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The outcomes of navigation-assisted bone tumour surgery: minimum three-year follow-up

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BACKGROUND
Recently there have been several preliminary reports about the application of navigation to the surgery of bone tumours. It is expected that the technique should minimize unnecessary resection, preserve maximum function and achieve good oncological and functional results. However, to date there have been no reports about the longterm outcome of computer-assisted resection of bone tumours. We therefore analysed the oncological and functional outcomes of patients whose malignant bone tumour was excised with the assistance of navigation.

METHODS
We evaluated the oncological and functional outcome of 18 patients, whose malignant bone tumours were excised with the assistance of navigation, and who were followed up for more than three years. There were 11 men and seven women, with a mean age of 31.8 years (10 to 57). There were ten operations on the pelvic ring and eight joint-preserving limb salvage procedures. The resection margins were free of tumour in all specimens. The tumours, which were stage IIB in all patients, included osteosarcoma, high-grade chondrosarcoma, Ewing's sarcoma, malignant fibrous histiocytoma of bone, and adamantinoma.

RESULTS
The overall three-year survival rate of the 18 patients was 88.9% (95% confidence interval (CI) 75.4 to 100). The three-year survival rate of the patients with pelvic malignancy was 80.0% (95% CI 55.3 to 100), and of the patients with metaphyseal malignancy was 100%. The event-free survival was 66.7% (95% CI 44.9 to 88.5). Local recurrence occurred in two patients, both of whom had a pelvic malignancy. The mean Musculoskeletal Tumor Society functional score was 26.9 points at a mean follow-up of 48.2 months (22 to 79).

CONCLUSIONS
We suggest that navigation can be helpful during surgery for musculoskeletal tumours; it can maximise the accuracy of resection and minimise the unnecessary sacrifice of normal tissue by providing precise intra-operative three-dimensional radiological information.

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