

OSTEOTOMY THROUGH THE SACRAL ALA: THE ADVANTAGE OF USING A 3D-PRINTED RESECTION GUIDE

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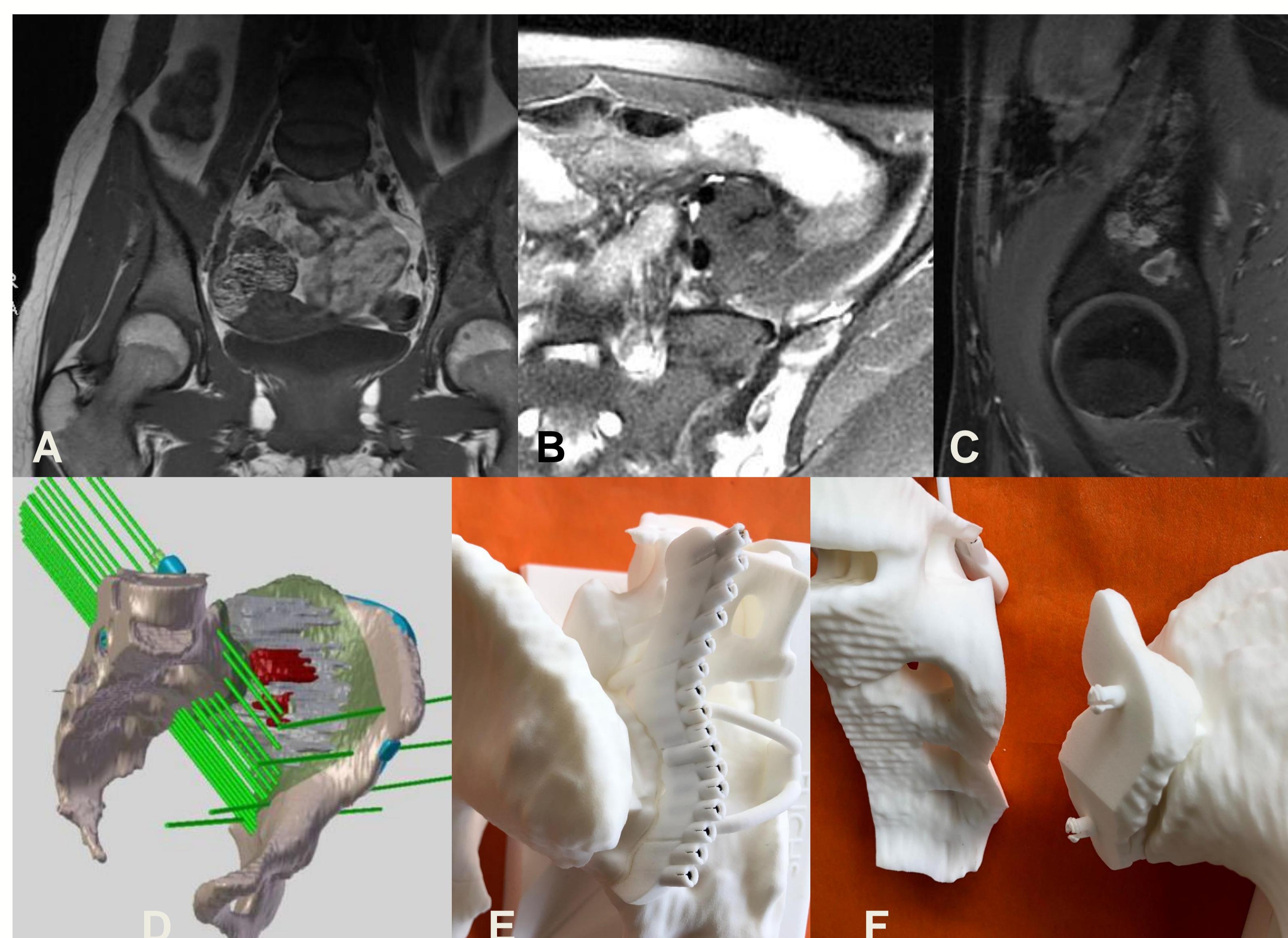
Sarcoma Service

