Poster #85: Outcomes After Arthroscopic Assisted Lower Trapezius Transfer For Irreparable Rotator Cuff Tears

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Disclosures

- Johnson & Johnson
- Stryker
- Zimmer Biomet
- Pacira
- Xiros NA
- Shoulder FX Solutions
- Conmed
- Smith & Nephew
- BD
- Atrion
- Trice Medical
- Tigon Medical

Objective

The goal of this study was to evaluate surgical outcomes of patients who underwent an arthroscopic assisted lower trapezius transfer (LTT) for an irreparable rotator cuff tear

Pre- and post-operative range of motion scores (Forward Flexion, External Rotation) were evaluated and compared

Pre- and Post-operative ASES and VAS scores were also compared

Materials and Methods

27 patients (n = 27)

Average age of 58 (range 44-76)

3 surgeons

Minimum follow-up of 12-months were included in this study

Pre- and post-operative range of motion and functional outcome scores were evaluated

Pre-op and 12-month post-op assessment scores were compared using the Wilcoxon Signed Rank Test

The testing level for all analyses is 0.05

All analyses are performed using SAS 9.4 (SAS Institute Inc, Cary, NC, USA).

Surgical Technique

Patient in beach chair position; arm draped appropriately allowing access to medial scapular boarder

Arthroscopic portals made with subsequent rotator cuff examination confirming posterosuperior rotator cuff tear. Subacromial decompression and clean-up done to aid in allograft/tendon passage

5cm vertical incision made 1cm lateral to the medial scapular boarder, centered over the lower trapezius tendon

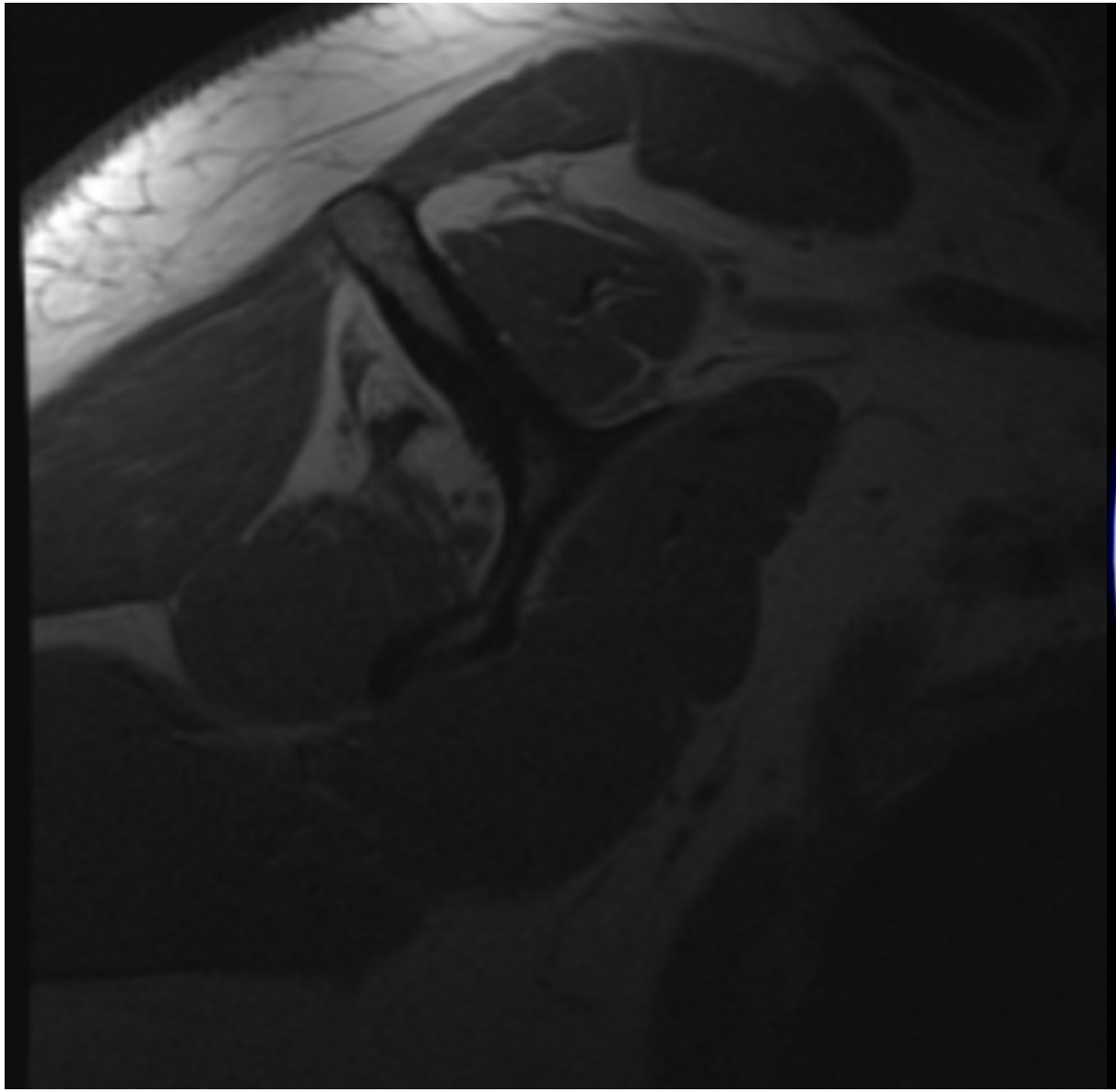
Lower edge of trapezius tendon identified; subsequent release and mobilization of the lower trapezius tendon. The tendon is then stitched in a Krakow fashion

