Axial Alignment of the Knee - Importance in Cartilage Repair?

osteotomy vs. distraction

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Disclosure

CSO, co-founder, and shareholder of ArthroSave BV
Knee joint distraction:

Joint preserving treatment as alternative for total knee arthroplasty for relatively young and active patients with conservative treatment resistant TF knee osteoarthritis.
Knee joint distraction treatment

- temporarily (6 weeks)
- extra-articular (not entering the joint)
- other surgical options remain possible in case of failure

- risk of pin tract infection without signs of compromising total knee arthroplasty in case of treatment failure.

- Development of a more user (patient and surgeon) friendly device
Knee joint distraction outcome

- prolonged (>5 years) clinical benefit
- actual joint tissue (a.o. cartilage) repair
- cost-effective below the age of 65 yrs


KJD for medial compartmental knee OA?
patients considered for osteotomy

Multi-center RCT: UMC Utrecht
Maartensclinic Woerden

Randomization 2:1 n=46 osteotomy
n=23 knee-distraction

Inclusion: indicated for high tibial osteotomy
  • medial compartmental knee osteoarthritis
  • tibio-femoral angle < 12° varus
  • normal knee stability
  • age < 65 years
  • BMI < 35
## Patients baseline characteristics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>osteotomy n=45</th>
<th>distraction n=22</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Male gender (n)</strong></td>
<td>27/45</td>
<td>16/22</td>
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<tr>
<td><strong>BMI (kg/m²)</strong></td>
<td>27.2 ± 0.5</td>
<td>27.5 ± 0.5</td>
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<tr>
<td><strong>Age</strong></td>
<td>49.4 ± 1.0</td>
<td>51.2 ± 1.1</td>
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<tr>
<td><strong>Joint damage 0-2</strong></td>
<td>18</td>
<td>10</td>
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<tr>
<td><strong>K&amp;L grade (n)</strong></td>
<td>23</td>
<td>11</td>
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<tr>
<td><strong>Tibio-femoral axis (°)</strong></td>
<td>6.2° ± 0.3°</td>
<td>5.8° ± 0.6°</td>
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</table>
Clinical outcome (WOMAC questionnaire)

- WOMAC (total) score over time:
  - Osteotomy: p < 0.001
  - Distraction: p < 0.001

- Δ WOMAC from baseline:
  - Osteotomy and distraction show a trend, but no significant difference (P = 0.159)

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Radiographic outcome (joint space width; JSW)

Joint Space Width (mm)  ∆ mean JSW  ∆ min JSW

0 3 6 12 mths

Distraction p=0.004
Osteotomy p<0.001

Mean medial
Distraction p<0.001
Osteotomy

Minimum
Distraction p<0.001
Osteotomy

JSW lateral (mm)

Distraction p=0.568
Osteotomy p=0.405

JSW whole (mm)

Distraction p=0.018
Osteotomy p=0.203

Mean lateral
Distraction
Osteotomy

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Radiographic outcome: Change in joint angle

Knee Image Digital Analysis (KIDA)
Marijnissen ACA. et al.
Axial alignment & joint angle; pre-treatment

Axial alignment (degrees)

KIDA joint angle (degrees)

R = -0.387
P = 0.002

9.4 deg

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Axial alignment vs. clinical & structural outcome

- Med JSW change BL-1yr (mm)
- WOMAC change BL-1yr (%)
Conclusion

Knee distraction in case of medial knee osteoarthritis considered for osteotomy results in:
- significant clinical benefit comparable to osteotomy
- cartilaginous tissue repair slightly better than osteotomy

The degree of malalignment (<12°) is not predictive for the clinical benefit nor the cartilaginous tissue repair (at 1 yr follow-up)

Knee distraction might be considered an alternative in treatment of medial osteoarthritis to postpone a knee prosthesis, decreasing the chance for revision surgery.
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