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## Computer navigation assisted surgery for pelvic and sacral tumours: experience of a tertiary centre

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### Background

Recent reports on the use of computer navigation assisted surgery for the resection of pelvic and sacral tumours have shown promising results, however these conclusions are based on small case series and varied anatomical tumour sites. The study aims were to (1) describe our initial experience with computer navigation assisted tumour surgery, (2) determine the intralesional resection rate when using this technique for primary tumours of the pelvis and sacrum, and (3) determine the early clinical outcomes following tumour resection.

### Methods

This prospective study included 23 patients (mean age 53.3 years and 57% male) in which computer navigation assisted surgery was performed for pelvic and sacral bone tumours at a single institution since 2010. Surgery was performed for 18 primary malignant bone tumours (9 chondrosarcoma, 5 sacral chordoma, 3 osteosarcoma, 1 Ewings sarcoma), 3 metastatic tumours, and 2 locally advanced rectal tumours. Preoperative CT and MRI images were fused in the navigation system (Stryker Orthomap 3D Navigation System II) to plan the surgical resection margins. In cases where reconstruction was required custom-made implants (silver coated with a hydroxyapatite collar) were used.

### Results

Registration error was less than 1 mm in all cases with no complications related to navigation. Navigation allowed the preservation of sacral nerve roots (n=8), the avoidance of hindquarter amputations (n=3), and resection of otherwise inoperable disease (n=2). Mean total operation time was 260 minutes (range 131-512 minutes). The intralesional resection rate for primary pelvic and sacral tumours was 11% (n=2) with clear bone resection margins achieved in all cases. At a mean follow-up time of 12.4 months (range 1-30 months) three patients (17%) developed local recurrence. Mean time alive from diagnosis was 14.5 months (range 1-38 months).

### Conclusions

The present study demonstrated that computer navigation assisted surgery was a safe technique for pelvic and sacral tumours which can reduce the intralesional resection rate (previously 29% at this centre) and provide acceptable short-term rates of local recurrence and complications. It has also allowed more complex resections and reconstructions to be performed. We recommend this technique is worthy of further appraisal in this patient group.

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