

Functional outcomes after limb-salvage surgery and endoprosthetic reconstruction with an expandable prosthesis: a report of 4 cases.

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Original article

## Functional Outcomes After Limb-Salvage Surgery and Endoprosthetic Reconstruction With an Expandable Prosthesis: A Report of 4 Cases

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### Abstract

Beebe K, Song KJ, Ross E, Tuy B, Patterson F, Benevenia J. Functional outcomes after limb-salvage surgery and endoprosthetic reconstruction with an expandable prosthesis: a report of 4 cases.

### Objective

To determine the functional outcomes of skeletally immature patients after replacement

To determine the functional outcomes of skeletally immature patients after replacement of the femur and tibia performed by using noninvasive expandable endoprostheses.

## Design

Case series.

## Setting

A hospital-based ambulatory care center.

## Participants

Pediatric patients (N=4) with primary bone tumors of the distal femur and proximal tibia who underwent surgical replacement performed by using the Repiphysis noninvasive expandable endoprosthesis (Wright Medical Technology, Memphis, TN).

## Interventions

Wide resection of bone sarcoma and placement of expandable endoprosthesis.

## Main Outcome Measures

Musculoskeletal Tumor Society (MSTS) scores were assessed at the beginning of the study and at each follow-up visit. Medical Outcomes Study 36-Item Short-Form Health Survey, Version 2 (SF-36); gait; sit-to-stand transition; and range of motion (ROM) were assessed at an average follow-up of 31.5 months.

## Results

At an average of 31.5 months postoperative, the SF-36 physical component summary scores lagged behind the national mean, whereas the mental component summary scores were satisfactory. MSTS scores indicated low levels of pain and supports use with high emotional acceptance and walking ability but persisting difficulties with function and gait. Patients also showed altered patterns of sit-to-stand transition including decreased peak vertical force in the operated limb and increased center of mass momentum in a shorter amount of time. Parts of gait functioning were found to be decreased, including gait velocity, stride length, and cadence. Some patients displayed alternate weight-bearing strategies that accompanied increased double-limb support and stance phase during walking. ROM and strength were diminished at both the hip and knee joints in the operated limb and in the nonoperated limb.

## Conclusions

Reconstruction with a noninvasive expandable endoprosthesis produces satisfactory

functional outcomes in pediatric patients with primary tumors of the bone. Patients in our study displayed some persisting physical difficulties including decreased ROM and strength and altered gait and sit-to-stand patterns, yet they maintained high levels of emotional acceptance and coping.



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## Key Words

Limb salvage; Lower extremity; Outcome assessment (health care); Rehabilitation

## List of Abbreviations

CDF, continuously disease free; COM, center of mass; GC, gait cycle; MCS, mental component summary; MSTs, Musculoskeletal Tumor Society; PCS, physical component summary; QOL, quality of life; ROM, range of motion; SF-36, Medical Outcomes Study 36-Item Short-Form Health Survey, Version 2

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