

## ABSTRACT

**Purpose:** High tibial osteotomy (HTO) is a primary surgical approach for managing knee medial compartment osteoarthritis. Although a certain degree of varus deformity is deemed necessary, there is no universally agreed-upon standard for the extent of varus deviation suitable for HTO. The aim of this study was to analyze the preoperative characteristics and postoperative outcomes of patients with mild genu varum ( $\leq 5^\circ$ ) versus those with greater varus deformity ( $> 5^\circ$ ) to determine if similar postoperative outcomes could be achieved. These results can offer valuable insights into the suitability of HTO as an intervention, particularly for individuals with mild genu varum.

**Methods:** A single center, observational, retrospective study was conducted on 168 patients undergoing a HTO surgery from February 2017 to May 2023. A total of 100 patients were included in the severe varus group ( $> 5^\circ$ ) and 68 in the mild varus group ( $\leq 5^\circ$ ). Radiographic assessment before and after surgery consisted of a bilateral long leg standing radiographs and included hip-knee-ankle (HKA) angle, medial proximal tibial angle (MPTA) and knee joint line obliquity (KJLO). Patient reported outcome questionnaires (NRS, Knee Injury and Osteoarthritis Outcome Score (KOOS) and UCLA activity questionnaire) were attained preoperatively and at 3 months, 6 months, 1 and 2 years postoperatively.

**Results:** Despite the severe varus group being, on average, 2 years older, there were no other significant differences observed in patient-reported outcome questionnaires between the two patient cohorts. Both groups showed a significant improvement ( $p < 0.05$ ) in pain, activity, and functional scales from baseline to 6 months and sustained these improvements up to 2 years postoperatively. Our findings further indicated that while preoperative varus, hip-knee-ankle (HKA), and medial proximal tibial angle (MPTA) values varied between the two groups, as anticipated, there were no significant differences in the postoperative values observed for HKA (varus<sub>severe</sub>:  $180.4 \pm 3.02$ , varus<sub>mild</sub>:  $182.3 \pm 2.16$ ) and MPTA (varus<sub>severe</sub>:  $92.94 \pm 3.40$ , varus<sub>mild</sub>:  $92.08 \pm 2.9$ ) between the groups.

**Conclusion:** Our findings indicate that the severity of varus deformity in patients with genua vara undergoing high tibial osteotomy does not correlate with symptom severity. Both patients with severe ( $> 5^\circ$ ) and mild ( $\leq 5^\circ$ ) varus deformity exhibit comparable postoperative outcomes ranging from pain relief to functional improvements. Additionally, both groups demonstrate similar outcome improvement up to two years postoperatively. We can conclude that high tibial osteotomy is a suitable intervention for individuals with even mild genu varum.