

## Clinical and Radiological Results of Double Level Osteotomy for Varus Knee Osteoarthritis

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### Summary:

Double level osteotomy around the knee can prevent the risk of joint-line obliquity. It is recommended in cases of severe varus and combined deformity of the proximal tibia and the distal femur.

### Abstract:

#### Introduction:

Osteotomies around the knee is generally indicated for patients with high activity level who have uni-compartmental knee osteoarthritis because total knee arthroplasty in this patient population may not be a good option. In addition, recent progresses in surgical procedure such as bi-plane osteotomy and use of rigid fixation device (LCP) have facilitated early functional recovery and expanded the indication for osteotomy. In Japan, we frequently encounter osteoarthritic young active patients with severe varus knee deformity requiring surgical treatment. Conventional osteotomy is such that correction of the deformity is only made in the proximal tibia. However, we encounter a problem of excessive joint line obliquity. To avoid that, we have indicated and performed double level osteotomy (DLO) in such situation. The concept of DLO was to obtain anatomical knee joint-line by bi-plane cut closed wedge distal femur osteotomy (DFO) and bi-plane cut open wedge high tibial osteotomy (HTO) with the use of LCP. The purpose of the study was to examine clinical and radiological outcomes of this procedure in our practice.

#### Patients & Methods:

Twenty-two knees in 21 patients with severe varus knee deformity who underwent DLO and could be followed up for clinical and radiological assessments were included in the study. DLO was indicated for medial compartment osteoarthritic knees with severe varus malalignment. Surgical goal of DLO is to reconstruct the anatomical knee joint line while correcting the varus malalignment. Whole leg weight-bearing radiographs at the preoperative period and 6 months after surgery were available for 15 knees in 14 patients. Radiological parameters measured for analysis were as follows: mechanical tibiofemoral angle (mTFA), mechanical lateral distal femoral angle (mLDFA), medial proximal tibia angle (MPTA), and joint-line convergence angle (JLCA). In addition, pre- and postoperative clinical outcomes were evaluated using the KOOS.

Results: Each of the radiological parameters improved after surgery. The postoperative changes in measured values for mTFA, MPTA, mLDFA, and JLCA from the preoperative to the 6-month evaluation were  $-15.1^{\circ}$  to  $1.4^{\circ}$ ,  $82.1^{\circ}$  to  $90.8^{\circ}$ ,  $91.2^{\circ}$  to  $85.3^{\circ}$  and  $6.1^{\circ}$  to  $4.2^{\circ}$  respectively. KOOS improved after surgery from 165 to 342.

#### Discussion:

This study showed that DLO for patients with severe varus malalignment and medial compartment osteoarthritis could accomplish satisfactory clinical outcomes by normalizing coronal alignment while avoiding joint line obliquity.