Proximal Biceps Repair: Mechanical Comparison of Loop 'N' Tack and Standard Krackow Stitch

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Test Objective:

Compare the biomechanical strength of a novel Loop 'N' Tack proximal biceps stitch technique using 1.3 mm SutureTape FiberLink™ suture (Arthrex, Inc.) to that of a standard Krackow stitch using #2 FiberWire® suture.

Methods and Materials:

Eleven matched pairs of proximal biceps were harvested from fresh frozen cadaver shoulders (average age = 49 ± 14 years, 9 male, 2 female). One tendon from each pair was stitched using the novel 1.3 mm SutureTape FiberLink suture for the Loop 'N' Tack method, approximately 5 mm to 7 mm from the terminal end, as shown in Figures 1a and 1b. The contralateral tendon sample was stitched using #2 FiberWire® suture in a standard Krackow stitch pattern. Each Krakow sample was prepared with 3 stitches on each side, ending about 5 mm from the terminal end of the tendon, as shown in Figures 2a and 2b.

Mechanical testing was performed using an E10000 Instron Machine with a 1kN load cell secured to the cross-head. A pneumatic clamp held the suture tails to the testing surface, and a vise grip fixture secured the proximal ends of the biceps tendons. Samples were cyclically loaded between 5 N and 20 N for 100 cycles, followed by a pull to failure at 33 mm/sec. Load and displacement data were recorded at 500Hz.

Figure 1a and 1b. *Loop 'N' Tack Stitch using 1.3 mm SutureTape FiberLink suture.*

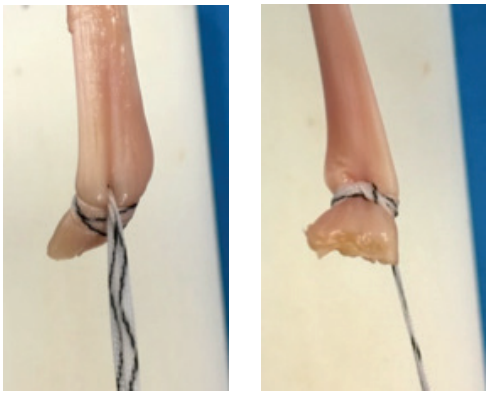
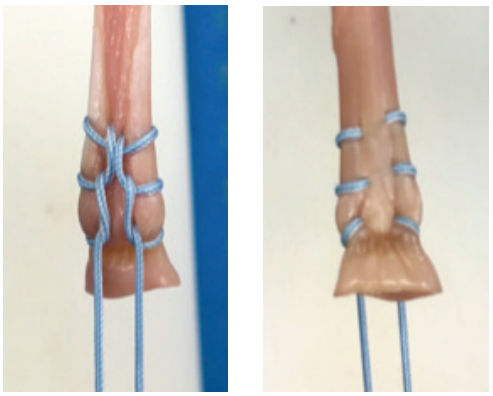


Figure 2a and 2b. *Krakow stitch using #2 FiberWire suture.*



Results:

Paired t-tests were used to compare the outcome measures of each sample group. There were no significant differences found between the two groups for ultimate load ($P = 0.928$), or for cyclic displacement ($P = 0.351$). The greater stiffness of the SutureTape samples was significantly different from that of the Krackow samples ($P = 0.035$). The results are shown graphically in Figures 3, 4, and 5.

Figure 3. *The ultimate load of the Loop 'N' Tack samples (285 ± 45 N) was not significantly different than that of the Krackow stitch (286 ± 48 N).*

