WashU

Office of Technology Management

BARBED FIXATION DEVICE FOR IMPROVING SURGICAL SUTURING

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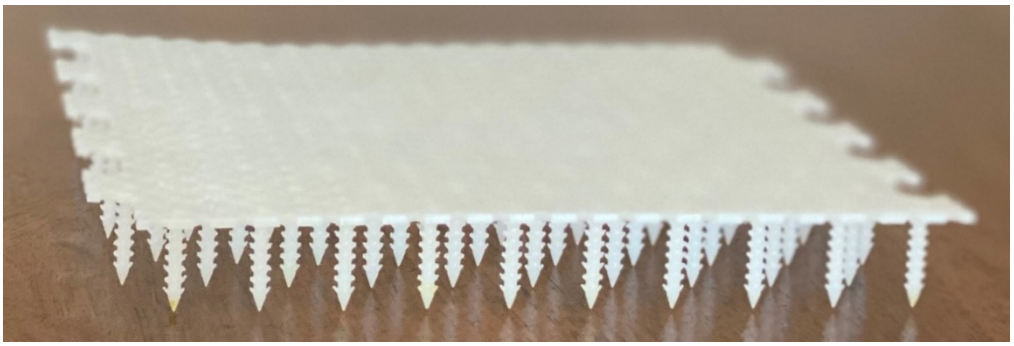
Value Proposition: *Barbed mesh wound closure device that eliminates the need for surgical suturing to close incisions of the skin and fascia.*

Technology Description

Researchers at Washington University in St. Louis have developed a barbed rod device that can be used to reduce/replace surgical suturing in the process of incision closure/tissue approximation. Currently, suturing is a tedious, time-consuming process that depends on the skill of the individual surgeon and is prone to failure. Conventional surgical mesh can prevent suture failure (e.g., “cheesewiring” and hernia formation) by distributing the tension over a broad area. However, these products still require sutures to affix them to the tissue, extending the time needed to close incisions during surgery.

This fixation device reduces time and effort by embedding mesh with self-fixating barbs that penetrate the tissue and adhere it to the mesh without sutures. This could enable simple, one-handed application to quickly and simultaneously immobilize multiple layers of tissue in an approximated position. This would immediately stabilize the tissue by providing tensile strength to the closure without the wasted time and associated operating room cost of suturing.



Above figure: Fixation device prototype

Stage of Research

A prototype has been produced by stereolithography and demonstrated gross success in sutureless fixation of abdominal wall closure in a cadaveric porcine hernia model. Having established proof-of-concept, attention is now being turned towards design refinements and production methods

Applications

- Surgical, wound closure

Key Advantages

- Fast, one-hand application that can reduce time in operating room
- Barbs allow tissue adhesion of the mesh - No additional fixation is needed
- Device is resorbable, which allows for mesh and barbs to be custom fitted

Patents

- Barbed Mesh for Incision Closure and Hernia Repair: US20230338129A1
- Barbed Rod for Linear Tissue Closure and Approximation: US11826041B2