Limb Salvage Surgery with Megaprosthesis for Pediatric Bone Tumors: Early Outcomes from a Single Center

Background:
Limb salvage surgery is the current standard for pediatric bone tumors when adequate oncologic margins can be achieved. Megaprosthetic reconstruction enables immediate functional restoration; however, its use in children presents unique challenges. This study reports early outcomes and intraoperative decision-making in pediatric patients undergoing limb salvage surgery.

Methods:
A retrospective case series was conducted including pediatric patients with primary malignant bone tumors of the lower extremities treated at a single center. Preoperative assessment suggested localized disease without distant metastasis or major neurovascular involvement. Data on tumor location, imaging diagnosis, surgical management, and outcomes were collected. Oncologic and functional outcomes, as well as intraoperative findings, were analyzed.

Results:
Four patients were included: one osteosacrcoma of the proximal tibia and three osteosarcoma of the distal femur. Limb salvage surgery with megaprosthetic reconstruction was successfully performed in three patients following wide resection with negative margins. In one patient with distal femur osteosarcoma, although limb salvage was initially planned, intraoperative findings revealed tumor invasion of major neurovascular structures, necessitating amputation. At early follow-up of 3 and 6 months, no local recurrence was observed in the limb salvage group. Functional outcomes were satisfactory, with acceptable limb function in daily activities. No major implant-related complications were observed.

Conclusion:
Limb salvage surgery with megaprosthesis is feasible and effective in selected pediatric patients with localized bone tumors. However, intraoperative findings may alter surgical strategy, emphasizing that oncologic safety must take precedence over limb preservation.