Appendix 1

Case examples

Case 1

A 37 year-old woman with an iliosacral osteosarcoma underwent an extended hindquarter amputation at our centre with vascularised femoral autograft reconstruction after failure of palliative radiotherapy. Due to the vascularised nature of the autograft, fusion occurred within 6 months. At 11 years post-surgery, there was no evidence of local recurrence.

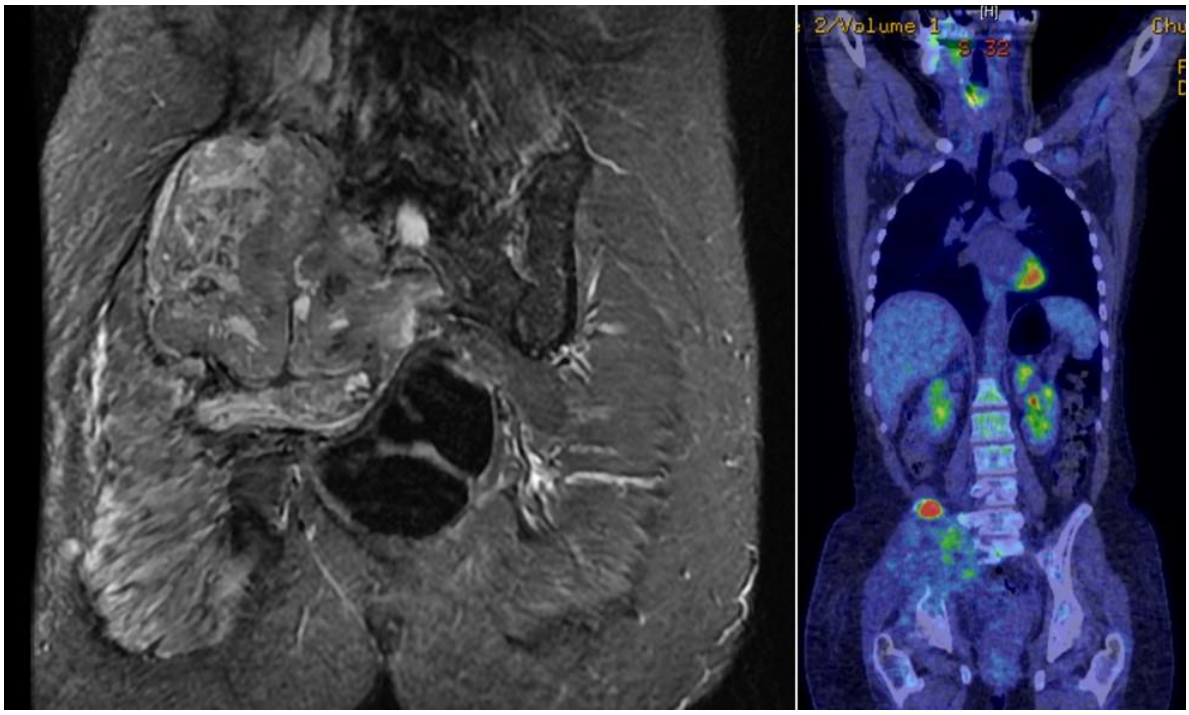

Fig. 2a Preoperative magnetic resonance imaging (MRI) and positron emission tomography (PET) scans

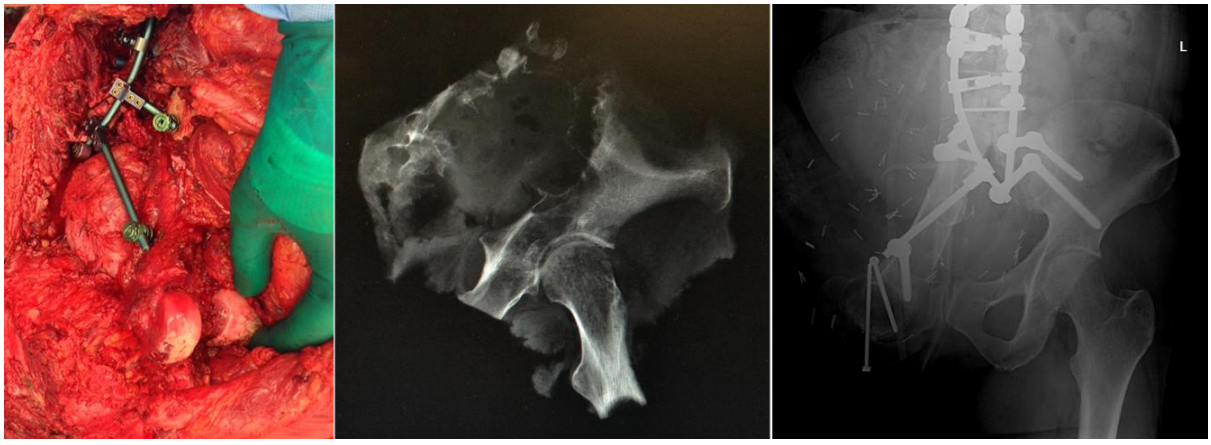

Fig. 2b Intraoperative photograph of the vascularised femoral autograft, postoperative radiograph of the excised tumour, and postoperative patient radiograph

