

# **Does Long Head Biceps Augmentation Improve the Biomechanics in Irreparable Anterior L-shaped Supraspinatus Tendon Tear?**



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# Background

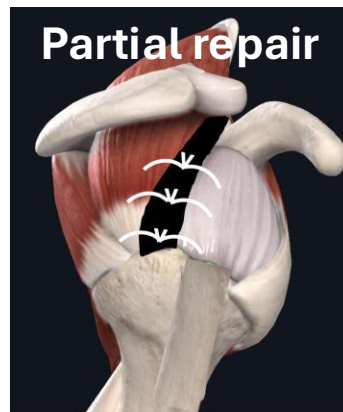
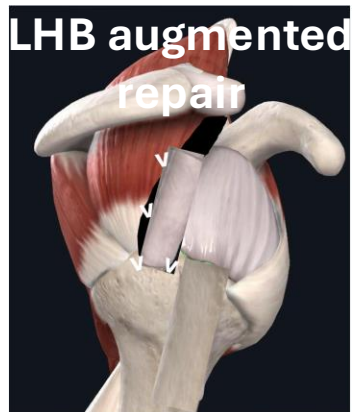
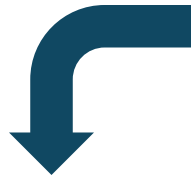
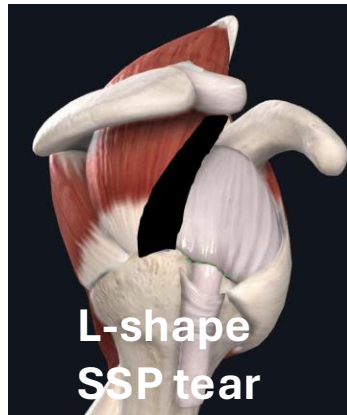
- **Problem:** Irreparable anterior L-shaped supraspinatus tears are challenging to repair.
- **Current Techniques:** Partial repair and superior capsular reconstruction (SCR) have limitations.
- **Objective:** Evaluate the biomechanical effectiveness of long head biceps tendon (LHB) augmentation compared to partial repair.

# Aim

- **Hypothesis: LHB augmentation can biomechanically restore shoulder stability better than partial repair in irreparable supraspinatus tears.**

