Factors Associated with Excellent Early Functional and Isokinetic Test Results Following ACL Reconstruction

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Background

- The incidence of ACL tear has been reported at 81 ruptures per 100,000 people $^2$

- Only 2/3 of athletes return to preinjury level of activities following ACL reconstruction $^1$

- Average return to moderate sports was at 5.8 months $^3$
- Average return to strenuous sports was at 8.1 months $^3$
Purpose

- To identify factors associated with excellent functional and isokinetic testing results at six months following ACL reconstruction surgery.
Methods

- 352 primary ACL reconstructions by single surgeon 1998-2005
- All patients were given option of Allograft vs. Autograft
- Retrospective review
  - Factors:
    - Age
    - Graft type
    - Gender
    - Quad activation
    - BMI
    - IKDC/Tegner scores
    - Intraarticular concomitant injuries
  - Functional and Isokinetic Testing at 6 months.
Methods

Functional and Isokinetic Testing

• Criteria for testing at 6 months
  • Absence of Effusion
  • No patellofemoral pain or pain with weightbearing
  • Objective stability on exam

• Functional Testing
  • Single hop
  • Vertical jump
  • Triple jump
  • Satisfactory result = >90% of opposite limb

• Isokinetic Testing
  • Maximal torque of hamstrings and quads were measured at 60°/s and 180°/s and recorded
  • Satisfactory result = >85% of opposite limb
Results

• Study Group
  • 224 Primary ACL reconstructions
  • Mean age 26 (12-59)
  • Mean BMI 25.8 (17-44)
  • 162 Autografts
    • 134 BTB
    • 28 Hamstrings
  • 62 Allografts

• Excellent Performance Group
  • Patients who performed satisfactorily in at least 6 of 7 of categories (3 functional tests and 4 strength tests).
## Results

### Age

<table>
<thead>
<tr>
<th>Age*</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>24.1 ± 12.1</td>
<td>0.01 *</td>
</tr>
<tr>
<td>27.1 ± 11.7</td>
<td></td>
</tr>
</tbody>
</table>

### Gender

<table>
<thead>
<tr>
<th>Gender</th>
<th>Excellent</th>
<th>Not Cleared</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 (48.1%) m</td>
<td>27 (51.9%) f</td>
<td>68 (39.5%) m</td>
<td>0.27</td>
</tr>
<tr>
<td>104 (60.5%) f</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### BMI*

<table>
<thead>
<tr>
<th>BMI*</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>24.5 ± 3.8</td>
<td>0.03 *</td>
</tr>
<tr>
<td>26.2 ± 4.8</td>
<td></td>
</tr>
</tbody>
</table>

### Articular Damage *

<table>
<thead>
<tr>
<th>Articular Damage *</th>
<th>Excellent</th>
<th>Not Cleared</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 (28.8%)</td>
<td>76 (44.2%)</td>
<td>0.048 *</td>
<td></td>
</tr>
</tbody>
</table>

**P = 0.01**
Results

BMI

- Excellent: 24.5*
- Not cleared: 26.2*

P = 0.03*

Articular Damage

- Excellent
- Not cleared

P = 0.048*

P = 0.03*

BMI

P = 0.048*

Cartilage Degeneration

Patients
## Results

### Allograft vs. Autograft

<table>
<thead>
<tr>
<th></th>
<th>Excellent Outcome Group</th>
<th>Not Cleared</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT autograft</td>
<td>28 (53.8%)</td>
<td>107 (62.2%)</td>
<td>0.29</td>
</tr>
<tr>
<td>HS autograft</td>
<td>10 (19.2%)</td>
<td>17 (9.9%)</td>
<td></td>
</tr>
<tr>
<td>PT allograft</td>
<td>15 (28.8%)</td>
<td>47 (27.3%)</td>
<td></td>
</tr>
<tr>
<td>Allograft vs</td>
<td>37 (71.2%)</td>
<td>124 (72.1%)</td>
<td>0.90</td>
</tr>
<tr>
<td>Autograft</td>
<td>15 (28.8%)</td>
<td>48 (27.9%)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age</th>
<th>Excellent Outcome %</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;18</td>
<td>50</td>
<td>0.66</td>
</tr>
<tr>
<td>18-30</td>
<td>30</td>
<td>0.75</td>
</tr>
<tr>
<td>&gt;30</td>
<td>20</td>
<td>0.047*</td>
</tr>
</tbody>
</table>

*Note: All p-values are statistically significant.
Results

Estimated probability of excellent outcome

Patients > 30 years old
Allograft vs. Autograft

P=.047*
Conclusion

• Younger age, lower BMI, and minimal cartilage degeneration is significantly associated with excellent functional and isokinetic test results at 6 months post operatively.

• Patients over 30, who underwent Allograft reconstruction were more likely to exhibit excellent test results at 6 months.

• The safety of returning patients with an Allograft reconstruction to sport at 6 months has not been established.
References