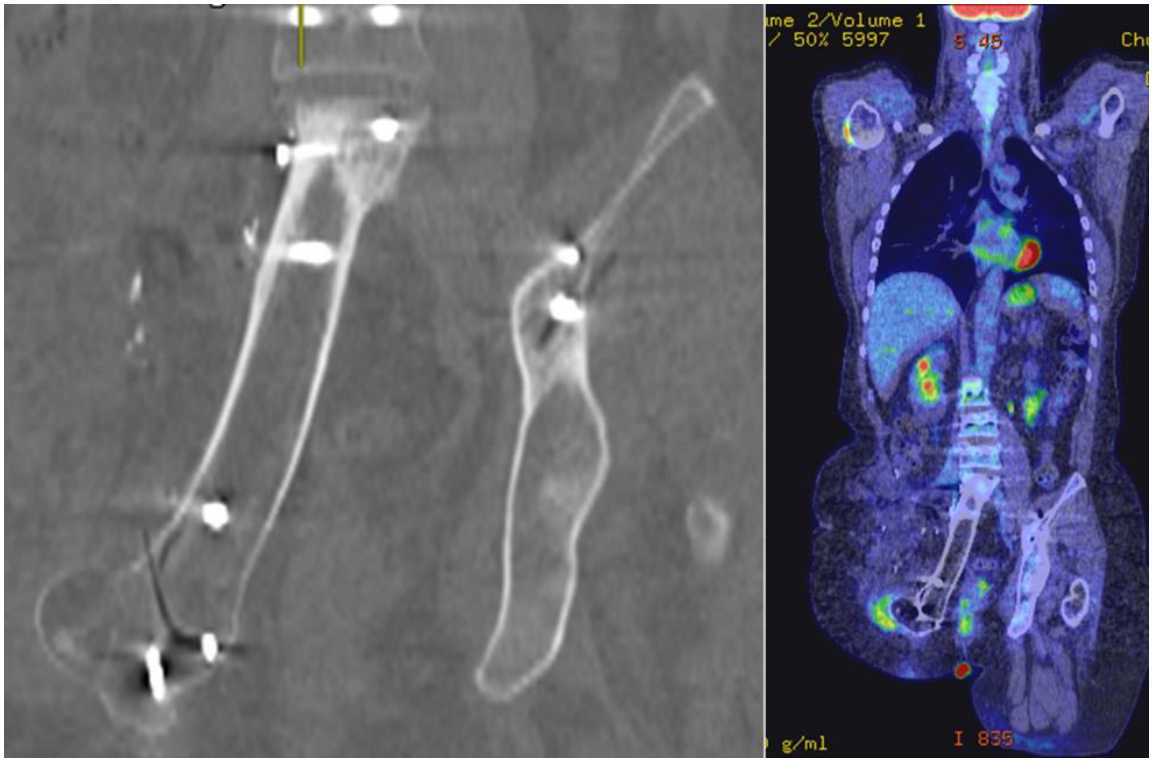

Fig. 2c Postoperative computed tomography (CT) scan demonstrating fusion of vascularised femoral autograft, and postoperative PET scan showing no active disease

Case 2

A 33 year-old woman presented with an L1 giant cell tumour with psoas and spinal canal extension. She was treated with neoadjuvant denosumab, leading to reduction in tumour size, especially in the epidural region. This allowed the patient to undergo an en-bloc excision of L1 and L2 with Enneking appropriate margins via a posterior and anterior approach.

