Load-to-Failure and Cyclic Displacement of the Arthrex Knotless TightRope Syndesmosis and Biomet ZipTight™ Ankle Syndesmosis

Arthrex Research and Development

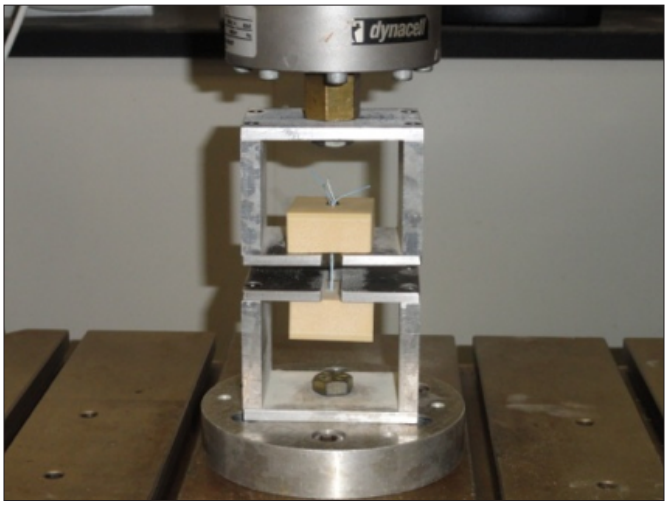
Objective

The objective of this study was to compare load-to-failure and cyclic displacement of the Arthrex Knotless TightRope Syndesmosis to Biomet ZipTight Ankle Syndesmosis.

Methods and Materials

2000-Cycle Tensile Test and Load-to-Failure: Both TightRope and ZipTight constructs were tensile tested using 20/40 lb/ft³ polyurethane foam (Figure 1). Seven samples from each group were inserted according to the manufacturer's specification and provided instrumentation. A distance of 20 mm was left between the blocks and 66 mm between the buttons. All constructs were tightened to 20N by alternating tension on the two free strands of suture. All samples were cycled from 50-450N at 1Hz for 2000 cycles. Post cycling load-to-failure was conducted at 20 mm/min. A displacement greater than 5 mm was considered a failure of the implant.

Figure 1

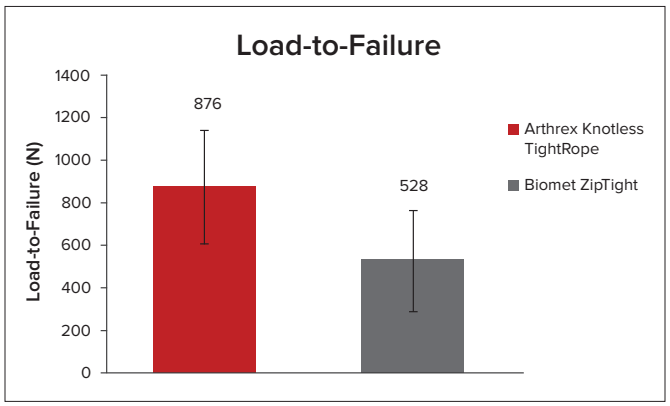


Test fixture for cyclic tensile test and load to failure

Results

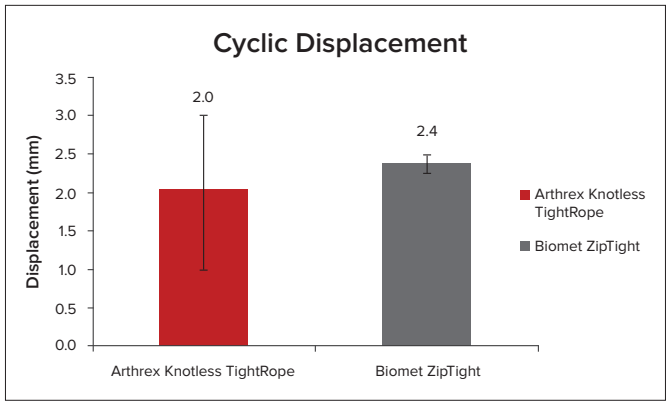
There is a statistically significant difference in tensile load-to-failure (Figure 2) between the TightRope and ZipTight (p=0.024). There is also a statistically significant difference in cyclic displacement (Figure 3) between the TightRope and ZipTight (p=0.031). Five samples of the ZipTight failed during cycling, compared to one sample of the TightRope.

Figure 2



Load-to-failure of the TightRope and ZipTight in tension

Figure 3



Cyclic displacement of the TightRope and ZipTight

Conclusion

The Knotless TightRope Syndesmosis allows for a repair greater in load-to-failure than the Biomet Knotless ZipTight Ankle Syndesmosis with the advantage of a lower cyclic displacement.