

Bridge Augmentation Technique All-Suture, Knotless Anchors to Address Scapholunate Interosseous Ligament Injury

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INTRODUCTION: Injury to the scapholunate interosseous ligament (SLIL) can lead to substantial morbidity, with no optimal technique of reconstruction or repair. This study sought to assess a novel scapholunate Bridge Augmentation technique using all-suture, knotless anchors in cadaveric wrists through evaluation of radiographic parameters, by comparing the bridged wrist to the wrist with intact SLIL and sectioned SLIL.

METHODS: Nine cadaveric specimens were tested in six positions: wrist flexion, extension, ulnar deviation, radial deviation, clenched fist, and neutral. Radiographic parameters including scapholunate interval (SLI), scapholunate angle (SLA), and dorsal scaphoid translation (DST) were measured in each position. The SLIL was then sectioned, and parameters again measured in all six positions. The SLIL was then repaired using one knotless anchor in the scaphoid and one in the lunate, affixed to one another to bridge the interval, and parameters again measured in the six positions. Radiographic parameters were compared between each SLIL state (intact, sectioned, bridged).

RESULTS:

SLI was wider in the sectioned state than both the intact and bridged, in flexion (mean interval in intact state:2.8mm, sectioned:5.9mm, bridged:3.2mm; $p<0.01$), ulnar deviation (intact:2.7mm, sectioned:3.8mm, bridged:2.3mm; $p<0.01$), and clenched fist (intact:3.1mm, sectioned:5.9mm, bridged:2.8mm; $p=0.01$). SLA was greater in the sectioned compared to bridged state in flexion (intact:62.4°, sectioned:65.9°, bridged:61.3°; $p<0.05$) and was greater in intact versus sectioned in clenched fist (intact:43.6°, sectioned:37.8°, bridged:39.8°; $p=0.01$). DST was greater in the sectioned state than both the intact and bridged states in ulnar deviation (intact:-1.0mm, sectioned:1.3mm, bridged:-0.5mm; $p<0.05$) and radial deviation (intact:-0.7mm, sectioned:2.2mm, bridged:0.2mm; $p<0.05$), and was greater in the sectioned than repaired state in neutral (intact:-0.9mm, sectioned:0.5mm, bridged:-1.5mm; $p<0.05$).

DISCUSSION AND CONCLUSION: Scapholunate Bridge Augmentation was able to restore radiographic parameters of carpal alignment. These findings highlight the effectiveness of this surgical technique, which affords biomechanically robust repair, small anchor size, and elimination of bulky extraarticular constructs.