The trapezius tendon is then attached to the Achilles allograft utilizing the Krakow sutures and reinforced with multiple nonabsorbable sutures.

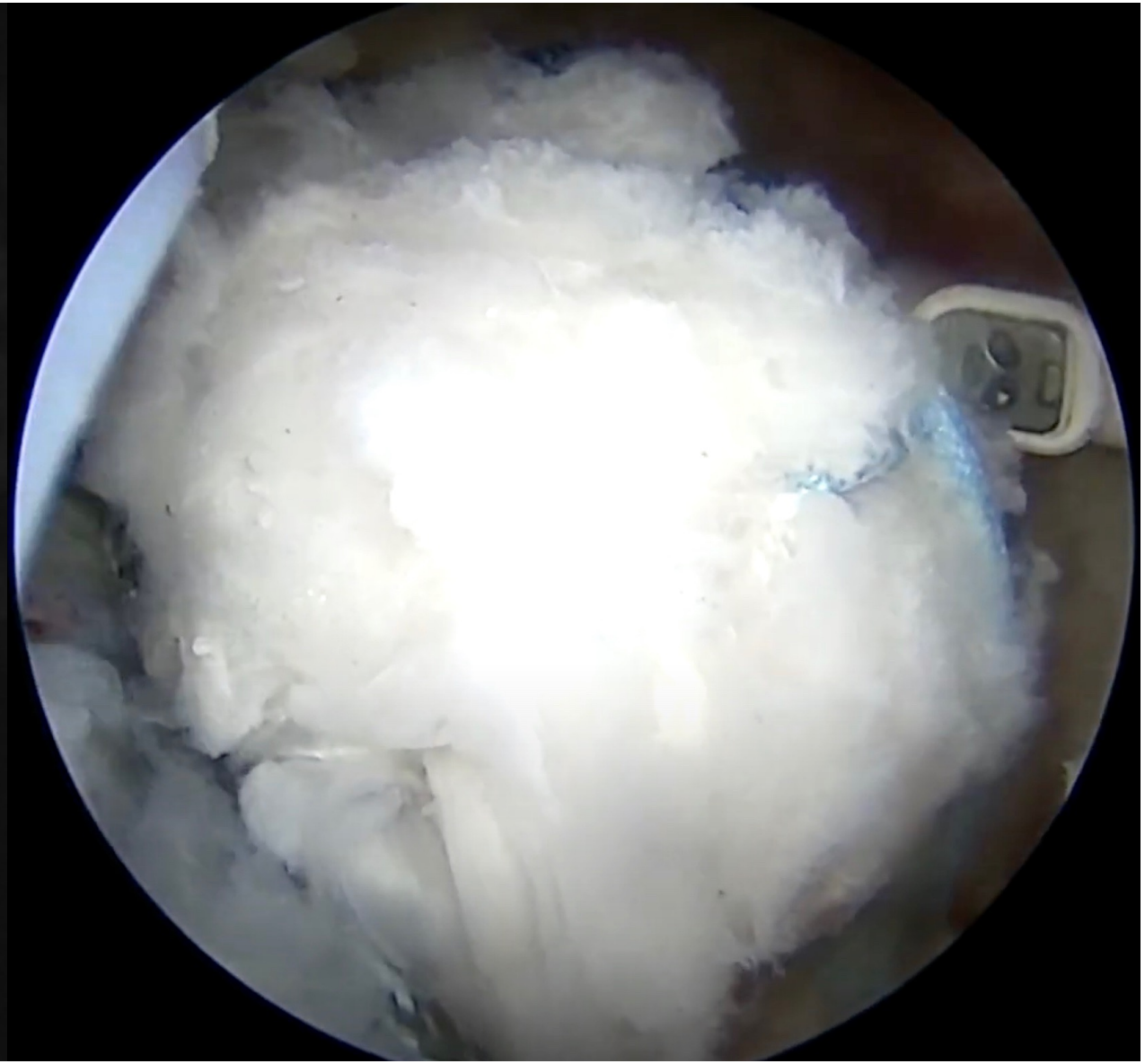
A tunnel was created extending towards the posterosuperior rotator cuff region. An arthroscopic grasper was then placed through the lateral wound, extending down in the the medial wound. Sutures connected to the allograft were retrieved and the tendon-graft construct was then pulled through the lateral wound.

