Modern Osteochondral Allograft Transplantation:
The “Gold Standard” for Femoral Condyle Cartilage Repair?

Luís E.P. Tírico, MD; Pamela A. Pulido, BSN;
Julie C. McCauley, MPHc; William D. Bugbee, MD

Department of Orthopaedic Surgery, Scripps Clinic, La Jolla, CA
Instituto de Ortopedia e Traumatologia - University of São Paulo, Brazil
Introduction

Osteochondral Allograft (OCA)

Modern Technique

- Commercialization of fresh allograft distribution (2002)
- Advances in surgical instruments
- Dowel allografts utilizing the minimum amount of bone needed for fixation

Advantages

- Technically easier to perform than shell grafts
- Bone transplantation kept to a minimum
- Fixation generally not required
Objective

To evaluate outcome of modern osteochondral allograft (OCA) transplantation for the treatment of isolated femoral condyle cartilage lesions in a large series of patients.
Methods

Demographics and graft details

- 200 knees (187 patients) from 1999 – 2014 (minimum 2 year follow up)
- Average age 31 years (range, 11 – 67)
- Femoral condyle location: Medial (69%), Lateral (31%)
- Mean total graft area: 6.3 cm² (range, 2.3 – 13)
- Mean graft thickness: 6.5 mm (range, 5 – 11)
- Number of grafts: 1 (73%), 2 (27%)
Material and Methods

Demographics

- 86% had previous surgery on operative knee
- Median 2 previous surgeries (range, 1 – 13)
Methods

Outcome assessment

• KOOS, IKDC
• Patient satisfaction
• Further surgery
• OCA failure = revision OCA or conversion to arthroplasty
Results

• Average follow-up 6.7 years (range, 2 – 17)
• 184 of 200 knees (92%) had allografts in situ
• Improvement on all IKDC and KOOS outcome measures (all $p<0.001$)
• 89% patients were satisfied with the results

<table>
<thead>
<tr>
<th>Measure</th>
<th>Preoperative</th>
<th>Latest Follow Up</th>
<th>p-value*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IKDC</strong></td>
<td></td>
<td></td>
<td>All $p&lt;.0001$</td>
</tr>
<tr>
<td>Pain</td>
<td>5.5 ± 2.5</td>
<td>2.7 ± 2.4</td>
<td></td>
</tr>
<tr>
<td>Function</td>
<td>3.4 ± 1.8</td>
<td>7.3 ± 2.2</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>43.7 ± 18.0</td>
<td>76.2 ± 18.7</td>
<td></td>
</tr>
<tr>
<td><strong>KOOS</strong></td>
<td></td>
<td></td>
<td>All $p&lt;.0001$</td>
</tr>
<tr>
<td>Symptoms</td>
<td>62.5 ± 18.0</td>
<td>82.5 ± 15.5</td>
<td></td>
</tr>
<tr>
<td>Pain</td>
<td>66.5 ± 18.6</td>
<td>85.3 ± 16.3</td>
<td></td>
</tr>
<tr>
<td>Activities of daily living</td>
<td>74.5 ± 18.9</td>
<td>91.1 ± 14.7</td>
<td></td>
</tr>
<tr>
<td>Sports / recreation</td>
<td>37.8 ± 22.6</td>
<td>70.2 ± 26.4</td>
<td></td>
</tr>
<tr>
<td>Quality of life</td>
<td>25.4 ± 17.6</td>
<td>60.0 ± 24.3</td>
<td></td>
</tr>
</tbody>
</table>
Reoperations
26% (52 of 200 knees)

Not related to allograft
18% (36 of 200 knees)

- Diagnostic arthroscopy
- Debridement
- Loose body removal
- Plate/screw removal
- Meniscus repair
- Osteotomy

Allograft failure
8% (16 of 200 knees)

- Allograft revision (4 knees)
- Arthrosurface (1 knee)
- Uni knee arthroplasty (6 knees)
- Total knee arthroplasty (5 knees)
Results

Allograft survivorship
Discussion

“Modern technique” of OCA for femoral condyle lesions

- Dowel allografts with a minimum bone component
- Consistently good patient reported outcomes
- High satisfaction (89%)
- Low reoperation rate (26%)
- Low clinical failure rate (8%)
Conclusion

OCA transplantation utilizing a “modern technique” is similar or better than any other cartilage repair procedure for isolated femoral condyle lesions