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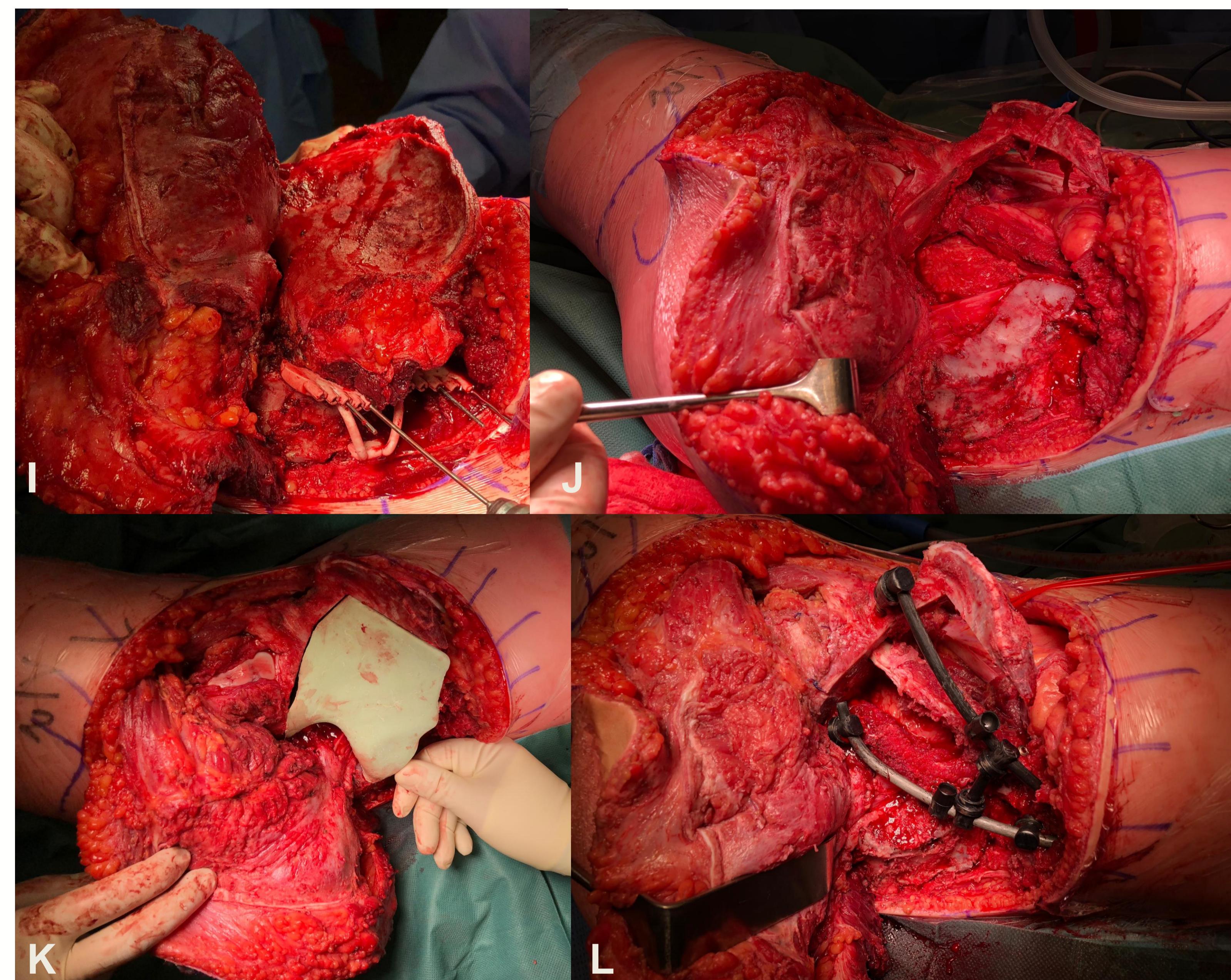
