Evaluation of Medial Meniscus Extrusion using Ultrasonography and Magnetic Resonance Imaging

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I have no financial conflicts to disclosure.
Purpose

✓ To compare medial meniscus extrusion in normal knees and patients using ultrasonography (US)

✓ In patients, to evaluate medial meniscus extrusion using US and Magnetic Resonance Imaging (MRI)
Control group

20 volunteers
(male 10, female 10, mean age 30.5 years)

Patient group

32 patients with medial painful knees
(male 13, female 19, mean age 58.8 years)

OA stage: Kellgren Lawrence (KL) grades
(KL grade 0: 16, KL grade 1: 16)
Materials and methods

**US**: LOGIQe, GE

A single examiner, Knee extension

**Supine**: Non weight bearing (NWB)

**Standing**: Weight bearing (WB)
Materials and methods

MRI: 1.5 T MRI, Horizon, GE
Radiologists evaluated pathological meniscus

Root tear
Horizontal tear
Results

Meniscus extrusion (mm)

Paired t-test

N.S.

P<0.05

Control

Patients
Meniscus extrusion (mm)

KL grade is associated with meniscus extrusion
32 knees in patient group

Radiological evaluation of MRI findings

- 12 knees: No abnormality
- 7 knees: Root tear
- 13 knees: Horizontal tear

Mann-Whitney U test with Bonferroni correction

- WB: 1.4 ± 0.4
- 2.8 ± 1.1
- 2.5 ± 1.1

P < 0.05

N.S.
Discussion

• Meniscal extrusion was associated with joint effusion and primary OA
  

• It remains unclear whether extrusion precedes or follows OA changes
  

• Osteophytes loosen attachments to coronary ligament and cause meniscus extrusion
  
  Kawaguchi K et al. Arthritis Rheum 2012, 64 173–180
**Degree of major extrusion was similar in knees with root tears and non-root tears.**


<table>
<thead>
<tr>
<th></th>
<th>Root tear group</th>
<th>Non-root (Horizontal etc.)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number</strong></td>
<td>17</td>
<td>85</td>
<td></td>
</tr>
<tr>
<td><strong>Extrusion (mm)</strong></td>
<td>$3 \pm 1$ (2 to 6)</td>
<td>$3 \pm 2$ (0 to 8)</td>
<td>N.S.</td>
</tr>
</tbody>
</table>

**Our study**

<table>
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<th>Horizontal tear</th>
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<td><strong>Number</strong></td>
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<td>13</td>
<td></td>
</tr>
<tr>
<td><strong>Extrusion (mm)</strong></td>
<td>$2.8 \pm 1.1$ (1.4 to 4.1)</td>
<td>$2.5 \pm 1.1$ (0.8 to 4.5)</td>
<td>N.S.</td>
</tr>
</tbody>
</table>
Conclusion

✓ In patients, meniscus extrusion was influenced by weight bearing.
✓ KL Grade is associated with meniscus extrusion.
✓ Meniscus root tear and horizontal tear influenced extrusion similarly.
Reference

• Wenger A et al. ARTHRITIS & RHEUMATISM
  Vol. 65, No. 7, July 2013, pp 1804–1811
• Kawaguchi K et al. Arthritis Rheum 2012, 64 173–180
• Hada et al. Arthritis Research & Therapy 2017 19:201