Less Joint Awareness Following Arthroscopic Primary Repair versus Reconstruction of the Anterior Cruciate Ligament

Jelle P. van der List
Harmen D. Vermeijden
Anne Jonkergouw
Gregory S. DiFelice

Hospital for Special Surgery, New York, NY
Disclosures

Jelle P. van der List, MD
I am a consultant and receive research support from Arthrex

Harmen D. Vermeijden
I have no financial conflicts to disclose

Anne Jonkergouw, MD
I have no financial conflicts to disclose

Gregory S. DiFelice, MD
I am a consultant and receive research support from Arthrex
Introduction

- Recently, a resurgence of interest for primary repair of proximal ACL tears was noted.¹

- Resurgence driven by (potential) advantages²-⁵
  - Preservation native ligament & proprioception
  - Less invasive surgery (no tunnels drilled or graft harvested)

- Potentially less joint awareness compared to reconstruction

¹ van der List et al., Surgeon, 2017
² van der List et al., Knee, 2017
³ Achtnich et al., Arthroscopy, 2016
Study aims

- Assess joint awareness following primary repair and compare with reconstruction

- Hypothesis: less joint awareness following primary repair compared to reconstruction
Methods

• Forgotten Joint Score-12 questionnaire\textsuperscript{1-4}
  • Recently validated PROM score
  • Higher score indicates ability to ‘forget’ the joint in daily life
  • Healthy controls scored 88.7
  • Not limited by ceiling effect

• Minimal clinically important difference (MCID) \textsuperscript{5}
  • Not yet validated in ACL surgery
  • Generally, 0.5 SD to estimate MCID

\textsuperscript{1} Behrend et al., J Arthroplasty, 2012
\textsuperscript{2} Behrend et al., Knee, 2017
\textsuperscript{3} Behrend et al., Knee Surg Sport Traumatol Arthros., 2017
\textsuperscript{4} Thompson et al., J Arthroplasty, 2015
\textsuperscript{5} Norman et al., Med Care, 2003
Methods

Retrospective
2012 – 2017
FJS-12
Clinic/contacted
Minimal 2 year FU

Joint awareness
Methods

All patients undergoing ACL surgery between May 2012 – May 2017
n = 200

Patients eligible for inclusion
n = 159

Excluded patients n = 41
- Failure n = 14
- Pre-existing osteoarthritis n = 2
- MLIK n = 25
- Skeletally immature n = 0

Patients able to receive survey
n = 146

Missing contact information n = 13

Surveys completed
n = 90

Did not respond n = 56

Survey completed > 5 year n = 7

Patients included
n = 83

ACL repair n = 49

ACL reconstruction n = 34
## Results

### Baseline characteristics

<table>
<thead>
<tr>
<th>Baseline characteristics</th>
<th>Primary repair (n = 49)</th>
<th>Reconstruction (n = 34)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (mean ± SD; years)</td>
<td>34 ± 11</td>
<td>29 ± 11</td>
<td>0.047</td>
</tr>
<tr>
<td>BMI (mean ± SD; kg/m²)</td>
<td>25 ± 4</td>
<td>26 ± 5</td>
<td>0.528</td>
</tr>
<tr>
<td>Male gender (n (%))</td>
<td>24 (51%)</td>
<td>20 (59%)</td>
<td>0.510</td>
</tr>
<tr>
<td>Delay (median (range); days)</td>
<td>36 (4 – 3416)</td>
<td>74 (8 – 2922)</td>
<td>0.202</td>
</tr>
<tr>
<td>Follow-up (mean ± SD; years)</td>
<td>2.5 ± 0.8</td>
<td>1.7 ± 4.8</td>
<td>0.012</td>
</tr>
<tr>
<td>Meniscus injury (n (%))</td>
<td>24 (49%)</td>
<td>23 (68%)</td>
<td>0.092</td>
</tr>
<tr>
<td>Chondral injury (n (%))</td>
<td>10 (20%)</td>
<td>8 (24%)</td>
<td>0.790</td>
</tr>
</tbody>
</table>
Results

- Outcomes of FJS-12

Forgotten Joint Score with ACL repair and Reconstruction

<table>
<thead>
<tr>
<th>Category</th>
<th>Repair</th>
<th>Reconstruction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall*</td>
<td>85.3</td>
<td>74.5</td>
</tr>
<tr>
<td>Women</td>
<td>85.7</td>
<td>77.3</td>
</tr>
<tr>
<td>Men*</td>
<td>85.0</td>
<td>72.5</td>
</tr>
<tr>
<td>Age &lt; 30</td>
<td>85.3</td>
<td>81.8</td>
</tr>
<tr>
<td>Age &gt; 30*</td>
<td>85.3</td>
<td>62.6</td>
</tr>
<tr>
<td>BMI &lt; 25</td>
<td>86.5</td>
<td>85.5</td>
</tr>
<tr>
<td>BMI &gt; 25*</td>
<td>85.9</td>
<td>64.7</td>
</tr>
</tbody>
</table>
Results

• **Multivariate regression analyses for confounders on FJS**

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE</th>
<th>P-value</th>
<th>95% CI (LB – UB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>104.4</td>
<td>8.186</td>
<td>0.000</td>
<td>88.064 – 120.651</td>
</tr>
<tr>
<td>Age</td>
<td>-0.194</td>
<td>0.191</td>
<td>0.312</td>
<td>-0.547 – 0.185</td>
</tr>
<tr>
<td>FU</td>
<td>-5.030</td>
<td>2.317</td>
<td>0.033</td>
<td>-9.641 – -0.419</td>
</tr>
<tr>
<td>Treatment</td>
<td>-9.016</td>
<td>4.420</td>
<td><strong>0.045</strong></td>
<td>-17.815 – -0.218</td>
</tr>
</tbody>
</table>
Discussion

- Less joint awareness following primary repair vs. reconstruction
  - Repair patients almost similar to healthy controls in the literature\(^1\)
  - 9 points differences exceeded estimated MCID threshold\(^2\)

- Limitations:
  - Retrospective design
  - No pre-operative FJS-12 available
  - Small sample size for some subgroup analyses

\(^1\) Behrend et al., Knee Surg Sport Traumatol Arthros., 2017
\(^2\) Norman et al., Med Care, 2003
Conclusions

• Less joint awareness following primary ACL repair vs. reconstruction

• Difference especially noted in:
  • Age above 30 years, male gender and BMI > 25 kg/m²

• Patients should be counseled on joint awareness

• Larger and prospective studies are necessary to assess if significant confounders are present
References

- van der List JP, DiFelice GS. Range of motion and complications following primary repair versus reconstruction of the anterior cruciate ligament. *Knee*. 2017
- Behrend H, Giesinger K, Zdravkovic V, Giesinger JM. The Knee Validating the forgotten joint score-12 in patients after ACL reconstruction. *Knee*. 2017