Predictive factors for conservative treatment failure when treating partial ACL tears in young patients

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Disclosure

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Introduction

Isolated ACL tears account for nearly half of all knee ligament injuries and primarily affect young and active patients. Partial ACL tears are difficult to diagnose and there is currently no consensus on treatment protocols.

The functional consequences of partial ACL injuries are moderate and a clinical examination can be relatively normal. Patients present with a moderate anterior knee laxity, a firm but delayed end-point upon Lachman testing and a glide or no pivot shift.
Hypothesis

• There is a lack of data available in the literature regarding the success rate of conservative treatment in young and very active patients after partial ACL injury.

• The purpose of this study was to assess predictive factors for conservative treatment failure after partial ACL tear in young and active patients.
Method

• A retrospective analysis of prospectively collected data was performed in patients who underwent conservative treatment for a partial ACL tear between October 1, 2008, and June 30, 2014.

• The inclusion criteria for the study were as follows: active patients (minimum thrice weekly participation in sports activities), age less than 30 and a diagnosis of partial ACL tear.

• The diagnosis of a partial ACL tear was based on
  • a clinical examination demonstrating a delayed but firm end-point upon
  • Lachman testing, < 4 mm difference in anterior knee joint laxity measured with the Rolimeter® (Aircast, Vista, California)
  • a glide or no pivot shift.
  • An MRI was performed to confirm the partial tear and assess the articular cartilage and the menisci.

Subtle focal hyperintensity in the substance of the proximal anterior cruciate ligament (arrow) and a slightly wavy contour of its anterior margin (arrowhead) are demonstrated on (2a), a fat-suppressed proton-density sagittal image.
Method

• All patients were prescribed a conservative treatment plan. Failure of conservative treatment, in this study, was defined as knee instability, manifest as a sensation of the knee ‘giving way’, confirmation of same on clinical exam and further evidence of knee pathology and/or completion of ACL tear on MRI.

• Knee stability was assessed again at one year post-injury. A Lachman test was utilised to assess anterior knee laxity, the pivot shift test for assessing rotatory knee instability and Rolimeter® (portable arthrometer, Aircast, Vista, California) to provide an instrumented objective evaluation of anterior knee laxity.

• Furthermore, all patients were contacted for this study (mean 43 months post-injury, range 24-96) to check if they had any new ipsilateral knee symptoms or injuries.
Results

The partial ligamentous injury progressed to a complete ACL tear in 16 (39%) patients.

In the remaining 25 patients, mean Tegner/IKDC scores were respectively 7.0/96.0 pre-injury, and 5.9/85.7, at last follow-up.

The mean ACL-RSI was 69.3. Tegner and IKDC scores were significantly lower post-injury.

Only 18 (51.4%) patients returned to their pre-injury level of sports activities.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Total</th>
<th>Non-operated</th>
<th>Operated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tegner</td>
<td>No.</td>
<td>36 (5)</td>
<td>24 (1)</td>
</tr>
<tr>
<td></td>
<td>Mean</td>
<td>7.3 (1.4)</td>
<td>7.0 (1.4)</td>
</tr>
<tr>
<td></td>
<td>Min; Max</td>
<td>5; 10</td>
<td>5; 10</td>
</tr>
<tr>
<td>IKDC</td>
<td>No.</td>
<td>35 (6)</td>
<td>23 (2)</td>
</tr>
<tr>
<td></td>
<td>Mean</td>
<td>96.8 (3.8)</td>
<td>96.0 (4.0)</td>
</tr>
<tr>
<td></td>
<td>Min; Max</td>
<td>84; 100</td>
<td>84; 100</td>
</tr>
<tr>
<td>ACL-RSI</td>
<td>No.</td>
<td>33 (8)</td>
<td>21 (4)</td>
</tr>
<tr>
<td></td>
<td>Mean</td>
<td>68.3 (17.8)</td>
<td>69.3 (19.2)</td>
</tr>
<tr>
<td></td>
<td>Min; Max</td>
<td>25; 100</td>
<td>25; 98</td>
</tr>
</tbody>
</table>

Table 2. Pre and post-injury scores
No.- Number
IKDC - International Knee Documentation Committee
ACL-RSI - Anterior Cruciate Ligament Return to Sports after Injury
Results

Patients under 20 years and practising pivot-contact sports had a statistically significant risk for progression to a complete ACL tear OR 0.19, p=0.037 and OR 6.29, p=0.026).

