

Long-Leg Versus Short-Leg Cast Immobilization for Displaced Distal Tibial Physeal Fractures

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Purpose: The traditional treatment recommendation for distal tibial physeal injuries is a long-leg cast (LLC) for initial immobilization. The purpose of this study was to compare the efficacy of LLCs versus short-leg casts (SLCs) for immobilization of distal tibial physeal fractures after closed reduction.

Methods: A retrospective chart and radiographic review was performed of all patients undergoing closed reduction of a displaced, extra-articular distal tibial physeal fractures treated at 3 Level I pediatric trauma centers between January 2012 and December 2018. Patients were divided into groups based on initial postreduction immobilization, either LLC or SLC. Loss of reduction (LOR) was defined as >3 mm of displacement or >5° of angulation from postreduction radiographs. Bivariate analysis was used to assess explanatory variables associated with LOR comparing SLCs to LLCs and assess the influence of these variables on the overall LOR.

Results: 148 fractures (148 patients) were identified with 108 LLC and 40 SLC cases. The average age was 12.2 years (interquartile range, 11.2-13.7); 73% of the patients were male. The average displacement on injury films was 12 mm with an average of 2 mm of postreduction displacement. 14 fractures (9.5%) experienced LOR identified at the time of cast removal, 13 in LLCs and 1 in an SLC ($P = 0.08$). LOR was associated with the location of the reduction (operating room vs emergency department (ED) as all 14 fractures with LOR were reduced in the ED ($P < 0.01$). Residents had a higher LOR, 18.5%, than advanced practice providers (LOR, 8.9%) or attending physicians (LOR, 0%) ($P = 0.01$).

Conclusion: The average rate of LOR is 9.5% for extra-articular distal tibia physeal fractures after closed reduction, with SLCs and LLCs having similar rates of LOR. LOR is associated with the location in which the reduction is performed and the level of training of the person performing the reduction. Our findings would suggest that SLC immobilization can adequately maintain alignment of extra-articular distal tibial fractures. This creates an opportunity to provide increased patient mobility and early knee range of motion.