Is Syndesmotic Screw Removal Needed Before Weight-bearing Ambulation?

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Disclosure

NO CONFLICT TO DISCLOSE
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We have no potential conflicts with this presentation.
Introduction

• Concensus for treatment of syndesmosis injury
  1. There are no difference in stainless steel versus titanium screws
  2. A 4.5-mm screw apparently provides greater resistance to shear stress than a 3.5-mm screw
  3. The level of placement probably does not affect outcome
  4. Three-cortical versus four-cortical screw placement does not affect biomechanical stability

• But, whether the syndesmosis screw should be removed prior to weight-bearing or not is still debated.
Purpose

• To compare the functional outcome between screw removal and retain group

• To compare the functional outcome between diastasis and no diastasis group

• To investigate for whether syndesmosis screw should be removed prior to weight-bearing or not
Material and methods

- From April 2006 to August 2013

- 56 patients had undertaken open reduction and internal fixation due to syndesmosis injury

- Divided into 4 groups
  - A group: syndesmotic screw removal before weight-bearing (postoperative 3 months, n=28)
  - B group: retained group (n=28)
  - C group: Recurrence of diastasis on syndesmosis (n=8)
  - D group: No diastasis after screw removal (n=20)
Material and methods

• Radiologic evaluation: determine recurrence of diastasis
  – Ankle AP: measured clear space of DTFS

• Clinical outcome evaluation
  – American Orthopaedic Foot and Ankle Society’s (AOFAS) Ankle-Hindfoot scale
  – Short Form Health Survey Physical component summary (SF12-PCS)
  – Short Form Health Survey Mental component summary (SF12-MCS)

• Complications
  – Screw loosening and breakage

• Statistical analysis
  – Student T-test
  – Mann-Whitney test
Fig.1. AOFAS ankle-hindfoot score shows 75.10±10.40 in group A, 77.07±10.60 in group B, and SF12-PCS shows 45.78±5.68 in group A, 47.33±5.83 in group B, and SF12-MCS shows 48.45±4.30 in group A, 48.50±10.04 in group B there is no significant difference between group A and B in AOFAS ankle-hindfoot score and SF-12 (p=0.487, p=0.319, p=0.197).
Results

Fig. 2 Radiological diastasis significantly develops ($p=0.025$) in group A (8/28) compared to B (1/28), but screw loosening or breakage significantly develops ($p=0.001$) in group B (4/28) compared to group A (0/28).
Fig. 3. AOFAS ankle-hindfoot score shows 70.33±6.22 in group C, 76.50±10.26 in group D, and SF12-PCS shows 49.85±3.83 in group C, 47.40±8.01 in group D, and SF12-MCS shows 44.47±4.47 in group C, 46.97±5.80 in group D there is no significant difference between group C and D in AOFAS ankle-hindfoot score and SF-12 (p=0.808, p=0.065, p=0.407).
## Discussion

<table>
<thead>
<tr>
<th>Study</th>
<th>LOE</th>
<th>Patients</th>
<th>Screw retained</th>
<th>Follow-up (months)</th>
<th>Major findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hoiness</td>
<td>1 (RCT)</td>
<td>64</td>
<td>32</td>
<td>12</td>
<td>Routine removal of quadricortical screws; no removal of tricortical screws. Tricortical, at 3 months significantly better on OMAS; after 1 year no difference in outcome</td>
</tr>
<tr>
<td>Bell</td>
<td>4 (retrospective cohort)</td>
<td>30</td>
<td>7 (2 broken)</td>
<td>15</td>
<td>No significant difference in Baird–Jackson ankle score</td>
</tr>
<tr>
<td>Weening</td>
<td>4 (retrospective cohort)</td>
<td>51</td>
<td>21</td>
<td>18</td>
<td>No significant difference in OMAS and SMFA for removed and retained screws</td>
</tr>
<tr>
<td>Moore</td>
<td>2 (quasi-RCT)</td>
<td>120</td>
<td>113 (9 broken)</td>
<td>5</td>
<td>No apparent difference in outcome between retained and removed screws</td>
</tr>
<tr>
<td>Hamid</td>
<td>4 (retrospective cohort)</td>
<td>52</td>
<td>25 (10 broken)</td>
<td>30</td>
<td>No significant difference in AOFAS and VAS for intact and removed screws. Broken screws, best outcome</td>
</tr>
<tr>
<td>Manjoo</td>
<td>4 (retrospective cohort)</td>
<td>76</td>
<td>64 (44 broken or loose)</td>
<td>23</td>
<td>No significant difference in the lower extremity measure and OMAS for broken/loose and removed screws. Intact screws, significantly lower outcome</td>
</tr>
<tr>
<td>Egol</td>
<td>4 (retrospective cohort)</td>
<td>79</td>
<td>68 (15 broken)</td>
<td>12</td>
<td>No statistical difference in pain, function or range of ankle motion between removed/broken screws and retained screws</td>
</tr>
</tbody>
</table>

LOE level of evidence; FAOS Foot and Ankle Outcome Score; OMAS Olerud-Molander Ankle Score; AOFAS American Orthopedic Foot Ankle Society hindfoot score; SMFA short Musculoskeletal Function Assessment Questionnaire
Conclusion

- Diastasis recurrence is significantly higher in removal group.
- But, screw retain group shows higher breakage, loosening rate than removal group.
- Clinical outcome such as VAS, AOFAS ankle-hindfoot score and SF-12 is no significant different in two groups.
- Also, if diastasis recurred, it did not affect clinical outcome.
- Therefore, we couldn’t conclude that syndesmotic screw removal is needed before weight-bearing (postoperative 3 months).
References


