

Biomechanical Evaluation of Two Anchors for Rotator Cuff Repair

Arthrex Research and Development

Objective

The objective of this study is to compare the ultimate repair strength and cyclic displacement of a rotator cuff repair using SwiveLock with FiberChain to a repair using ArthroCare's OPUS Magnum anchor.

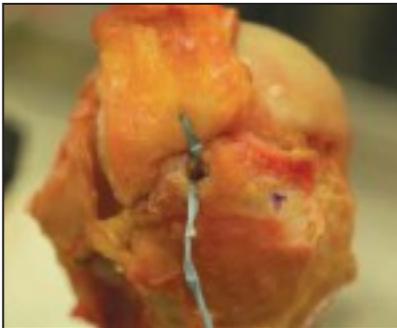
Methods and Materials

Four matched pairs of cadavers were used for this study. The supraspinatus tendon was harvested and transected into 1.5 inch sections. Each specimen was randomly inserted in either the anterior, middle, or posterior aspect of the lateral edge of the tuberosity at a "deadman" angle, following the manufacturer's instructions (Figure 1). Nylon straps were stitched to the free end of the tendon for ease of loading.

Specimens were preloaded to 10N then cycled from 10N to 60N at 1Hz. Following cycling, the specimens were pulled to failure at a rate of 33mm/s.

Ultimate repair strengths and cyclic displacements were found, and statistics were run on the results using a paired t-test.

Figure 1: Inserted SwiveLock with FiberChain.



Results

The SwiveLock with FiberChain has an ultimate repair strength of 132 ± 38 N, and a cyclic displacement of 4.0 ± 1.3 mm. The predominant mode of failure ($n = 7$ of 8) was suture tearing through the tendon. The OPUS Magnum repair has an ultimate strength of 120 ± 42 N, and a cyclic displacement of 3.9 ± 1.1 mm. The predominant mode of failure ($n = 5$ of 8) was the suture internally slipping in the anchor. No statistically significant difference exists between either the ultimate repair strength ($p=0.542$) or the cyclic displacement ($p=0.401$) of the two anchors tested (See Figures 2 and 3).

Figure 2: Ultimate Repair Strength of SwiveLock with FiberChain and OPUS Magnum.

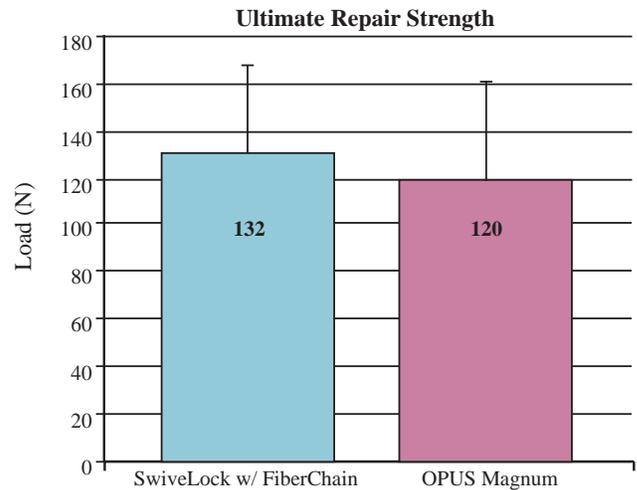
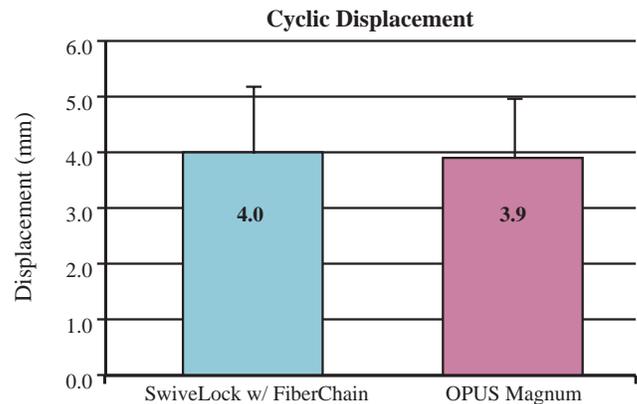


Figure 3: Cyclic Displacement of Rotator Cuff Repair using SwiveLock with FiberChain and OPUS Magnum.



Conclusion

The SwiveLock provides a bioabsorbable knotless fixation of rotator cuff tissue with on average higher ultimate repair strength than the metal OPUS Magnum anchor. The modes of failure observed for the SwiveLock (suture tearing through the tissue) suggest that higher ultimate repair strength could be achieved in better quality rotator cuff tissue; however, the modes of failure observed for the OPUS Magnum anchor (internal slippage of the suture) suggest that the ultimate loads reported in the study may be on the upper limit the anchor is capable of resisting.