Does Immediate Post-Operative Use of Neuromuscular Electrical Stimulation (NMES) Influence Calf Atrophy Following Achilles Tendon Surgery? A Prospective RCT

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Our disclosures are in the Final AOFAS Mobile App. There is a potential conflict with this presentation due to: Research grant, DJO Global (CFH,GCB,TMP)
Statement of Purpose

• Post-surgical muscle atrophy common after Achilles surgery and immobilization
• Lengthy recovery time and sometimes never fully recover
• NMES shown to accelerate recovery in orthopedic surgery
Statement of Purpose

• Perhaps minimizing calf atrophy critical to positive patient outcomes
• The purpose of the study was to quantify the atrophy sparing effects of NMES applied immediately after surgery and its effect on post-operative patient recovery
Study Methods

- IRB approved, double blind, RCT, 40 patients – Powered at 80%
- 20 active and 20 ‘sham’ 4 lead NMES devices
- Blinded study team: MSK radiologist, Physical therapy, surgeons
- Biostatistician

**Table 1: Pre and Post Operative Measures**

<table>
<thead>
<tr>
<th>Measure</th>
<th>Pre-op</th>
<th>Post-op weeks 2, 6, 12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calf size</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>FOTO score</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>AOFAS hindfoot</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>MRI leg</td>
<td>✔</td>
<td>Weeks 2 and 6 only</td>
</tr>
</tbody>
</table>
Study Methods

• Only Achilles procedures including:
  – Acute rupture repair
  – Insertional detachment/re-attachment repair
  – Chronic repair with FHL transfer

• Standard Post-op Regimen:
  – 4-lead NMES applied in OR under Jones splint, NWB 2 weeks (± 1 week) with NMES
  – PWB Boot with NMES x 4 weeks
  – Discontinued NMES at 6 weeks
  – PTx at 6 weeks
Results

- 40 subjects:
  - Mean age: 48.9
  - Mean BMI: 32.2
- Active group: trended toward higher FOTO and AOFAS but not SS
- Volumetric MRI trended less atrophy in active, but not SS
- No difference in calf circumference at any interval
- 6.4% incidence of device used on wrong setting (8% active, 5% sham) this was SS
Conclusions

• In prior case series, NMES anecdotally decreased pain/swelling, minimized calf atrophy and improved patient outcomes

• In the double blind RCT, trends to improved outcomes in active group but not SS
Conclusions/Questions

• Is 6 weeks of NMES treatment and 12 weeks of follow-up long enough to quantify and measure post-op atrophy?
  – Trends there but perhaps needed longer follow-up

• ‘Sham’ device still provided minimal stimulation to seem ‘real’. Did this still have minor effect which minimized the delta between Active and Sham?