# Methods

- **Study Design: 16 soft cadaveric shoulders**
- **Testing:**



- **Measurements**

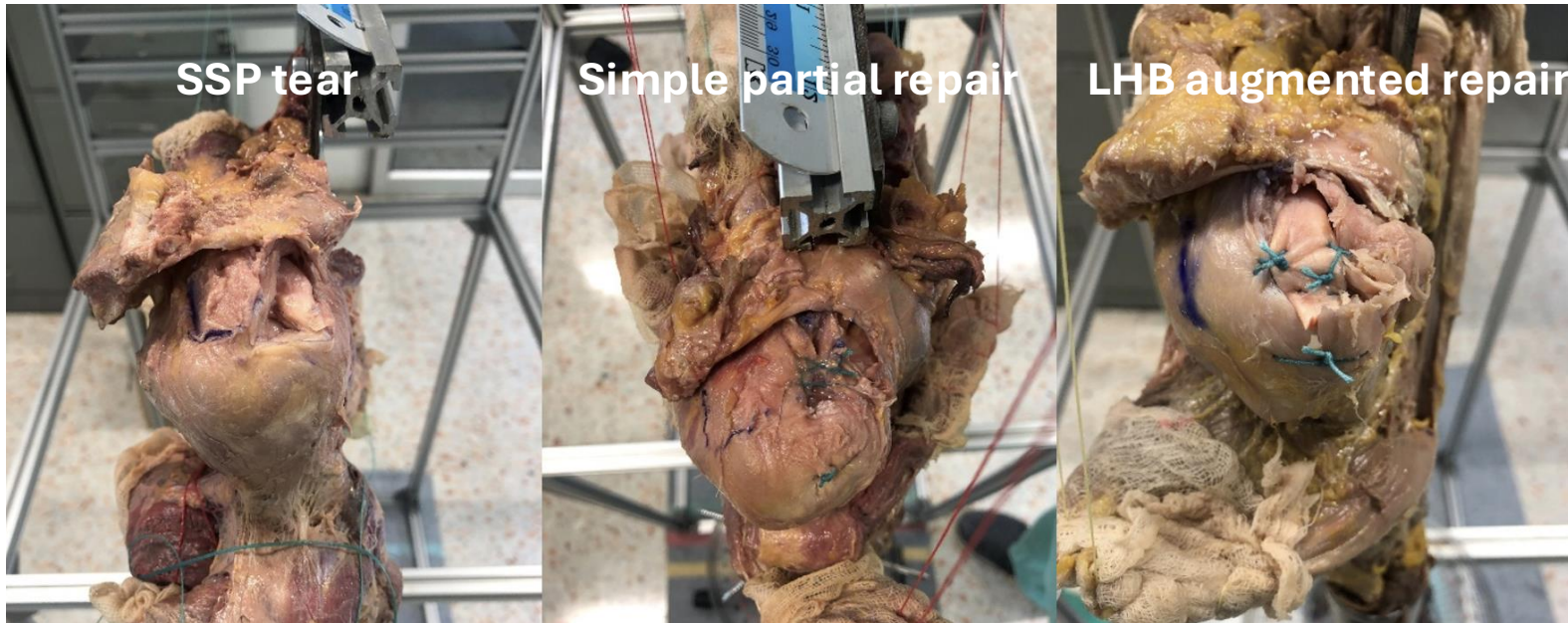
Superior humeral translation



Rotational range of motion

# Surgical Techniques

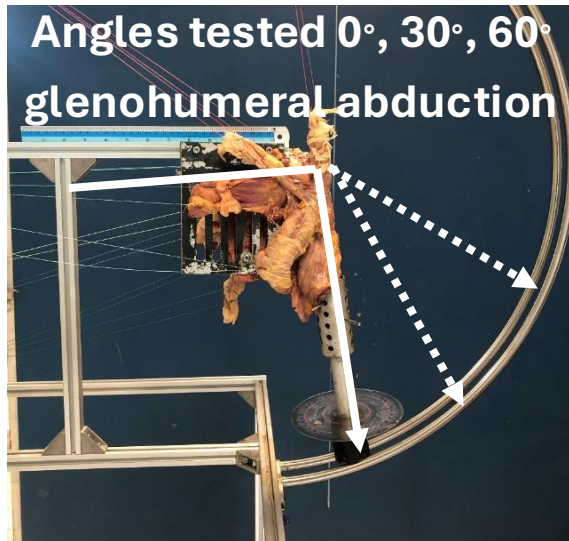
- **Partial Repair: Side-to-side repair using Ethibond sutures.**
- **LHB Augmentation: Detached LHB repositioned to fill the supraspinatus gap, secured with sutures.**
- **Surgical techniques**





# Biomechanical Testing Setup

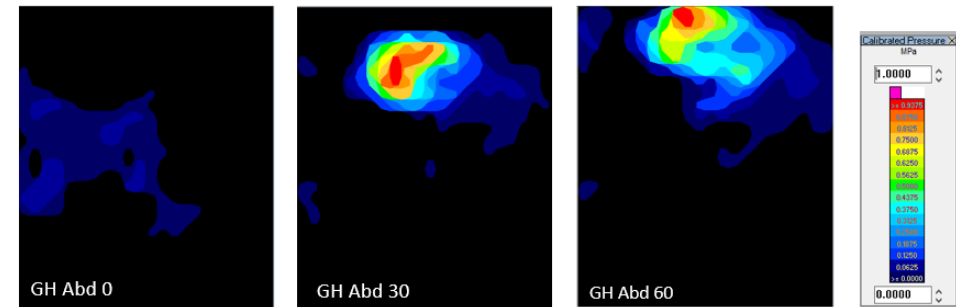
## ■ Custom Shoulder Testing System:



