Hamstring Autograft for Foot and Ankle Applications

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Disclosures

Dr. Drakos is a paid consultant for Fast Form and Extremity Medical, neither of whose projects are related to this presentation. Dr. Deland is a paid consultant for Zimmer, Wright Medical, and Arthrex, and he receives royalties from Arthrex, all outside of the current project.

No other conflicts to disclose

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Our disclosures are in the AOFAS Mobile App
We have no potential conflicts with this presentation

Hamstring Autografts for Foot and Ankle Applications
Background

- **Hamstring tendon autografts** (gracilis and/or semitendinosus) are an alternative to allograft or local tendon grafts in foot and ankle surgery
  - Mostly for tendon or ligament repairs in which direct repair has failed or is not possible
- **Advantages**:
  - Avoid expense and lower healing potential of allografts
  - Avoid morbidity of using local tendon grafts

**Hypothesis**: When gracilis and/or semitendinosus are harvested for use in the foot/ankle, morbidity to the knee is limited and foot and ankle outcomes are good
Methods

• All patients who underwent hamstring autograft for foot or ankle applications by a fellowship-trained sports surgeon since 2011 were screened for inclusion
  • Inclusion criteria: age $\geq 18$, no knee/hip pathology, at least one year post-op
• 36 patients enrolled an average of 38 months post-op (range, 13-51 months)
  • Average age 45 ± 17 years
  • 53% women
  • Questionnaires completed: Foot and Ankle Outcome Score (FAOS) and Short Form (SF)-12

Harvest of gracilis and semitendinosus
Methods

- Bilateral knee flexion and extension strength were assessed ≥1 year post-op
- Isokinetic testing was performed using a Biodex dynamometer
- Peak flexion and extension torque as well as flexion and extension torque at 30, 70, and 90 degrees were collected
- 2 different testing speeds, 180 and 300 deg/sec
- Torque values reported as percentages of the values reported for the non-operated leg
Results

Tendons harvested:
- Semitendinosus
- Gracilis
- Both tendons

Procedures performed:
- Achilles recon
- Tibialis Anterior recon
- Peroneus brevis recon
- Lateral ligament recon
- Tibialis posterior recon

Hamstring Autografts for Foot and Ankle Applications
Results

- No patients dissatisfied
- All would recommend the surgery to someone else
- Most patients asymptomatic at the harvest site
  - 4 patients (11%) had mild to moderate symptoms at the harvest site
### Results

Torque at **180 deg/sec**, reported as % of non-operated leg

<table>
<thead>
<tr>
<th></th>
<th>Flexion</th>
<th>Extension</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Peak (%)</strong>, ± SD</td>
<td>96.4 ± 13.5</td>
<td>95.7 ± 10.2</td>
<td>0.775</td>
</tr>
<tr>
<td><strong>30 degrees (%)</strong>, ± SD</td>
<td>107.9 ± 49.6</td>
<td>106.5 ± 39.2</td>
<td>0.785</td>
</tr>
<tr>
<td><strong>70 degrees (%)</strong>, ± SD</td>
<td>90.6 ± 15.1</td>
<td>95.3 ± 9.8</td>
<td>0.100</td>
</tr>
<tr>
<td><strong>90 degrees (%)</strong>, ± SD</td>
<td>83.0 ± 25.8</td>
<td>93.9 ± 15.1</td>
<td><strong>0.029</strong>*</td>
</tr>
</tbody>
</table>

![Graph showing torque comparison between flexion and extension at 30, 70, and 90 degrees.](image)

* *p < 0.05

Hamstring Autografts for Foot and Ankle Applications
## Results

**Torque at 300 deg/sec, reported as % of non-operated leg**

<table>
<thead>
<tr>
<th>Flexion</th>
<th>Extension</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Peak (%, ± SD)</strong></td>
<td>96.0 ± 18.1</td>
<td>98.9 ± 13.2</td>
</tr>
<tr>
<td><strong>30 degrees (%, ± SD)</strong></td>
<td>91.5 ± 36.3</td>
<td>100.6 ± 39.4</td>
</tr>
<tr>
<td><strong>70 degrees (%, ± SD)</strong></td>
<td>92.6 ± 23.1</td>
<td>99.0 ± 14.5</td>
</tr>
<tr>
<td><strong>90 degrees (%, ± SD)</strong></td>
<td>96.6 ± 70.2</td>
<td>94.2 ± 27.0</td>
</tr>
</tbody>
</table>

![Graph showing flexion and extension torque at various angles](image.png)
Results

- Isokinetic testing data summary:
  - No significant difference between peak relative flexion and extension strength
  - Flexion strength at higher degrees of flexion (90°) was significantly lower compared to extension strength, when testing performed at lower speed
  - When testing at low speed, flexion strength was significantly greater at 30° and 70° compared to 90°
  - No difference between patients with gracilis, semitendinosus, or both tendons harvested
Limitations

- No pre-operative isokinetic testing for comparison
  - As substitute, flexion strength was compared to extension strength, which should not be affected by surgery
- Small number of patients
  - Unable to identify effect of graft harvested (gracilis, semitendinosus, or both)
  - Possibly not enough power to detect smaller deficits in flexion strength
Conclusions

- When used for foot and ankle surgery, hamstring autografts result in good functional outcomes and high patient satisfaction.
- Few patients experience symptoms from harvest site at follow-up.
- Knee flexion strength may be decreased at higher degrees of flexion, but this is not likely to be clinically significant.