

# Aortic Root Enlargement via Upper Hemisternotomy Using the **Alfred A. Kocher Technique**

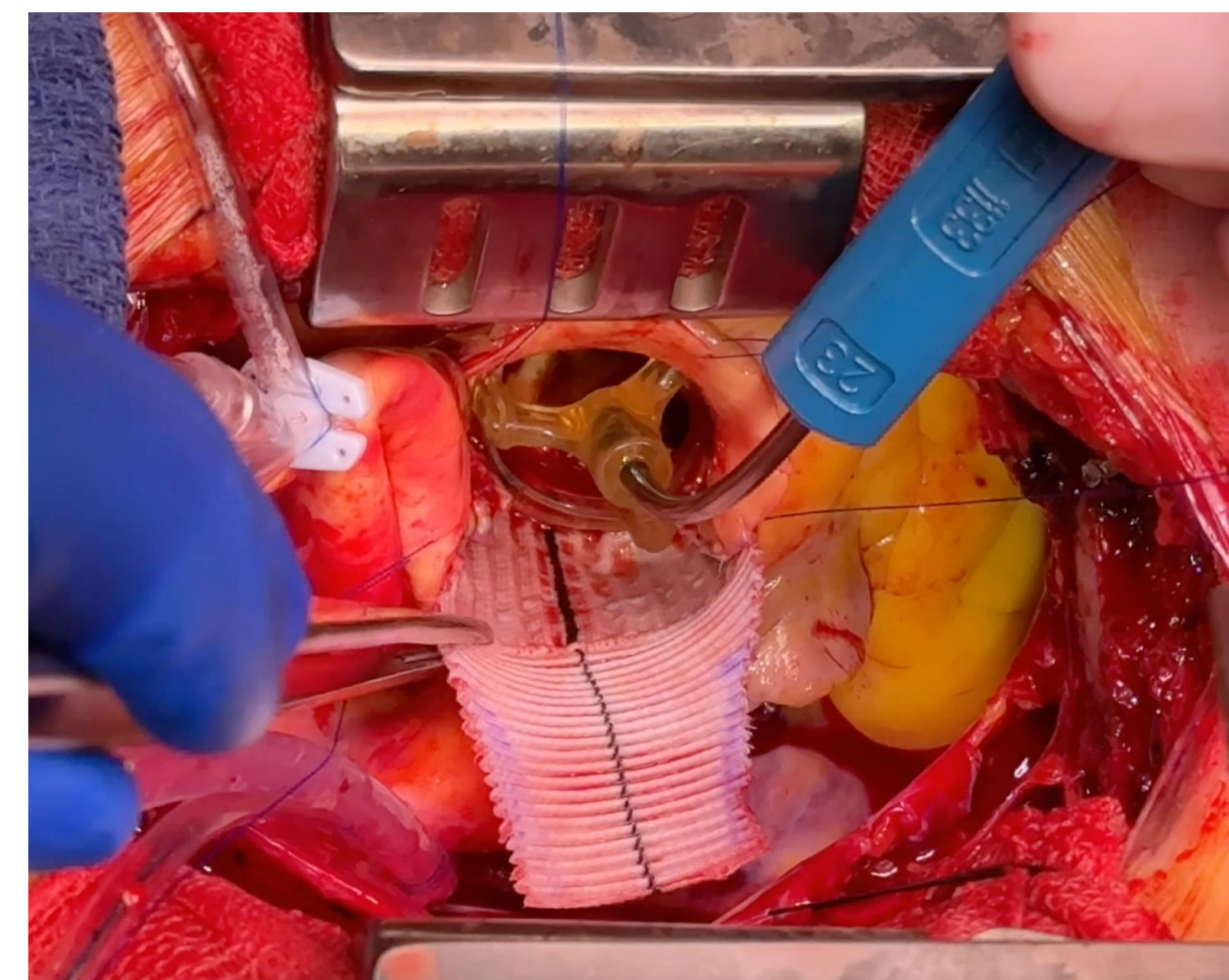
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## Objective

Aortic root enlargement (ARE) is an established strategy to avoid prosthesis-patient mismatch (PPM) during surgical aortic valve replacement (SAVR). Its use in minimally invasive settings remains limited due to concerns about exposure and technical complexity.

We present a novel method for ARE through an upper hemisternotomy, using the Alfred A. Kocher Technique - extending minimally invasive SAVR to patients who would otherwise require full sternotomy.



