Regenerative Medicine

The Biological Repair of Joint Surface Defects

Frank P. Luyten, MD, PhD
Division of Rheumatology
Department of Musculoskeletal Sciences
KULeuven
Belgium
Autologous Chondrocyte Implantation for the repair of a symptomatic joint surface defect
Superior structural repair at 12 months

Characterized Chondrocyte Implantation Results in Better Structural Repair When Treating Symptomatic Cartilage Defects of the Knee in a Randomized Controlled Trial Versus Microfracture

Danel B. F. Saris, a MD, PhD, Johan Vanlauwe, b MD, Jan Victor, c MD, Miroslav Haspi, d MD, PhD, Michael Bohnsack, e MD, Yves Fortems, f MD, Bruno Vandekerckhove, g MD, K. Frederik Almqvist, h MD, PhD, Toon Claes, i MD, Frank Handelberg, j MD, Koen Lagae, k MD, Jan van der Bauwhede, l MD, Hilde Vandenneucker, m MD, K. Gie Auw Yang, n MD, PhD, Mislav Jelic, o MD, PhD, Rene Verdonk, p MD, PhD, Nancy Veulemans, q MD, Ir, Johan Bellemans, r MD, PhD, and Frank P. Luyten, s MD, PhD

Conclusion: One year after treatment, characterized chondrocyte implantation was associated with a tissue regenerate that was superior to that after microfracture. Short-term clinical outcome was similar for both treatments. The superior structural outcome may result in improved long-term clinical benefit with characterized chondrocyte implantation. Long-term follow-up is needed to confirm these findings.

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Clinical benefit over microfracture at 36 months

Characterized Chondrocyte Implantation Results in Better Clinical Outcome at 36 Months in a Randomized Trial Compared to Microfracture

Daniel B. F. Saris,* ‡ MD, PhD, Johan Vanlauwe, ‡ MD, Jan Victor, ‡ MD, PhD, Karl Fredrik Almqvist, † MD, PhD, Rene Verdonk, † MD, PhD, Johan Bellemans, ‡ MD, PhD, and Frank P. Luyten, ‡ MD, PhD, for the TIG/ACT/01/2000&EXT Study Group

Conclusion: Characterized chondrocyte implantation for the treatment of articular cartilage defects of the femoral condyles of the knee results in significantly better clinical outcome at 36 months in a randomized trial compared with MF. Time to treatment and chondrocyte quality were shown to affect outcome.

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Clinical benefit over microfracture at 36 months

Longitudinal Analysis
Treatment effect at 36m
Mixed linear model (heterogenous compound symmetry with time as categorical variable)

<table>
<thead>
<tr>
<th>KOOS</th>
<th>P-value</th>
</tr>
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<tbody>
<tr>
<td>Overall(1)</td>
<td>0.048</td>
</tr>
<tr>
<td>Pain</td>
<td>0.044</td>
</tr>
<tr>
<td>Symptoms</td>
<td>0.123</td>
</tr>
<tr>
<td>Activity (ADL)</td>
<td>0.064</td>
</tr>
<tr>
<td>Sports</td>
<td>0.123</td>
</tr>
<tr>
<td>Quality of Life</td>
<td>0.036</td>
</tr>
</tbody>
</table>

(1) Knee Injury and OA Outcome Score - Average of all KOOS domains, except Sports
(2) Full Analysis Set excluding treatment failures and without imputation for missing data
KOOS improvement over time* including all available data (long term follow-up) and LOCF for failures** (means)

*average of all KOOS domains, except Sports
** FAS with LOCF imputations for missing data of failures
Overall conclusions

- **Structural superiority** vs. MF at 12 months
- **Clinical benefit** vs. MF at 36 months
- **Durability of effect** at 60 months follow-up
  - Clinical response at 24m predictive of long term response
  - MF failures tend to occur earlier
- No unexpected safety issues and comparable **safety profile**

- **Early treatment** results in better long term clinical outcome