

Background

- The learning curve for minimally invasive mitral surgery is steep due to the complexity of steps required for the operation and intricate coordination and communication required between the console surgeon and the bedside assistant.

Objectives:

- To describe the impact of an advanced practice provider training manual and how it affects overall surgical case efficiency including decreased cross-clamp and improved patient safety/outcomes process for those learning to be a bedside assistant.
- Demonstrate how utilizing an established manual can markedly streamline the onboarding process for those learning to be a bedside assistant.

Methods

- Our institution set up 33 simulation sessions totaling 83 hours of training, including classroom style education and online modules to review the history and technology of the Da Vinci Xi robot, hands-on docking/instrument exchange, atriotomy, chordoplasty, annuloplasty, and atriotomy closure with the use of a LifeLike Bio Tissue model.
- A guidebook was created at the conclusion of the simulation sessions, which was serially edited throughout subsequent live cases. or major steps of the operation.

Figure A. Robotic Mitral Valve Surgery Manual for the Bedside Assistant is a 15-page document

Results

- The guidebook was passed along to bedside assistants in-training and was updated in real time with each subsequent case debriefing session. **Key steps outlined below:**
 - Patient selection-absolute & relative contraindications
 - ECHO analysis/determination of neochoord, band/ring size
 - Operating room set-up prior to patient arrival
 - Neochords using the Shibata
 - Patient preparation & positioning
 - Draping and passing off lines
 - Cannulation
 - Prior to cross-clamp checklist
 - Docking the robot
 - Atriotomy, Chordoplasty, Annuloplasty, and Atriotomy Closure
 - Undocking the robot
- This manual ultimately contributed to helping reduce operative times, as it gave a framework for the bedside assistant team to quickly and efficiently integrate into their role with the console surgeon.
- Cross-clamp times overall decreased after our first 10 cases and continued to decrease when the same surgical team was used due to repetition and collaboration of steps