The arm was the positioned in 60° of external rotation and 50° of abduction prior to graft fixation

The graft was then fixated to the rotator cuff footprint once proper tensioning was obtained.



Pre-Operative MRI demonstrating significant Supraspinatus and Infraspinatus muscular atrophy



Intra-Operative arthroscopic picture showing the final construct after graft fixation

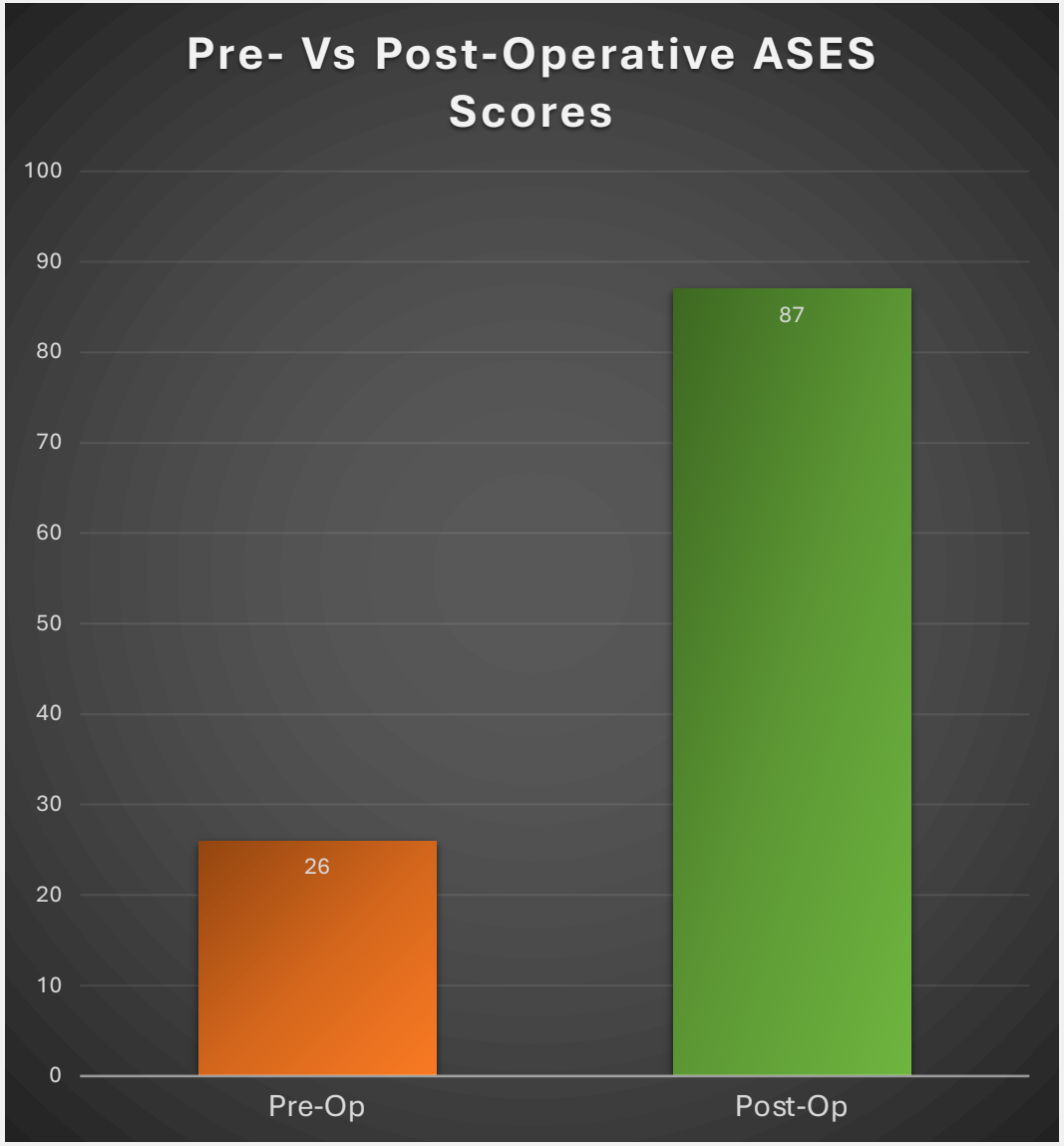
Overall Results

Table 1. Descriptive Statistics

	Pre-Op (N=27)	12 Month Post-Op	Difference (Post-Pre)	P-value*
VAS: Assessment Score				
N	21	21	17	**<.0001**
Median (IQR)	5.0 (4.0, 6.0)	0.0 (0.0, 2.0)	-4.0 (-5.0, -3.0)	
Range	0.0, 8.0	0.0, 5.0	-8.0, 0.0	
ASES: Assessment Score				
N	23	21	21	**<.0001**
Median (IQR)	26.0 (22.0, 31.0)	87.0 (76.0, 92.0)	59.0 (52.0, 67.0)	
Range	18.0, 52.0	38.0, 98.0	13.0, 70.0	
Active Forward Flexion ROM: Assessment Score				
N	27	27	27	**0.0003**
Median (IQR)	130.0 (90.0, 145.0)	160.0 (150.0, 170.0)	25.0 (10.0, 60.0)	
Range	0.0, 170.0	20.0, 180.0	-110.0, 180.0	
Passive Forward Flexion ROM: Assessment Score				
N	13	16	10	**0.0313**
Median (IQR)	150.0 (140.0, 160.0)	165.0 (160.0, 170.0)	15.0 (0.0, 30.0)	
Range	70.0, 170.0	140.0, 180.0	-10.0, 100.0	
Abduction ROM: Assessment Score				
N	23	23	21	**0.0049**
Median (IQR)	90.0 (80.0, 90.0)	90.0 (90.0, 90.0)	5.0 (0.0, 10.0)	
Range	40.0, 90.0	80.0, 120.0	-10.0, 30.0	
External Rotation ROM: Assessment Score				
N	27	25	25	**0.0053**
Median (IQR)	20.0 (0.0, 40.0)	40.0 (20.0, 45.0)	10.0 (0.0, 30.0)	
Range	0.0, 80.0	0.0, 70.0	-30.0, 40.0	

