Functional Outcomes of Lower Extremity Osteotomies

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Purpose: Our objective was to compare patient disability before and after lower extremity osteotomy with long-term patient satisfaction and functional outcomes.

Methods: Patient charts were selected based on CPT codes of lower extremity osteotomies from 1 September 2005 to 1 July 2020 by a single fellowship-trained orthopaedic trauma surgeon. Inclusion criteria included undergoing a lower extremity osteotomy with at least 6 months of clinical follow-up and PROMIS (Patient-Reported Outcomes Measurement Information System) scores available. Patient information was reviewed for demographic variables (age, gender), cause of lower extremity deformity (congenital, metabolic disease, posttraumatic), co-morbidities (body mass index, smoking, diabetes, steroid use, alcoholism, end-stage renal disease), postoperative course (date of weightbearing as tolerated, postoperative weightbearing status, time to union), and complications (osteonecrosis, nonunion, malunion, revision date and type, and infection). Patient questionnaires (PROMIS) were assessed for patient reported outcome measures including pain, physical function, mobility, and global physical and mental health.

Results: 125 patients met criteria to be included in the study. The largest subgroup was intertrochanteric (24.8%, 31/125) and the smallest was multilevel (6.4%, 8/125). Most common cause of lower extremity deformity was posttraumatic (69.6%, 87/125), followed by congenital (29.6%, 37/125). Comorbidities included diabetes mellitus (9.6%, 12/125), alcoholism (3.2%, 4/125), and end-stage renal disease (0.08%, 1/125). Complications included nonunion (13.6%, 17/125), infection (10.4%, 13/125), revision surgery for any reason (24.8%, 31/125), wound complications (0.8%, 10/125), and postoperative loss of osteotomy correction (21.6%, 27/125). Bony union was assessed at follow-up at an average of 273.5 days for all osteotomies. A higher proportion of proximal femoral rotational osteotomy patients achieved bony union compared to intertrochanteric osteotomy patients ($P = 0.034$). Time to union was significantly shorter for proximal femoral versus mid-distal femoral osteotomy patients (213.9 vs 352.7 days, $P = 0.0083$). Most PROMIS scores showed improvements at 6 months and final follow-up date. There were no statistically significant differences in PROMIS scores for patients who did or did not achieve bony union on follow-up. The most clinically meaningful measures were improvement of PROMIS Global Mental Health scores to within 1 standard deviation of a healthy population for proximal femoral, mid-distal femoral, proximal-mid tibial, and distal tibial osteotomy patients.

Conclusion: Lower extremity osteotomies for correction of lower extremity deformities positively affect patients with complex problems. A majority of patients achieved bony union with improvements in PROMIS scores at 6 months and final follow up. However, complication and revision surgery do happen and should be discussed with the patient before deformity correction surgery is undertaken.