Biomechanical Comparison of Tissue Tear-Through Risk: LabralTape™ Suture and #2 FiberWire® Suture

Arthrex Research

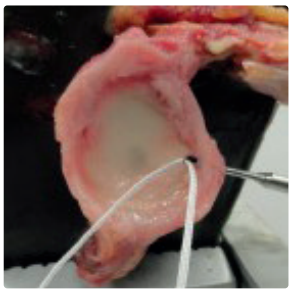
OBJECTIVE

The objective of this study was to evaluate whether LabralTape suture possesses a biomechanical advantage for glenoid labrum repair in comparison to #2 FiberWire suture.

METHODS AND MATERIALS

Three matched pairs (n = 6 for each group) of cadaver glenoids were stripped of all soft tissue, except for the labrum, and each sample was potted in fiberglass resin. A 90° SutureLasso™ suture passer was used to pass a simple stitch of suture through the intact labrum at the level of the glenoid articular surface, as shown in Figure 1.

Figure 1. A LabralTape suture sample being passed through the labrum for a simple-stitch SLAP repair.

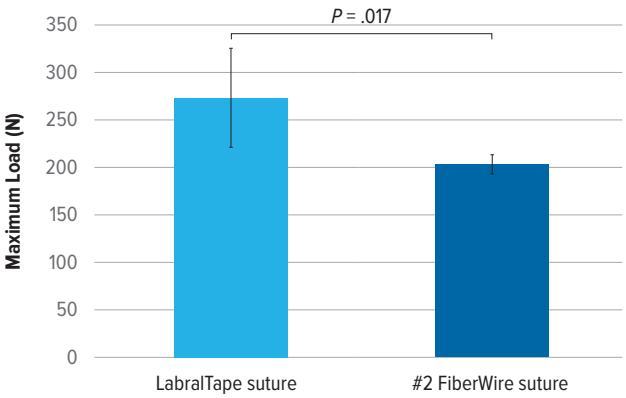


One strand of LabralTape suture and one strand of #2 FiberWire suture were passed through the labral tissue of each glenoid sample. Suture passes were alternated between the 3-, 5-, 7-, and 9-o'clock positions (relative to the right glenoid).

Mechanical testing was performed using an Instron 8871 Axial Table Top Servohydraulic Testing System, with a 5 kN load cell attached to the crosshead. After applying a preload of 10 N, a load-to-failure test was performed at 33 mm/sec. Load and displacement data were recorded at 500 Hz. The potted specimens were secured to an adjustable-angle fixture so that the direction of pull would be parallel to and away from the glenoid face. The free ends of suture were secured to the crosshead with a pneumatic clamp.

Normality was obtained (tested with Shapiro-Wilk); therefore, a paired *t* test was performed to check for significance. The significance level was set to $\alpha = .05$. Statistical analyses were performed on SigmaPlot version 12.0 (Systat Software Inc).

Figure 2. Maximum for LabralTape (n= 6) suture samples and #2 FiberWire (n = 6) suture samples.



RESULTS

The maximum load for the LabralTape suture samples was 279 ± 53 N, and the maximum load for the #2 FiberWire suture samples was 203 ± 12 N. The mode-of-failure for all samples was the suture tearing through the labral tissue. The LabralTape suture has a significantly greater maximum load than that of the #2 FiberWire suture ($P = .017$).

DISCUSSION AND CONCLUSIONS:

The results of this testing indicate that LabralTape suture is 37% more resistant to tearing through tissue, when compared to #2 FiberWire suture.[1] The larger maximum loads of the LabralTape suture may be due to the larger surface area of the suture, which could distribute loads over a wider area.

Reference

1. Arthrex, Inc. Data on file (APT-02292). Naples, FL; 2013.

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