Does Posterior Tibial Slope Affect Graft Rupture Following ACL Reconstruction?

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• Sung-Do Cho, M.D.
  – I have no financial conflicts to disclose
Introduction

• Risk factors of ACL injuries
  – Anatomic factors: Posterior Tibial Slope (PTS)
    • Meister et al. AJKS. 1998.
    • Brandon et al. Arthroscopy. 2006.
    • Hashemi et al. JBJS. 2008 and AJSM. 2010.
    • Hohmann et al. KSSTA. 2011.
    • Hudek et al. CORR. 2011.
    • Vyas et al. KSSTA. 2011. … etc
Purpose

• However, the relationship between PTS and the risk of ACL graft rupture remains unclear.

• To evaluate the association between PTS and ACL graft rupture in patients who had undergone ACL reconstruction by comparing results in patients who experienced graft rupture and a matched control group.
Materials and Methods

• April 2005 ~ October 2014
• 64 Knees (64 Patients) with the failure of ACL reconstruction
• Exclusion criteria
  – Contact ACL injuries, re-revision ACL surgery, index surgeries using synthetic ligaments, multiple ligament injuries, combined fractures
Materials and Methods

Methods

• 64 knees with the failure of ACL reconstruction → Group A

• 64 knees of control group without the failure of ACL reconstruction → Group B
  : randomly matched to Group A
  (age, gender, left or right, body mass index)
Methods

Primary ACL reconstruction by one surgeon

- 37 knees with the failure of ACL reconstruction
  → Group A-a

- 37 knees of control group without the failure of ACL reconstruction
  → Group B-b

: randomly matched to Group A-a
Materials and Methods

Methods

• Compare PTS
  – between Group A & B and Group A-a & B-b

• Compare PTS according to age, gender, right or left side and BMI in Group A

• Statistical analysis
  – T-test and Pearson’s correlation tests
  – Logistic regression model for odds ratio
Comparison Between Two Groups

<table>
<thead>
<tr>
<th></th>
<th>Group A</th>
<th>Group B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean PTS</td>
<td>$13.2 \pm 2.5^\circ$ (8.5-18.2°)</td>
<td>$10.9 \pm 3.1^\circ$ (4.9-13.6°)</td>
</tr>
</tbody>
</table>

$p < 0.01$

Group A: with failure of ACL reconstruction
Group B: without failure
## Results

### Comparison Between Two Groups

<table>
<thead>
<tr>
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<th>Group A-a</th>
<th>Group B-b</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean PTS</td>
<td>13.5±2.5° (8.5-18.2°)</td>
<td>11.1±2.9° (5.1-13.6°)</td>
</tr>
</tbody>
</table>

*(p < 0.01)*

Group A-a : with failure of ACL reconstruction
Group B-b : without failure primary ACLR by one surgeon
Results

Comparison in Group A

- There were no differences of PTS according to the age, gender, right or left side and BMI.

Comparison Between Two Groups

- Linear regression model
  - 1° increase in PTS → odds ratio of 1.37
  - Cutoff point
    - PTS ≥ 12° : OR 4.52
Conclusions

• This study showed that mean PTS was significantly greater in patients with than without noncontact ACL graft rupture (13.2° vs. 10.9°, p<0.01).

• The failure of ACL reconstruction appears to be associated with increased PTS, with PTS ≥ 12° a risk factor for the failure of ACL reconstruction.


