet surgery
- Results showed that lower DTD values predicted higher failure rates even after adjusting for percent glenoid bone loss
- As a result, bone loss on the humeral side may be more critical than previously believed

Discussion

- Future research should investigate other contributors to RTS clearance in a larger sample size
- Future directions may include DTD calculation post-op to determine if on-track/near-track/off-track status post Latarjet effects outcomes in addition to the ones outlined in this study

Clinical Significance

- DTD may be an effective prognostic indicator associated with recurrent instability in patients who underwent primary open Latarjet surgery.

- The findings of this study can aid in patient selection and counseling for the Latarjet procedure, allowing for more informed decision-making regarding surgical management.

Thank you

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