

## Background

- Extracranial-Intracranial (EC-IC) bypass anastomosis is a precise neurological procedure that requires microsurgical techniques to join the superficial temporal artery (STA) to the middle cerebral artery (MCA), aiming to restore cerebral blood flow.<sup>1,2</sup>
- A device is needed to standardize EC-IC bypass anastomosis, improving speed, reproducibility, and reducing skill dependence.

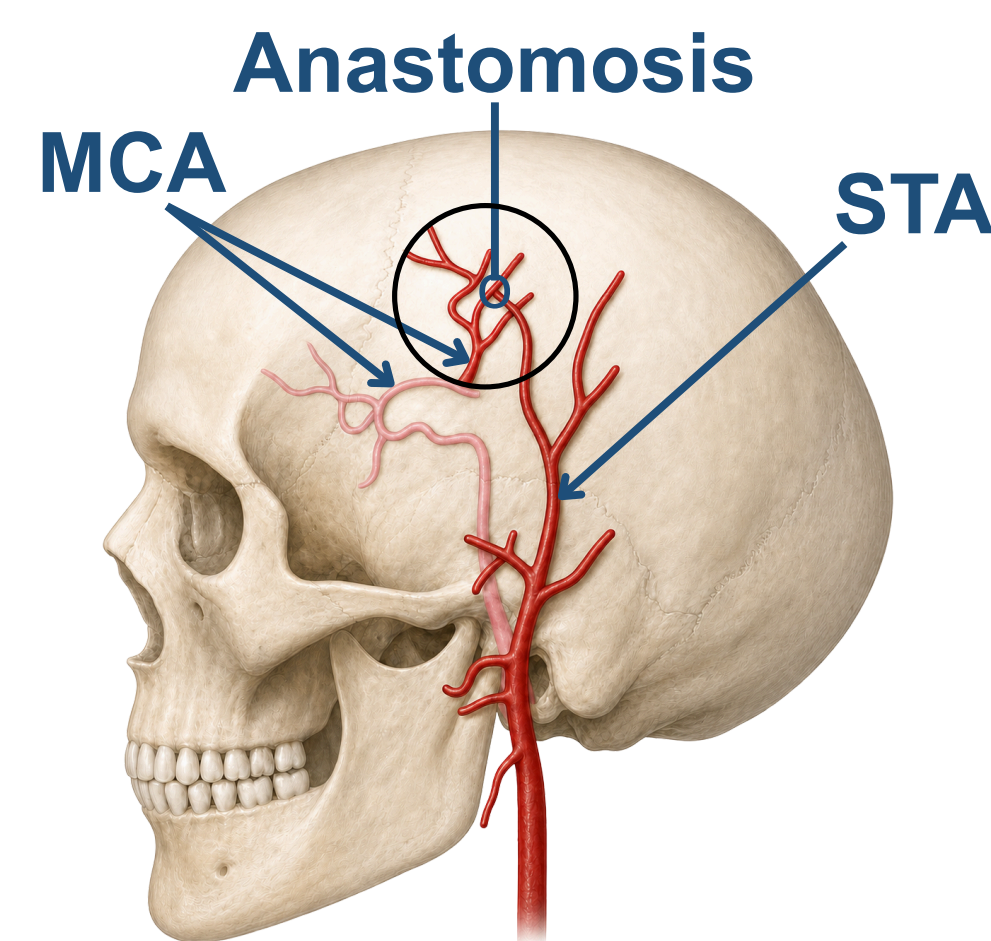
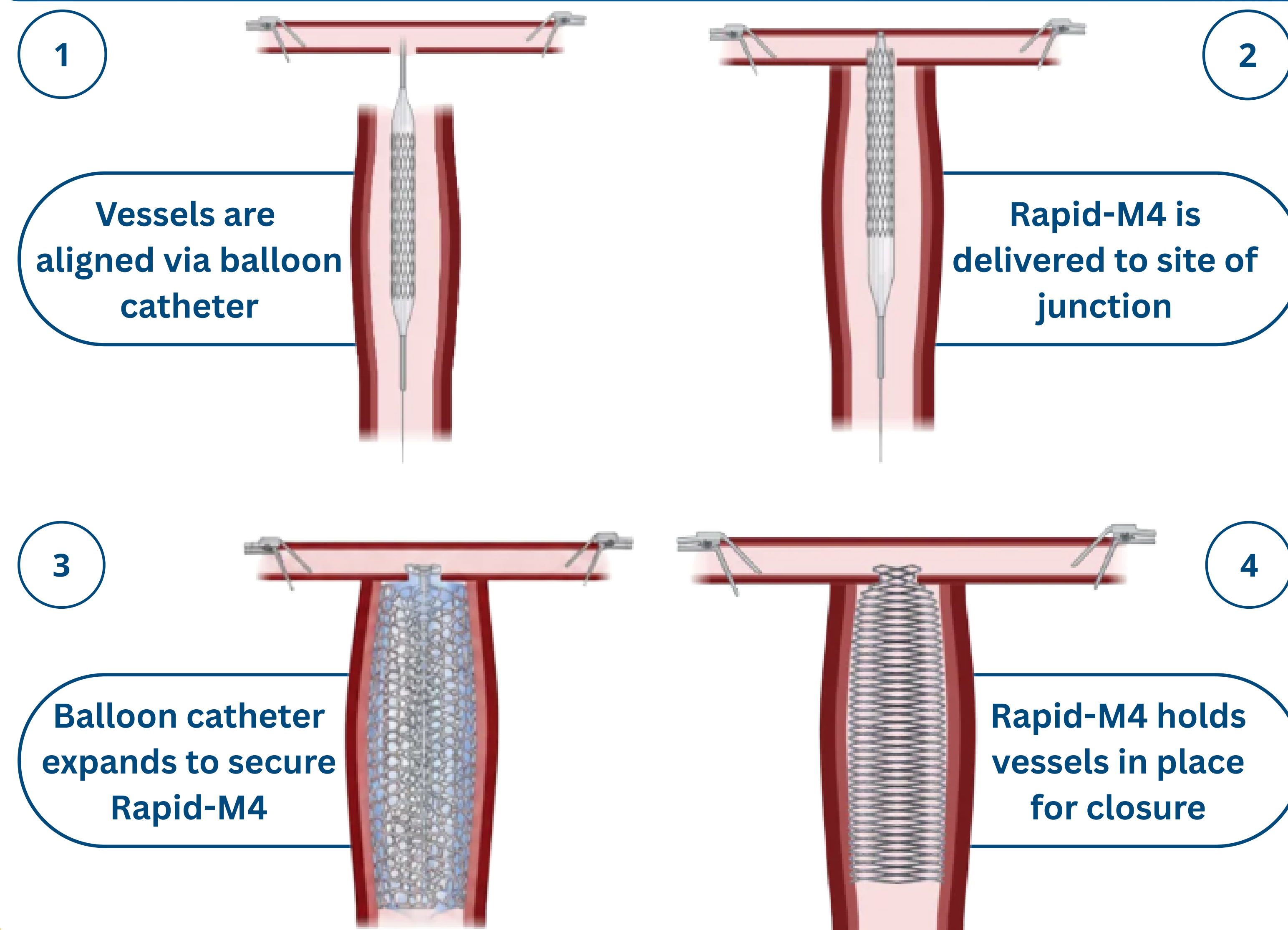