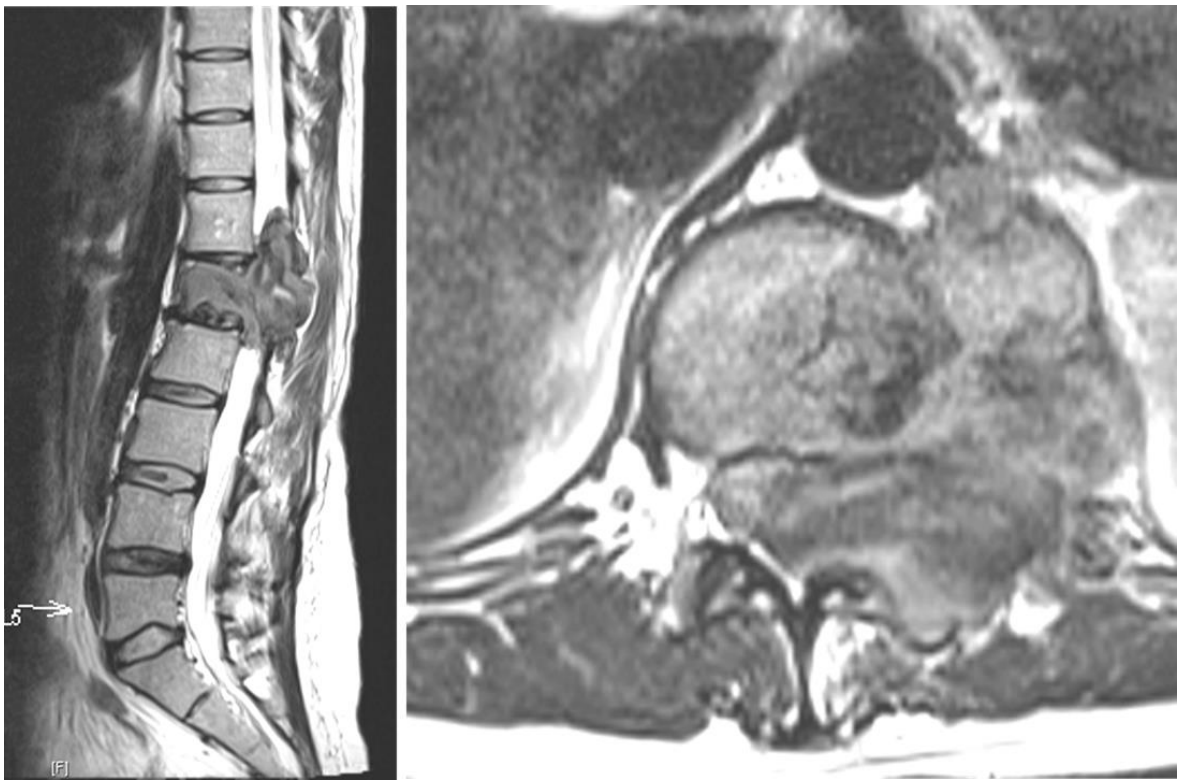

Fig. 3a Pre-operative MRI demonstrating extra-osseous tumour extension, and extension into the epidural space

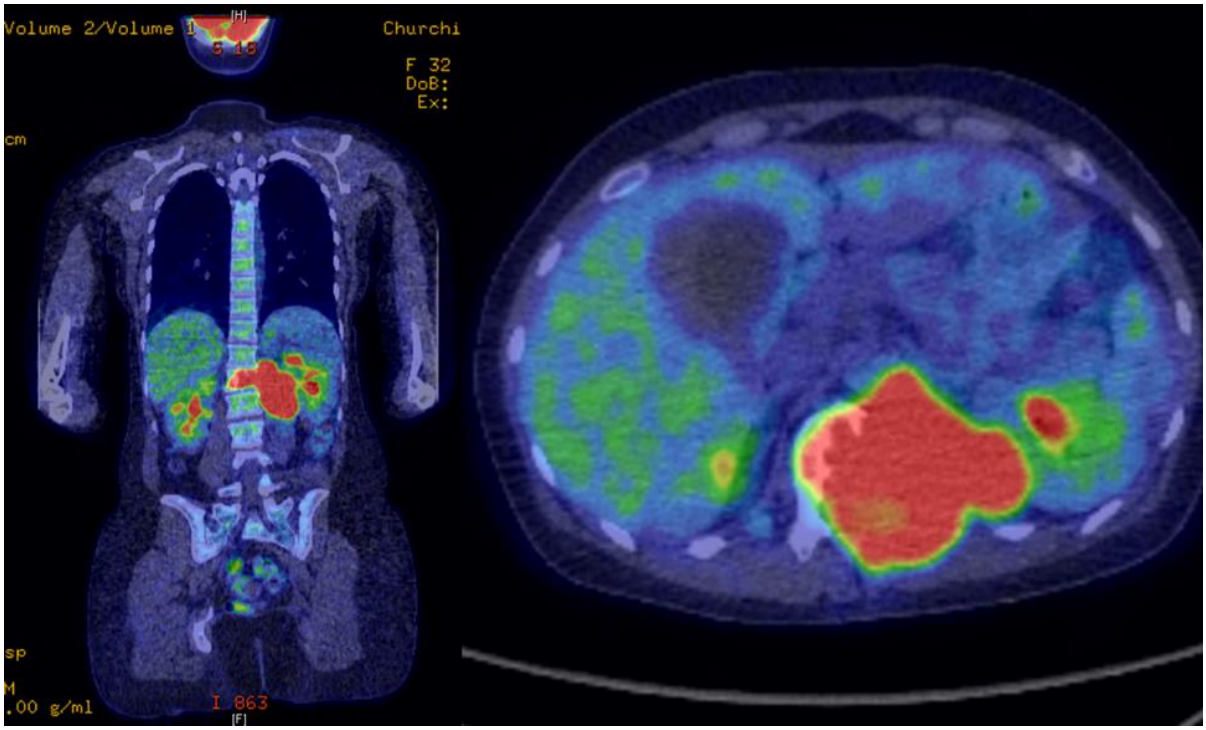

Fig. 3b Preoperative PET scan demonstrating a metabolically active giant cell tumour at L1 with epidural and extra-osseous extension

