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Tibialization of the fibula as a limb salvage option after tibial shaft tumor resection in children

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Introduction: Limb salvage surgery in pediatric patients remains a great challenge for the orthopaedic oncologists. All means of tibia reconstruction require advanced surgical skills and come with a lot of complications. The optimal limb sparing treatment method remains unknown. The purpose of this study was to assess the outcome of 3 patients with a primary sarcoma of the tibial diaphysis who underwent limb salvage surgery and tibial reconstruction by ipsilateral fibular transposition.

Methods: The cases of two girls and one boy of a mean age of 6 years (range, 2,5-11) treated for primary bone sarcoma of the tibia were retrospectively revised. The large diaphyseal defects after the tumor excision have been reconstructed by tibializing the ipsilateral fibula. The surgical procedure included tumor resection and then proximal and distal osteotomies of the ipsilateral fibula. The limb's length has been maintained by the use of external fixation.

Results: All patients survived until the last follow-up. The mean treatment period was 20 months (range, 19-24). The tibialization of the fibula was successful in all cases and the fixation devices have been removed in a mean period of 7,5 months (range, 2,5-12). Full weight bearing was achieved after a mean period of 12 months (range, 10-14). Leg length discrepancy 3 years postoperatively was less than 2 cm. One child presented with a non-union of the distal part and was successfully treated with a flexible intramedullary nail. Hypertrophy of the transferred fibula has been observed in all of the patients reaching the diameter of the contralateral tibia. No signs of ischemia of the fibular graft have been noticed. Knee and ankle range of movement was normal 3 years postoperatively.

Conclusion: Tibialization of the fibula seems to be a promising method of extensive tibial defects' reconstruction concerning pediatric population. It is a simple, biologic and cost effective method of reconstruction with low rates of complications. At the same time, the limb's normal growth is ensured, without limiting the range of movement of the adjacent joints. However, preservation of the physis during tumor excision is necessary.