

Arthrex #2 FiberWire vs. Adaptive Surgical #2 HS-Fiber

Arthrex Research and Development

Objective

The purpose of this study was to compare the straight pull, knot pull, knot security and stiffness of the Adaptive Surgical, LLC #2 HS-Fiber (Portland, OR) to the Arthrex, Inc. #2 FiberWire.

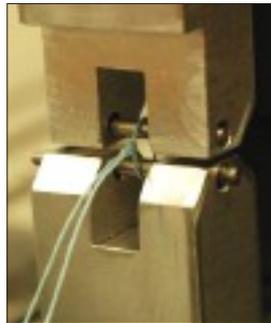
Methods and Materials

For straight pull, each suture was clamped at a gauge length of 5 inches in the pneumatic grips of an electromechanical dynamic testing system (INSTRON, Canton, MA). The same procedure was followed for knot pull, except a Surgeon's Knot, without reverse half-hitches on alternating posts (RHAPs), was tied around a ¼" silicone tube located in the middle of the suture gauge length. Stiffness testing was calculated by determining the slope of the load-extension graph between 1 and 2 mm of extension. The gauge length for stiffness testing was 30 mm.

For knot security testing, each suture was tied around a 30 mm circumference plastic post to ensure a consistent loop size. The static Surgeon's Knot included a series of three RHAPs. Each loop was then mounted on the INSTRON to test the knot security (Figure 1). Knot security is the load at 3 mm of extension of the loop. The 3 mm of extension was chosen because loop elongation of 3 mm or more is generally associated with clinical failure.

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Figure 1:



Knot Security Test Set-up

Results

Straight pull, knot pull, knot security at 3 mm of extension, maximum knot security, and stiffness between 1 and 2 mm of extension is shown below (Table 1).*

	#2 HS-Fiber	Statistical Difference?	#2 FiberWire
Knot Pull (lbf)	31.8 ± 0.9	Yes, p=0.007	34.0 ± 1.3
Straight Pull (lbf)	52.5 ± 1.8	Yes, p=0.001	67.7 ± 3.3
Knot Security at 3 mm Displacement (lbf)	39.7 ± 9.9	Yes, p=0.039	57.8 ± 10.2
Maximum Knot Security (lbf)	62.3 ± 5.2	Yes, p=0.004	74.9 ± 3.7
Stiffness (lbf/mm)	3.9 ± 0.6	Yes, p=0.001	16.6 ± 1.0

Conclusion

After evaluating the two sutures, the #2 FiberWire outperforms #2 HS-Fiber in knot pull, straight pull, knot security, and stiffness.

*Data on file