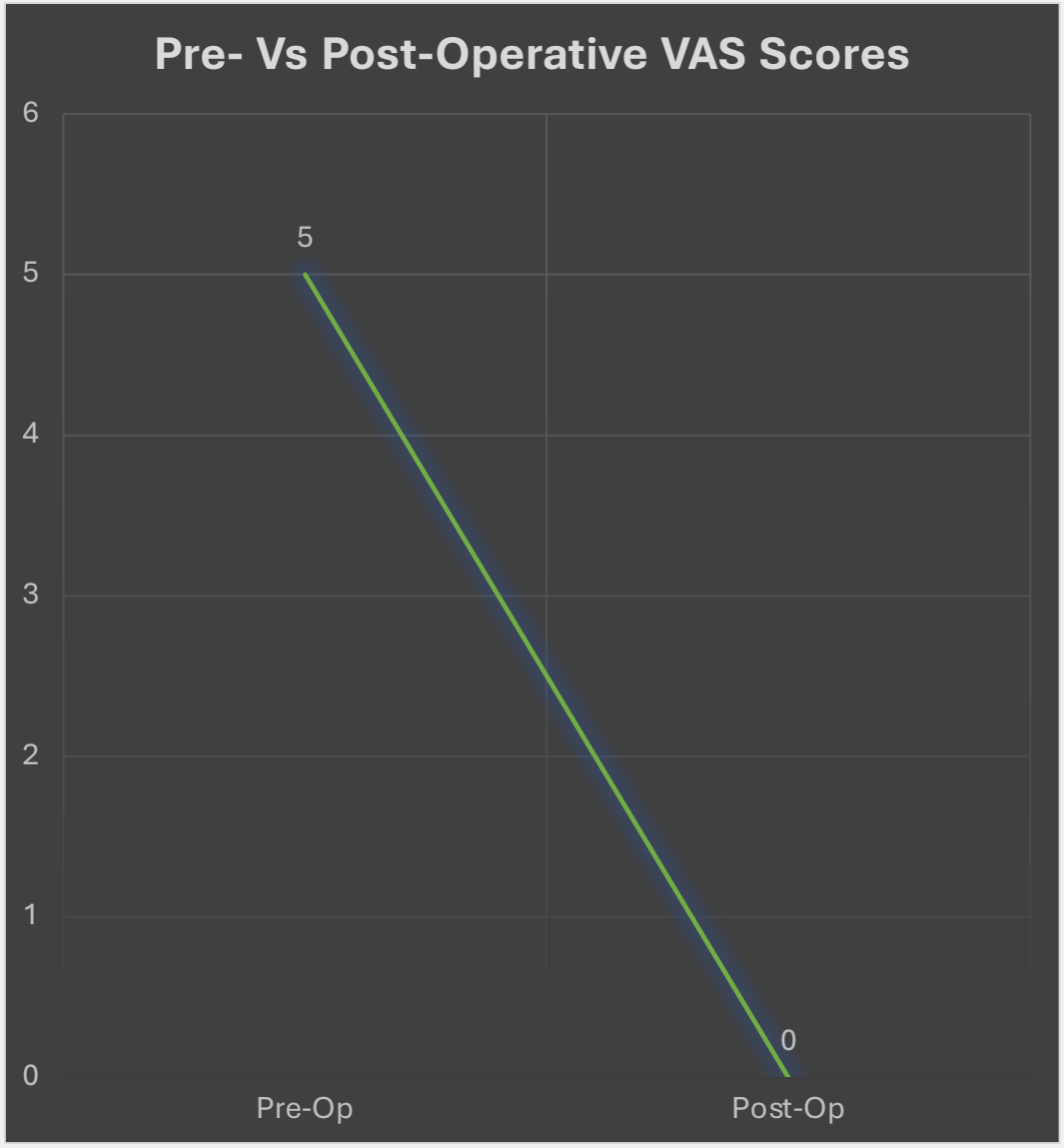
ASES Results

- Significant increase in post-operative ASES scores.
- Average increase of 59.0 points ($p<0.0001$)