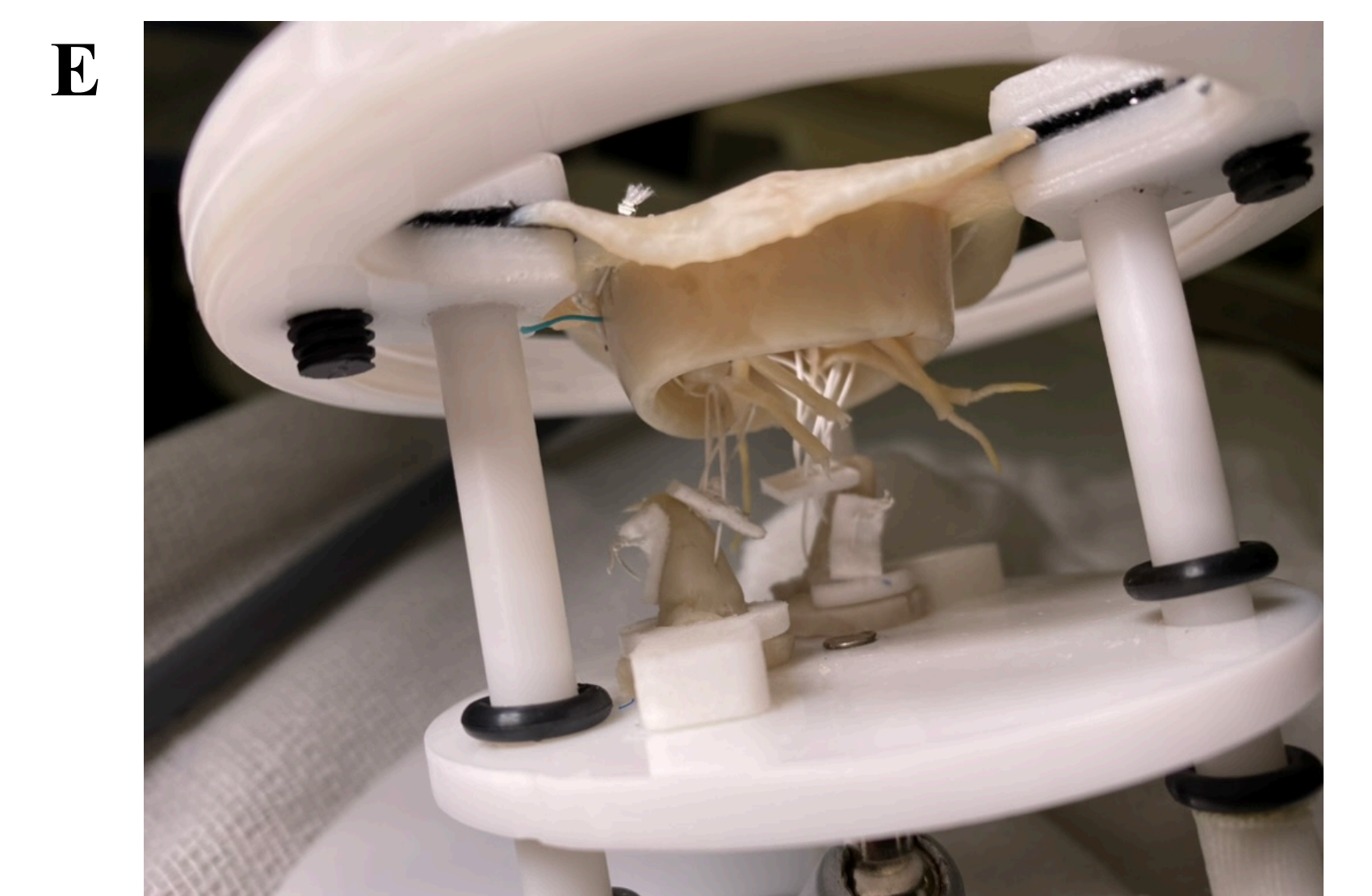
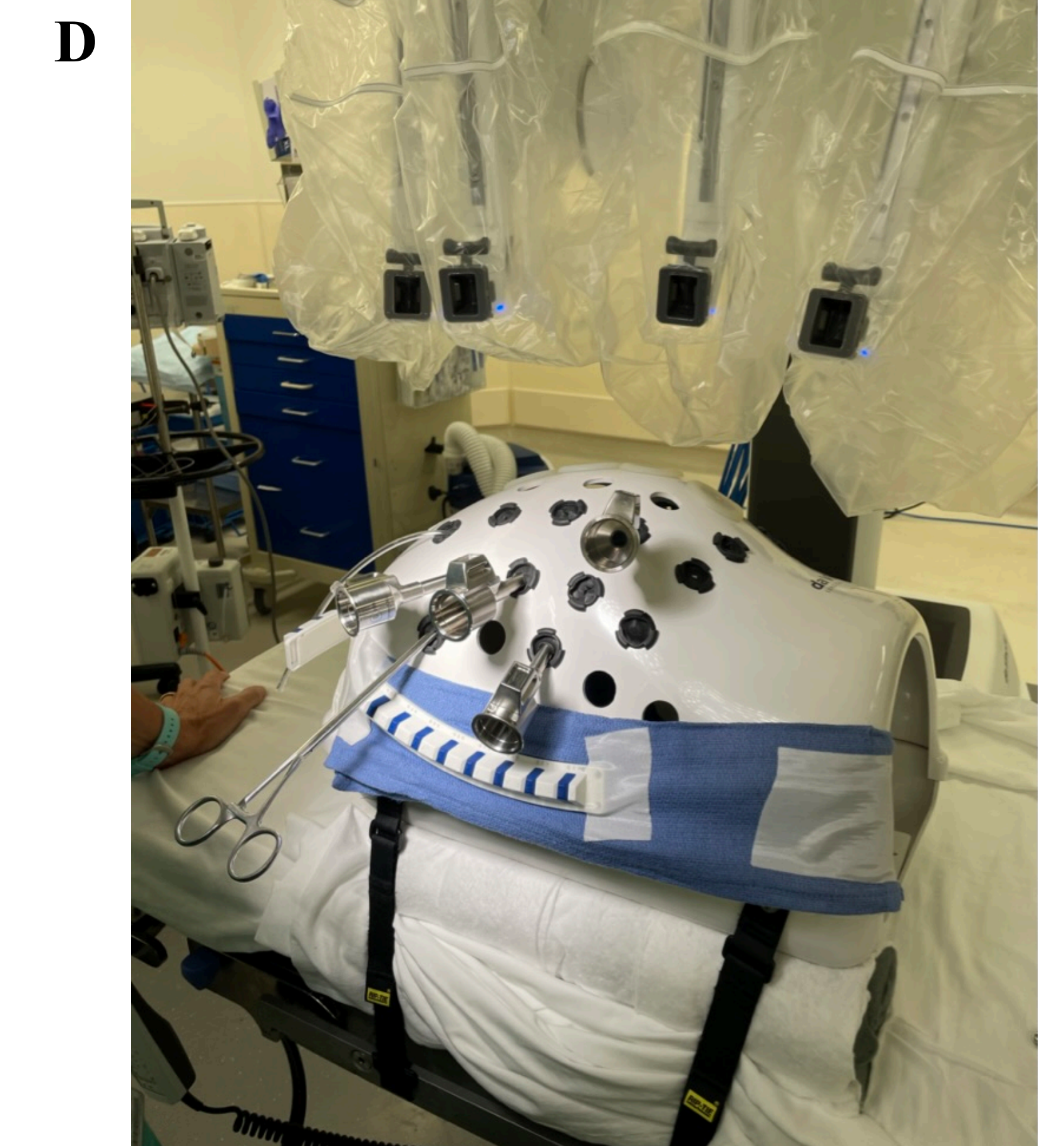


Figure B. Robotic Heart Surgery Team. 1st successful case at UC Davis-November 2020. Record cross-clamp 110 minutes with intraclade device and same team including 2 surgeons, 1 chief resident, and 2 PA's.

Figure C. Final set-up of bedside assistant's mayo stand after many revisions which helped reduce cross-clamp time

Figure D. Plastic thoracic cage model used during simulation training sessions. Critical steps were documented. Docking decreased from 7 minutes to 1 minute. Chordoplasty decreased from 32 minutes to 15 minutes. Annuloplasty time reduced to 12 minutes. Atriotomy closure reduced to low of 15 minutes during simulation training .

Figure E. 3-D LifeLike tissue model by Minimally Invasive Solutions

Conclusions

- The creation of a guidebook detailing the critical steps of the operation was critical to ensure that no important steps of the operation were overlooked. This process led to an improvement in cross-clamp times and efficiency of the staff training and operation flow. We are also hopeful to utilize this manual to assist other hospitals when starting a new robotic program.