

Scapholunate Reconstruction: A Biomechanical Analysis of a Novel Technique

Arthrex Research and Development

Objective

To compare biomechanical properties of a novel scapholunate reconstruction technique to the native dorsal portion of the scapholunate (SL) ligament.



Figure 1: Image showing the nearly completed construct

Methods and Materials

Six matched pairs from male donors with an average age of 44.2 were used for this study. One limb from each pair was randomly assigned to be repaired; the contralateral limb was assigned to the control group. Reconstruction was performed using two 3.5 x 8.5 mm DX SwiveLock® SL suture anchors, a 2 mm wide extensor carpi radialis brevis (ECRB) tendon autograft and LabralTape™ suture as an *InternalBrace*™ augmentation procedure. The ECRB was whipstitched at both ends. Proper drill hole placement was confirmed using fluoroscopy. A 3.5 mm drill bit was used to create the anchor socket. The SwiveLock anchors were inserted into the proximal pole of the scaphoid and the lunate (Figure 1). The strength of the repair was tested using an Instron to obtain linear stiffness (N/mm), linear load to failure (N), load to 3 mm displacement (N) and failure displacement (mm). The volar and central native ligaments were resected, leaving the dorsal component intact. The dorsal native ligament was subsequently tested and analyzed within the same parameters as the reconstruction.

Results

The load to failure of native dorsal ligaments and repair constructs were 137±43 N and 90±42 N, respectively with no statistically significant difference between the two groups (p=0.1). The force to 3 mm gap formation was not significantly different (p=0.06).

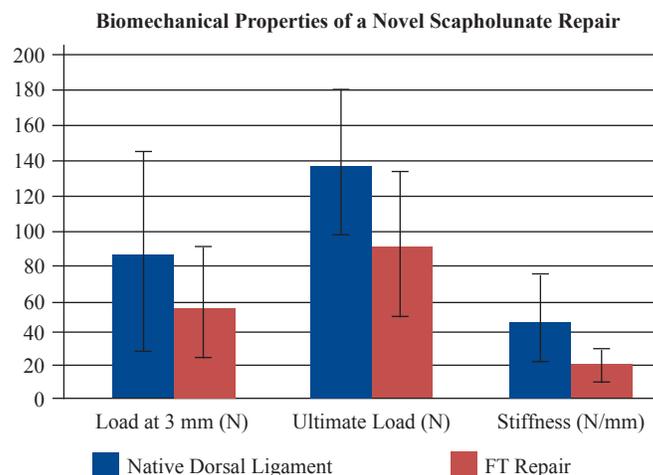


Figure 2: Biomechanical properties of a novel SL repair compared to the native dorsal SL ligament

Conclusion

This novel reconstruction option with 3.5 SwiveLock anchors, LabralTape suture, and the ECRB tendon provides surgeons with a reproducible alternative to reconstruct an injury to the dorsal component of the SL ligament. Biomechanical testing reveals no significant difference between the repair and native ligament strength.

The *InternalBrace* surgical technique is intended only to augment the primary repair/reconstruction by expanding the area of tissue approximation during the healing period and is not intended as a replacement for the native ligament. The *InternalBrace* technique is for use during soft tissue-to-bone fixation procedures and is not cleared for bone-to-bone fixation.