Modified Anatomic Hamstring Graft Reconstruction for Revision and Severe Cases of Lateral Ligament Instability

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Disclosure:
The authors have no conflicts to disclose.
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BACKGROUND

- Lateral ligament repair successfully treats ankle instability in most cases \(^1-6\)
- Ligament *reconstruction* has been recommended in cases of
  1. Generalized ligamentous laxity
  2. High-grade ankle laxity
  3. Heavier build
  4. High athletic demands
  5. Underlying deformity
  6. Failed previous ligament repair \(^4,7,8\)
- Non-anatomic reconstruction results historically suboptimal \(^9-12\)
- Anatomic reconstruction techniques have limited presence in the literature
- Few modern studies on pts w/ failed lateral ligament repair \(^13\)
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PURPOSE

- To report clinical and radiographic outcomes after modified anatomic lateral ligament reconstruction w/ hamstring auto- or allograft.
- To describe a novel lateral ligament reconstruction technique.

METHODS

- Single-center, retrospective case series w/ minimum 6 month follow-up
- Surgical indications:
  - Severe ligament instability (talar tilt angle ≥ 20°, anterior drawer > 15 mm)
  - Generalized ligamentous laxity
  - Revision surgery
- Patient reported outcomes included VAS, SF-12, and FAOS scores
- Objective measure using Telos (Hungen, Germany) stress radiographs
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**SURGICAL TECHNIQUE**

- **Anterior Arthroscopy:** Assess and address intra-articular pathology.

- **Hamstring Autograft:** Single tendon is harvested. Goal dimensions: 15 cm x 4-5 mm.

- **Modified Broström Part 1:** 5 cm longitudinal incision over distal fibula. ATFL/CFL incised off their origins. Periosteum is removed and bony surface prepared with curette at distal fibula.

- **Calcaneal Fixation:** 1 cm incision over calcaneal tuberosity in line with and distal to the fibula; blunt dissection carried down to bone and periosteum is elevated. Graft fixed in calcaneus with interference screw (typically 4.5 mm x 15 mm).
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SURGICAL TECHNIQUE

- **Fibular Tunnel**: Graft passed deep to peroneal tendons and P-to-A through a tunnel drilled transversely in the distal fibula. Window created in peroneal retinaculum posterior to fibula to protect the tendons during drilling.

- **Talar Tunnel**: Guide pin placed from just distal to lateral process exiting medially between tibialis anterior and posterior tibial tendons. Tunnel is drilled and graft is passed through soft tissue bridge under the ATFL and through the talar neck. A small incision is made medially to allow the graft tissue to pass through the skin.
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SURGICAL TECHNIQUE

- **Fixation:** Interference screws are placed in the fibular and talar tunnels while holding the ankle in a position of eversion and posterior translation.

- **Modified Broström Part 2:** The ATFL and CFL tissue is then repaired to the fibular periosteum and augmented with the inferior extensor retinaculum.

- Layered closure and short leg plaster splint

- Post-Operative Rehab:
  - 0-2 wks: splint, NWB
  - 2-4 wks: boot, NWB, ankle ROM
  - 4-6 wks: boot, PWB
  - 6-12 wks: boot, WBAT, PT, transition to sneaker
  - 12 wks: initiate light jogging
  - 24 wks: may return to all sports
# Modified Anatomic Hamstring Graft Recon for Revision & Severe Cases of Lateral Ligament Instability

## DEMOGRAPHICS

<table>
<thead>
<tr>
<th>Study Group</th>
<th>33 patients</th>
<th>34 ankles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average age</td>
<td>33.8 years</td>
<td></td>
</tr>
<tr>
<td>Follow-up</td>
<td>21.8 months</td>
<td></td>
</tr>
<tr>
<td>Follow-up rate</td>
<td>76% post-op scores</td>
<td>70% post-op XR</td>
</tr>
<tr>
<td>Sex</td>
<td>27 female</td>
<td>5 male</td>
</tr>
<tr>
<td>Indication</td>
<td>21 primary</td>
<td>13 revision</td>
</tr>
<tr>
<td>Graft type</td>
<td>27 autograft</td>
<td>7 allograft</td>
</tr>
</tbody>
</table>
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Patient Reported Outcomes

<table>
<thead>
<tr>
<th>FUNCTIONAL SCORES</th>
<th>PRE-OP MEAN</th>
<th>POST-OP MEAN</th>
<th>PRE-TO-POST-OP CHANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>VAS</td>
<td>5.3</td>
<td>2.1</td>
<td>- 3.2*</td>
</tr>
<tr>
<td>SF-12</td>
<td>64</td>
<td>82</td>
<td>19*</td>
</tr>
<tr>
<td>FAOS Pain</td>
<td>58</td>
<td>86</td>
<td>28*</td>
</tr>
<tr>
<td>FAOS Symptoms</td>
<td>61</td>
<td>76</td>
<td>17*</td>
</tr>
<tr>
<td>FAOS Activities</td>
<td>75</td>
<td>91</td>
<td>16*</td>
</tr>
<tr>
<td>FAOS Sports</td>
<td>40</td>
<td>76</td>
<td>37*</td>
</tr>
<tr>
<td>FAOS QoL</td>
<td>26</td>
<td>69</td>
<td>43*</td>
</tr>
</tbody>
</table>

* Statistically significant with p < 0.05
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**RADIOGRAPHIC RESULTS**

<table>
<thead>
<tr>
<th>RADIOGRAPHIC MEASUREMENT</th>
<th>PRE-OP MEAN</th>
<th>POST-OP MEAN</th>
<th>PRE- TO POST-OP CHANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anterior Drawer</td>
<td>9 mm</td>
<td>6 mm</td>
<td>- 3 mm*</td>
</tr>
<tr>
<td>Talar Tilt</td>
<td>16°</td>
<td>5°</td>
<td>- 9° *</td>
</tr>
</tbody>
</table>

* Statistically significant with p < 0.05

Pre-Op Stress XR: ↑ talar tilt  
↑ anterior drawer

Post-Op Stress XR: improved talar tilt and anterior drawer
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COMPLICATIONS
- 4 (12%) minor wound edge necrosis requiring local wound care
- 2 (6%) nerve issue
- 1 (3%) venous thromboembolic event
- 1 (3%) return to OR for hardware removal

CONCLUSION
- Improved functional outcome scores
- Reduced pain
- Improved radiographic stability
- Low morbidity
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REFERENCES


