

Quantifying the Difference in Glenoid Component Position Between Total Shoulder Arthroplasty and Reverse Shoulder Arthroplasty

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Disclosures

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LG, ML, KI – employees of Akunah



Introduction

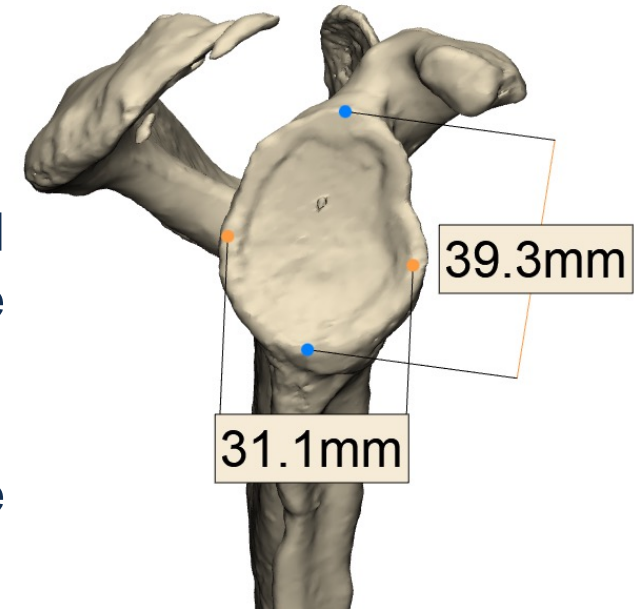
- Revision of Anatomic Total Shoulder Arthroplasty (TSA) to Reverse Shoulder Arthroplasty (RSA) is becoming more common
- Position of the RSA glenoid component very important for function
- Different convertible systems to revise TSA to RSA
 - Different philosophies of positioning of implants
- Limited literature comparing difference in implant positioning for the two modalities of shoulder arthroplasty

Aim of the Study

**To quantify the difference between optimal TSA and RSA
glenoid implant positioning on 3D segmented models**

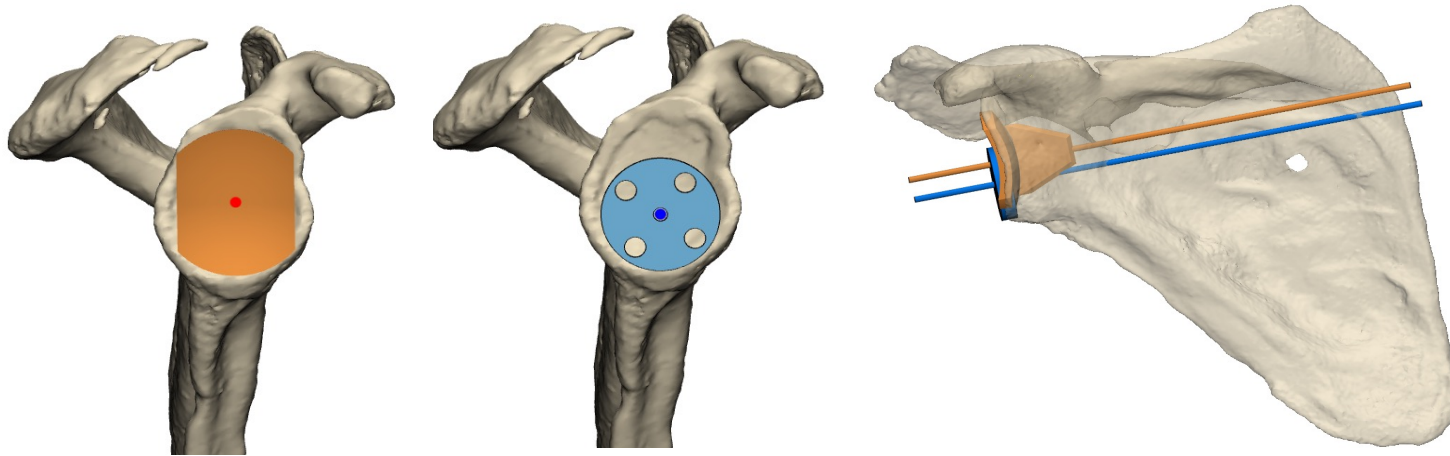
Methods

- **n = 25**, patients who underwent primary RSA procedures
- **Age:** 72.8 ± 9 yrs; 18 Males, 7 Females
- Segmentation of the shoulder CT images was performed in Mimics 24.0 (Materialise, Leuven, Belgium) to create 3D-Models
- Glenoid dimensions were recorded → to evaluate the effect of different glenoid sizes (S / M / L)



