MUSCLE TIBIALIS ANTERIOR FATIGUE PROTOCOL EFFECTS ON KINETIC PARAMETERS OF GAIT AND BALANCE: A Laboratory Study

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• Primary muscle on anterior aspect
• Neuromuscular role
• Easy to fatigue

Does the TA fatigue affect balance and gait?

Inclusion & exclusion
✓ Healthy
✓ Right dominant side
✗ Under 18
✗ Any pathology related to foot

Pre-evaluation
• MVC
• Gait analysis
• Balance test

Fatigue Exercises Protocol
• EMG

Post-evaluation
• MVC
• Gait analysis
• Balance test

<table>
<thead>
<tr>
<th></th>
<th>Before Fatigue</th>
<th>After Fatigue</th>
<th>Z</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>BORG exertion scale (1-10)</td>
<td>0±0</td>
<td>6,46±1</td>
<td>-36,306</td>
<td>&lt;,001</td>
</tr>
<tr>
<td>MVC (n)</td>
<td>42,2±5</td>
<td>33,7±5</td>
<td>12,058</td>
<td>&lt;,001</td>
</tr>
<tr>
<td>MdPF (Hz)</td>
<td>9684±41</td>
<td>3946±19</td>
<td>-5,373</td>
<td>&lt;,001</td>
</tr>
</tbody>
</table>

**Increase in**
- Borg
- Max. pressure on forefoot

**Decrease in**
- MVC
- MdPF
- Max. pressure on rear foot
### Results

#### Percentage of phases

<table>
<thead>
<tr>
<th>Percentage of phases</th>
<th>Before Fatigue</th>
<th>After Fatigue</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>All stance</td>
<td>63,90±2,54</td>
<td>63,24±1,88</td>
<td>1,66</td>
<td>0,104</td>
</tr>
<tr>
<td>Pre-swing</td>
<td>12,82±0,29</td>
<td>13,55±0,32</td>
<td>3,42</td>
<td>0,002*</td>
</tr>
<tr>
<td>Late-swing</td>
<td>36,10±0,41</td>
<td>36,62±0,29</td>
<td>1,43</td>
<td>0,161</td>
</tr>
<tr>
<td>Mid-stance</td>
<td>27,14±0,70</td>
<td>26,15±0,50</td>
<td>1,77</td>
<td>0,084</td>
</tr>
</tbody>
</table>

* *p<0.05. Key: COP: Centre of pressure

**Increase in**

- COP path length
- COP velocity

Percentage of pre-swing phase
Similar with short-term TA dysfunction

- Decreased MPoRF,
- Raised pre-swing phase

Risk of falls

- Increased COP velocity and
- Increased COP length

Postural oscillation

Balance

Should be taken into consideration more frequently when patient and sportsman and, individual training programs being assessed.