Complications after Pediatric ACL Reconstruction: A Meta-Analysis

Stephanie E. Wong M.D., Brian T. Feeley M.D., Nirav K. Pandya M.D.
Department of Orthopaedic Surgery, University of California San Francisco, San Francisco, CA

Introduction
• Wide variety of surgical techniques used for pediatric ACL reconstruction.
• There is limited data on the outcomes of surgery, frequency of complications, and rate of growth disturbance.
• Objective: to review clinical outcomes following pediatric ACL reconstruction and the complications of growth disturbance.
• Hypothesis:
  • The rate of surgical intervention for re-rupture will be higher than that of growth disturbance in the literature.

Methods
• PubMed and EMBASE databases were searched for studies on ACL ruptures in the skeletally immature from 1985 to 2016.
  • Search terms: “ACL” or “anterior cruciate ligament” AND “pediatric” OR “immature” OR “young” or “children” or “child”.
• Complications not specific to the pediatric population were excluded (i.e. infection, knee stiffness).
• Demographics, graft type, surgical technique, follow up, growth disturbance, re-rupture, and patient reported outcome scores were collected. Data was analyzed in aggregate.
• The threshold for angular deformity was 3 degrees and for LLD was 1 cm.

Results
• Forty-five studies were included
• 1,321 patients and 1,392 knees
• Re-ruptures
  • 115 total (8.7%)
  • 94.6% of patients with re-rupture required revision ACL
• Growth disturbance
  • 58 total (16 required corrective surgery, or 27.6%)
  • Angular deformity (18 knees, or 3.7%, most commonly valgus)
  • Limb length discrepancy > 1cm (37 knees, or 7.5%)
  • IKDC score: range 81-100, 88% grade A or B
  • Lysholm score: mean 94.6

<table>
<thead>
<tr>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (chronological)</td>
</tr>
<tr>
<td>Sex</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Follow up</td>
</tr>
<tr>
<td>Graft</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Reconstruction technique</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Table 1. Patient demographics

Conclusions
• Growth disturbance can occur with any of the reconstruction techniques. Proper surgical technique is likely more important than the specific reconstruction technique.
• Patients with re-rupture require surgery at much higher rates than those with growth disturbance.
  • We suggest emphasis be given to the prevention of re-rupture in this age group.
• Our meta-analysis provides important insight given limited data on growth disturbance.
• Limitations: majority of studies included were case reports and case series; heterogeneous assessment of skeletally maturity and use of outcome scores.