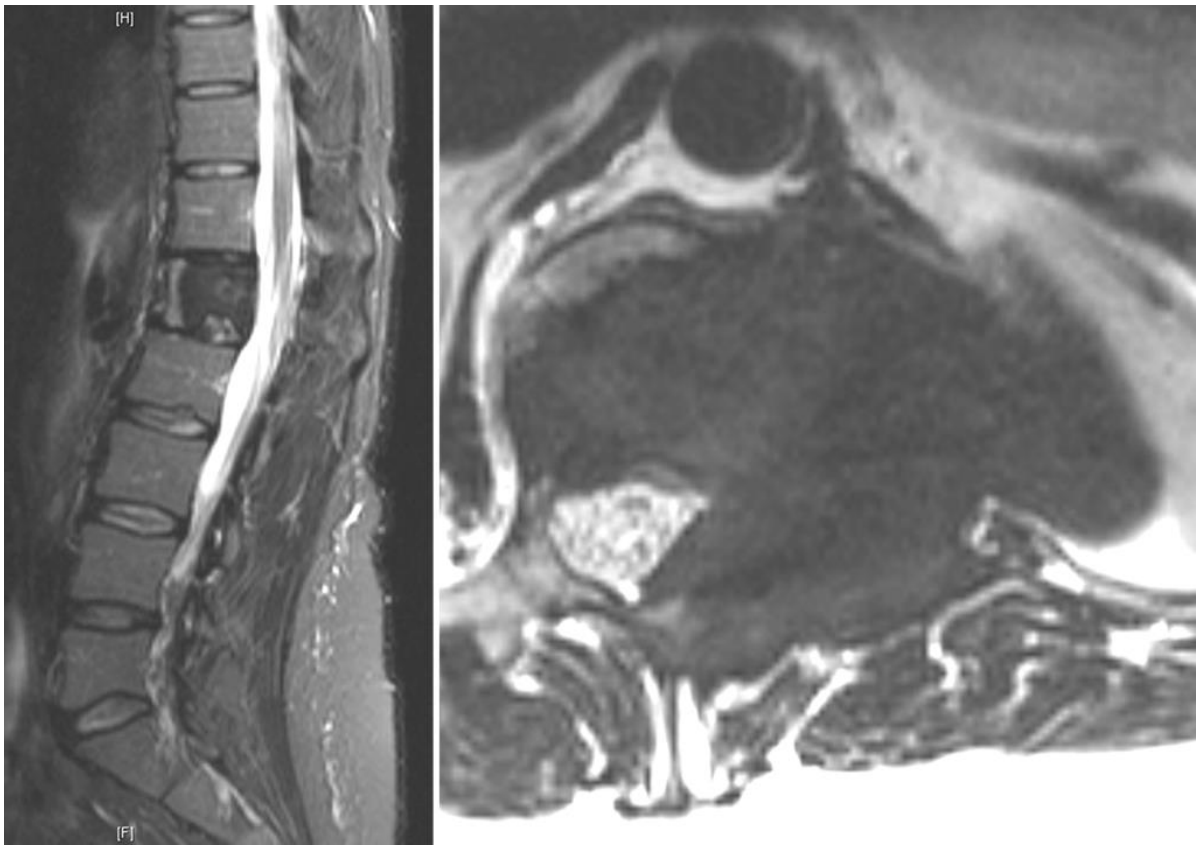

Fig. 3c MRI demonstrating tumour shrinkage after neoadjuvant denosumab treatment

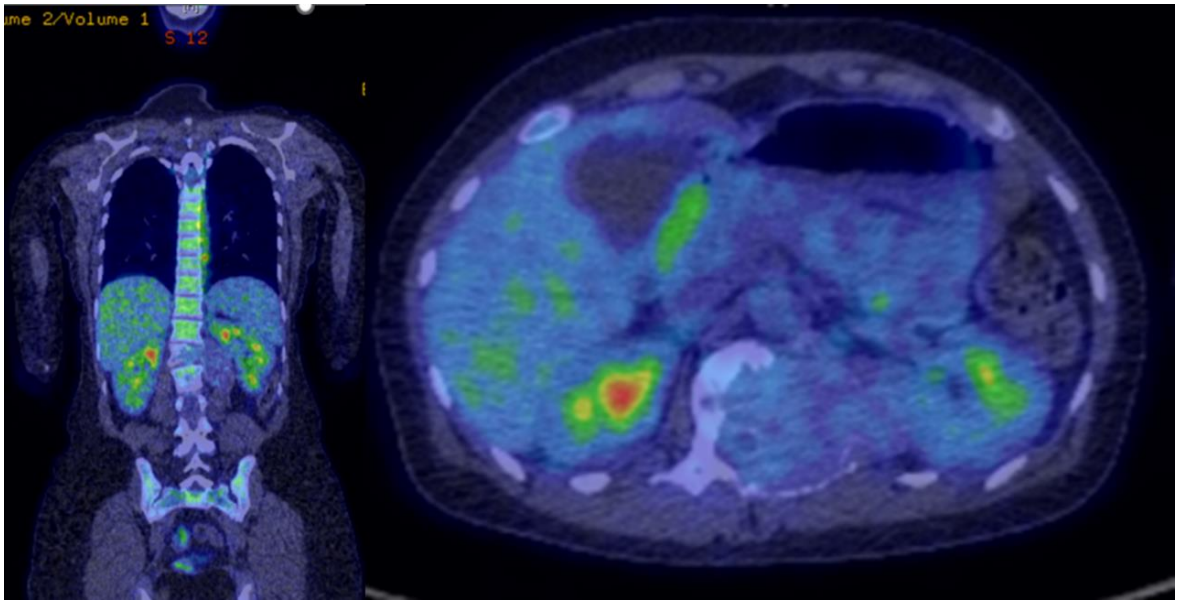

Fig. 3d Post-denosumab PET scan showing a metabolically inactive tumour with minimal fluorodeoxyglucose (FDG) uptake

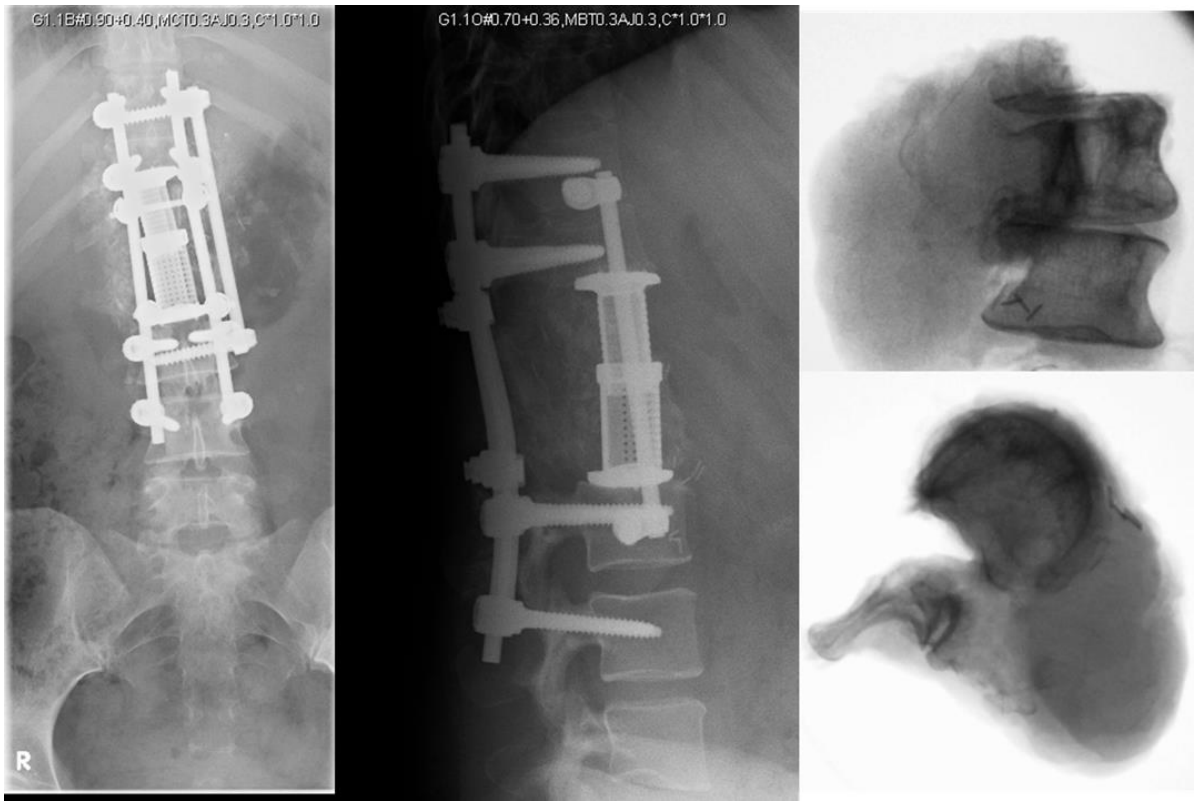

Fig. 3e Post-operative patient radiographs, and post-operative radiographs of the excised tumour

Case 3

A 53 year-old woman with a C1-C3 chordoma underwent an en-bloc excision of the C1-C3 tumour via a posterior and dual incision anterior approach with sagittal osteotomy of C1-C3. Anterior reconstruction was performed by a vascularised fibula allograft.

