BIOMECHANICAL COMPARISON OF SINGLE- AND DOUBLE-ROW REPAIR TECHNIQUES FOR ACUTE BONY BANKART LESIONS

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Disclosures

- Dr. Voloshin reports personal fees from Innomed, personal fees from Arthrex, personal fees from Smith & Nephew, personal fees from ZimmerBiomet, personal fees from Arthrosurface
- All other co-authors have nothing to disclose
Introduction

• Previous single- and double-row reconstruction techniques for acute bony Bankart fractures have examined static forces required to displace the bony Bankart lesion.

• We aimed to examine the dynamic stability and ultimate displacement of single- vs double-row repair techniques for acute bony Bankart lesions.

• We hypothesize double-row fixation would provide superior stability and decreased displacement of a simulated bony Bankart lesion throughout the healing process in a cadaveric model compared with single-row technique.
Methods

• 13 matched pairs of glenoids with simulated bony Bankart fractures with defects 25% of the glenoid diameter width.

• Half of the fractures were repaired with a double-row technique; the contralateral glenoid were repaired with a single-row technique.
Methods

• A concavity-compression model was created using a 150N load between the humeral head and glenoid.

• Dynamic biomechanical stability and ultimate step-off of the repairs was assessed throughout 2000 cycles of internal-external rotation at 1Hz to simulate standard rehabilitation protocols.

• Toggle was quantified throughout cycling with a coordinate measuring machine.
Methods

- 3D spatial fracture displacement was measured and calculated using MATLAB. (Figure 1)

Figure 1: Dynamic motion toggle was calculated by applying the distance formula and assessing the distance from crest to trough.
Results

- The double-row technique resulted in significantly (p=0.005) less displacement (mean=342.48 µm, SD=300.64 µm) than single-row technique (mean=981.84 µm, SD=640.38 µm) (Figure 2a)
Results

- Ultimate fracture displacement of double-row repair was significantly less (mean=792.23 µm, SD=333.85 µm, p=0.046) after simulated rehabilitation by internal-external rotation cycling compared to single-row repair (mean=1,267.38 µm, SD=640.38 µm)

![Diagram showing single- and double-row comparison of ultimate 3D spatial displacement]
Conclusion

- Double-row fixation technique for acute Bony Bankart fractures resulted in superior stability throughout simulated rehabilitation, and decreased displacement following simulated rehabilitation in this cadaveric compression-concavity model.