

A Modular Robotic Simulator (LeuPecs) for Totally Endoscopic Coronary Artery Bypass :

A Platform for Objective Skill Assessment

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Background

- TECAB
 - Crown of minimal invasive CABG
 - Challenging robotic cardiac procedure
 - Feasible and clinical benefit
- Limited adoption in Europe
 - MDR challenges
 - Da Vinci Generation 5 expected to acquire certification for TECAB

Methods

- Development of a modular simulator
 - Robotic mammary artery harvesting
 - Robotic coronary anastomosis (LIMA -> LAD)
- Objective assesment of critical steps
- Educational and validation platform
 - Video records
 - Performance metrics
 - Anastomosis quality (subjective and geometric)

Results

- Reproducible modular model
- Compatible with different robotic systems
- User friendliness and realism
 - NASA-TLX score 40.2 ± 9.5 , Likert scale 6 ± 1
- Fast improvement in economy of motion and precision
 - first anastomosis in 23min vs third in 15min for expert
- Geometrical analysis distinguishes between novice and expert

Conclusion

- Objective training assessment
- Different components of TECAB
- Learning curve evolution
- Preparation for clinical setting
 - Safe skill acquisition
 - Procedural workflow