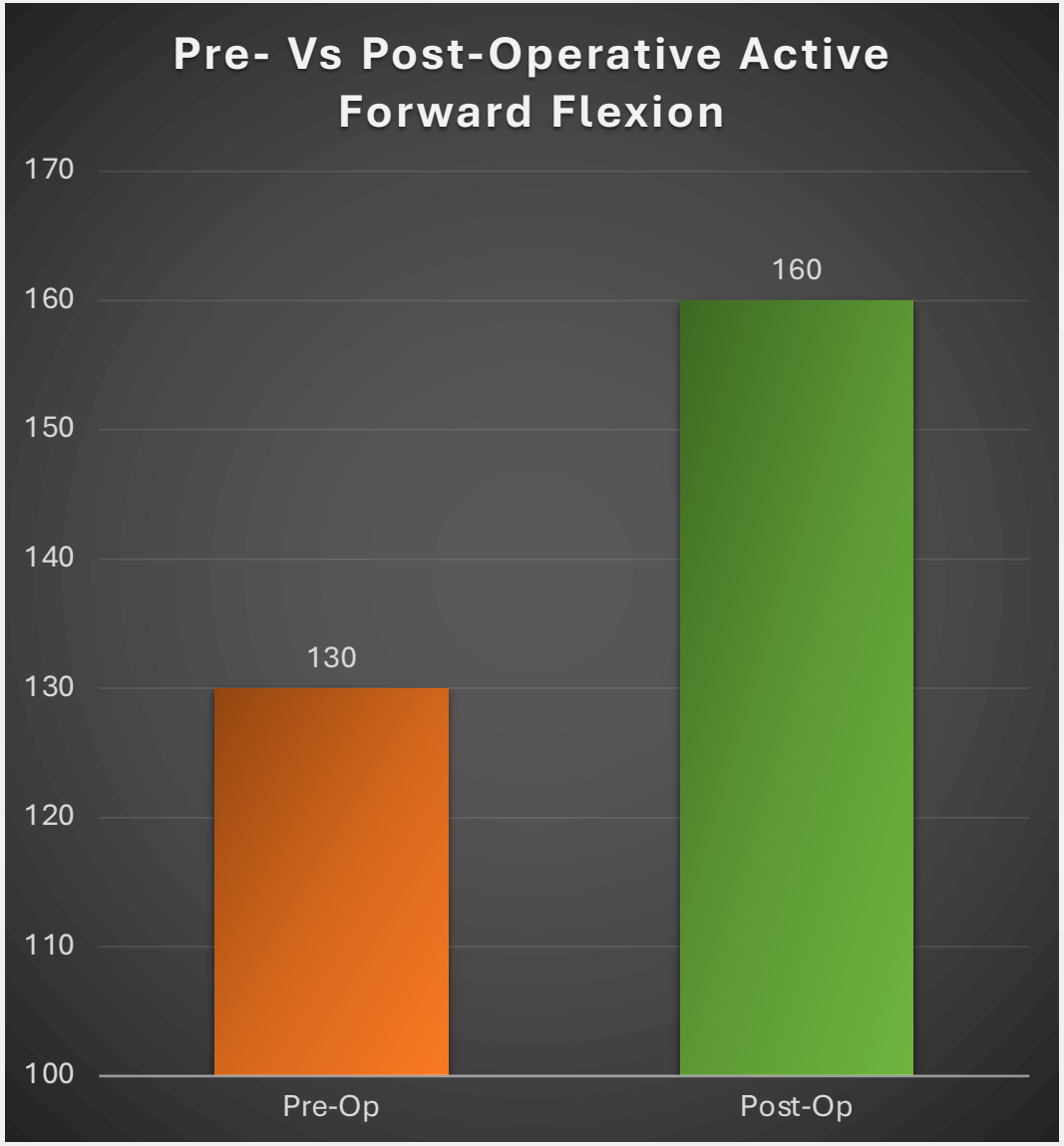
VAS Results

- Significant decrease in post-operative VAS scores.
- Average decrease of 4.0 points ($p<0.0001$)