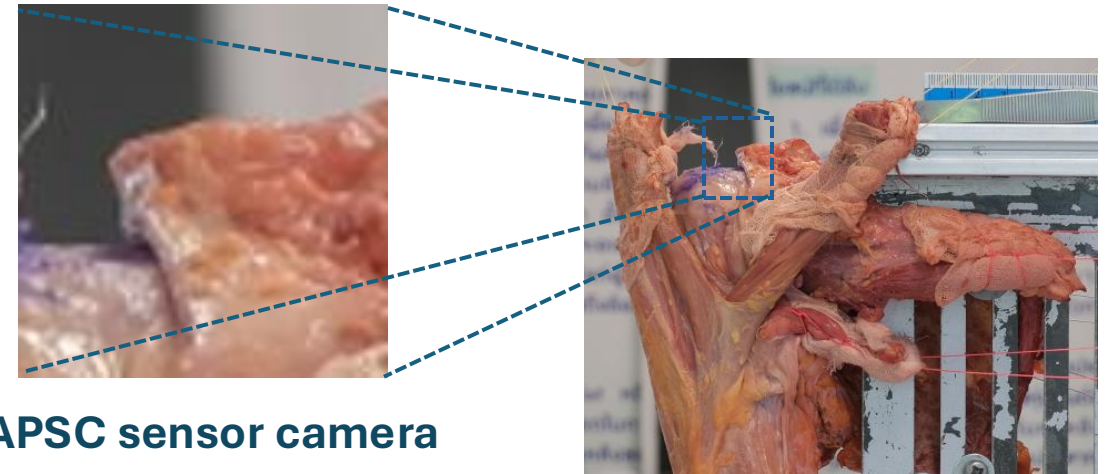
Muscle loading conditions  
(balanced / unbalanced)



