Assessment of the Knee Articular Cartilage through MRI-T2 Mapping at Five Year Follow-Up of Meniscal Allograft Transplantation

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Disclosure

Luis T. Llano-Rodriguez, MD, Mexico City, MEXICO
I have no financial conflicts to disclose.

Francisco Cruz-Lopez, Mexico City, MEXICO
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Clinical improvement after a meniscal allograft transplant (MAT) has been demonstrated.*

Not enough evidence to demonstrate its chondroprotective effect.

Backgrounds

MRI-T2 Mapping

Non-invasive technique dependent on the amount of water and integrity of the matrix of collagen and proteoglycans.

Quantitative information on water content of articular cartilage (Water relaxation time, 0-100 ms).

Femoral condyle: 40-50 ms *
Tibial plateau: 30-50 ms *

The water relaxation times (WRT) of the articular cartilage will remain within normal parameters at 5 years of MAT.
Methods

Uncontrolled clinical trial; 24 patients with a history of total meniscectomy, no malalignment, no instability, no advance arthrosis

Arthroscopic MAT was performed with gamma-irradiated (GI) or fresh frozen (FF) graft according to availability.

Evaluations of WRT with MRI-T2 mapping in an annual follow-up for 5 years.
Results

24 patients, 13 (54%) female and 11 (46%) male with an average age of 31.29 ± 7.32 y.

BMI of 26.68 ± 3.93 kg/m2.

21 (87%) medial MAT and 3 (13%) lateral.

13 (54%) MAT-FF, and 11 (46%) MAT-GI.

Time from meniscectomy to MAT: 21.62 ± 3.93 months.

<table>
<thead>
<tr>
<th>Gender</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>MALE</td>
<td>11</td>
<td>46 %</td>
</tr>
<tr>
<td>FEMALE</td>
<td>13</td>
<td>54 %</td>
</tr>
<tr>
<td>MAT FF</td>
<td>13</td>
<td>54 %</td>
</tr>
<tr>
<td>MAT GI</td>
<td>11</td>
<td>46 %</td>
</tr>
<tr>
<td>MEDIAL</td>
<td>21</td>
<td>87 %</td>
</tr>
<tr>
<td>LATERAL</td>
<td>3</td>
<td>13 %</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measure</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI</td>
<td>26.7kg/m2</td>
</tr>
<tr>
<td>AGE</td>
<td>31.29 y</td>
</tr>
</tbody>
</table>
MRI-T2 Mapping 5 years follow-up

FRESH FROZEN

GAMMA-IRRADIATED
MRI-T2 Mapping of Femur and Tibia. 5 years follow-up

<table>
<thead>
<tr>
<th>Femur Pre-op</th>
<th>Femur 12m</th>
<th>Femur 24m</th>
<th>Femur 36m</th>
<th>Femur 48m</th>
<th>Femur 60m</th>
</tr>
</thead>
<tbody>
<tr>
<td>38.54 ± 5.32</td>
<td>37.37 ± 6.41</td>
<td>38.47 ± 5.67</td>
<td>39.95 ± 5.03</td>
<td>40.33 ± 5.59</td>
<td>44.13 ± 4.29</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tibia Pre-op</th>
<th>Tibia 12m</th>
<th>Tibia 24m</th>
<th>Tibia 36m</th>
<th>Tibia 48m</th>
<th>Tibia 60m</th>
</tr>
</thead>
<tbody>
<tr>
<td>39.86 ± 7.21</td>
<td>34.33 ± 5.07</td>
<td>38.47 ± 5.39</td>
<td>41.35 ± 5.86</td>
<td>41.91 ± 5.30</td>
<td>45.96 ± 4.20</td>
</tr>
</tbody>
</table>
MRI-T2 Mapping of Femur (GI vs FF) 5 years follow-up

<table>
<thead>
<tr>
<th>FEMUR</th>
<th>Pre</th>
<th>P vs.</th>
<th>5 year</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>GAMMA</td>
<td>36.50 ± 4.54</td>
<td>0.002</td>
<td>41.10 ± 3.12</td>
<td>6.11 ± 3.61</td>
</tr>
<tr>
<td>P vs.</td>
<td>0.46</td>
<td>0.599</td>
<td>0.350</td>
<td></td>
</tr>
<tr>
<td>FRESH FROZEN</td>
<td>36.59 ± 9.08</td>
<td>0.164</td>
<td>44.68 ± 6.57</td>
<td>3.51 ± 7.56</td>
</tr>
</tbody>
</table>

Graph: Relaxation time (Ms) vs. Follow-up (Months)

- **Gamma Irradiated (Femur)**
- **Fresh Frozen (Femur)**
Conclusions

The measurements remain within normal parameters (30ms - 50ms) with an increase of 1.11ms per year for the femur and 1.22ms for the tibia.

There are no significant differences in the comparison between both types of grafts.

MAT maintains the cartilage WRT within normal parameters at 5-year follow-up.

Continue with the follow up.


