

A Biomechanical Analysis of the Arthrex Meniscal Viper and the Smith & Nephew FasT-Fix

Arthrex Research and Development

Objective

The purpose of this biomechanical investigation is to compare the load-to-failure of the Arthrex Meniscal Viper FiberWire technique, Smith & Nephew FasT-Fix, and Ethibond with vertical mattress stitches in cadaver menisci. The Meniscal Viper provides an effective method of passing a vertical FiberWire suture loop in an all-inside surgical repair technique, whereas the FasT-Fix Meniscal Repair System uses a self-locking sliding knot technique. The Ethibond with vertical mattress suture repair has long been the industry's standard surgical technique for peripheral meniscal tears, similar to FiberWire.

Methods and Materials

Eighteen fresh-frozen adult human menisci were divided into three groups of six specimens each. A sharp blade was used to create a vertical longitudinal tear 3 mm from the periphery of the meniscus. Group one was repaired with a vertical mattress stitch using a FasT-Fix device loaded with #0 braided polyester suture. Group two was repaired with one Meniscal Viper vertical stitch of 2-0 FiberWire Loop. Group three was repaired using two simple vertical mattress sutures of 2-0 Ethibond and served as the control group. Each specimen was mounted in an Instron materials testing machine and an axial load was applied at 5 mm/min until failure.

Results

The table in Figure 2. lists the ultimate tensile loads and modes of failure for all groups. The ultimate load of the Meniscal Viper stitch was significantly greater than that of the FasT-Fix ($p < 0.05$). There was no other significant difference in ultimate tensile load between any other groups.

Figure 1.

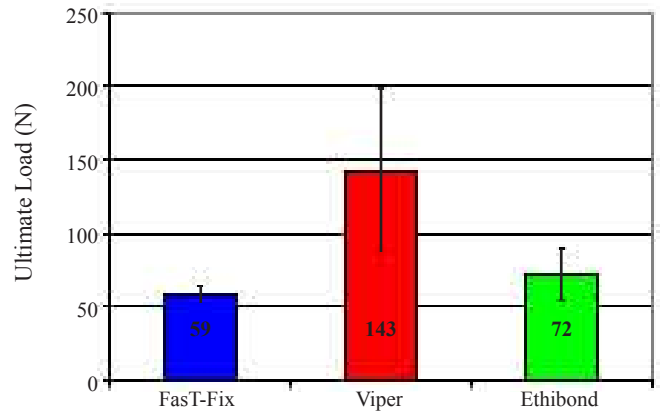


Figure 2.

Suture	Ultimate Load (N) Mean \pm SD	Mode of Failure		
		Suture pull through tissue	Both sutures break at knot	One suture break; pull through tissue
FasT-Fix	59 \pm 6	5	1	
Viper	143 \pm 55	6		
Ethibond	72 \pm 17	1	3	2

Conclusion

The Meniscal Viper provides a method for all-inside suture repair of meniscal tears that is stronger than that of the FasT-Fix repair. In addition, the Meniscal Viper allows the knot to be placed off the meniscal articulating surface where as the FasT-Fix places the knot on the meniscal articulating surface. The knot may cause abrasion on the femoral condyle.