

## POSTER 25

### Comparison of the oncological and functional outcomes following endoprosthetic reconstruction or rotationplasty for paediatric sarcoma

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#### Background

Paediatric bone sarcomas around the knee are often amenable to either endoprosthetic reconstruction or rotationplasty. Cosmesis and durability broadly distinguish these two options. However, impacts upon oncological, surgical, functional outcomes are incompletely understood. Since sarcoma may disseminate within microvasculature near the primary tumour, the large difference in the volume of tissue resected by these two approaches may be relevant to oncological outcomes.

#### Purpose

We asked whether local control, overall survival, complication profile and functional outcomes are different between rotationplasty and endoprosthetic reconstruction for primary paediatric sarcomas around the knee.

#### Methods

We retrospectively reviewed all wide resections for bone sarcoma of the distal femur or proximal tibia that were reconstructed either with an endoprosthesis or by rotationplasty at our institution between January 2004 and December 2017 with minimum 5-year follow-up. Comparisons were made using Chi-square tests for categorical data and unpaired t-test for numerical data. Survival analysis was performed using the Kaplan-Meier method. Functional outcomes were compared using the Musculoskeletal Tumor Society (MSTS) score, Toronto Extremity Salvage Score (TESS) or Paediatric TESS (pTESS), and PROMIS Pediatric or Adult Global Health measures.

#### Results

Fifty patients with primary sarcoma around the knee underwent wide resection and either endoprosthetic reconstruction (n=26) or rotationplasty (n=24). In nearly all cases, patients were given a choice and selected the reconstruction based on their preference. The two groups had comparable demographic parameters, local and systemic tumour burden at presentation, and all patients had negative margins at resection. Among patients who presented without metastasis, there were insignificant trends favouring five-year overall survival (67.9% vs 51.4%, p=0.864) and local control (0% vs. 11.5% (n=3), p=0.09) among patients who underwent rotationplasty. When only those nonmetastatic patients with greater than 90% chemotherapy-induced necrosis were considered, overall survival was superior in the rotationplasty group (100% at five years, p=0.03). Including all reasons for re-operation including contralateral epiphysiodesis, 42.3% (n=11) of the endoprosthesis patients required a minimum of one additional procedure compared with 29.2% (n=7) among rotationplasty patients (p=0.33). At a mean of over 8 years follow up, pTESS, MSTS and PROMIS Global Health scores exhibited trends favouring rotationplasty patients (Table 1).

#### Conclusion

Rotationplasty is associated with a lower complication rate and, possibly, superior local and systemic oncological outcomes compared to endoprosthetic reconstruction. Trends toward better function and survival in the rotationplasty group warrant further investigation with more patients, ideally in a prospective manner. Potential differences in oncological outcomes could be due to differences in the volume of tissue and regional microvasculature that is resected.

**Table 1. Functional Outcome Scores**

	Endoprosthesis (n = 9)	Rotationplasty (n = 8)
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Follow-Up in Months (SEM) P=0.23	103.6 (17.5)	129.9 (10.8)
MSTS Score (SEM) p=0.17	22.2 (2.4)	26.1 (1.1)
TESS (SEM) P=0.56	83.0 (4.0)	78.9 (5.9)
PROMIS Adult Global Physical Health (SEM) p=0.40	47.2 (2.7)	51.3 (4.1)
PROMIS Adult Global Mental Health (SEM) p=0.69	45.4 (2.8)	47.4 (4.0)
pTESS*	79.0	96.0
PROMIS Pediatric Global Physical Health (SE)*	25.9 (2.9)	56.9 (3.4)
PROMIS Pediatric Pain Interference (SE)*	64.2 (7.3)	42.6 (7.5)
PROMIS Pediatric Fatigue Score (SE)*	63.7 (8.7)	46.4 (7.2)

\*One patient in each group completed the Paediatric TESS and PROMIS Pediatric global health due to age less than 17 years old.