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Promoting Technology and Collaboration

A Leap Forward in Mitral Valve Simulation: Developing Functional Models for Accurate Repair Testing

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Background: Mitral valve repair surgery, whether performed traditionally or through minimally invasive techniques, demands extensive training and experience to develop the advanced skills necessary for long-lasting outcomes. Even the most skilled surgeons test the valve multiple times with saline, both before and after surgery, to evaluate the repair's effectiveness by simulating its function under physiological conditions. Unfortunately, current mitral valve simulators are non-functional and cannot replicate this critical aspect, limiting their effectiveness in training and assessment, potentially slowing the learning curve, and impacting clinical outcomes.

Technology Overview: Existing mitral valve models in simulators often fail to accurately simulate the valve leaflets and cannot replicate the dynamic movement and pressure conditions required for a reliable saline test. These limitations hinder the effectiveness of repair testing. Our research focuses on developing a silicone-based functional mitral valve model that can be integrated into surgical simulators. This model is designed to mimic the movement and pressure conditions encountered in actual surgeries, enabling realistic repair testing and significantly enhancing the training experience.

Potential Application in Surgical Simulation and Education: Integrating a functional mitral valve model into surgical simulators represents a significant improvement over current training tools for surgeons. This innovation allows for realistic repair testing using a saline test, providing valuable feedback on surgical procedures and enhancing the accuracy and effectiveness of surgical training.

Potential Opportunities to Collaborate: We are actively seeking collaborations with institutions and organizations interested in advancing surgical simulation technologies. Potential partnerships could involve refining the functional mitral valve model, integrating it into existing training programs, or exploring new applications in surgical education. Working with experts in simulation and valve repair could accelerate the development and implementation of this innovative tool, benefiting the broader medical community.