Minimal Changes in Wrist Motions After Simulated Scapholunate Arthrodesis

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Objectives
◆ Scapholunate Interosseous Ligament (SLIL) instability represents a common clinical problem
◆ High incidence of nonunion and poor outcomes with prior fixation techniques
◆ Evaluate SL fusion as a plausible procedure for SL instability
◆ Establish the effect of simulated SL arthrodesis with modern fixation techniques on wrist motions in a cadaveric model

Methods
◆ Ten cadaveric wrists were tested in wrist joint range of motion simulator
◆ Wrist range of motion was simulated with five-pound weights sutured to wrist tendons (Six Motions)
◆ Scaphoid was exposed radially, capsulectomy with no styloectomy
◆ Two 3.0 mm headless compression screws placed across SL joint to simulate fusion
◆ Goniometric measurements and fluoroscopic images were obtained for each range of motion both before and after simulated SL fusion
◆ The paired t-test was used to compare wrist motions before and after arthrodesis

Results
◆ Appropriately positioned and rigid simulated SL fusion were verified under fluoroscope and a consistent SL angle (47° ± 6° vs. 46° ± 4°, p=0.37, pre and post fusion, respectively)
◆ The SL angle did not change throughout range of motion testing after screw insertion, confirming simulation of rigid SL fusion
◆ The only statistically significant decreases in wrist range of motion following simulated SL fusion occurred during maximum flexion, dart thrower’s flexion, and dart thrower’s extension:
  1. Wrist flexion decreased 9° on average
  2. Dart thrower’s flexion decrease 6° on average
  3. Dart thrower’s extension decreased 9° on average

Conclusion
◆ SL arthrodesis has been attempted in the past
◆ Range of motion after simulated SL fusion (84-100%) compares favorably to reported range of motion outcomes SL repair or reconstruction procedures
◆ Decreases in wrist flexion and dart thrower’s extension and flexion following simulated SL fusion are of questionable clinical significance given the relatively small effect size

<table>
<thead>
<tr>
<th>Position</th>
<th>Intact Wrist</th>
<th>SL Arthrodesis</th>
<th>%</th>
<th>P-value</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max Flexion</td>
<td>80 (5)</td>
<td>72 (6)</td>
<td>90</td>
<td>0.0001</td>
<td>6.61-11.39</td>
</tr>
<tr>
<td>Max Extension</td>
<td>59 (8)</td>
<td>54 (14)</td>
<td>92</td>
<td>0.22</td>
<td>-3.27-12.47</td>
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<tr>
<td>Max Radial Deviation</td>
<td>52 (9)</td>
<td>51 (13)</td>
<td>98</td>
<td>0.89</td>
<td>-8.54-9.74</td>
</tr>
<tr>
<td>Max Ulnar Deviation</td>
<td>45 (15)</td>
<td>45 (7)</td>
<td>100</td>
<td>0.90</td>
<td>-11.29-1.09</td>
</tr>
<tr>
<td>Max Dart Thrower’s Ext</td>
<td>57 (9)</td>
<td>48 (8)</td>
<td>84</td>
<td>0.0001</td>
<td>6.11-10.89</td>
</tr>
<tr>
<td>Max Dart Thrower’s Flex</td>
<td>76 (11)</td>
<td>70 (11)</td>
<td>92</td>
<td>0.0003</td>
<td>3.78-8.82</td>
</tr>
</tbody>
</table>

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References