

**Introduction:** The purpose of the study to analyze long term oncological and functional outcomes of joint preservation limb sparing surgery by transepiphyseal transmetaphyseal resection about the knee joint in children with malignant bone tumors.

**Material and methods:** From 1990-2013, Thirteen patients malignant bone tumors, age 3 to 18 years were treated. Location 8-distal femur, 5-proximal tibia. All received chemotherapy. Eleven patients transmetaphyseal and two transepiphyseal resection. Combined allograft vascularized fibular graft performed in five distal femurs. At the level of the proximal tibia reconstruction was made by intercalary allograft.

**Results:** Follow-up period 2 to 25 years. All remained disease free. No immediate complications. Two patients, tibial allograft stress fracture treated successfully by improved fixation. Two other patients with distal femur, allograft fracture required revision using vascularized fibular graft. One patient, distal femur nonunion underwent resection replacement endoprosthesis. All continued growth without significant limb length discrepancy. All patients retained their limb, regained full active range of motion.

**Discussion:** Improved radiographic imaging and more effective chemotherapy has enabled to accurately assess malignant tumor extension preoperatively. These advances made it possible to come closer to tumor with adequate surgical margins. Patients in whom the tumor is away from the growth plate, transmetaphyseal resection could be performed successfully, saving the knee joint and growth plate allowing continues growth, minimizing limb length discrepancy. This biological solution is effective alternative to mega-prosthesis. All patients retained their limb, regained full active range of motion of the knee and returned to normal lifestyle activity. Based on M.S.T.S functional evaluation, excellent results were achieved in 11 patients.