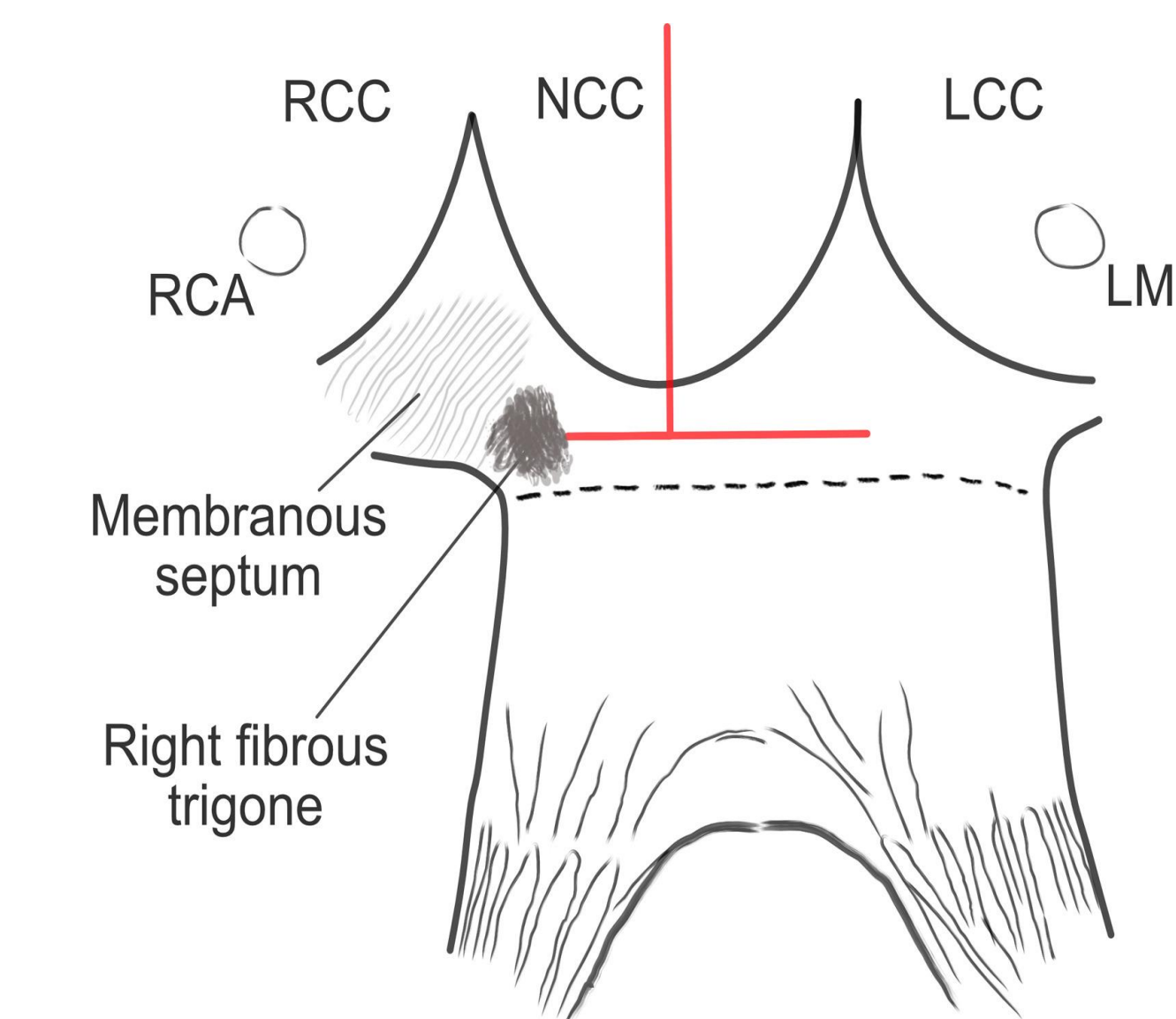
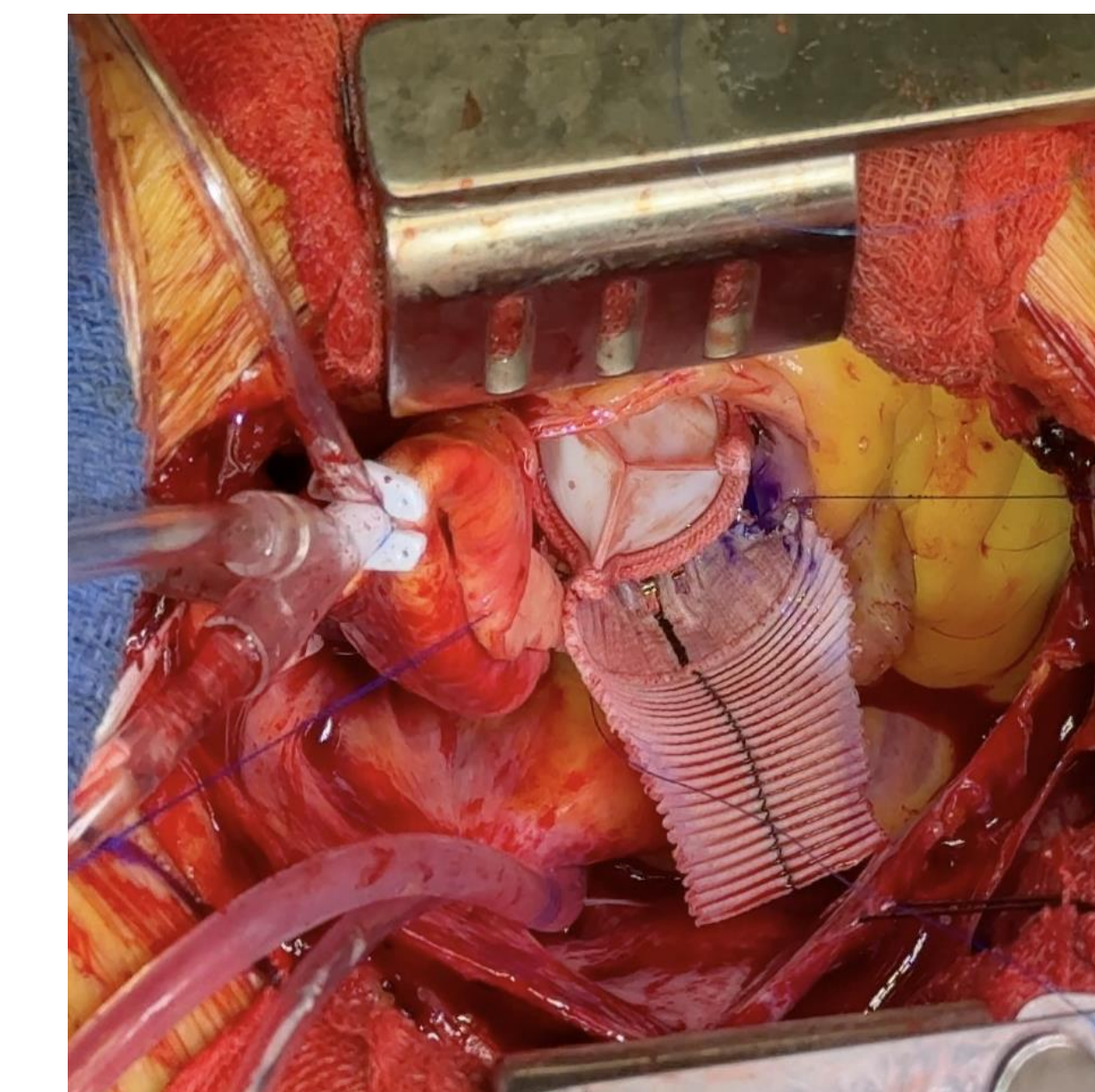
Sizing of a 23 mm valve following aortic root enlargement (ARE) using the Alfred A. Kocher technique