## ■ Measurement Tools:



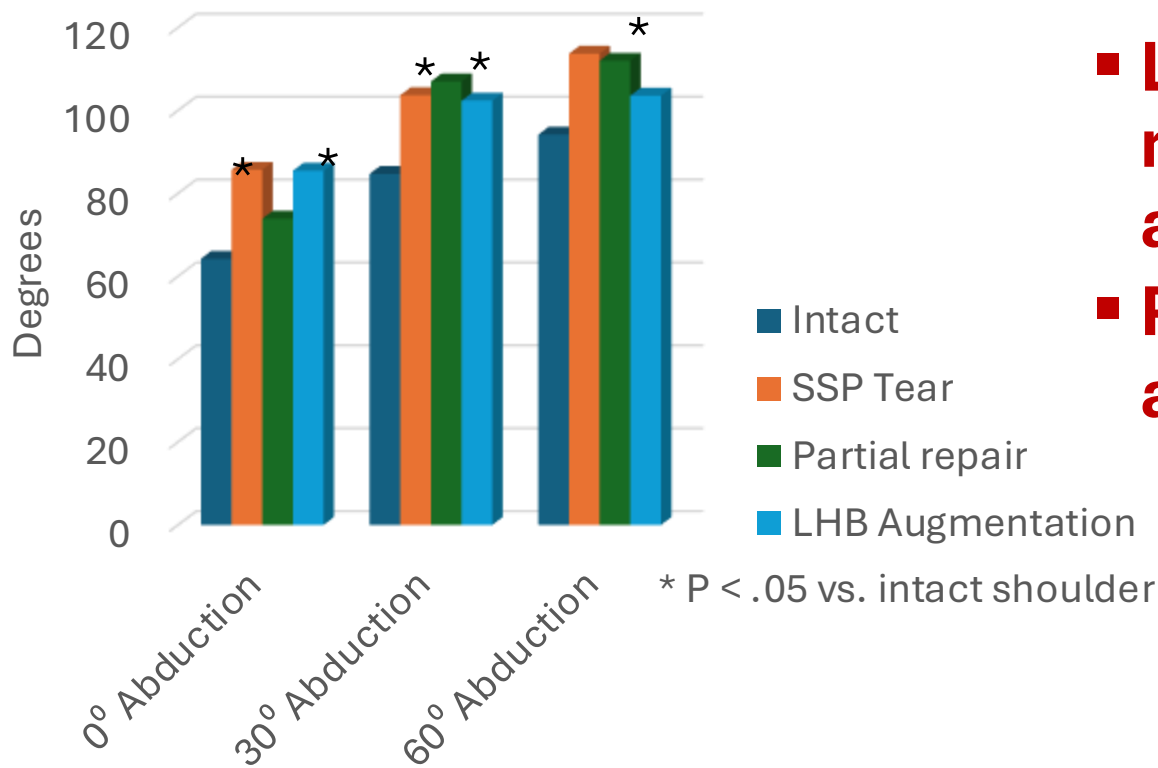
Tekscan pressure mapping



APSC sensor camera

# Results – Rotational Range of Motion

Total Rotational Range of Motion

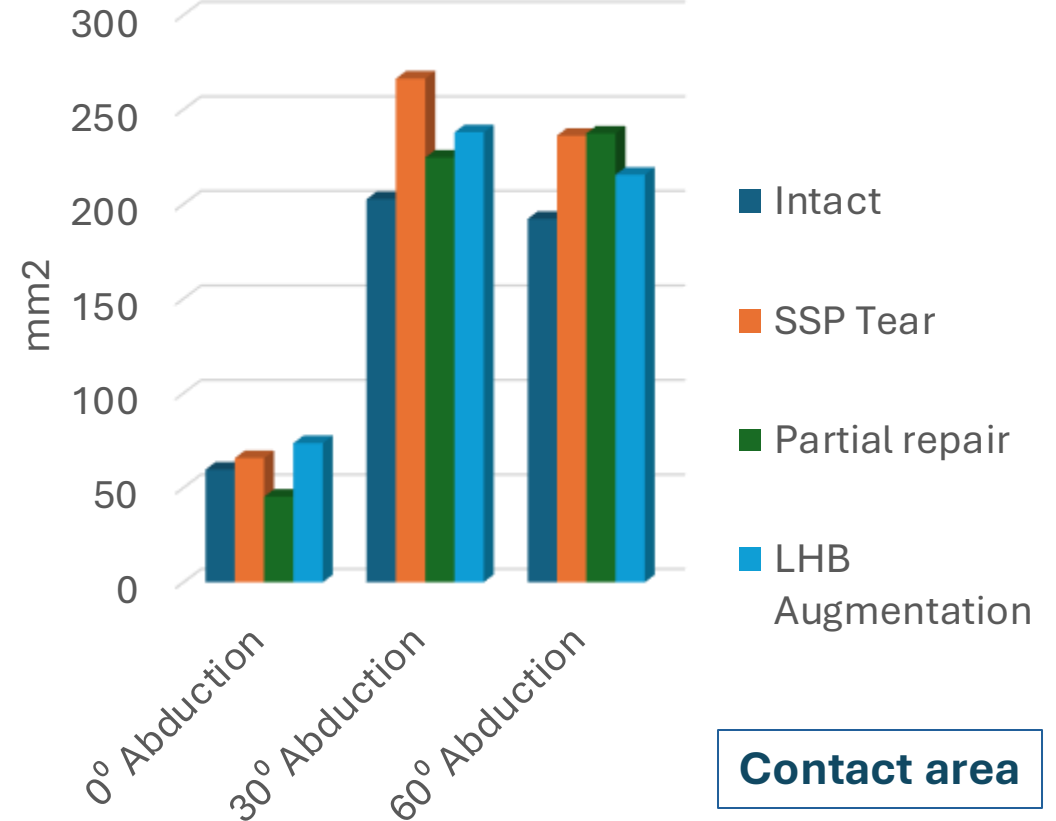
