UTILIZATION OF THREE-DIMENSIONAL TECHNOLOGY IN THE RESECTION OF SPINOPELVIC SARCOMA OF BONE

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INTRODUCTION

Wide-margin resection of pelvic tumors is a challenging procedure.

Advancements in 3D-printed patient-specific instrumentation may have benefits over traditional techniques.

Despite its promise, there is no consensus supporting its routine use in resection of spinal and pelvic tumors.

METHODS

A retrospective analysis of 13 cases over a ten-year consecutive period was performed at our tertiary academic center.

	Frequency	Percent
Chondrosarcoma	6	46.2
Metastatic bone disease	3	23.0
STS	2	15.4
Osteosarcoma	2	15.4
Total	13	100.0

Table 1. Preoperative diagnoses. STS, soft tissue sarcoma.

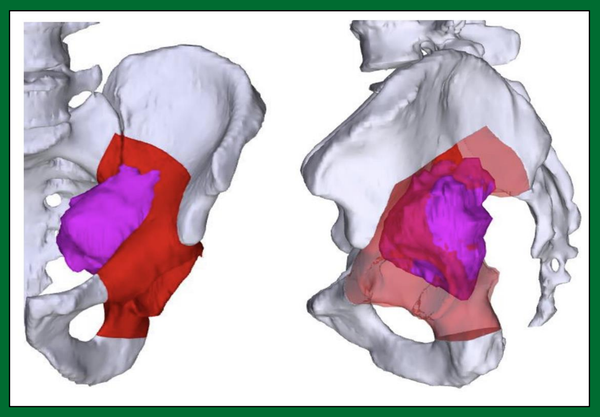
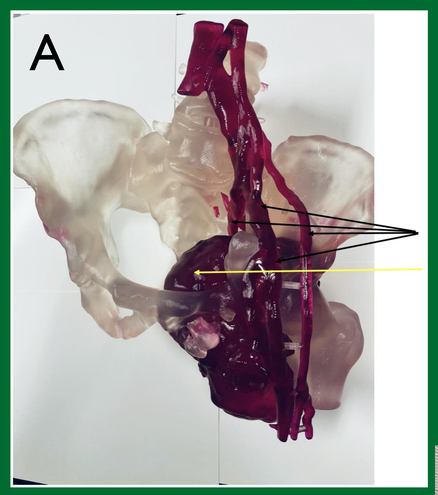
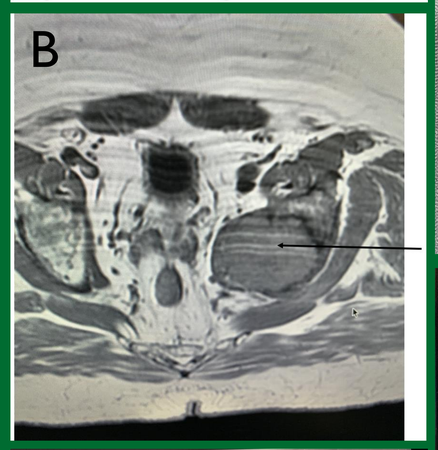


Figure 1. For each case engineers and surgeon meet to discuss tumor location and operative approach, during which a virtual model is constructed.

METHODS (continued)





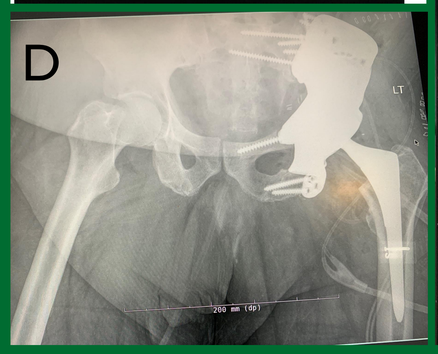
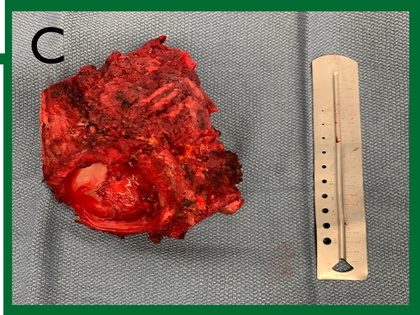
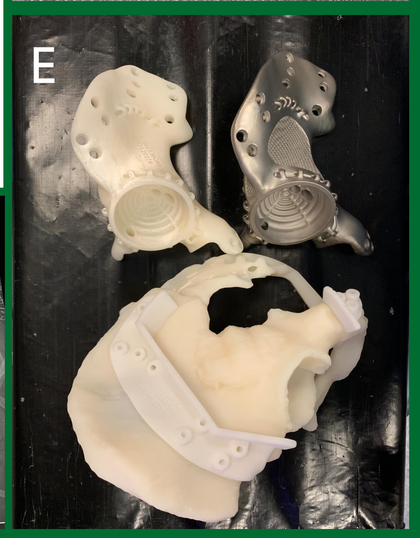
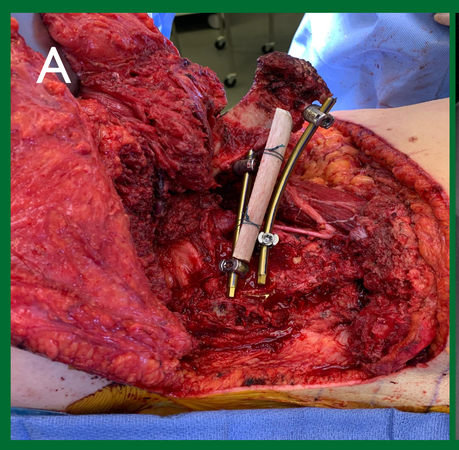


Figure 2. A tumor model (A) with adjacent structures (arrows) is made from patient imaging (B). The mass is then resected (C) and replaced with 3D-printed patient-specific instrumentation (D-E).







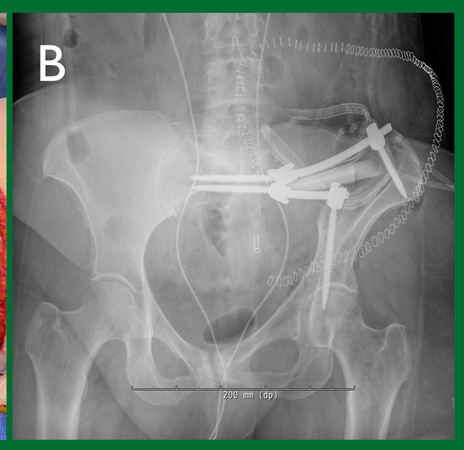


Figure 3. Pelvic reconstruction after resection using 3D-printed cutting guide and fibular strut allograft (A); post-operative anteroposterior radiograph (B).

RESULTS

- 3D-printed cutting guides were utilized in 7 (53.8%) cases, 3D-printed implants in 2 (15.4%), and for surgical simulation and demonstration in the remaining four.
- There were three deaths (all disease-related) in the immediate postoperative period at a mean 4.6 weeks (range, 1-10) weeks, and 1 disease-related death at 53 weeks following surgery.
- Three of 13 cases (23%) had microscopically contaminated margins.

CONCLUSIONS

This technology can be useful but has not emerged in our clinical practice as a clear determinant mostly due to rarity of use.

While we believe this technique offers advantages over freehand cutting and navigated surgical techniques, there is no substitute for anatomic understanding and operative experience for pelvic tumors.

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