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An Imaging-Guided Posterior Working Portal: Technique and Radiologic Correlation

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Disclosures / Disclaimer



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- Our disclosures are:
 - Conor McCarthy, MD: Committee Member, Orthopaedic Trauma Association
 - Lance LeClere, MD:
 - American Orthopaedic Society for Sports Medicine, Board of Directors
 - Member At Large, Arthroscopy Association of North America, Advocacy Committee; Member
 - American Journal of Sports Medicine: Member, Editorial Board; Arthroscopy Journal: Member, Editorial Board; Video Journal of Sports Medicine: Member, Editorial Board
 - Robert Waltz, MD: American Orthopaedic Society for Sports Medicine: Board or committee member
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Introduction



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- With increasing recognition of posterior shoulder instability, there is greater need for an accurate, precise posterior portal to perform stabilization procedures
- **Purpose:** To present a novel technique for a patient-specific imaging-guided working portal to compare to standard approaches



Methods



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- Retrospectively reviewed arthroscopic labral repairs performed at a single institution from 2010-2020
- Randomly selected from patients with available MRI:
 - 30 anterior labral tears
 - 30 posterior labral tears
- Assessed glenoid version, glenoid bone loss (GBL), posterior acromial height, and acromial tilt



Methods



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- Evaluated entry point and trajectory of:
 - Novel **imaging-guided posterior portal** (Figure 1)
 - Unguided portal positions at **2 cm** and **4 cm** from the posterolateral acromion (Figure 2)
- ANOVA analysis of differences between guided/unguided positions/trajectories across instability type
- Linear regression models for differences associated with pattern of instability and acromial morphology





Figure 1: Ideal imaging-guided portal positioning.

(A) Trajectory along glenoid.

(B) Scrolled lateral and measured to the acromion and vertical location of the coracoid tip in line with the subcutaneous fat and conjoint tendon, respectively.

(C) Referenced on axial to ensure the measurement is taken from the posterolateral acromion.

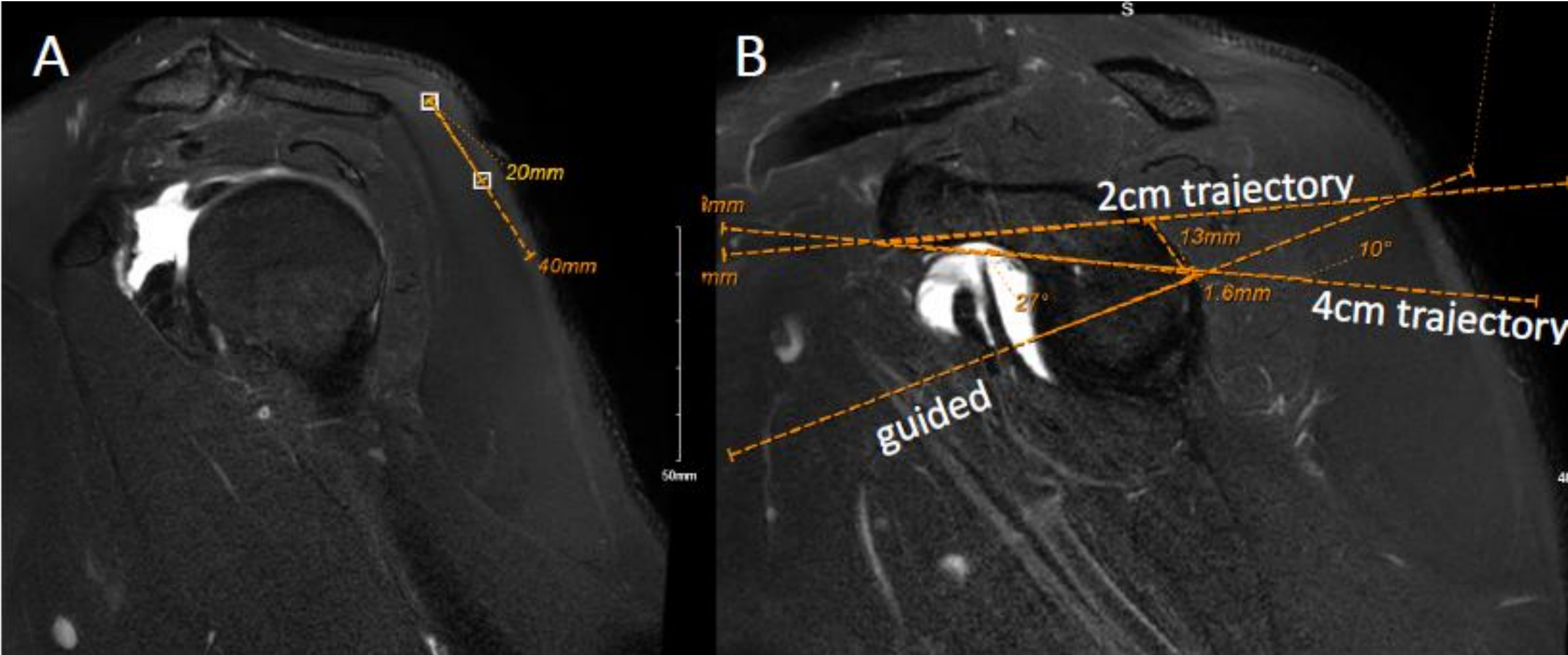


Figure 2: (A) Using set distances of 2 and 4 cm from the acromion on MRI, (B) positions and angles of unguided portals with respect to the horizontal equator were measured.

Results



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- The 4 cm unguided portal **entry point** deviated less from the guided portal intersection with the glenoid in both instability patterns ($p < .0001$)
- However, the 4 cm unguided portal **angle** deviated more compared to the guided portal in both instability patterns ($p < .0001$)
- **Using the unguided 2 and 4 cm portals aiming towards the coracoid, there was more than 5 mm deviation from the guided portal at the glenoid and would require replacement of the portal 89.8% (86.2% anterior, 93.0% posterior) and 45.5% (37% anterior, 53.6% posterior) of the time, respectively**



Table 1. Summary of Index MR Measurements by Instability Pattern

Characteristic	Anterior, N = 30 ¹	Posterior, N = 30 ¹	p-value ²
Hill Sachs	18.0 (60.0%)	3.0 (10.0%)	<0.001
Glenoid Height (mm)	40.4 (3.0)	40.2 (3.2)	0.7
Glenoid Width (mm)	27.2 (2.4)	27.9 (3.0)	0.3
Perfect Circle Diameter (mm)	28.1 (2.3)	29.0 (3.0)	0.2
Glenoid Bone Loss (%)	3.4 (4.0)	4.0 (4.1)	0.6
Glenoid Version (deg)	-3.5 (6.3)	-8.3 (4.8)	0.001
Acromial Tilt (deg)	39.1 (10.7)	33.4 (9.8)	0.037
Posterior Acromial Height (mm)	14.9 (7.9)	16.7 (7.2)	0.4
Guided Portal Distance to Acromion (mm)	16.4 (8.8)	24.2 (7.0)	<0.001
Guided Portal Distance to Coracoid (mm)	25.9 (5.7)	23.8 (4.5)	0.12

¹ n (%); Mean (SD)

² Pearson's Chi-squared test; Two Sample t-test

Conclusions



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- Variation exists between instability patterns for accurate posterior working portal placement for arthroscopic shoulder labral repair
- Traditional landmarks may be inadequate as currently utilized
- Patient-specific, planned entry portals provide a higher accuracy start point, potentially decreasing replacement of portals or use of suboptimal portals



References



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