

## Hinge fractures in medial closed wedge distal femoral osteotomy for valgus knee osteoarthritis

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**INTRODUCTION:** Medial closed-wedge distal femoral osteotomy (MCW-DFO) is an effective surgical procedure for correction of valgus knee deformity and good long-term results have been reported recently. The complications of distal femoral osteotomy (DFO) include hinge fracture, delayed union, implant failure, correction loss, infection, vascular injury. Hinge fracture may directly impair the surgical outcome, therefore it would be a critical issue how to prevent it. Although there have been a number of reports investigating hinge fractures after HTO, there is a paucity of information related to CW-DFO. The purpose of this study is to investigate the incidence and types of hinge fractures in medial closed wedge distal femoral osteotomy with the biplanar technique *Shota Morimoto* for valgus knee osteoarthritis.

**METHODS:** A consecutive series of 62 knees (57 patients) underwent MCW-DFO comprised the study population. The mean age at surgery was  $46.2 \pm 12.2$  years. There were 36 male and 26 female. Presence of hinge fracture was assessed on radiographs and CT images at 1 week after surgery. Clinical results were evaluated using the Knee Injury and Osteoarthritis Outcome Score (KOOS). The fracture type was classified according to the direction of the fracture line: crack propagation in line with the osteotomy (type 1) and fractures extending proximally (type 2) or distally (type 3) from the tip of the wedge.

**RESULTS:** Postoperative radiographs showed hinge fractures in 14 knees (22.6%) and CT images shows hinge fractures in 21 knees (33.9%). Postoperative CT revealed type 1 and 2 medial femoral hinge fractures in 14 knees (22.6%) and 7 knees (11.3%), while no type 3 fracture was identified in this group. The average of KOOS at 2 years postoperatively was 421.3 for the group with hinge fracture and 408.7 for the group without hinge fracture. There was no significant difference between the groups with and without hinge fractures.

**DISCUSSION:** Hinge fractures in MCW-DFO with the biplanar technique occurred in 34%. Seven of those 21 hinge fractures could not be detected on plain radiographs. In this case series, the rehabilitation protocol was modified to delay postoperative weight-bearing with hinge fracture. Although there was no difference in clinical outcome at 2 years after surgery with or without hinge fracture, postoperative CT imaging is necessary, and efforts should be made to prevent hinge fractures.

**SIGNIFICANCE:** Hinge fractures in MCW-DFO occurred at high rates, postoperative CT imaging is necessary to arrange a rehabilitation protocol, and efforts should be made to prevent hinge fractures.