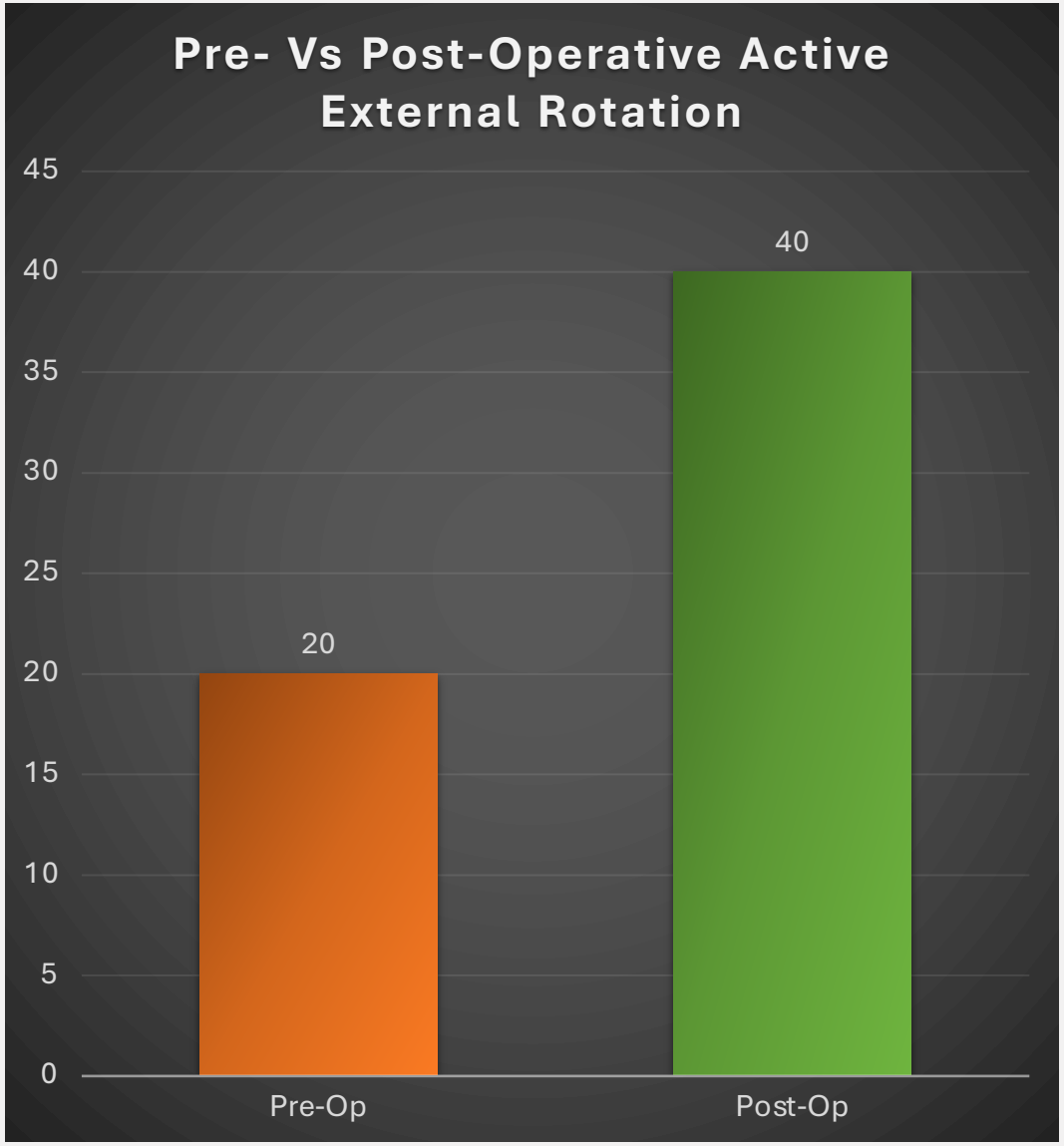
Forward Flexion Results

- Significant increase in active forward flexion post-operatively
- Average forward flexion increase of 25^{o} ($p<0.001$)