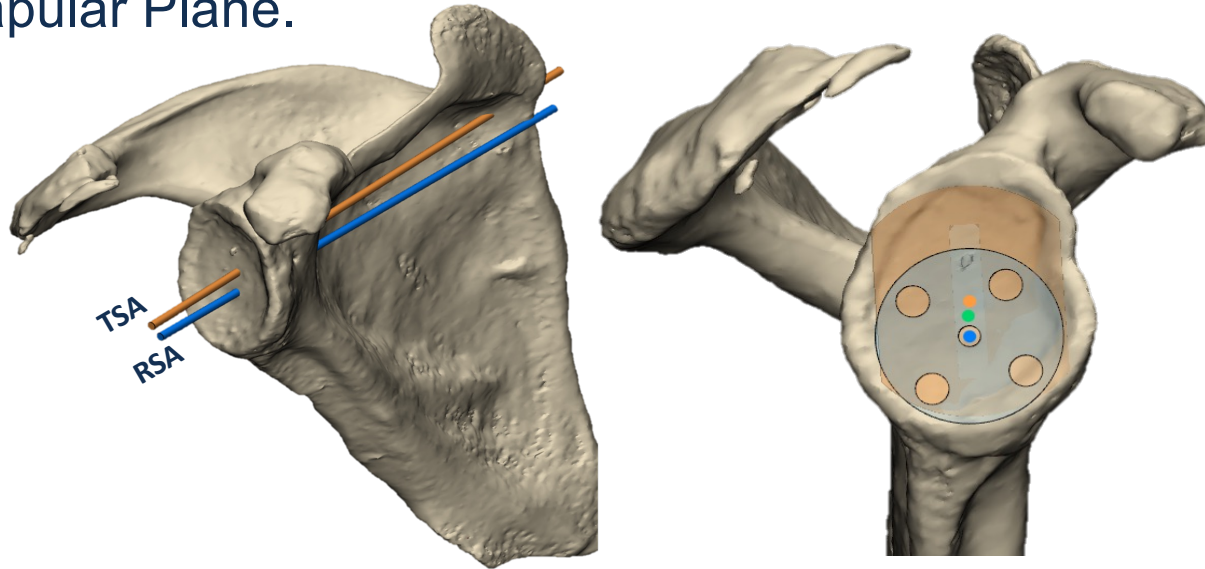
Methods

- **RSA baseplate** positioning → Preoperative planning by the treating orthopaedic surgeon (25mm baseplate)
- **TSA glenoid components** positioning → on the same 3D reconstructed scapulae retrospectively (by two fellowship-trained orthopaedic surgeons)



Methods

- **Translation:** Glenoid Center to Entry Point of a simulated guidewire
- **Rotation (Version/Inclination):** Angle between the Simulated Guidewire and the Scapular Plane.

