

**FC-153****Expandable prosthesis in children after bone tumour resection of the distal femur. The experience of the Rizzoli Institute**

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Introduction: The challenge of reconstructing the distal femur after bone tumour resection in a growing child is related to small anatomical size, age-specific bone characteristics, potential limb length discrepancy (LLD), and long-term high functional demand.

Over the last decades several types of expandable prostheses have been introduced to overcome the problem of growth loss, maintaining good function and reducing the need for major surgical revisions.

The authors present their experience with expandable prostheses in growing children.

Methods: Between 2000 and 2013, 38 custom-made expandable prostheses were implanted in patients under the age of 12, all after distal femur bone tumour resections. Average age was 8 years (range 5-11 years). Diagnosis was high grade osteosarcoma in 37 cases, Ewing sarcoma in one. Cases were divided in three groups, based on type of implant. Group A: 7 cases with a Stryker prosthesis (Howmedica Osteonics, Rutherford, New Jersey), expandable through a mini-invasive surgical procedure. Group B: 15 cases with a Repiphysis prosthesis (Wright Medical Technology, Arlington, Tennessee USA), expandable through an electromagnetic field, usually under general anesthesia. Group C: 16 cases with a JTS (Stanmore Implants Worldwide, Elstree, UK), expandable through an electromagnetic field in an outpatient setting.

Results: Group A: 6 long term survivors. Average Follow-up 81 months (56-150 months). No mechanical failure, no residual LLD. Group B: 10 long term survivors. Average follow-up 104 months (range 85-148 months). Nine cases required revision for mechanical failure/implant breakage, 6 of these required another expandable prosthesis, and 5 needed massive allografts to restore bone stock. Group C: 12 long term survivors. Average follow-up 44 months (range 18-68 months). In 4 cases (25%) partial growth arrest of the proximal tibia, with loosening of the tibial component.

Conclusions: The use of expandable prostheses after bone tumour resections in growing children can avoid the problem of LLD. Non-invasive implants reduce the need for further surgery and hospitalization. However, they are associated with high revision rates due to mechanical failure or stem loosening with related bone loss. Stem fixation in the proximal femur and design of the tibial component should be customized to optimize durability of these implants.