

Interconnected Knotless SutureTak[®] and SutureTak[®] Anchor Pulley Construct

Arthrex, Inc., Research and Development

Objective:

Determine the mechanical strength of a novel Interconnected 3.0 mm PEEK Knotless SutureTak[®] construct and compare the results to those of a traditional knotted 3.0 PEEK SutureTak Double Pulley construct, as could be used for a transtendon PASTA or Remplissage technique.

Methods and Materials:

Twelve 30 lf/ft³ foam blocks were prepared by drilling two pilot holes using the AR-1250LT drill and AR-1949 spear, 20 mm apart. Either two 3.0 mm PEEK Knotless SutureTak[®] (AR-1938PS) or two 3.0 mm PEEK SutureTak (AR-1934PS) were inserted into the pilot holes using a mallet. Nylon straps were doubled over and the sutures were shuttled through both layers of the material, approximately 15 mm from the ends of the strap. The Interconnected Knotless SutureTak construct was created by pulling the suture tails through the opposite anchor's splice. Double Pulley constructs were created by tying 6-throw surgeon's knots.

Mechanical testing was performed using an E10000 Electropulse INSTRON Materials Testing System with a 10 kN load cell. A vise and metal plate fixture secured the foam block to the testing surface, such that the direction of pull would be perpendicular to the suture anchor long axis. The looped nylon strap was connected to the cross-head with a clevis and dowel fixture, as shown in Figures 1 and 2. Samples were cycled between 0 and 100 N for 100 cycles, at 1 Hz, followed by a pull-to-failure conducted at 33 mm/sec. Load and displacement data were recorded at 500 Hz. Additionally, digital video tracking was used to determine the plastic displacement at the repair site.

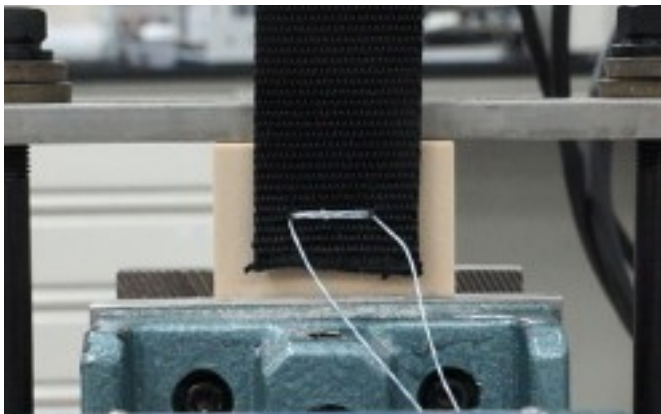


Figure 1: An Interconnected Knotless SutureTak sample prior to mechanical testing.

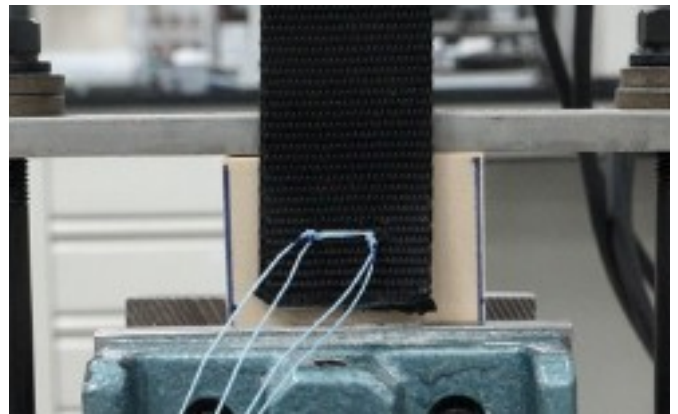


Figure 2: A SutureTak Double Pulley sample prior to mechanical testing.

Results:

The larger ultimate load of the Interconnected Knotless SutureTak (693 ± 44 N) was significantly different from that of the SutureTak Double Pulley constructs (357 ± 25 N). These results are shown in Figure 3*. There were no significant differences between the two groups in plastic displacement/gap formation, results shown on next page in Table 1*.

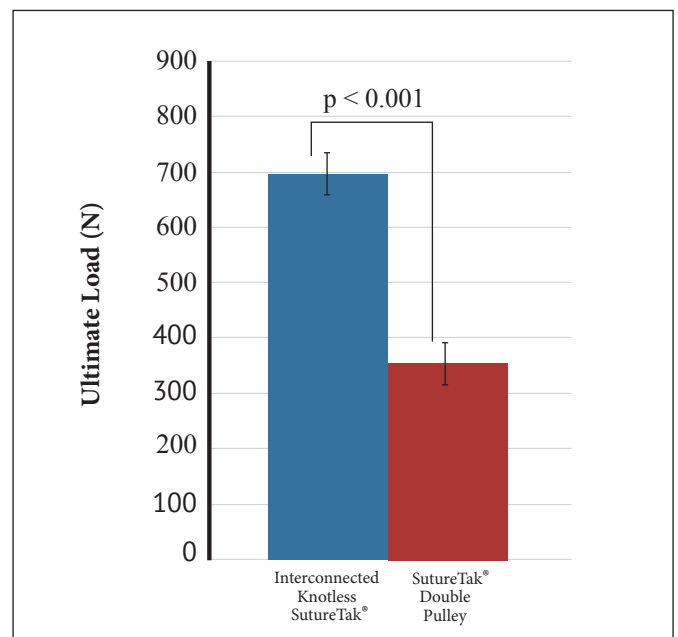


Figure 3: Ultimate load results. (*Data on file)

Table 1: Cyclic plastic displacement using digital video tracking of the two constructs. (*Data on file)

Cyclic Displacement (mm)	Video Tracking	
	Cycles 1-5	Cycles 6-100
Interconnected Knotless	1.8 ± 0.7	1.1 ± 0.5
Double Pulley SutureTak®	2.1 ± 0.6	0.9 ± 0.3
Significance	p = 0.526	p = 0.589

Conclusion:

The Interconnected Knotless SutureTak® construct provides a mechanically superior repair when compared to the knotted SutureTak® Double Pulley.