70-year-old male  Bilateral Knee Osteoarthritis

Present History
He visited our hospital with the complaint of bilateral knee pain for 3 years. The pain was over the medial aspect of the knees and got worse when walking and going up stairs.

Preoperative Clinical Status

HT 161cm  BW 66kg  BMI 25.7kg/m²
Knee ROM   0 - 140° / 0 - 140°
KSS Knee score (R/L)   45 / 55
Function score (R/L)   70 / 70
Preoperative Assessment
Standing Knee X-ray

Knee alignment: FTA 181°
OA Grade 2

OA Grade 2
Joint space narrowing
Varus deformity

180°
2
Preoperative Assessment

Varus stress

Valgus stress

Medial Compartment OA

- Full-thickness articular cartilage in lateral compartment
- Mild degenerative change of patellofemoral joint
- Well maintained joint space in patellofemoral joint
ICRS Grade 4 articular cartilage loss is seen in the medial femorotibial compartment. The presence of full-thickness articular cartilage is confirmed in the lateral femorotibial and patellofemoral compartment. The ACL is intact.
Patient: Clinical & Radiological Features
1. Single Compartmental Knee OA
2. OA Grade 2
3. Mild varus deformity
4. Good range of motion
5. Good stability
6. Age: 70 years
7. High physical activity
8. Expectation to return to sporting activities; walking and hiking

3 Options for Surgical Treatment
- High tibial osteotomy
- Unicompartmental knee arthroplasty
- Total Knee Arthroplasty
Indications and Surgical Methods for Opening Wedge HTO

**Indications**
- Less than 15 degrees of anatomical varus deformity
- Less than 15 degrees of fixed flexion deformity
- Functionally intact ACL
- Advanced age and obesity are not contraindications

**Surgical Methods**
- Subperiosteal exposure of the medial side of the tibia
- Oblique incomplete osteotomy
- Insertion of two wedge-shaped artificial bone substitute (\(\beta\)-TCP)
  - Facilitate bone union
  - Stabilize the osteotomized site
- Rigid fixation with TomoFix plate
  - Simplify and accelerate the postp, rehab.
An anatomical femorotibial angle (FTA) of 170° on the long leg radiograph is anticipated.

Triangular shape of β-TCP with base of the same length of “d”

Correction angle is converted into the distance between upper and lower edges of opened osteotomy site which is measured on the predicted radiograph.
Surgical Procedure of Opening Wedge HTO

Skin Incision

Slightly Medial Parapatellar Curved Skin Incision

Elongation of Skin Incision when expose a knee joint

Tibial tuberosity

Additional Skin Incision for Screwing

Capsulotomy when needed

Patella

Longitudinal Separation of Capsule

Subvastus approach
When the medial soft tissue is still tight after the release, multiple small incisions are applied to the superficial medial collateral ligament in a pie-crust manner in extension.
Osteotomy and Insertion of Bone Substitute

Osteotomy
- A retractor is inserted into an incision site just beneath the posterior side of the proximal tibia.
- Osteotomy is carried out using a bone saw and chisel under a guidance of Kirshner wires.

Insertion of Bone Substitute
- The first block is placed at the most posterior side of the opened gap.
- While keeping complete full extension of the knee, a smaller block is inserted into the anterior side of the gap.
70-year-old male Bilateral Knee Osteoarthritis

- Simultaneous Bilateral Surgery
- Postop. Rehab
  - Isometric quadriceps exercise and ROM exercise the day after operation
  - Full-weight-bearing after 1 week
70-year-old male  Bilateral Knee Osteoarthritis

Changes of %Mechanical Axis Deviations; %MAD

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<th>Pre-op.</th>
<th>Post-op. 1Y</th>
<th>Post-op. 5Y</th>
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<tr>
<td>Knee score</td>
<td>45 / 55</td>
<td>84 / 87</td>
<td>90 / 89</td>
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<tr>
<td>Function score</td>
<td>70 / 70</td>
<td>100 / 100</td>
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%MAD

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<tr>
<td>70-year-old</td>
<td>17%</td>
<td>11%</td>
<td>71%</td>
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<td>male</td>
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<td>Knee Osteoarthritis</td>
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17%  11%  71%  78%  65%  72%
Age Does Not Affect Clinical Outcomes After Opening Wedge HTO

≥ 70 years vs < 70 years

Knee score

Function score

Opening wedge HTO

Suitable for not only young patients but also active older patients

72-year-old male