Patellar Tendinopathy Increases the Risk of Bone-Tendon-Bone Autograft Failure After Anterior Cruciate Ligament Reconstruction

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CONFLICT OF INTEREST

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To evaluate the influence of patellar tendinopathy (PT) on primary anterior cruciate ligament (ACL) reconstruction graft failure when using bone-patellar tendon-bone (BPTB) autograft
Between January 2011 and July 2015, all patients undergoing ACL reconstruction were approached for eligibility.

Inclusion criteria:
- Primary ACL reconstruction using BPTB autograft
- Pre-operative MRI evaluation available
- Revision ACL reconstruction cases were included provided the primary surgery was done using a BPTB autograft and that pre-operative MRI of that procedure was available for review.
- Hamstring tendon autograft and patients with open physes were excluded from this study.
METHODS

Procedures

• A medical chart review was conducted to obtain data on presence/absence of graft failure and demographic, anatomical, injury characteristics, treatment characteristics, and length of follow-up information.
• A single, fellowship-trained, knee-specialist and blinded researcher performed pre-operative MRI interpretation of PT.
• The presence/absence and degree of PT was compared between patients with (cases) and without (controls) failure of ACL reconstruction.
## METHODS

### Patients

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>21.5</td>
<td>6.7</td>
</tr>
<tr>
<td>Weight (Kg)</td>
<td>71</td>
<td>11.2</td>
</tr>
<tr>
<td>Height (cm)</td>
<td>174</td>
<td>8.3</td>
</tr>
<tr>
<td>BMI</td>
<td>23.3</td>
<td>2.8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>448</td>
</tr>
<tr>
<td>Right side</td>
<td>305</td>
</tr>
</tbody>
</table>

N=548
METHODS

Outcomes

- Pre-operative MRI evaluated parameters for the central third of the patellar tendon were:
  - PT changes: yes/no
  - Location of the PT: proximal, midportion, distal, or diffuse
  - Grading of PT: grade 0, 1, 2, 3
  - Patellar tendon partial tear (yes/no) and location
METHODS
Outcomes

• PT was defined as:
  • Increased signal intensity on fat-suppressed proton density sequences;
  • Increased signal intensity on fat suppressed T2-weighted sequences; or
  • Local increase in tendon thickness evidenced on T1-weighted sequences with increased MRI signal in the other sequences
• Grading of PT was:
  • Grade 0, no changes;
  • Grade 1 (mild) increased signal intensity in < 25% of the axial cross sectional tendon width;
  • Grade 2 (moderate) increased signal intensity in 25–50% of the axial cross sectional tendon width;
  • Grade 3 (severe) increased signal intensity in > 50% of the cross sectional tendon width.
## RESULTS

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>GRAFT FAILURE</th>
<th>P-VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No (n)</td>
<td>Yes (n)</td>
</tr>
<tr>
<td>PT, No</td>
<td>368</td>
<td>9</td>
</tr>
<tr>
<td>PT, Yes</td>
<td>159</td>
<td>23</td>
</tr>
<tr>
<td>Partial tendon tear, No</td>
<td>526</td>
<td>29</td>
</tr>
<tr>
<td>Partial tendon tear, Yes</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>
# RESULTS

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>Odds ratio</th>
<th>95% CI</th>
<th>P-VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presence of PT</td>
<td>5.9</td>
<td>2.7-13.1</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Grade 2-3 PT</td>
<td>20.8</td>
<td>6.8-63.9</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Presence of proximal PT</td>
<td>4.2</td>
<td>2-8.6</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Presence of distal PT</td>
<td>4.1</td>
<td>1.4-11.5</td>
<td>0.005</td>
</tr>
<tr>
<td>Partial patellar tendon tear</td>
<td>54.4</td>
<td>5.5-539.4</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>
DISCUSSION

- Prevalence of clinical PT ranges from 10-55% (1,2). The prevalence of MRI-based PT in the present study involving soccer players was 32.6%.
- Chronic tendon overload leads to tissue quality impairment, predisposing the tendon to injury (3,4,5,6).
- In a previous similar study (7), a significant risk of graft failure was found in patients with compared to without PT. In addition, patients with moderate or severe (grade 2 and 3) PT had a 6.1 times higher risk of graft failure, compared to the 21 times higher in the present study.
CONCLUSIONS

- The presence of PT increases the risk of BPTB graft failure when used for ACL reconstruction.
- The use of BPTB autograft is particularly discouraged in cases of partial patellar tendon tear.
REFERENCES