Docket #: S22-404

Innovative prosthetic valve design for severe mitral annular calcification

Stanford researchers at the Woo Lab have designed an innovative prosthetic valve to address challenges in mitral valve replacement for patients with severe mitral annular calcification (MAC). Conventional procedures often result in para-valvular leaks due to the difficulty in removing all calcification, leading to poor patient outcomes.
The new valve design features a large detachable skirt proximal to the sewing cuff, allowing an additional layer of graft material to be sewn onto the left atrial tissue, ensuring a secure seal and eliminating the risk of potential para-valvular leaks. The design accommodates patients without severe MAC by allowing the skirt to be detached. This design comes in a collapsed geometry to allow for sewing ring implantation first, followed by skirt expansion, and lastly a second anastomosis suture line. The CAD renderings show only a mechanical valve design. However, the same concept and design can be applied to biologic valves, and even for aortic positions for patients

Stage of Development
Prototype Design

Figure

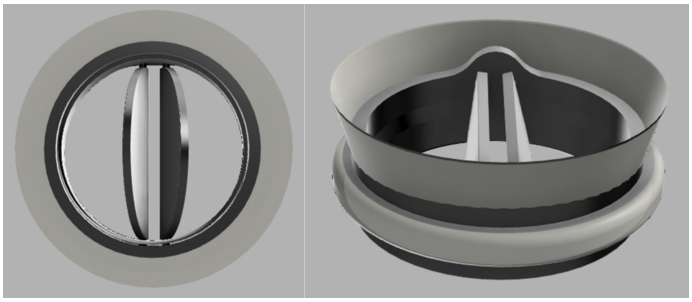


Figure description: CAD renderings of prosthetic valve design (*Image Credit – Woo Lab*)

Related Technologies

Stanford Docket S22-308 "Composite Inclusion Graft for Ross Procedure" describes a composite inclusion graft that addresses several challenges associated with the Ross procedure, such as late autograft dilation. This inclusion technique was developed to support the autograft and prevent this late autograft dilation.

Stanford docket S22-333 "Geometric Aortic Graft" describes an advanced version of conventional aortic grafts with a reinforced suture area which reduces bleeding around the anastomosis line.

Applications

- Mechanical mitral valve
- Biologic mitral valve
- Aortic positions for patients with severe aortic valve stenosis due to calcification

Advantages

- Ensures perfect seal to eliminate risk of potential para-valvular leaks
- Collapsed geometry to allow for sewing ring implantation first, followed by skirt expansion, and lastly a second anastomosis suture line

Patents

- Published Application: WO2024216235
- Published Application: 20260033947

Innovators

- Yuanjia Zhu

- Joseph Woo

Licensing Contact

Seth Rodgers

Licensing Manager, Life Sciences

Email