Meniscal lesions were found in 8 (57%) patients with a complete ACL tear.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Comparaison</th>
<th>OR</th>
<th>95% CI</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (at the time of partial tear)</td>
<td>&gt;20 vs ≤20</td>
<td>0.19</td>
<td>0.04-0.84</td>
<td>0.037*</td>
</tr>
<tr>
<td>Level of sport activity (before partial tear)</td>
<td>Competition vs training</td>
<td>3.0</td>
<td>0.61-22.47</td>
<td>0.213</td>
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<tr>
<td></td>
<td>Competition vs recreation</td>
<td>2.18</td>
<td>0.53-9.51</td>
<td>0.283</td>
</tr>
<tr>
<td>Type of sport</td>
<td>Pivot+contact vs others</td>
<td>6.29</td>
<td>1.36-38.03</td>
<td>0.026*</td>
</tr>
</tbody>
</table>

*statistically significant results

Table 3. Predictors for failure after conservative treatment
No.- Number
OR – Odds ratio
95% CI- 95% Confidence interval

Meniscal lesions were found in 8 (57%) patients with a complete ACL tear.
Discussion

• The most significant finding in the current study was that patient age less than or equal to 20 years and participation in pivot contact sports are significant predictive factors for failure of conservative treatment i.e. progression to a complete ACL tear. This occurred in 39% of this particular cohort, in the current study, at a mean of 43 months post-injury.

• Conservative treatment has traditionally been proposed as the gold standard in cases of partial tears.

• Odensten et al. reported on 21 patients presenting with partial ACL tears who were conservatively managed, with a mean follow-up of six years. All patients had good or excellent results. At final follow-up, three patients were considered to have unstable knees (1).

• Sommerlath et al. evaluated 19 patients with partial ACL tears, with a mean of 15 years follow-up. Knee function was rated as good with a mean Lysholm score of 93 points. None of the patients complained of instability. The authors considered conservative treatment effective only if the patients decrease their activity level (2).

• These studies evaluated a heterogeneous population of patients in terms of age and meniscal injury status. Even though associated lesions were found in more than half of the knees with a partial ACL tear, the authors considered that non-operative management is warranted.

• The current study focused on a relatively homogenous cohort presenting with a partial ACL tear. All the patients were active in sports and younger than 30 years.
Discussion

- Noyes et al. evaluated 32 patients presenting with a partial ACL tear with a mean of 7.3 years follow-up. The rate of return to sport, at the same level, was only 12.5%. No patient progressed to a complete rupture although the study cohort were older than in the current study and there was less participation in sports involving pivoting (3).

- Barrack et al. found 40% of 35 patients with partial ACL tears were able to return to their pre-injury level at a mean follow-up of 41 months. The age at the time of injury ranged from 15 to 45 years and the level of sport was not specified (4).

- Bak et al. evaluated 56 patients presenting with a partial ACL tear, without associated meniscal or chondral lesions, with a mean follow-up of 5.3 years. Good or excellent knee function was reported for 62% of patients with a Lysholm score between 84 and 100. Only 30% of patients resumed their pre-injury level of activities (5).

- In the current study, which focused solely on patients under 30 years old, only 5 patients from 16 (31%) were able to return to their pre-injury level (mean Tegner score 7.6). The authors concluded that the prognosis for knee function is more favourable if pivoting sports are stopped.
Conclusion

• Non-operative treatment for partial ACL tears is a reasonable treatment in young and active patients.

• However, there should be a discussion about the relatively high risk (40%) of conservative treatment failure, as demonstrated in the current series, such that the patient makes a truly informed decision.

• This is especially relevant for that cohort who are ≤ 20 years of age, practising pivoting contact sports, amongst whom, a progression to a complete ACL tear was observed in 75% of cases.
REFERENCES

Thank you