Figure 1. Model of EC-IC anastomosis

## Procedure & Device Integration



## 3D Printed Prototypes



## Design Validation

- Structural: Secures STA + MCA for Alignment
- Mechanical: Withstands Flow + Stress
- Clinical: Time < 10 minutes

## Experimental Design



## Proposed Methods

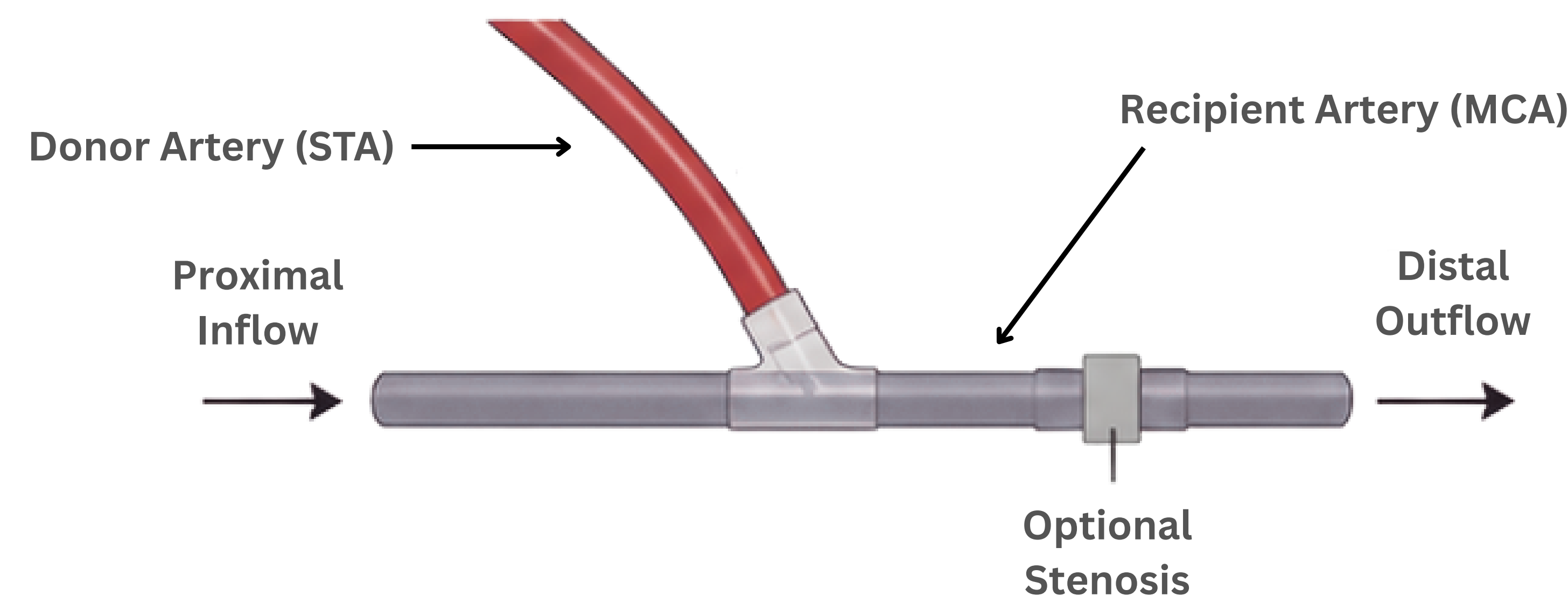


Figure 3. Anatomical Model Simulation

STA and MCA (M4) vessels mimicked using 1mm-3mm tubing.

Peristaltic pump simulated laminar flow of ~40-60 mL/min.

Flow continuity and leakage tested using food coloring dye.

## Future Steps

- Prototype stent design using **nitinol**.
- Conduct **mechanical strength testing** (radial compression, fatigue durability, flexibility) of final stent iteration.
- Perform **Finite Element Analysis (FEA)** studies to analyze stent deployment methods.

## Acknowledgements

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1) Biswas, Arundhati et al. "Extracranial to intracranial by-pass anastomosis: vol. 10,4 (2015): 303-9. doi:10.4103/1793-5482.162711  
2) "Extra-Intra Cranial Bypass: Resident Education - Faculty Clinical Specialty " Extra-Intra Cranial Bypass "neurosurgery.ufl.edu/residency/neurosurgery-uf/clinical-specialties/extra-intra-cranial-bypass/