Combined Reconstruction of the Anterolateral Ligament in Patients with Hypermobility and Knee Hyperextension with ACL Injuries Leads to Better Clinical Outcomes than Isolated ACL Reconstruction

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• Camilo P Helito - Speaker for Arthrex, Smith Nephew, Implamed, Merck, Pfizer
• Marco K Demange - Royalties received from Las Brasil, Speaker for Depuy Synthes, Las Brasil, Support received from Depuy Synthes
Introduction

- Hypermobility has been implicated as a contributing factor for ACL and ACL graft injury in certain subpopulations.
- The objective of this study is to evaluate the results of combined ACL and anterolateral ligament (ALL) reconstruction in patients with hypermobility and ACL injury.
- It was hypothesized that patients who underwent combined ACL and ALL reconstruction would exhibit less residual laxity and better clinical outcomes.
Methods

- Two groups of patients were evaluated and compared retrospectively
- Both groups consisted of patients with ACL injuries and associated ligamentous hyperlaxity, defined based on the modified Beighton scale with a minimum score of 5
- Group 1 patients underwent anatomical ACL reconstruction, and group 2 patients underwent anatomical ACL reconstruction combined with ALL reconstruction
- The presence of associated meniscal injury, subjective International Knee Documentation Committee (IKDC) and Lysholm functional scores, KT-1000 measurements, the presence of a residual pivot-shift and the graft rupture rate were evaluated
Results

- Ninety patients undergoing ACL reconstruction with ligamentous hyperlaxity were evaluated.
- The mean follow-up was 29.6 ± 6.2 months for group 1 and 28.1 ± 4.2 months for group 2 (p=0.51).
- No significant differences were found between the groups regarding Beighton scale, gender, the duration of injury before reconstruction, follow-up time, preoperative instability or associated meniscal injuries.
- The mean age was 29.9 ± 8.1 years in group 1 and 27.0 ± 9.1 years in group 2 (p = 0.017).

<table>
<thead>
<tr>
<th></th>
<th>Group 1 (control)</th>
<th>Group 2 (ACL + ALL)</th>
<th>p</th>
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</thead>
<tbody>
<tr>
<td>Number of subjects</td>
<td>60</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td><strong>Mean age (years)</strong></td>
<td><strong>29.9 ± 8.1</strong></td>
<td><strong>27.0 ± 9.1</strong></td>
<td><strong>0.017</strong></td>
</tr>
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<td>Number of males</td>
<td>28 (46.7%)</td>
<td>13 (43.3%)</td>
<td>0.80 (NS)</td>
</tr>
<tr>
<td>Duration of injury before surgery (months)</td>
<td>12.4 ± 14.2</td>
<td>13.1 ± 12.8</td>
<td>0.41 (NS)</td>
</tr>
<tr>
<td>Preoperative KT-1000 (mm)</td>
<td>7.4 ± 1.2</td>
<td>7.7 ± 1.3</td>
<td>0.27 (NS)</td>
</tr>
<tr>
<td>Preoperative pivot-shift</td>
<td>11 grade 1 (18.3%), 28 grade 2 (46.7%) and 21 grade 3 (35.0%)</td>
<td>6 grade 1 (20%), 16 grade 2 (53.3%) and 8 grade 3 (26.7%)</td>
<td>0.73 (NS)</td>
</tr>
<tr>
<td>Beighton scale</td>
<td>5.8 +/- 0.9</td>
<td>6.1 +/- 1.1</td>
<td>0.42 (NS)</td>
</tr>
<tr>
<td>Presence of meniscal injuries</td>
<td>20 (33.3%)</td>
<td>8 (26.7%)</td>
<td>0.52 (NS)</td>
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<tr>
<td>Follow-up time</td>
<td>29.6 ± 6.2</td>
<td>28.1 ± 4.2</td>
<td>0.51 (NS)</td>
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<tr>
<td>Graft diameter (mm)</td>
<td>8.1 ± 0.8</td>
<td>8.2 ± 0.6</td>
<td>0.44 (NS)</td>
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</table>
Results

- In the final evaluation, group 2 patients showed better anteroposterior clinical stability as evaluated by KT-1000 arthrometry ($p = 0.02$), better rotational stability as evaluated by the pivot-shift test ($p = 0.03$) and a lower reconstruction failure rate (21.7% (group 1) vs. 3.3% (group 2); $p = 0.03$)

- Clinical evaluations of postoperative functional scales showed no differences between the two groups ($p=0.27$ for IKDC and $p=0.41$ for Lysholm)

<table>
<thead>
<tr>
<th></th>
<th>Group 1 (60 patients)</th>
<th>Group 2 (30 patients)</th>
<th>p</th>
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</thead>
<tbody>
<tr>
<td>Subjective IKDC</td>
<td>84.3 ± 9.8</td>
<td>86.9 ± 9.3</td>
<td>0.27 (NS)</td>
</tr>
<tr>
<td>Lysholm</td>
<td>86.3 ± 7.8</td>
<td>88.3 ± 7.3</td>
<td>0.41 (NS)</td>
</tr>
<tr>
<td>Postoperative KT-1000 (mm)</td>
<td>2.3 ± 1.4</td>
<td>1.5 ± 1.1</td>
<td>0.02</td>
</tr>
<tr>
<td>Residual pivot-shift</td>
<td>51.7%</td>
<td>26.7%</td>
<td>0.03</td>
</tr>
<tr>
<td>Postoperative pivot-shift</td>
<td>29 grade 0, 26 grade 1, 5 grade 2</td>
<td>22 grade 0, 8 grade 1</td>
<td>0.04</td>
</tr>
<tr>
<td>Rerupture</td>
<td>13 (21.7%)</td>
<td>1 (3.3%)</td>
<td>0.03</td>
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We believe that isolated ACL reconstruction with hamstrings tendons should not be the preferred technique in patients with ligamentous hyperlaxity.

We believe that if intra-articular ACL reconstruction alone is selected, the patellar tendon or quadriceps can be used.

Nevertheless, the combined ACL and ALL reconstruction failure rate of 3.3% observed in this study is lower than reported in literature for this group of patients and should be strongly considered.
Conclusion

- Combined ACL and ALL reconstruction in patients with ligamentous hyperlaxity resulted in a lower failure rate and improved knee stability parameters compared to isolated ACL reconstruction.

- No differences were found in the functional scales.
Thank you
References