Supramalleolar Osteotomy for Tibial Component Malposition in Total Ankle Replacement
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Category: Ankle

Keywords: Supramalleolar Osteotomy, Total Ankle Replacement (TAR), Varus Tibial Component, Tibial Anterior Surface Angle (TAS), Tibial Lateral Surface Angle (TLS), Pain

Introduction/Purpose: A key for success in total ankle replacement is a balanced ankle joint. If the tibial component is misaligned, the ligamentous structures, the malleoli and the tendons may be overused, which may lead to pain and impairment during gait. A misaligned tibial component can be revised using a corrective bone resection and re-insertion of a new component or using a corrective osteotomy of the distal tibia above the stable implant. The aim of this study was to review a series of patients, in whom a corrective supramalleolar osteotomy was performed to realign a misaligned tibial component in total ankle replacement.

Methods: Twenty-two patients (nine male; 13 female; mean age, 62.6 years; range, 44.7 – 80.0) were treated with a supramalleolar osteotomy to correct a painful dysbalanced ankle, following a varus implanted tibial component. Following radiological and clinical outcomes were recorded preoperatively and at the follow-up examination within the first 24 months: the tibial anterior surface angle (TAS), the tibial lateral surface angle (TLS), patient's pain measured with the Visual Analogue Scale (VAS), the American Orthopedic Foot and Ankle Society (AOFAS) hindfoot score, range of motion (ROM) of the ankle and patient’s satisfaction. Furthermore, postoperative complications were reviewed.

Results: The TAS changed on average from 85.2 ± 2.5 degrees preoperatively to 91.4 ± 2.9 degrees postoperatively (p < 0.0001), the AOFAS score increased from 46 ± 14 to 66 ± 16 points (p < .0001) and the VAS pain score decreased from 5.8 ± 1.9 to 3.3 ± 2.4 (p < .001). No statistical difference was found in the TLS and the range of motion. The osteotomy healed in 19 patients (86 %), re-osteosynthesis was successful in the remaining three patients. In one of these three patients, a chronic infection of the ankle joint led to a below-knee amputation. Fifteen patients (68 %) were (very) satisfied, four (18 %) moderately satisfied and three (14 %) patients were not satisfied with the obtained postoperative result.

Conclusion: The supramalleolar osteotomy was found to be an efficient alternative to correct the misaligned tibial component in total ankle replacement. Pain could be successfully addressed in the majority of the patients. The treatment of a malpositioned, well anchored tibial component with a supramalleolar osteotomy, instead of exchanging the tibial component, allows preservation of the bone stock. However, non-union should be mentioned as a possible complication of this surgery. Nonetheless, this method might be a feasible treatment option, especially for younger patients.
Persistent pain in 23 to 60% of ankles after total ankle replacement (TAR) 
(Gougoulias et al., 2010)

Main pain source: insufficiently balanced ankle 
(Espinosa et al., 2010; Fukuda et al., 2010, Saltzman et al., 2004)

Exchanging component and corrective resection cut 
(Hintermann et al., 2011)

Supramalleolar osteotomy (SMOT) 
→ extraarticular procedure 
→ preserve integrity of replaced joint

Figure 1: Possible surgical treatment options for persistent pain after total ankle replacement (TAR)

Table 1: Results

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Preoperative to follow-up</th>
<th>Change</th>
<th>P- value</th>
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</thead>
<tbody>
<tr>
<td>TAS °C</td>
<td>85.2 ± 2.5 to 91.4 ± 2.9</td>
<td>↑</td>
<td>p &lt; .0001</td>
</tr>
<tr>
<td>TLS °C</td>
<td>87.3 ± 3.7 to 88.1 ± 4.2</td>
<td>equal</td>
<td>p = 0.39</td>
</tr>
<tr>
<td>Pain [VAS]</td>
<td>5.8 ± 1.9 to 3.3 ± 2.4</td>
<td>↓</td>
<td>p &lt; .001</td>
</tr>
<tr>
<td>AOFAS</td>
<td>46 ± 14 to 66 ± 16</td>
<td>↑</td>
<td>p &lt; .0001</td>
</tr>
<tr>
<td>ROM °C</td>
<td>25.6 ± 9.8 to 23.3 ± 8.7</td>
<td>equal</td>
<td>p = 0.085</td>
</tr>
</tbody>
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