Appendix: Results of base case - 29.8 mm diameter arm with the contraction over the delivery system.

The first stage in all the models is the insertion of the delivery system during the contraction. This stage included the contraction of the heart and the closure of the valve on a rigid tube (representing the delivery system; diameter of 8.5 mm). The electrical model was solved, and the action potential results were then used to activate the muscle traction loads in the mechanical model. The electrical model was modified to reach the maximum contraction (70% systole) and then stopped. Thereafter, the mechanical model was solved simulating both the closure of the valve on the tube and the pulling of the chords. During the closure stage, the tube was positioned normal to the valve's ring plane. The contact of the tube with the mitral valve and its subvalvular apparatus was accounted for.

The top three rows of the Supplemental Figure show how the chordae approach the delivery system as the mitral valve closes. The LV views (left column) demonstrate the change in the annulus shape and size. The influence of the cylinder on the closure as a result of the cylinder is also evident. In fact, in the 70% systole instance the cylinder prevents a full closure and results in a small gap (seen in the Supplemental Figure to the right of the cylinder). It should be mentioned that if the cylinder is not included, the valve is fully closed at this stage (Fig. 1, right panel). The second column of the Supplemental Figure shows the role of the heart's contraction in the mitral valve closure. The annulus perimeter is correlated to the ventricular motion and the functions of the papillary muscles and subvalvular apparatus during the closure are also noticeable. Additionally, this view shows the contact between the papillary muscles and

the cylinder, which affects the tension in the chordae. By the end of the 70% systole step and the beginning of the rotation, the annulus perimeter reached 120.7 mm while the maximum chordae stress magnitude was 4.1 MPa.

The bottom rows of the Supplemental Figure show how the rotation affects the mitral valve, chordae, and left ventricle. In the LV views, the rotation angle increases continuously counterclockwise but is presented here with steps of 60°, matching the angle between the arms. Therefore, each arm moves into its counterclockwise neighbor position when the angle increases. Increasing the angle leads to a decrease of the annulus perimeter and to an increase of the chordae stress magnitudes. This can also be appreciated from the quantitative values in the two right columns of the Supplemental Figure. The tilted views show that the device's rotation pulls the entire ventricle, and specifically the papillary muscles, helping to reduce the annulus perimeter.