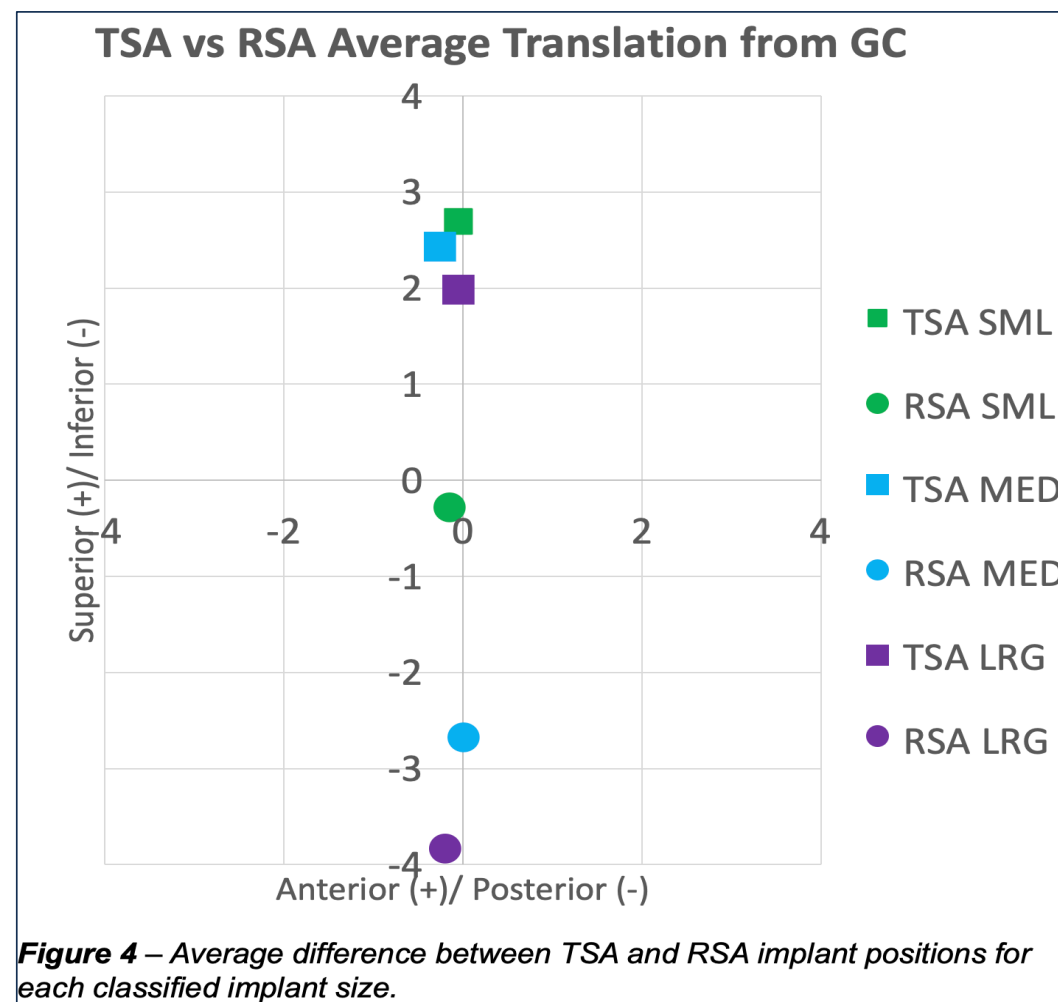


Results

	Translation (mm)		Rotation (°)	
	A/P	S/I	Version	Inclination
SMALL	0.1 ± 0.5	3.0 ± 0.4	0.0 ± 0.0	3.3 ± 4.7
MEDIUM	-0.2 ± 0.7	5.1 ± 1.2	0.1 ± 1.0	0.6 ± 1.1
LARGE	0.1 ± 1.0	5.8 ± 1.6	-0.2 ± 0.5	0.9 ± 2.1

Table 3 – Average difference between TSA and RSA implant positions. (AP – anterior/posterior) (SI – superior/inferior)

- Largest variation seen in S/I direction
- Variance increases with glenoid size
- **Average inferior translation difference = 4.9mm** (implant size disregarded)
- No significant difference in other metrics



Conclusion

In our study, we have identified that:

- The ideal RSA baseplate position is **inferior** with respect to the TSA position
- **Larger glenoid size amplifies this variance**, with large glenoids showing a variance of around 6mm
- Larger diameter RSA baseplate will reduce this distance by the increase in radius. This will be investigated in future work
- Results should be considered when revising TSA to RSA

Conclusion

Further work will include:

- Expanding the dataset
- Increasing the number of raters to include an intra-rater and improve the inter-rater assessment

References

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- **Franke KJ, Christmas KN, Simon P, Mighell MA, Frankle MA.** The effect of glenoid bone loss and rotator cuff status in failed anatomic shoulder arthroplasty after revision to reverse shoulder arthroplasty. *J Shoulder Elbow Surg.* 2021 Apr;30(4):844-849. doi: 10.1016/j.jse.2020.07.024. Epub 2020 Aug 1. PMID: 32750531.