Initial Fibular Displacement as a Predictor of Medial Clear Space Widening in Weber B Ankle Fractures

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Disclosures

- No conflict to disclose

- Our disclosures are in the Final AOFAS Mobile APP. We have no potential conflicts with this presentation
Introduction

• Determining stability of Weber B ankle fractures is important as research shows better long term outcomes with operative fixation in deltoid deficient (unstable) fractures\(^1\).

• Manual stress examination is the gold standard to diagnose deltoid disruption, but can cause pain to patients. Gravity stress exams are an alternative due to comparable accuracy and ability to impose less discomfort\(^2\).

• The purpose of this study was to determine whether the initial displacement of Weber B ankle fractures could predict medial clear space widening on gravity stress radiographs.
Methods

• Retrospective review
• Inclusion:
  – Patients seen between August 2014 and April 2016
  – Isolated Weber B fibula fracture
  – Initial injury films
  – Gravity stress films
Methods –
Radiographic Measurements

• On the mortise view, the medial clear space (MCS), lateral fibular displacement (LFDP), and fibular shortening (FS) were measured
Methods – Radiographic Measurements

- On the lateral view, anterior to posterior fibular gap (APFG) was measured.
- On the gravity stress view, the medial clear space (MCS-W) was measured.
Methods-
Outcomes and Statistical Analysis

- MCS-W≥5mm was considered unstable.©3
- T-tests were used to calculate mean and standard deviation.
- Correlation and linear regression analyses were run with each variable relative to MCS-W.
- ROC analysis was used to determine sensitivity (SN) and specificity (SP).
Results

- There were significant differences in the LFDP and APFG between stable and unstable fractures, but not FS.

<table>
<thead>
<tr>
<th></th>
<th>MCS&lt;5.0mm</th>
<th>MCS&gt;5.0mm</th>
<th>P-VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCSW</td>
<td>3.98±0.4</td>
<td>6.83±2.1</td>
<td>0.002</td>
</tr>
<tr>
<td>LFDP</td>
<td>1.30±0.8</td>
<td>2.52±1.4</td>
<td>0.047</td>
</tr>
<tr>
<td>APFG</td>
<td>0.54±0.3</td>
<td>1.50±0.4</td>
<td>1E-05</td>
</tr>
<tr>
<td>FS</td>
<td>1.55±1.2</td>
<td>2.10±1.1</td>
<td>0.30</td>
</tr>
</tbody>
</table>
**Results**

- Significant correlations with MCS-W were found for LFDP and APFG, but not FS

<table>
<thead>
<tr>
<th>DISPLACEMENT</th>
<th>CORRELATION WITH MCS WIDENING</th>
<th>P-VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>LFDP</td>
<td>0.69</td>
<td>0.002</td>
</tr>
<tr>
<td>APFG</td>
<td>0.72</td>
<td>0.001</td>
</tr>
<tr>
<td>FS</td>
<td>0.34</td>
<td>0.18</td>
</tr>
</tbody>
</table>

- Linear regression revealed ability to predict MCS-W for LFD and APFG but not FS

<table>
<thead>
<tr>
<th>DISPLACEMENT</th>
<th>COEFFICIENT</th>
<th>[95% CI]</th>
<th>P-VALUE</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>LFDP</td>
<td>1.12</td>
<td>0.47 – 1.6</td>
<td>0.002</td>
<td>0.48</td>
</tr>
<tr>
<td>APFG</td>
<td>1.2</td>
<td>3.93 – 3.93</td>
<td>0.001</td>
<td>0.52</td>
</tr>
<tr>
<td>FS</td>
<td>0.67</td>
<td>-0.35 – 1.69</td>
<td>0.18</td>
<td>0.11</td>
</tr>
</tbody>
</table>
Results

- ROC analysis for APFG showed that a cutoff of 1.0 mm yielded SN and SP of 100% and 100%
Conclusions

• Initial fibular displacement, represented by lateral fibular gap and anterior to posterior fibular gap, are a strong predictors of medial clear space widening in Weber B ankle fractures on injury radiographs.

• A cutoff of 1mm of anterior to posterior fibular gap showed a specificity of 100% and a sensitivity of 100% in predicting deltoid integrity.

• In the future, it may help avoid patient discomfort with a stress view or the costs of additional diagnostic testing.
References

