Results of a Pilot Program Using a Novel 3D Simulation Model for Training in Vascular Reconstruction

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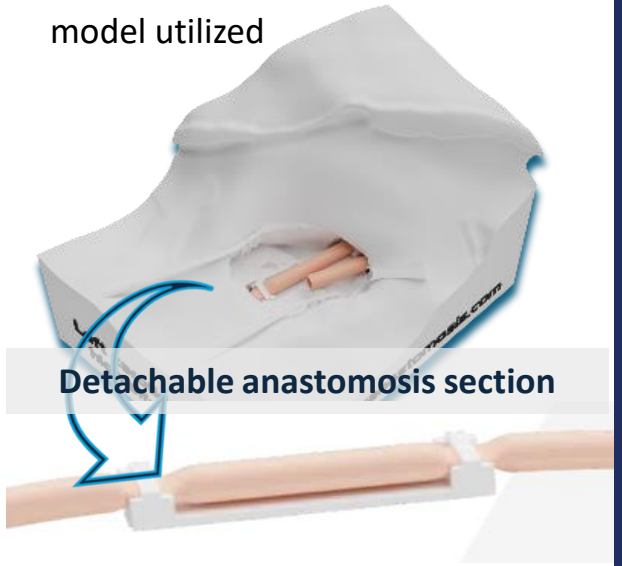
Objective

A novel 3D-printed vascular anastomosis simulation model that allows objective performance tracking was tested

Methods

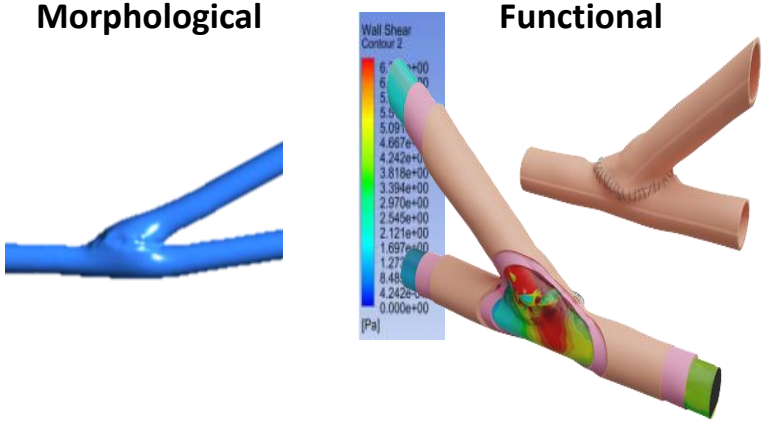
- Anastomoses performed on models by trainees
- Supervised by a vascular surgeon
- Your-Anastomosis® left carotid model utilized



Methods

Detached anastomosis generated a "digital twin" for computational flow dynamic study

Morphological **Functional**



- Biomechanical indices calculated [Wall shear stress, energy loss, and oscillatory shear index with morphological and functional analysis
- Objective score generated

  Gold-standard score range: 1.3 – 8.7, based on 0=worst possible and 10 =best possible score; previously generated by novice/ expert]
- **Anastomoses performed by two groups of trainees evaluated**
  - Group I- General surgery
  - Group II- Vascular Surgery
- **Student subjective feedback obtained**

Results

Group I; N=17	Group II; N=8
General Surgery PGY1 + Medical students	Vascular Surgery 0/5 integrated residents PGY 1-4
Overall score average ± SD	
3.8 ± 0.8	4.8 ± 0.8

Overall subjective experience excellent

Conclusions

- **Confirmed feasibility of high-fidelity simulation**
- **Data-driven surgical education**
- **Provides digitized realistic training with objective feedback and case specific assessment metrics**

- Reflects learners needs, remotely available, scalable
- Supports broader adoption and standardization in surgical training, Ap supported
- Limitation- cost