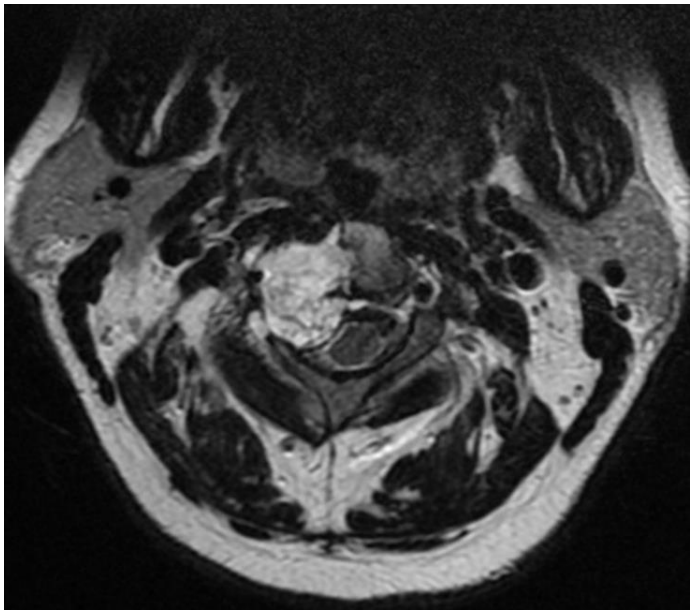

Fig. 4a Axial MRI of the C2 level showing a right-sided chordoma with epidural extension and compression of the right vertebral artery

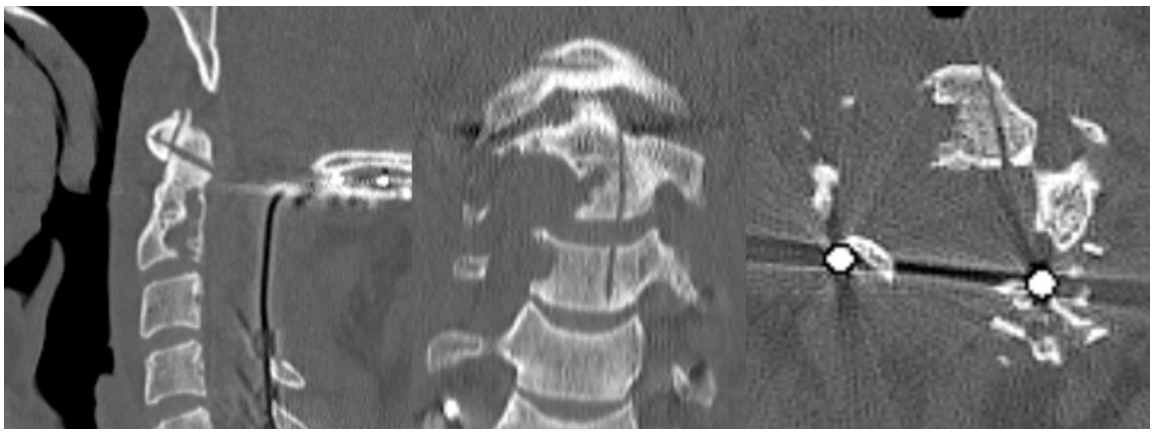

Fig. 4b CT scan of the cervical spine showing osteotomy cuts performed via the posterior approach

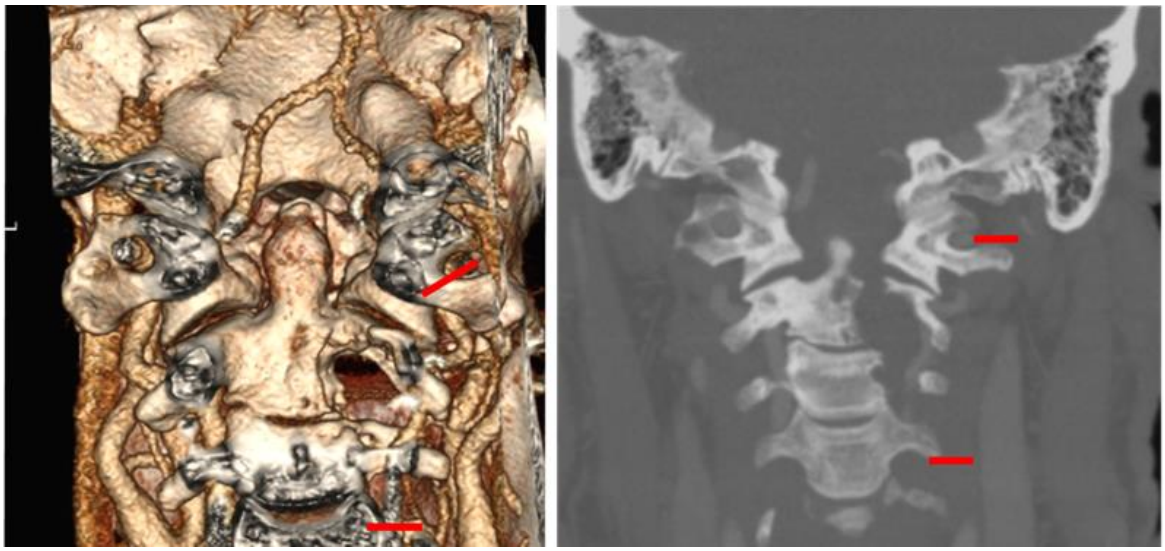

Fig. 4c CT angiography and 3D reconstruction showing the length of the right vertebral artery to be ligated

