Osteochondral Allografting of the Knee in the Pediatric and Adolescent Population

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Background

- Chondral and osteochondral lesions common in adolescents

Etiology
- Traumatic
  - ACL & Patella dislocations
- Overuse
  - OCD (Incidence 1-3/10,000)
- AVN
  - Steroid induced
  - Sickle cell disease
Current Treatment Options

- Chondroplasty
- Microfracture/marrow stimulation
- OATS/Mosaicplasty
- ACI/MACI
Osteochondral Allograft

- Failed primary procedures
- Large lesions
- Significant bony involvement
Allograft Fundamentals

- Transplantation of...
  1. Mature hyaline cartilage
  2. Viable chondrocytes
  3. Supporting subchondral bone

- Incorporation via “creeping substitution”

- Retrieval studies confirm presence of live donor chondrocytes > 10 years post-op
Kids Are Particularly Challenging

- Young
- Active
- “Poor compliance”
- Not good arthroplasty candidates
Purpose

- The aim of this study was to describe our 30 year experience with osteochondral allografts in patients under 18 years of age with a focus on subjective outcome measures, return to activities, and allograft survivorship.
Methods

- IRB approved
- Retrospective Study
- Inclusion criteria
  1. Primary allograft
  2. Age < 18 years
  3. >2 year follow-up
Outcome Measures

- D’Abigne and Postel 18 point Scale
- IKDC
- Knee Society Function (KS-F) Score
- Satisfaction
- Graft survivorship (Kaplan-Meier)
- Complications
Tissue Processing

- Accredited AATB Facility
- Size matched on AP x-ray
- Tissue recovered within 24 hours
- Stores @$4^\circ$ C
- Implanted 5-28 days post-recovery
Surgical Technique

- Peripatellar arthrotomy
- Geometrically prepared
- Depth 2-10 mm
- Small/medium lesions “dowel technique”
- Large lesions “shell technique”

“Dowel Technique”

“Shell Technique”
Patient Demographics

- 39 patients with 43 knees
- Mean age 16.4 years (range 11.1-17.9)
- 26 Males/17 Females
- BMI = 24.4 (range 18.8-51.0)
- # previous surgeries = 1.5 (range 1-3)
- Lesion size (cm²) = 8.4 (range 2.2-20.8)
Subjective Results

Average follow up 8.4 years (range 2 - 27.1 years)

<table>
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<tr>
<th></th>
<th>IKDC Pain Score</th>
<th>IKDC Function Score</th>
<th>IKDC Total Score</th>
<th>Modified D’Aubigne &amp; Postel 18-Point Score</th>
<th>KSF Score</th>
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<tr>
<td>Pre-operative</td>
<td>2.47</td>
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<td>Post-operative</td>
<td>5.72</td>
<td>7.82</td>
<td>74.1</td>
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Satisfaction: 74.3% extremely satisfied
14.3% satisfied
Allograft Survivorship

- 5 year survival 93%
- 10 year survival 90%
- 5 failures (4.6 years)
- All failures salvaged with revision allograft
Radiographic Assessment

All grafts incorporated
Conclusions

- Osteochondral allografts are a viable option for the salvage of complex osteochondral knee lesions in adolescents.
- Yields improved function, pain, and satisfaction in the mid-term (8.4 years), but even in the long-term (>25 years).
- Survival rate 93% @ 5 years & 90% @ 10 years.
- When failures occur, they can be successfully revised with another allograft procedure.