Serial Changes in Joint Line Convergence Angle and Second-Look Arthroscopic Assessment of Cartilage After Hybrid High Tibial Osteotomy (HTO)

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• High tibial osteotomy (HTO) is a reliable procedure for knee osteoarthritis and osteonecrosis. Especially, Hybrid HTO reported by Takeuchi R et.al is a novel closed wedge HTO which is applicable to the patients with severe varus knee deformity.
Hybrid HTO
(Takeuchi et al.; Arthrosc Tech. 2014)
PURPOSE

• The aim of this study is to assess the clinical results and surgical complications of Hybrid HTO in our hospital. Intraarticular findings and changes were assessed by second-look arthroscopy before and after Hybrid HTO.
Materials & Methods

• **63 knees in 53 cases**
  (41 female 11 male  age ave. 61.1 years old)
  Duration of follow-up 16.4 ± 2.4 months

• Clinical evaluation
  • **JOA Score** (Japan Orthopedic Association Knee Score)

• Radiological parameters
  • Hip-Knee Angle angle (**HKA**)
  • posterior tibial slope angle (**PTS**)
  • Weight Bearing Line -Ratio (**WBL-R**) 
  • Joint Line Convergence Angle (**JLCA**)
  • Caton-index (**CDI**)
  • The ratio of the leg length (**RLL**) : between the operated side and the opposite side

• **ICRS Scale** (International Cartilage Repair Society)
  For the evaluation of articular cartilage in medial femorotibial joint and patellofemoral joint pre and post surgery.
## Clinical results and Radiographic data

<table>
<thead>
<tr>
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<th>Pre-OP</th>
<th>Post-OP</th>
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<tbody>
<tr>
<td>JOA score</td>
<td>47.8 ± 3.8</td>
<td>82.5 ± 4.0</td>
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<tr>
<td>HKA</td>
<td>9.65 ± 3.5</td>
<td>0.06 ± 1.4</td>
</tr>
<tr>
<td>PTS</td>
<td>4.7 ± 1.9°</td>
<td>1.9 ± 2.1°</td>
</tr>
<tr>
<td>WBL-R</td>
<td>10.2 ± 15.5°</td>
<td>56.2 ± 13.8°</td>
</tr>
<tr>
<td>CDI</td>
<td>0.85 ± 0.14%</td>
<td>0.84 ± 0.12%</td>
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<tr>
<td>RLL</td>
<td>0.994 ± 0.013</td>
<td>0.995 ± 0.008</td>
</tr>
<tr>
<td>JLCA</td>
<td>4.04 ± 0.26</td>
<td>3.87 ± 0.29</td>
</tr>
</tbody>
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Articular cartilage change after hybrid HTO

<table>
<thead>
<tr>
<th>Joint</th>
<th>Improved</th>
<th>No Change</th>
<th>Deteriorated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medial FT (femorotibial) joint</td>
<td>33 (84.6%)</td>
<td>6 (15.9%)</td>
<td>0</td>
</tr>
<tr>
<td>Patellofemoral (PF) joint</td>
<td>16 (41.1%)</td>
<td>23 (58.9)</td>
<td>0</td>
</tr>
</tbody>
</table>
Surgical Complication

• non-union of the osteotomy site 2 knees in 1 case (3.1%)

• Deep SSI (MRSA) 1 knee (1.6%)

• Pseudoaneurysm formation in the anterior tibial artery just after plate removal 1 knee (1.6%)

• deep peroneal nerve injury 2 knees (3.2%)
DISCUSSION & CONCLUSIONS

• From the result of this study, Hybrid HTO leads to significant improvements in radiographic parameters and knee function.

• In general, closed wedge HTO tends to shorten the leg length, however Hybrid HTO did not significantly influence the leg length.

• According to the result of JLCA change, required correction angle is almost same with bony correction angle. According to arthroscopic findings, Hybrid HTO may contribute to the regeneration of cartilage in FT and PF joints.