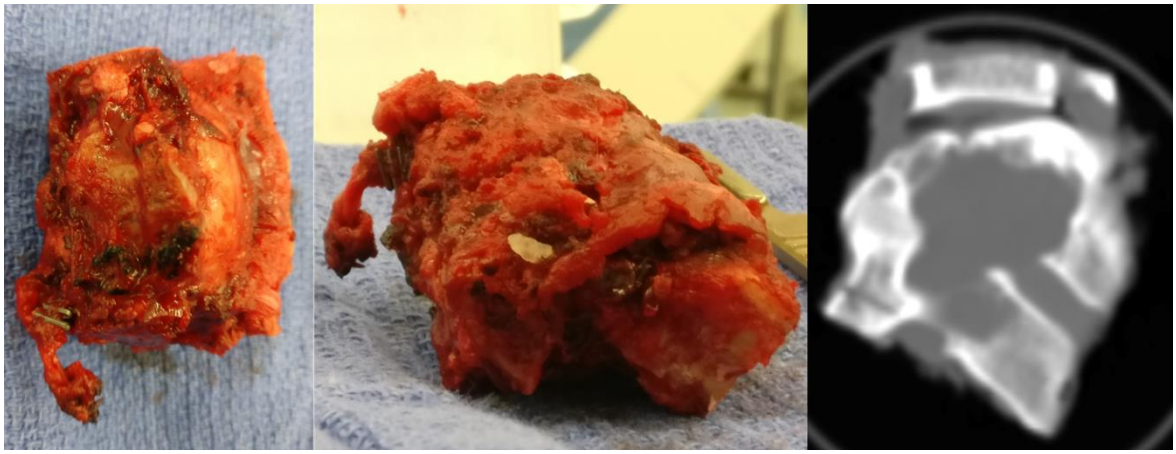

Fig. 4d Post excision photographs and radiograph of the excised tumours showing no macroscopic breach. Vascular clips are visible on vertebral artery V2

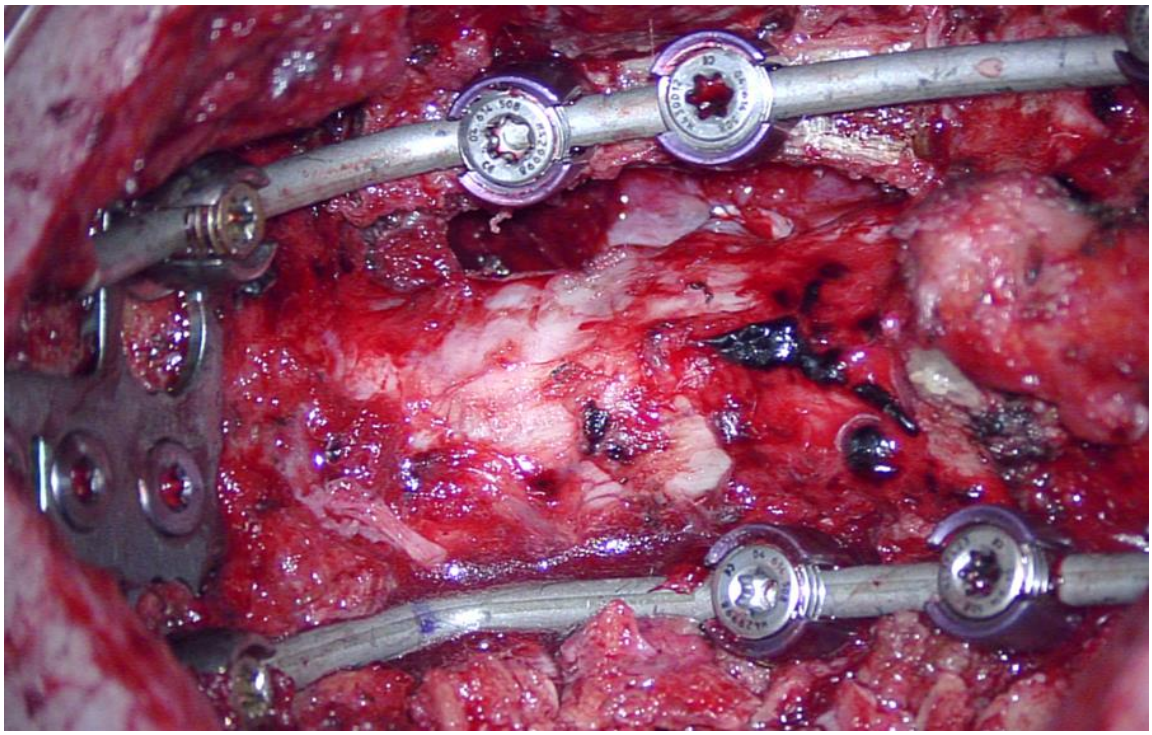

Fig. 4e Intraoperative photograph showing occipital cervical fusion and stabilisation of the fibula autograft