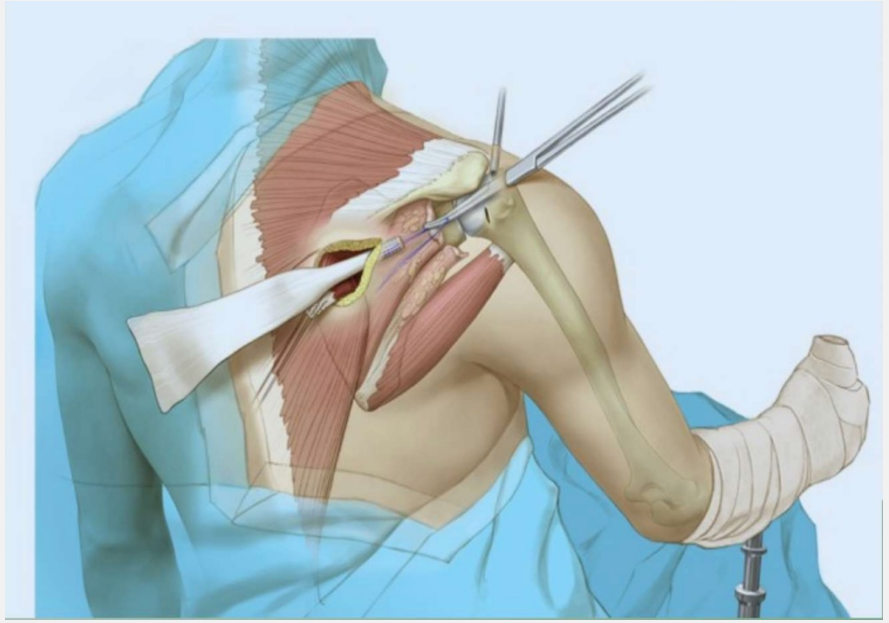
External Rotation Results

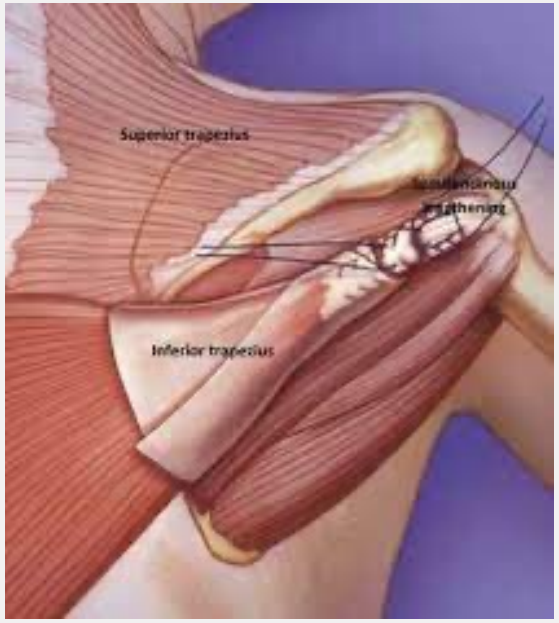
- Significant increase in active external rotation post-operatively
- Average external rotation increase of 10^{o} ($p<0.001$)



Conclusion

- Utilizing the technique described by Elhassan et al, lower trapezius tendon transfer is a reproducible and beneficial procedure that has significant improvement in patient report functional outcome scores and range of motion testing
- Longer follow-up is needed to evaluate the longevity of the allograft augmented tendon transfer and the graft viability/durability





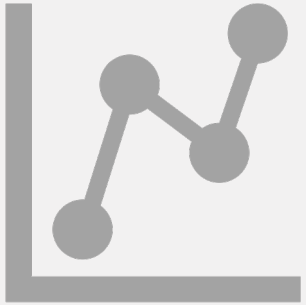
Significance of the findings

Arthroscopic assisted lower trapezius transfer for massive irreparable rotator cuff tears may provide significant improvement in ASES scores and ROM, specifically forward flexion and external rotation.

These findings suggest that LTT for massive irreparable rotator cuff tears is a proven successful treatment option in relatively young and active patients.

Limitations

Multiple patients involved in the study were referred by an outside surgeon in order to undergo this specific technique. Follow-up care was provided by the referring surgeon and statistical data was not available for analysis



This is a retrospective study. A prospective, randomized control study comparing a control group would be beneficial to evaluate/compare overall outcomes

References

1. Galatz, L.M., et al., *The outcome and repair integrity of completely arthroscopically repaired large and massive rotator cuff tears.* J Bone Joint Surg Am, 2004. **86**(2): p. 219-24.

2. Elhassan, B.T., et al., *Arthroscopic-Assisted Lower Trapezius Tendon Transfer for Massive Irreparable Posterior-Superior Rotator Cuff Tears: Surgical Technique.* Arthrosc Tech, 2016. **5**(5): p. e981-e988.