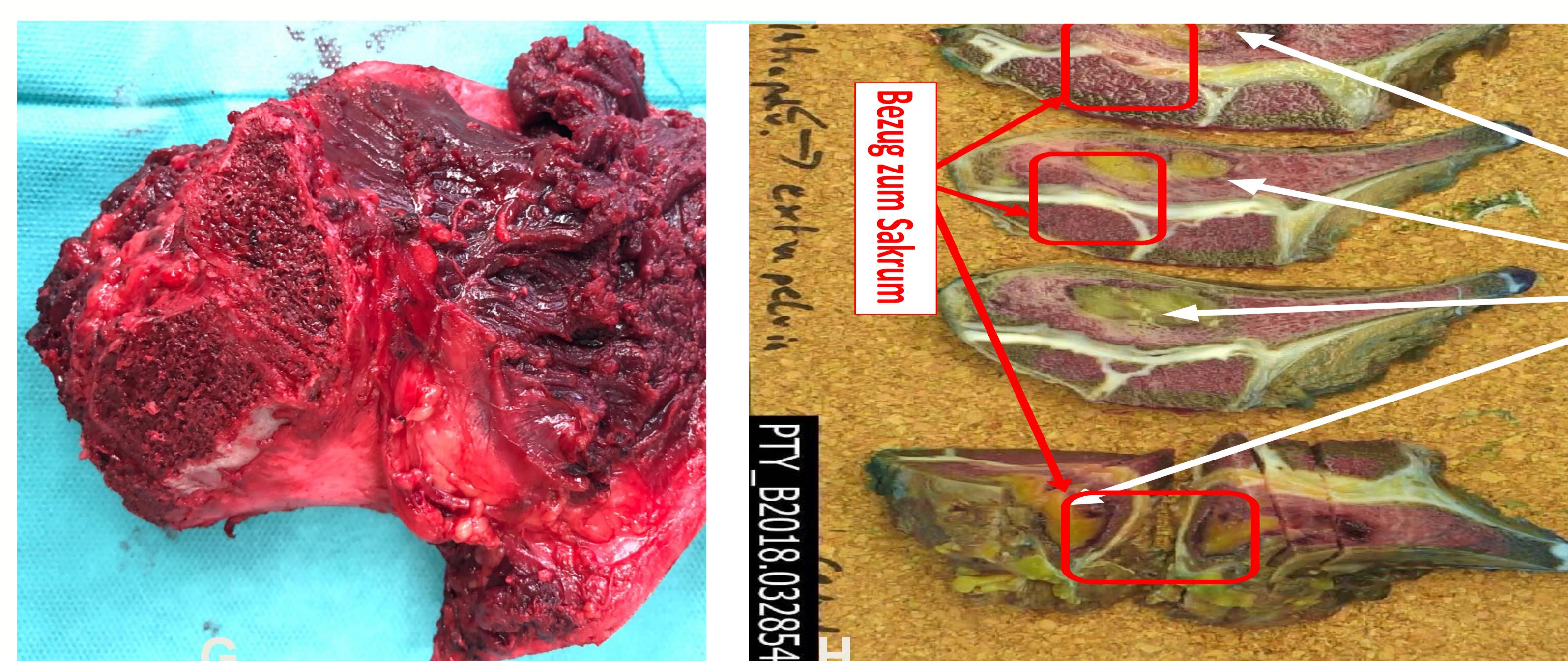
INTRODUCTION