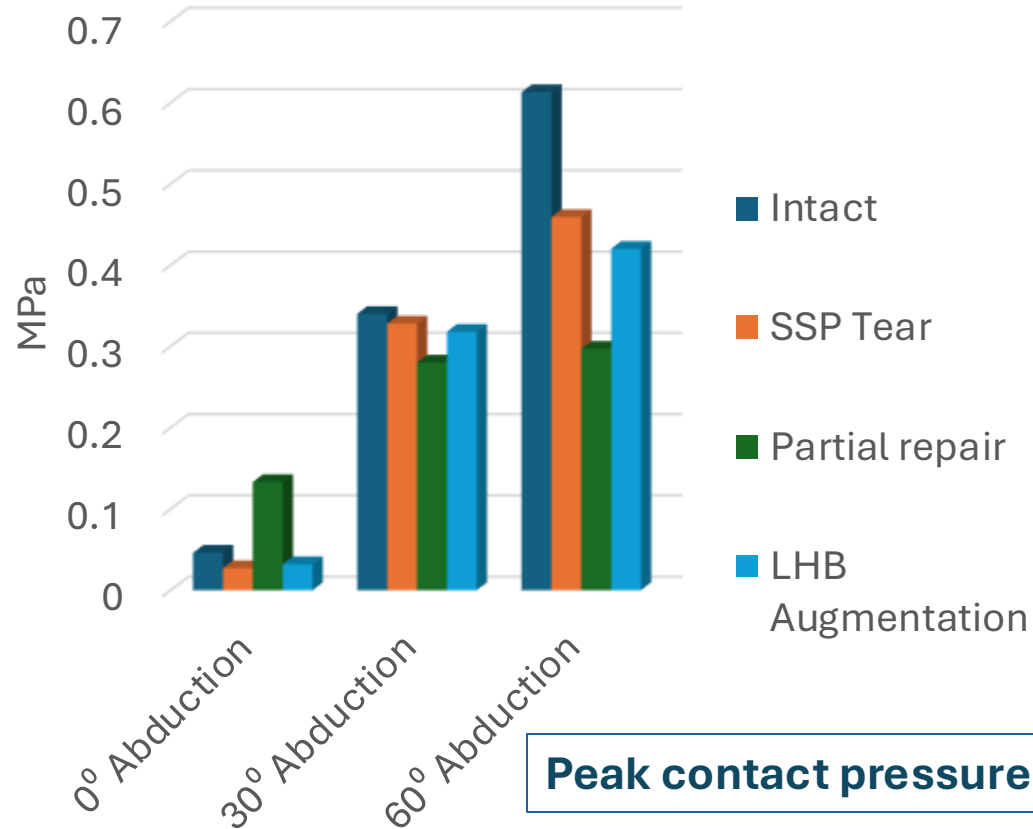


\* P < .05 vs. intact shoulder

- **LHB augmentation restored rotational range of motion at 30° and 60° abduction.**
- **Partial repair restored motion at 0° abduction but not at 30°.**

