Outcomes Following Open Reduction and Internal Fixation for Distal Humerus Fracture: Does Handedness Matter?

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Outcomes Following Open Reduction and Internal Fixation for Distal Humerus Fracture: Does Handedness Matter?

Charlotte N. Shields, BS; Joseph R. Johnson, BS; Sanjit R. Konda, MD; Kenneth A. Egol*, MD

(*) indicates primary project advisor
(**) indicates another student who is declaring the same project as primary for SI
• The key outcome following distal humerus fractures is functional ability
• Consistent physical therapy is important to achieve this outcome and maximize range of elbow joint motion
• The “need” to recover dominant extremity function may play a role in expediting elbow recovery
Objectives & Hypothesis

• To our knowledge, no study has assessed the relationship between hand dominance and distal humerus fracture outcomes
• This study sought to compare post-operative outcomes and complications between patients with distal humerus fractures treated with open reduction and internal fixation of their non-dominant vs dominant arm
Materials & Methods

• Retrospective review of all distal humerus fractures between 2011 and 2015
• 69 distal humerus fracture patients (OTA/AO type 13) treated with ORIF and at least 6-month follow up
• Categorized by whether fracture was in dominant or non-dominant extremity
Materials & Methods

• A retrospective chart review gathered data on demographics, hand dominance, injury information, and surgical management

• Post-operative outcomes: complications, time to union, painful hardware, removal of hardware, Mayo Elbow Performance Index (MEPI), elbow ROM

• Statistical analyses used independent samples t-tests, Fisher exact tests, and chi-square tests as appropriate
• 40 (58%) dominant extremity
• 29 (42%) non-dominant extremity
• Mean overall follow-up: 14.1 ± 10.5 months
• No difference in mean follow-up time, demographics, injury information, or surgical management between groups
### Results: Post Op Complications

<table>
<thead>
<tr>
<th>Variable</th>
<th>Non-Dominant Hand (N = 40)</th>
<th>Dominant Hand (N = 29)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any Complication, N (%)</td>
<td>14 (35.0)</td>
<td>4 (13.8)</td>
<td>0.048*</td>
</tr>
<tr>
<td>Fracture Nonunion</td>
<td>0 (0.0)</td>
<td>2 (6.9)</td>
<td>0.173</td>
</tr>
<tr>
<td>Hardware Failure</td>
<td>5 (12.5)</td>
<td>1 (3.4)</td>
<td>0.389</td>
</tr>
<tr>
<td>Elbow Contracture</td>
<td>10 (25.0)</td>
<td>3 (10.3)</td>
<td>0.124</td>
</tr>
<tr>
<td>Wound Dehiscence</td>
<td>1 (2.5)</td>
<td>0 (0.0)</td>
<td>1.000</td>
</tr>
</tbody>
</table>

Patients who experienced multiple post-operative complications were only accounted for once in the Any Complications category. Asterisks represent significant differences.
## Results: Post Op Complications

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</tr>
</thead>
<tbody>
<tr>
<td>Time to Union (Months), Mean ± SD</td>
<td>4.7 ± 2.0</td>
<td>4.6 ± 3.4</td>
<td>0.936</td>
</tr>
<tr>
<td>Painful Hardware, N (%)</td>
<td>12 (30.0)</td>
<td>2 (6.9)</td>
<td>0.018*</td>
</tr>
<tr>
<td>Removal of Hardware, N (%)</td>
<td>14 (35.0)</td>
<td>1 (3.4)</td>
<td>0.002*</td>
</tr>
<tr>
<td>MEPI Score, Mean ± SD†</td>
<td>86.4 ± 18.8</td>
<td>94.7 ± 10.7</td>
<td>0.037*</td>
</tr>
<tr>
<td>Elbow Extension (deg)†</td>
<td>16.7 ± 18.4</td>
<td>12.8 ± 7.8</td>
<td>0.239</td>
</tr>
<tr>
<td>Elbow Flexion (deg) †</td>
<td>121.0 ± 20.9</td>
<td>125.3 ± 25.1</td>
<td>0.444</td>
</tr>
<tr>
<td>Total Elbow Arc (deg) †</td>
<td>104.3 ± 35.2</td>
<td>112.5 ± 29.6</td>
<td>0.314</td>
</tr>
</tbody>
</table>

Abbreviations: MEPI, Mayo Elbow Performance Index. Daggers (†) represent outcomes measured at latest follow up. Asterisks represent significant differences. Deg, Degrees.
Discussion

• Patients who sustain a distal humerus fracture of their non-dominant arm treated with ORIF experience more post-operative complications, painful hardware, removal of hardware, and worse functional recovery.

• This may be related to limitation of active arm movement during the recovery period, resulting in a higher prevalence of symptoms.
When counseling patients, physicians and physical therapists should emphasize the importance of physical therapy and maintaining arm movement especially when the non-dominant arm is involved.