Mental Health Has No Predictive Association with Self-Assessed Knee Outcome Scores in Patients After Osteochondral Allograft Transplantation in the Knee

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Introduction

Osteochondral allograft transplantation (OCA)

• Increasingly performed as a primary procedure for large osteochondral defects showing excellent clinical outcomes $^1,^2,^3$
• Multiple factors influence postoperative outcome
• Influence of psychosocial factors to predict outcomes is of increasing interest
• Low patient mental health/depression was found to be associated with poor outcomes in:
  – Trauma surgery $^4,^8$
  – Spine surgery $^5,^10,^11,^12$
  – Hand and upper extremity surgery $^6,^7,^9$
  – Osteoarthritis $^{13,14,15}$
  – ACL reconstruction and total knee arthroplasty $^{16,17,18}$
Purpose

- To determine the role of psychological factors on patient-reported pain and functional outcomes in patients after OCA

Hypothesis

- Poor preoperative mental health, as measured with the Short Form-12 Mental Component Summary (SF-12 MCS), is associated with diminished KOOS scores at minimum follow up of 24 months
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Materials and Method

Patient Selection

- OCA for focal osteochondral defects in the knee
- Single surgeon
- March 2011 to April 2016
- Minimum 2-year follow-up

<table>
<thead>
<tr>
<th>PROMs</th>
<th>Patient Factor</th>
<th>Lesion Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>SF-12 MCS</td>
<td>Age</td>
<td>Size</td>
</tr>
<tr>
<td>KOOS</td>
<td>BMI</td>
<td>Number</td>
</tr>
<tr>
<td>Lysholm</td>
<td>Sex</td>
<td>Location</td>
</tr>
<tr>
<td>Tegner</td>
<td>Smoking status</td>
<td></td>
</tr>
<tr>
<td>IKDC</td>
<td>WC status</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Previous surgeries</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Concomitant surgeries</td>
<td></td>
</tr>
</tbody>
</table>
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Results

Patient Characteristics, Postoperative Outcome and Improvement Scores

<table>
<thead>
<tr>
<th>PROM</th>
<th>Total Score (Mean ± SD)</th>
<th>Delta Score (Mean ± SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>KOOS Pain</td>
<td>80.47 ± 18.57</td>
<td>23.47 ± 21.75</td>
</tr>
<tr>
<td>KOOS Symptoms</td>
<td>54.0 ± 13.41</td>
<td>11.14 ± 14.64</td>
</tr>
<tr>
<td>KOOS ADL</td>
<td>87.25 ± 16.53</td>
<td>20.96 ± 20.67</td>
</tr>
<tr>
<td>KOOS Sport/Recreation</td>
<td>60.30 ± 29.49</td>
<td>29.70 ± 27.86</td>
</tr>
<tr>
<td>KOOS QOL</td>
<td>57.56 ± 27.08</td>
<td>32.74 ± 25.49</td>
</tr>
<tr>
<td>Tegner</td>
<td>4.1 ± 1.96</td>
<td>1.02 ± 2.65</td>
</tr>
<tr>
<td>Lysholm</td>
<td>75.1 ± 21.29</td>
<td>24.81 ± 22.31</td>
</tr>
<tr>
<td>IKDC</td>
<td>67.77 ± 21.70</td>
<td>27.11 ± 20.78</td>
</tr>
<tr>
<td>SF-12 MCS</td>
<td>54.73 ± 6.02</td>
<td>4.41 ± 8.53</td>
</tr>
</tbody>
</table>

Patients: n = 67

- Age, y, mean ± SD: 35.0 ± 10.0
- BMI, kg/m², mean ± SD: 26.8 ± 4.7
- Female Gender, n: 37
- Mean Follow-up, mean ± SD: 2.7 ± 1.0
- Smokers, n: 5
- WC, n: 2
- Concomitant HTO, n: 12
- Concomitant TTO, n: 11
- Concomitant DFO, n: 1
- Concomitant MAT, n: 2
- Concomitant MPFL, n: 1
- Previous Surgery, n: 38
- OCA Size, cm², mean ± SD: 5.0 ± 3.7
- Number of Plugs, mean ± SD: 1.6 ± 0.7
- Plug Location:
  - MFC, n: 40
  - LFC, n: 21
  - Trochlea, n: 12
  - Patella, n: 8
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Results

Uni- and Multivariable Regression Models

Despite significant bivariate correlations, the **SF-12 MCS** had **no predictive association** with any **PROM** in the multivariable linear regression models.

The SF-12 MCS showed **no bivariate correlation** with any PROM Delta (*P* > .05).

**Patient sex** contributed significantly to the final regression models of:
- KOOS Sport/Recreation (*P* = .042)
- Tegner (*P* = .024)
- Lysholm (*P* = .031)

### Univariable Regression of Preoperative SF-12 MCS and Postoperative Patient-reported Outcome Measures at Final Follow-Up

<table>
<thead>
<tr>
<th></th>
<th>KOOS Pain</th>
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<th>IKDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson</td>
<td>0.22</td>
<td>-0.30</td>
<td>0.30</td>
<td>0.28</td>
<td>0.16</td>
<td>0.01</td>
<td>0.22</td>
<td>0.25</td>
</tr>
<tr>
<td><em>P</em></td>
<td>0.08</td>
<td><strong>0.01</strong></td>
<td><strong>0.02</strong></td>
<td><strong>0.02</strong></td>
<td>0.20</td>
<td>0.96</td>
<td>0.08</td>
<td><strong>0.04</strong></td>
</tr>
</tbody>
</table>

### Univariable Regression of Preoperative SF-12 MCS and Improvement (Delta) of Patient-reported Outcome Measures at Final Follow-Up

<table>
<thead>
<tr>
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<th>IKDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson</td>
<td>-0.02</td>
<td>-0.11</td>
<td>-0.10</td>
<td>0.11</td>
<td>0.03</td>
<td>-0.20</td>
<td>-0.10</td>
<td>0.03</td>
</tr>
<tr>
<td><em>P</em></td>
<td>0.89</td>
<td>0.38</td>
<td>0.42</td>
<td>0.37</td>
<td>0.80</td>
<td>0.11</td>
<td>0.40</td>
<td>0.84</td>
</tr>
</tbody>
</table>
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Discussion

- Preoperative mental health assessment may provide useful prognostic information in patients with osteoarthritis undergoing arthroplasty \(^{19, 20}\)
- Preoperative mental health has significant influence on postoperative functional scores after ACI \(^{21, 22}\)
- Shorter recovery time and easier rehab in patients after OCA than ACI may explain the disparity in results
- Compliance with rehabilitation and a patient’s mental health are likely related \(^{23}\)
- ACI may require better preoperative mental health than OCA in order to attain good compliance with the longer and more involved postoperative course to achieve better postoperative function
Limitations

• Retrospective review of prospectively collected data
• Small study group
• Represented only 50% of the eligible population
  – But study population was representative for the entire eligible population
• As a tertiary referral center for cartilage repair, patients in this study had relatively large or multiple cartilage defects
• Preoperative mental health demonstrated **no predictive value for postoperative PROMs**

• **Female sex was negatively correlated** with
  – KOOS Sport/Recreation
  – Tegner
  – Lysholm scores

• Given the disparity between our findings and previous reports on other cartilage repair options, **it is advisable to include preoperative mental health** as one of the many factors involved in the informed decision making process between patient and physician to select the most appropriate cartilage repair procedure.
Thank you for your attention!