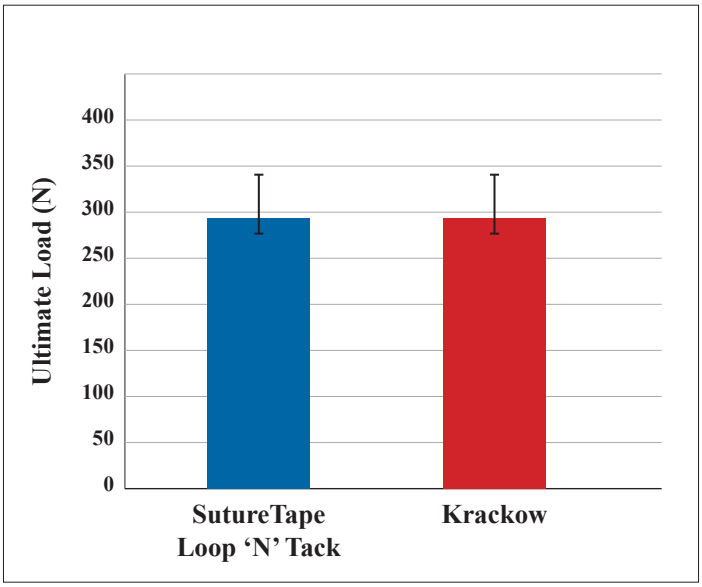


Figure 4: *The stiffness of the Loop 'N' Tack (42 ± 11 N/mm) was significantly greater than that of the Krakow stitch (37 ± 13 N/mm).*

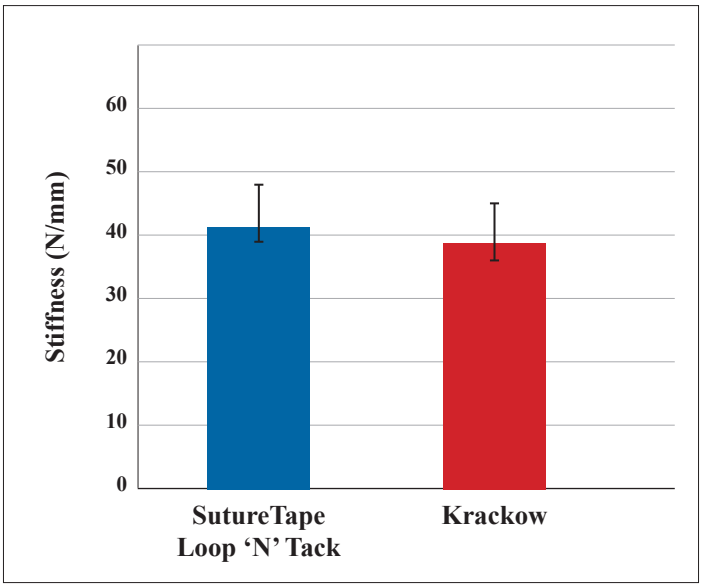
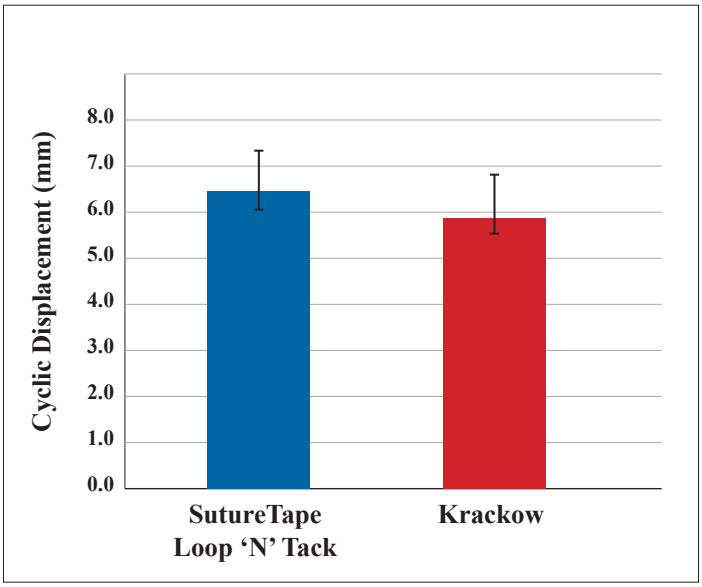


Figure 5: *The cyclic displacement of the Krackow samples (6.5 ± 1.8 mm) was not significantly different than that of the Krackow stitch (5.8 ± 1.4 mm).*



Conclusions:

The mechanical strength of the Loop 'N' Tack stitch is, at minimum, equivalent to that of a Krackow stitch.