Egro Anastomosis Suture Instrument (EASI): Development of a Novel Device to Facilitate Complex Microsurgical Reconstruction in Any Healthcare Setting

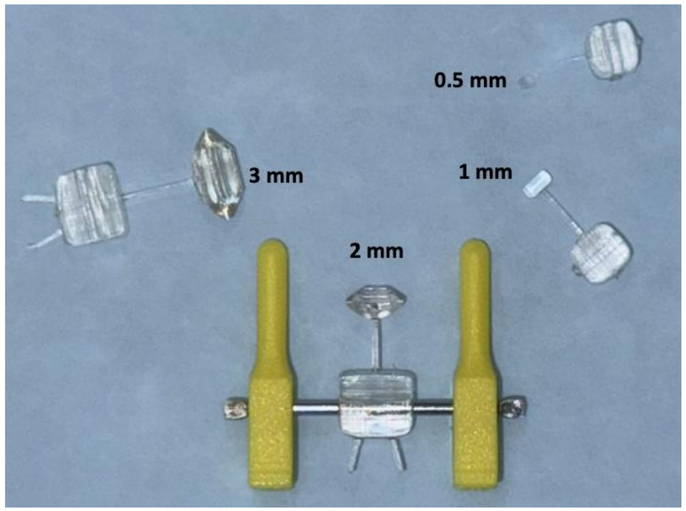
Hilary Y. Liu, BS; Christopher J. Fedor, MS; Francesco M. Egro, MD, MSc, MRCS
Department of Plastic Surgery, University of Pittsburgh Medical Center

Background

Microsurgical reconstruction is a cornerstone of modern plastic, orthopedic, and oncologic surgery, yet it remains limited by skill, time, and high-cost equipment. Microsurgical anastomosis, or reconnection of small-caliber arteries and veins, is particularly error-prone, with complications like backwalling (inadvertently piercing the opposite vessel wall) contributing to free flap failure rates of up to 10%. Expensive visualization tools and long learning curves further limit access to high-quality outcomes.

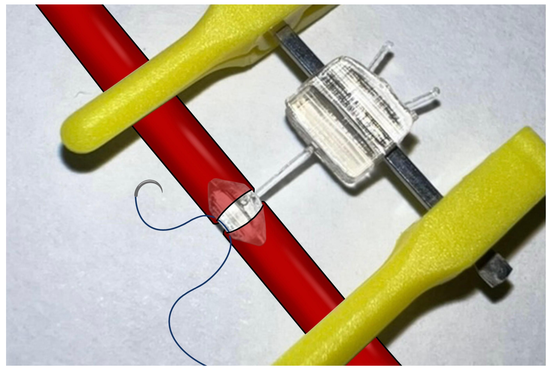
Methods

We developed the Egro Anastomosis Suture Instrument (EASI), a novel intraluminal guide designed to standardize and simplify microsurgical anastomosis. EASI features a cylindrical core with guiding divots for equidistant suturing, an anti-rotation stabilizing rod, and compatibility with Acland clamps. The device enables precise, tactile-only anastomosis in vessels as small as 1-5 mm, without the need for high-magnification microscopes or extensive microsurgical training.



How to Use

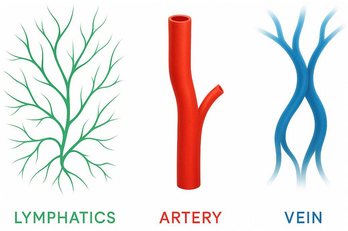
1. Insert EASI into the blood vessel lumen.
2. Follow guiding divots with the needle.
3. Place continuous sutures loosely.
4. Rotate EASI and make additional sutures.
5. Remove EASI and tighten the sutures.



Competitive Advantage

	Current standard	Our product
Optimize vessel alignment	✓	✓
Prevent backwalling	✓	✓
Usable by surgeons of varying skill levels	✓	✓
Usable in veins	✓	✓
Usable in **arteries**	✗	✓
Usable in **lymphatics**	✗	✓
Device removed from patient	✗	✓

Expansion potential:
ENT, ophthalmology, urology, OB/GYN, neurosurgery, general surgery
$2.2 billion total attainable market



Value to Surgeons and Hospital Systems

Eliminate the risk of **backwalling**

Improve surgeon **confidence** from 3 to 10

Cut arterial anastomosis times by **60%**

Reduce the need for **salvage procedures**

EASI Economic Benefit:
$45,000/avoided salvage
$88/minute saved

Customer Discovery + Market Research

"Backwalling is a real problem… if you could create a device to solve it, that would be **HUGE"**

"The **best inventions** are the **simplest ones!"**

"OMG **When can I get my hands on it?"**

"When can I have it?"

"I **love** it!"

"This is **genius**!"

"I would use it 1 million per cent for lymphatics!"

THE UNIVERSITY OF TEXAS MD Anderson Cancer Center
Penn
HOUSTON Methodist
UMC Utrecht
UPMC LIFE CHANGING MEDICINE
UTSouthwestern Medical Center
UNIVERSITY of SOUTH FLORIDA
CORPS

Conclusions

EASI has the potential to democratize microsurgery by making it safer, more efficient, and accessible across a wider range of surgical settings. Our device will serve both a clinical tool and a powerful adjunct to surgical education worldwide.

If interested in being an early product user, please contact **Dr. Francesco Egro (egrofm@upmc.edu).**