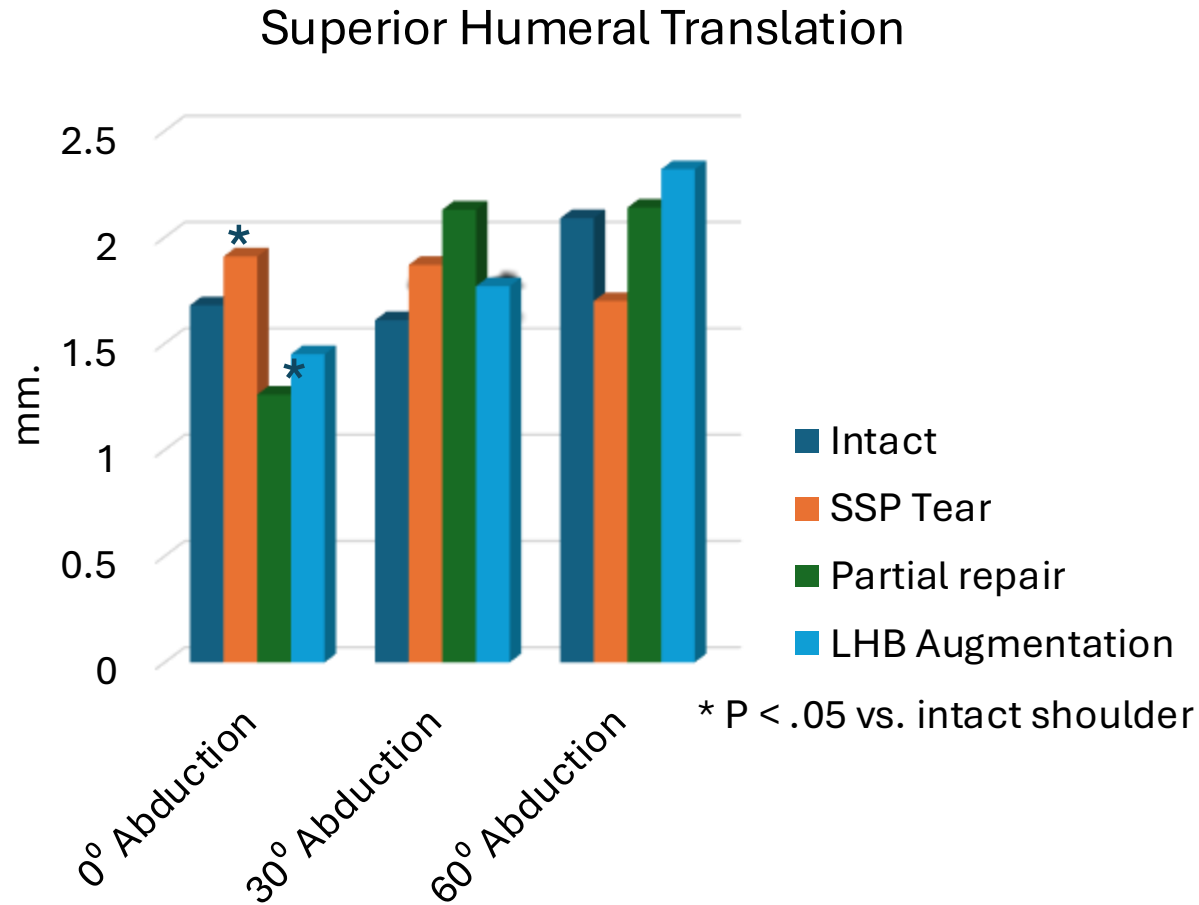
# Subacromial Contact Pressure & Area

- No significant difference between LHB augmentation and partial repair.
- Both techniques restored subacromial contact area and pressure to near-normal levels.





# Superior Humeral Translation



- **LHB augmentation restored superior humeral translation to near-normal levels.**
- **Partial repair showed significant improvement but was less effective than LHB augmentation.**

# Discussion

- **LHB augmentation effectively restores rotational range of motion and humeral stability.**
- **Comparable to partial repair in restoring subacromial contact pressure and area.**
- **Clinical Implications: LHB augmentation is a viable surgical option for irreparable anterior L-shaped supraspinatus tears.**

# Limitations

- **Static Muscle Loading:** Does not replicate dynamic human muscle forces.
- **Cadaveric Study:** No biological healing potential, only time-zero outcomes.
- **Variability:** Muscle load direction may differ between specimens.

# Conclusion

- **LHB augmentation restores rotational range of motion and humeral stability.**
- **Supports LHB augmentation as a clinical treatment option for irreparable anterior L-shaped supraspinatus tears.**

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