3. Clouette, J., et al., *The lower trapezius transfer: a systematic review of biomechanical data, techniques, and clinical outcomes.* J Shoulder Elbow Surg, 2020. **29**(7): p. 1505-1512.

4. Elhassan, B., *Lower trapezius transfer for shoulder external rotation in patients with paralytic shoulder.* J Hand Surg Am, 2014. **39**(3): p. 556-62.

5. Omid, R., et al., *Biomechanical comparison between the trapezius transfer and latissimus transfer for irreparable posterosuperior rotator cuff tears.* J Shoulder Elbow Surg, 2015. **24**(10): p. 1635-43.

6. Minagawa, H., et al., *Prevalence of symptomatic and asymptomatic rotator cuff tears in the general population: From mass-screening in one village.* J Orthop, 2013. **10**(1): p. 8-12.

7. Zhang, A.L., et al., *Analysis of rotator cuff repair trends in a large private insurance population.* Arthroscopy, 2013. **29**(4): p. 623-9.

8. Omid, R., et al., *Surgical anatomy of the lower trapezius tendon transfer.* J Shoulder Elbow Surg, 2015. **24**(9): p. 1353-8.

9. Brand, P.W., R.B. Beach, and D.E. Thompson, *Relative tension and potential excursion of muscles in the forearm and hand.* J Hand Surg Am, 1981. **6**(3): p. 209-19.

10. Elhassan, B., et al., *Shoulder tendon transfer options for adult patients with brachial plexus injury.* J Hand Surg Am, 2010. **35**(7): p. 1211-9.

11. Herzberg, G., J.P. Urien, and J. Dimnet, *Potential excursion and relative tension of muscles in the shoulder girdle: relevance to tendon transfers.* J Shoulder Elbow Surg, 1999. **8**(5): p. 430-7.

12. Hartzler, R.U., et al., *Biomechanical effectiveness of different types of tendon transfers to the shoulder for external rotation.* J Shoulder Elbow Surg, 2012. **21**(10): p. 1370-6.