## Conclusion

Aortic root enlargement using the **Alfred A. Kocher Technique** is feasible, safe and reproducible through an upper hemisternotomy, enabling implantation of larger prosthetic valves in minimally invasive SAVR and expanding access to patients who would otherwise require full sternotomy or would be at risk for PPM.

## Methods – Technique Steps

- 1 Hockey-stick aortotomy**  
Standard aortotomy extended into the top of the center of the noncoronary sinus via upper hemisternotomy approach.
- 2 Inverted asymmetric T-incision**  
Incision is extended towards the nadir of the noncoronary sinus. At the basal ring, the transverse limb of the T- incision extends along the anterior mitral valve leaflet hinge line toward the left-non commissure. The second limb of the T incision is created toward the right fibrous trigone. The membranous septum is preserved.
- 3 Barrel-shaped patch**  
Transverse section (2.5–3 cm) measured. A barrel-shaped patch tailored from a 34 mm Valsalva prosthesis preserves annular curvature and creates an anatomically shaped noncoronary neosinus. Sewn with 4-0 polypropylene running suture.
- 4 Valve implantation & closure**  
Standard valve implantation. Aortotomy closed incorporating the patch.



Intraoperative View of a 23mm prosthetic valve and the barrel shaped patch (left) and schematic drawing of Alfred A. Kocher Technique (right), adapted from Kocher et al, CC BY 4.0.

## Results

The **Alfred A. Kocher Technique** enabled safe and reproducible aortic root enlargement via upper hemisternotomy, allowing implantation of a 23 mm prosthetic valve in a patient with a small (19 mm) aortic annulus. Operative visibility and hemostatic control were maintained throughout. Conversion to full sternotomy was not required. The technique integrates seamlessly into routine minimally invasive SAVR.

More information



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Link to the Video



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### References

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- Kocher AA, Osorio E, Leangle S, Ehrlich M, Coti I, Zimpfer D, Werner P. A. Kocher Technique: A Simplified Universally Applicable Approach for Aortic Root Enlargement. Innovations. Article in press. doi:10.1177/15569845261450957.