3D-PRINTED CUTTING GUIDES FOR INTERCALARY LONG BONE RESECTION AND ALLOGRAFT RECONSTRUCTION IN EXTREMITY BONE SARCOMA

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Disclosures: Please see AAOS/MSTS list of disclosures.

INTRODUCTION

Patient-specific 3D-printed cutting guides for the resection of long bone tumors and allograft reconstruction is a novel technique.

Prior to cutting guides, resection of long bone tumors was more difficult and resulted in less precise cuts with variable patient outcomes.¹ ²

This study aimed to validate the use of these 3D-printed cutting guides in the resection of long bone malignancies.

METHODS

A retrospective review of 6 patients was performed.

Patients were included if a 3D-printed cutting guide and intercalary allograft reconstruction were utilized during their long bone sarcoma surgery.

Margin status, union/nonunion, complications, and disease-related outcomes were recorded.

METHODS (continued)

Table 1. Patient demographics and tumor characteristics.

<table>
<thead>
<tr>
<th>Case</th>
<th>Age/Sex</th>
<th>Diagnosis</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>32 F</td>
<td>Osteosarcoma</td>
<td>Tibia</td>
</tr>
<tr>
<td>2</td>
<td>18 M</td>
<td>Ewing Sarcoma</td>
<td>Tibia</td>
</tr>
<tr>
<td>3</td>
<td>60 F</td>
<td>Ewing Sarcoma</td>
<td>Femur</td>
</tr>
<tr>
<td>4</td>
<td>21 M</td>
<td>Osteosarcoma</td>
<td>Tibia</td>
</tr>
<tr>
<td>5</td>
<td>35 F</td>
<td>Chondrosarcoma</td>
<td>Femur</td>
</tr>
<tr>
<td>6</td>
<td>19 M</td>
<td>Ewing Sarcoma</td>
<td>Femur</td>
</tr>
</tbody>
</table>

• Nine of 12 (75%) cumulative osteotomy sites went on to union.

• 4 non-union (66.7%) received adjuvant radiation therapy.

• 2 (33.3%) reconstructions failed (Henderson Type 3; implant failure).

• 0 local recurrences at maximum recorded follow-up of 4.05 years.

• 0 perioperative infections recorded.

SUMMARY

Our institution has successfully performed limb salvage surgery with patient-specific 3D-printed technology.

We demonstrate high rates of negative margin resection, low rates of infections, and acceptable rates of junctional union that align with historical and more recent series.³ ⁴

REFERENCES