Docket #: S20-004

Selectively Flexible Mitral Valve Ring for Improved Mitral Valve Repair

Stanford researchers have developed an innovative mitral annuloplasty ring designed to enhance mitral valve repair surgeries.

Mitral valve annuloplasty, a common heart surgery for the repair of leaking mitral valves with more than 200,000 surgeries annually in the U.S. It often utilizes annuloplasty rings to tighten or reinforce the ring around a valve (called the mitral annulus) and prevent further dilation. Current commercial rings either restrict natural motion or fail to prevent dilation in critical dimensions, resulting in less effective valve repair outcomes.

The new annuloplasty ring allows the mitral annulus to move naturally between flat and saddle shapes during the heart cycle while maintaining its size in one dimension, using slits of varying depths that control flexibility. This unique design supports natural mitral valve dynamics, ensuring better functional outcomes and longevity of the repair.

Stage of Development
Prototype

Figure

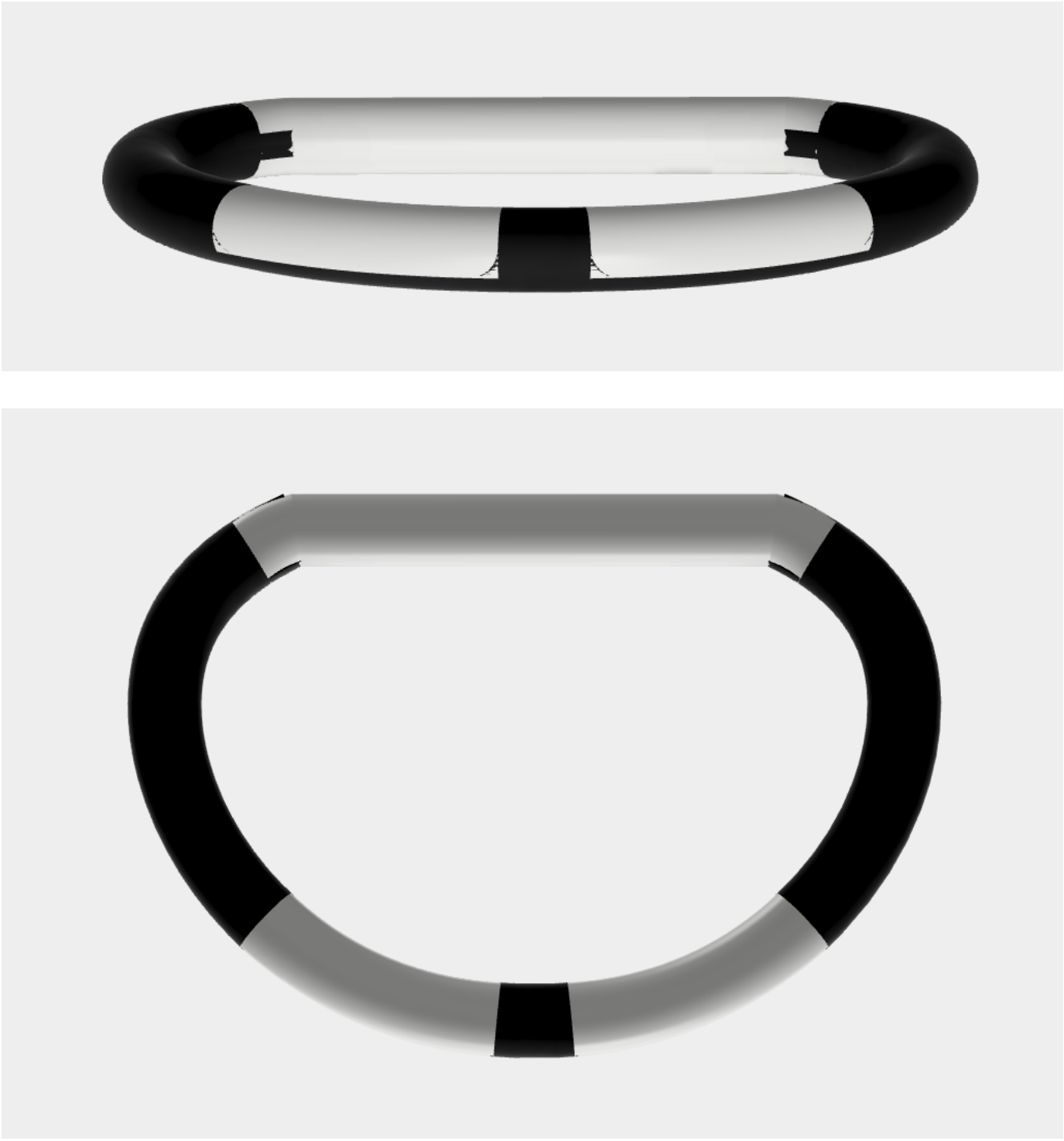

Figure Description: illustration of prototype (source: the inventors).

Applications

- Mitral valve repair surgeries
- Degenerative valve diseases

Advantages

- Allows natural motion of the mitral annulus
- Prevents further enlargement of the annulus
- Provides structural support with selective flexibility

Publications

- Frishman, Samuel, Ali Kight, Ileana Pirozzi, Sainiteesh Maddineni, Annabel M. Imbrie-Moore, Zulekha Karachiwalla, Michael J. Paulsen, Alexander D. Kaiser, Y. Joseph Woo, and Mark R. Cutkosky. "DynaRing: A Patient-Specific Mitral Annuloplasty Ring With Selective Stiffness Segments." Journal of Medical Devices 16, no. 3 (2022): 031009.
- Zhu, Yuanjia, Annabel M. Imbrie-moore, Matthew H. Park, Tyler E. Cork, Robert J. Wilkerson, Nicholas Tran, Mateo Marin-Cuartas et al. "A Novel Selectively Flexible Mitral Annuloplasty Ring Designed Based on Human Imaging with Superior Performance in Hemodynamics, Biomechanics, and Annular Dynamics-A Comprehensive Bench to in vivo Large Animal Analysis." Circulation 144, no. Suppl_1 (2021): A10378-A10378.

Patents

- Published Application: WO2022015966
- Published Application: 20230172716

Innovators

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