

Title: 11162—Femoral-Physeal Fixation and Growth Abnormalities After Pediatric Limb Salvage
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Introduction: Injury to the physis can lead to premature growth arrest and result in limb length discrepancy in the effected limb.

Question/Purpose: In patients with allograft limb salvage reconstruction, our purpose was to assess allograft fixation techniques, the location of osseous resections, and tumor size with regard to leg length discrepancy.

Methods: 230 Limb salvage procedures were performed from 1988-2014 at our multidisciplinary pediatric bone tumor clinic. Patients were excluded for lack of follow up, soft tissue sarcoma diagnosis or inadequate radiographic images. 50 Patients received an allograft or implant of the distal femur or proximal tibia over the past five years (2009-2014) as a limb salvage procedure. We reviewed 24 allograft cases with an assessment of allograft fixation techniques in the distal femur or proximal tibia. Patients had a diagnosis of Ewings or osteosarcoma about the knee. Patient records and radiographic images were reviewed retrospectively for the assessment of surgical allograft fixation techniques (Figure 1), location of osseous resection, and average tumor size. Leg length discrepancy (LLD) was routinely documented clinically and radiographically at yearly intervals.

Results:

Of the 24 patients included in this study, the mean patient age was 10.8 (2-17) years with an average follow-up of 54.0 (10-132) months. Average tumor size was 7.1(2.1-17.6)cm. Allograft physeal fixation types included: crossing 33%(8/24); central 38%(9/24); parallel/peripheral 33%(8/24). Allograft fixations included: screw, plate 75%(18/24); screw, pin, plate 8%(2/24); screw, rod 15%(4/24). Average LLD of 3.5cm was observed in the majority of these patients. Central fixation was associated with greater risk of leg length discrepancy.

Conclusion:

Pediatric allograft patients suffered an average LLD of 3.5cm. LLD was greater with central or crossing fixation than peripheral or parallel techniques. Revision fixation was required in 20% of patients. A comparison of LLD in allografts versus implants from a similar 5-year time frame showed a smaller LLD in implant patients versus allograft patients (3.5cm vs. 1.9cm).

Level of Evidence: III

Figure 1: Allograft fixation techniques of the distal femur and proximal tibia.

A: crossing, B: Central, and C: Parallel/peripheral fixation types

