Significant Proportion of Severe Lateral OA In Asian Patients Have Non-valgus Knee Alignment With Milder Clinical Manifestation

Cheong-Su Lim, MD\textsuperscript{1}; Jong-Min Kim MD, PhD\textsuperscript{1}

\textsuperscript{1}Department of Orthopaedic Surgery, University of Ulsan, College of Medicine
Disclosure

• Cheong-Su Lim, MD
• Jong-Min Kim MD, PhD

• We have no financial conflicts to disclose
Introduction

- Knee alignment
  → associated with progression and incidence of OA

- In lateral OA,
  → association between valgus malalignment ↑
  → varus malalignment : regarded as a ‘paradox’

- Lateral OA with non-valgus knee alignment
  (i.e. varus or neutral)
  → little research
Purpose

- To Identify
  - Is there some proportion of severe lateral OA patients who had non-valgus alignment?
  - Is there any difference in clinical manifestation between valgus and non-valgus alignment group?
Materials & Methods

• Retrospective study (from 2008 to 2018)
• Severe lateral OA (K-L grade 3 or 4)

• Analysis of Alignment
  ➔ Hip-knee-ankle (HKA) angle on full-limb x-ray
  ➔ Varus (<180°) Neutral (180°) Valgus (>180°)

• Bone-on-bone arthritis (K-L grade 4)
  ➔ Divided into 2 groups ; Non-valgus vs valgus
  ➔ Reviewed the recommended treatment ; surgery or conservative treatment
Materials & Methods

- **904 Pts** with Lateral OA Diagnosed between 2008 - 2018
- **724 Pts** with Lateral OA with full-limb x-ray
- **180 Pts** had no full-limb x-ray
- **76 Pts** were excluded (medial dominant OA, post-traumatic OA, tumor, ON, septic knee sequelae, RA, etc)
- **647 Pts (825 Knees)** with Deg. Lateral OA with full-limb x-ray
- **272 Knees** were K-L Gr 1 or 2
- **553 Knees** were K-L Gr 3 or 4, → the analysis of alignment
- **263 knees** were K-L Gr 4, → the analysis of recommended treatment
Statistical analysis

• Using SPSS version 22.0

• Chi-square test
  - The difference in distribution of the recommended treatment btw. 2 groups (non-valgus vs valgus)

• Student t-test
  - Demographic differences btw. 2 groups

* P-value < 0.05 : considered significant
Results

- The proportion of mechanical alignment in severe lateral OA (K-L Gr 3 or 4, 553 knees)

<table>
<thead>
<tr>
<th>Severity</th>
<th>Total</th>
<th>Mechanical alignment ‡</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Varus (%)</td>
</tr>
<tr>
<td>K-L grade 3</td>
<td>290</td>
<td>83 (28.6)</td>
</tr>
<tr>
<td>K-L grade 4</td>
<td>263</td>
<td>46 (17.5)</td>
</tr>
<tr>
<td>Total</td>
<td>553</td>
<td>129 (23.3)*</td>
</tr>
</tbody>
</table>

* Notably, 44% of these 553 knees had non-valgus (varus or neutral) alignment (95% CI, 40%–48%, exact binomial test)

‡ Intraclass correlation coefficients (ICC) of HKA angle measurements ranging from 0.98 to 0.99
Results

- The proportion of recommended treatment in bone-on-bone lateral OA (K-L Gr 4, 263 knees)

<table>
<thead>
<tr>
<th>Alignment</th>
<th>Total</th>
<th>Recommended treatment</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Surgery (%)</td>
<td>Conservative (%)</td>
</tr>
<tr>
<td>Nonvalgus group ‡ (varus or neutral)</td>
<td>86</td>
<td>17 (19.8)</td>
<td>69 (80.2)*</td>
</tr>
<tr>
<td>Valgus group ‡</td>
<td>177</td>
<td>67 (37.9)</td>
<td>110 (62.1)</td>
</tr>
<tr>
<td>Total</td>
<td>263</td>
<td>84 (31.9)</td>
<td>179 (68.1)</td>
</tr>
</tbody>
</table>

* the proportion of patients recommended for conservative treatment was significantly higher in the non-valgus than in the valgus group ($\chi^2$ test, $P = 0.003$)

‡ Sex, age, and BMI were not significantly different between the two groups
Conclusion

- In Asian patients
  - A substantial proportion of severe lateral OA (K-L Gr 3 or 4) had varus or neutral knee alignment
  - Non-valgus patients with bone-on-bone lateral OA (K-L Gr 4) presented with a significantly milder clinical manifestation