Association between graft choice and preoperative measurement of semitendinosus tendon using ultrasonography

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I have no financial conflicts to disclose.
Introduction

Arthroscopic anatomical double-bundle ACL reconstruction (DB-ACLR) has become increasingly common of late.\textsuperscript{1-3}

If the volume of the semitendinosus (ST) tendon was not enough, the gracilis (G) tendon would be harvested additionally.\textsuperscript{4}

Is it possible to predict this decision preoperatively?

Purpose

To investigate whether the preoperative measurement of the ST tendon using ultrasonography (US) would help this decision.
Material & Methods

- 20 patients (13 men and 7 women)
- Primary DB-ACLR (October 2017 – March 2019)
- Mean age: 28.5 ± 10.2
- Exclusion: history of trauma of the hamstrings
Measurement of ultrasonography (US)

- Ipsilateral ST tendon was measured 1 day before surgery
- Prone position
- At crease level behind the knee
- Twice measurements by one author
- Calculated cross sectional area (CSA) by the diameter and breadth in short-axis
Material & Methods

• The oblique 3cm incision on the pes anserinus
• The G tendon was harvested additionally when ST graft < 5mm

• Group ST: only the ST tendon was harvested
• Group STG: the G tendon was harvested additionally
# Results

Comparison between Group ST and Group STG

<table>
<thead>
<tr>
<th></th>
<th>Group ST (n=12)</th>
<th>Group STG (n=8)</th>
<th>$P$ value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex (M/F)</td>
<td>10/2</td>
<td>3/5</td>
<td>0.0623</td>
</tr>
<tr>
<td>Age (years)</td>
<td>29.6 ± 10.7</td>
<td>26.8 ± 10.6</td>
<td>0.417</td>
</tr>
<tr>
<td>Side (R/L)</td>
<td>3/9</td>
<td>7/1</td>
<td>0.0198</td>
</tr>
<tr>
<td>Height (cm)</td>
<td>172.9 ± 5.8</td>
<td>163.6 ± 6.3</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Body Weight (kg)</td>
<td>72.9 ± 9.9</td>
<td>60.5 ± 15.2</td>
<td>0.0167</td>
</tr>
</tbody>
</table>
• The diameter and breadth were 4.21 ± 0.38 and 2.34 ± 0.44 mm in Group ST, 3.39 ± 0.68 and 1.78 ± 0.42 mm in Group STG.

• The mean CSA were 7.74 ± 1.41 mm² in group ST and 4.79 ± 1.59 mm² in group STG.
ROC Curve Analysis

Cutoff value 7.0mm
Sensitivity 75.0%
Specificity 87.5%
AUC 0.823
Discussion

• The CSA of ST tendon $< 7 \text{ mm}^2$ linked to harvesting G tendon additionally in our study.

• Sensitivity 75.0%, Specificity 87.5%, and AUC 0.823

• The measurement of ST tendon by using ultrasonography can be useful for graft choice in DB-ACLR.
The preoperative measurement of ST tendon

<table>
<thead>
<tr>
<th>Author</th>
<th>Journal</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wernecke et al.(^5)</td>
<td>Arthroscopy</td>
<td>The mean CSA was 14.8mm(^2) (MRI)</td>
</tr>
<tr>
<td>Rodriguez-Mendez et al.(^6)</td>
<td>J Knee Surg</td>
<td>The mean diameter was 4.9mm in US, 4.7mm in their operation</td>
</tr>
<tr>
<td>Galanis et al.(^7)</td>
<td>Electromyography and Kineology</td>
<td>The mean CSA was 12.81mm(^2) (US)</td>
</tr>
</tbody>
</table>

The mean CSA in our study < in previous studies
→ These previous studies were not ‘true‘ short axis.
The difference of physique by race?
Conclusion

• The preoperative CSA of the ST tendon determined using ultrasonography could be used as a reference for deciding whether to harvest the G tendon or not in DB-ACLR.

• In our study, the cutoff value was 7.0mm whether gracilis tendon needs to be harvested.
References