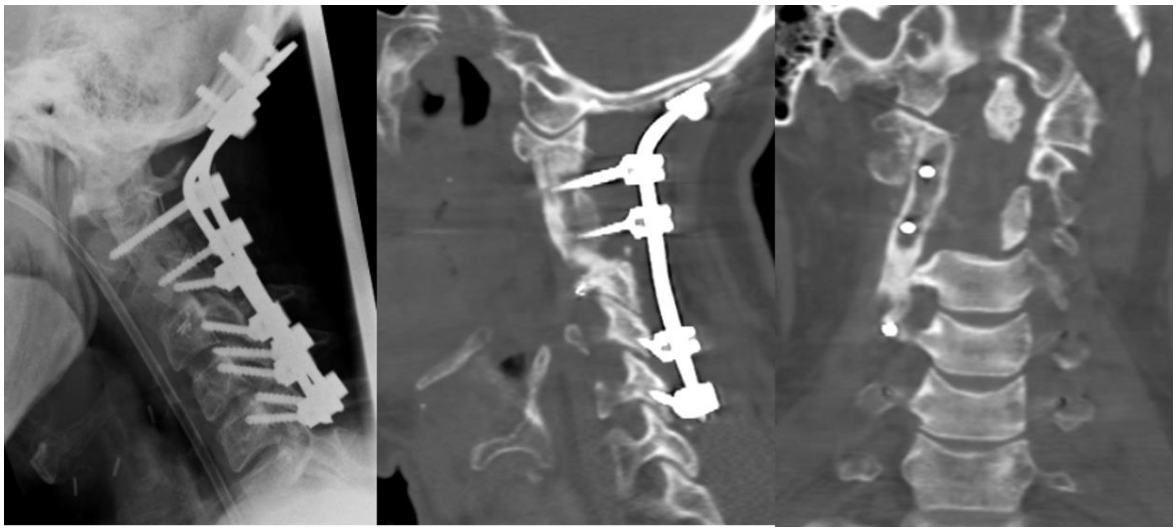

Fig. 4f Postoperative radiograph and CT scan showing occipital cervical fusion and stabilisation of the fibula autograft with excision of the tumour

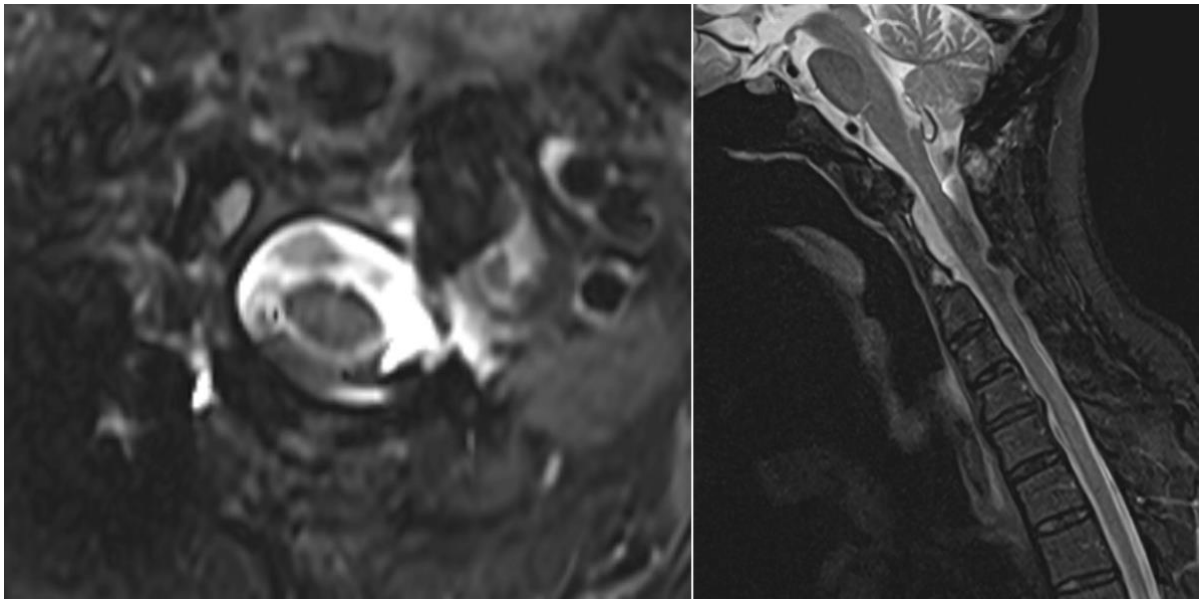

Fig. 4g Postoperative MRI demonstrating resection of the tumour with no evidence of recurrence