Hemipelvectomies need to be carefully planned because the anatomy offers only little options between adequate tumor resection margin and functional loss. This applies specifically for the dorsal osteotomy through the sacral ala, where the tumor often abuts the sacro-iliac joint (SIJ) laterally, and the sacral foramina on the medial side. Further, the long arm of the SIJ is several cm long and thick, and at the inner table, there runs the L5 nerve root which exits the pelvis through the sciatic notch. Therefore, sacral osteotomy is rather complex and free-hand chisel osteotomy may not be precise enough.



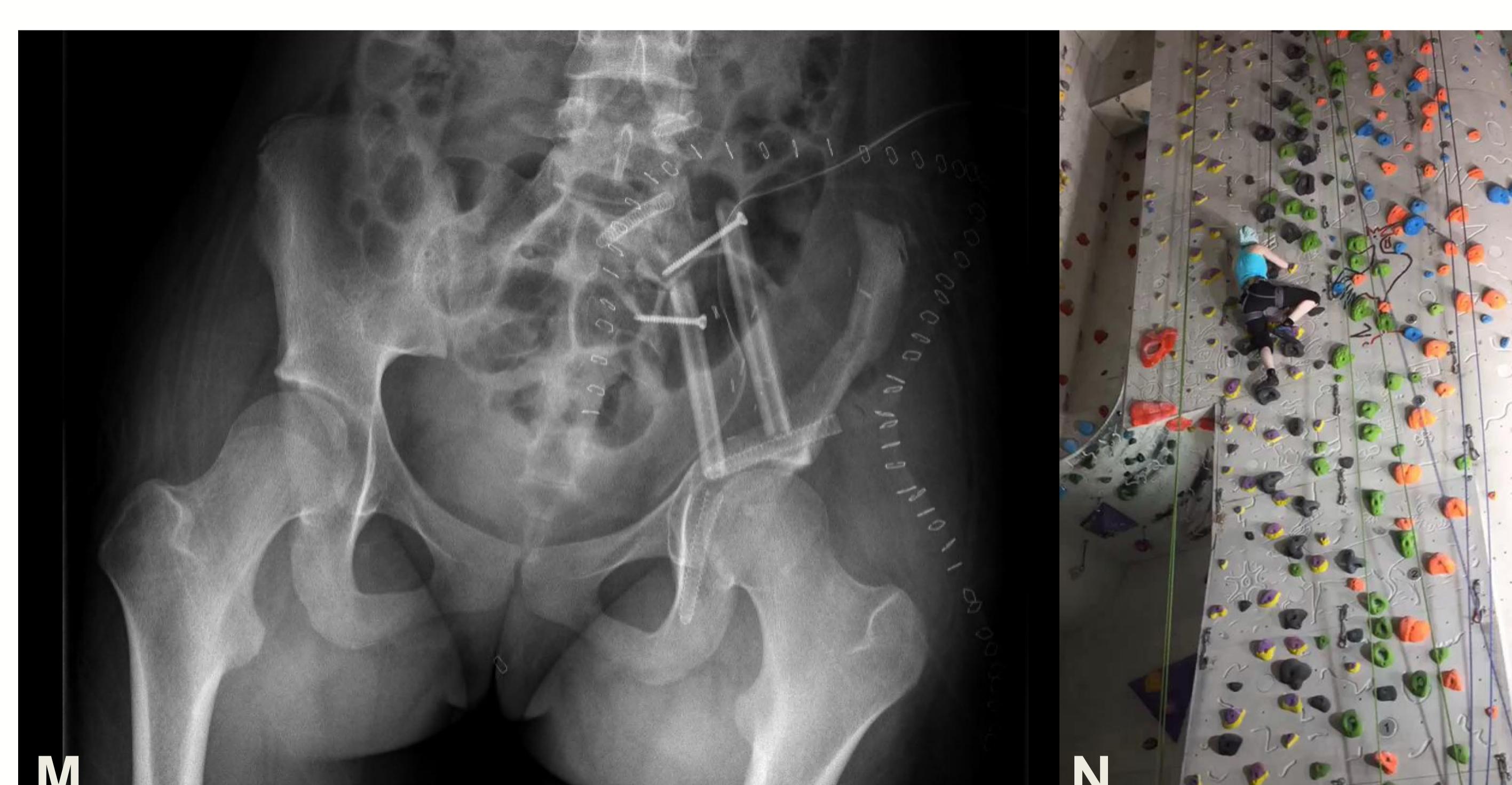
PATIENT & METHODS

A 14 year-old girl was diagnosed with localized Ewing's sarcoma of the iliac bone, and underwent preoperative chemotherapy. Imaging revealed the extent of the tumor from 6mm above the acetabulum to the SIJ, with however, involvement of the respective joint (A-F). After completion of preoperative chemotherapy, there was no soft tissue tumor involvement. Through a large iliac incision starting from the sacral midline over the PIS, it was extended distally and dorsally to the greater trochanter, to release the abductors and expose the outer pelvis and protect the sciatic notch (G-H).



RESULTS

Two 15 holes 3D drilling guides were printed based on CT and MRI imaging data such that it perfectly fitted to the dorsal aspect of the sacrum (I-L). Both guides had the same footprint, but their drilling bits guides were slightly set apart so that the drill holes were set as closely to each other as possible. The length of the drill holes can be accounted for as well in order to avoid damage of the L5 nerve root. Using the chisel by hand allows to safely complete the osteotomy.



CONCLUSION

The printing of a 3D guide which incorporates drilling guidance greatly assists to perform the sacral osteotomy and to improve the precision of this osteotomy, to remove the tumor completely, and to spare the functional anatomy as much as possible.

HIGHLIGHTS:

Reconstruction using rods and fibulae after complete iliac resection may preserve normal hip and pelvic function.