

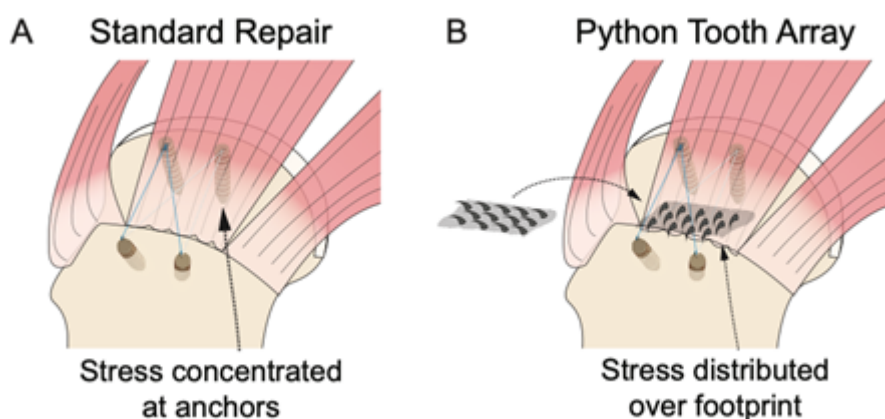
BIOMIMETIC DEVICE FOR STRONGER REPAIR OF ROTATOR CUFF AND OTHER SOFT TISSUE-TO-BONE TEARS

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Technology Description

A team of engineers led by Professor Guy Genin has developed a device to strengthen the reattachment of soft tissue to bone for use in orthopedic procedures such as rotator cuff repairs. Although tendon and ligament tears are common, the techniques used to reattach these tissues to bone often fail. For example, rotator cuff repairs rupture at a rate as high as 94%, causing many patients to suffer from reinjury or forego surgery altogether. The standard approach of reattaching soft tissue to bone concentrates mechanical stress at the interface between the tissue and suture anchor points, which frequently results in repeated tearing of the tissue. This invention solves that problem with an array of small teeth that mimics how python teeth and plant burrs use many coordinated anchor points to grasp their targets. Placed at the interface between soft tissue and bone, this device distributes forces more evenly across a larger surface area, thereby improving attachment strength. This device could be used in orthopedics and other surgical specialties to augment or replace sutures.



A) The standard approach of reattaching soft tissue to bone concentrates mechanical stress, often leading to repeated failure. B) Together with sutures or alone, the array of small teeth distributes the mechanical load over a larger area, increasing the strength of the attachment and improving repair success.

Stage of Research

Prototype – Using computational modeling and mechanical tests on *ex vivo* tissue, the inventors have optimized the design of their device for maximum grasping strength. They have also evaluated the fit and qualitative grasping ability of different prototypes in a human cadaver shoulder.

Future work – The inventors plan to further refine the device design and biocompatibility and test it in a

cadaver rotator cuff repair model.

Applications

Soft tissue-hard tissue fixation — Can be used with sutures, or potentially replace them, for reattaching tendons and ligaments to bone in the surgical repair of injuries such as rotator cuff tears.

Key Advantages

Increased repair strength — Could bolster the strength of tendon-to-bone repairs by over 25% when combined with standard suture techniques based on mechanical tests with cow tendons.

Patents

Pending

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