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Reconstruction of critical tibial defects after limb salvage procedures for musculoskeletal sarcomas: presentation of surgical techniques

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Introduction: Reconstruction of tibial defects after limb salvage procedures at the leg is a challenge for orthopaedic surgeons. Even though there are a lot of different choices regarding reconstructive surgical techniques, all of them require advanced surgical skills and are fraught with complications. Therefore, every case requires personalization and thorough planning of the surgical technique about to be applied.

Methods: The cases of 16 patients treated for bone sarcomas of the tibia were retrospectively reviewed. All patients underwent limb salvage procedures requiring reconstruction of large tibial defects. 3 patients were children (2,5 - 11 years old) and 13 adults (22 - 80 years old). The reconstruction techniques performed included tibialization of the fibula with external fixation stabilization (n= 6), diaphyseal megaprostheses (n= 4), diaphyseal allograft (n= 3), combination of diaphyseal allograft and vascularized fibular graft reconstruction (n= 1), distraction osteogenesis (n= 1), and cementation with internal fixation stabilization (n= 1). Mean follow-up was 8 years.

Results: One child experienced non-union of the distal part of the tibialization of the fibula, and was revised with a flexible intramedullary nail. An adult treated with a vascularized fibular graft experienced breakage of the internal fixation plate, and the osteosynthesis w revised successfully. Another adult treated with tibialization of the fibula with external fixation was finally amputated because of osteomyelitis. The remaining fibular tibializations were successfully completed. A reoperation for union of the docking site was necessary for the patient with distraction osteogenesis. One patient treated with megaprosthesis and one with allograft reconstruction experienced osteomyelitis that was treated with surgical debridement, 2-stage revision of the megaprosthesis and intravenous antibiotics, without recurrence of the infection.

Conclusion: Tibialization of the fibula seems to be effective in children. However, preservation of the epiphysis is required, if normal growth should be expected. External fixation devices present increased rate of complications. Infection is the most common complication when allografts or megaprostheses are applied.