Keep it Simple! – Reinforced Tendons Perform no better in a Cadaveric Biomechanical Study

Julien Shine MD, Maleka Ramji MD, Ann-Sophie Lafrenière MD, Justin Yeung MD
Department of Plastic Surgery, University of Calgary

CALGARY HAND AND WRIST

Study Objective

Design and test intraoperative modifications to enhance biomechanical properties of tendon autografts.

Introduction

Tendon autografts, often used in ligament reconstructions, are cost-effective and minimize the use of foreign materials. Scapho-lunate and ulnar collateral reconstructions have both been described with autografts. However, these constructs may loosen with time, potentially causing patients functional setbacks.

Methods

Flexor tendons from two male cadavers were harvested to make 4 groups of 6 tendons.

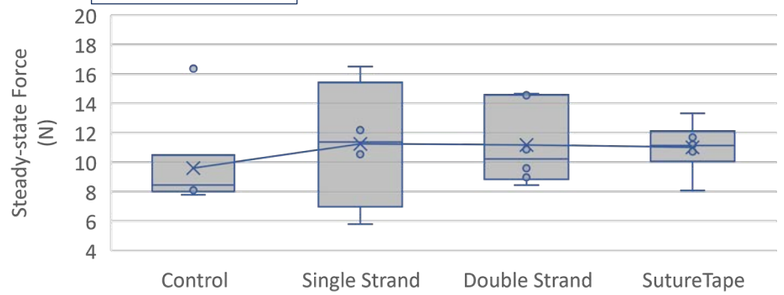
1. Control group
2. Single-strand 3-0 FiberWire locking stitch
3. Double-strand 3-0 Fiberwire locking stitch
4. 1.3mm SutureTape

All samples were subjected to a standardized tensile loading protocol which determined each sample's

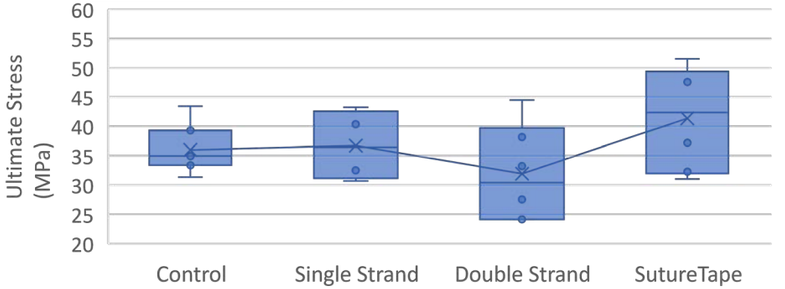
- Viscoelasticity
- Ultimate strength
- Young's Modulus

Results

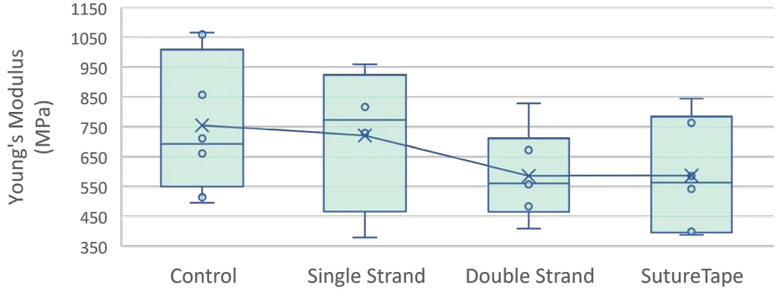
Viscoelasticity



Ultimate Strength



Young's Modulus



Control | Single Strand | Double Strand | Suture Tape | Sample fastened to clamp for loading

Discussion

We found **no statistically significant difference** in viscoelasticity, ultimate strength or Young's modulus between control and enhanced samples. We believe this may be attributable to the weakness of augment materials relative to tendons, inadequate anchoring of augment material, and insufficiently large groups.

Conclusion

Tendon reinforcement methods presented herein were not found to be superior to untampered tendons in terms of strength, stiffness, or viscoelasticity. Durability of the repair is more likely dependent on excellent surgical technique and adequate anchoring than on potential tendon enhancements.