



To News Editor
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**CUHK is the World's Pioneer
in the Use of Computer Navigation for Bone Tumor Surgery**

Under the conventional management of bone cancer patients without the application of computer navigation system, surgeons have difficulties in visualizing the tumor extent and achieving the desired precision in bone resection during surgery. To ensure the survival of the bone cancer patients, the surgeons have to ensure the resections are thorough enough to remove the bone tumor. Therefore, it is hard to preserve anatomically complex areas like the joint. The constraint of the conventional approach is now totally overcome by the computer navigation assisted bone cancer surgery.

Children with bone cancer have good prospects for survival – almost 75% of these children will remain alive 10 years after their disease. Chemotherapy has not only improved survival but also has enabled surgeons to perform limb salvage surgery in 80% of paediatric patients. Surgical removal of the tumor is necessary for survival, while reconstruction of the removed bone is necessary for the paediatric patients to walk after surgery. Therefore, precision in tumor removal and reconstruction is crucial to ensure the best outcome in bone cancer patients.

The orthopaedic surgeons from The Chinese University of Hong Kong have successfully applied computer navigation to assist resection and reconstruction in bone cancer patients by adapting a commercially available navigation system conventionally used for spine to perform bone tumor surgery. With this new technique, precise resection of a tumor and accurate reconstruction of the resultant bone defect can be achieved. It therefore spares important anatomical structures and preserves function, particularly in anatomically complex areas. The novel management of bone tumor patients has significant implications on paediatric cases as it is particularly useful in joint saving resection which further enables the surgeons to perform limb salvage surgery.

Computer navigation has been effectively used in the treatment of orthopaedic trauma, spinal surgery and joint replacement surgery in the past few years. Hardware-software solutions catering to each of these disciplines are commercially available. CUHK orthopaedic surgeons skillfully adapt the computer navigation system by including other pertinent data of bone cancer patients such as MRI images of the bone tumor and the adjacent soft tissues. With the integration of pre-operative information about the local anatomy and extent of the tumor, the computer navigation system can now assist the orthopaedic surgeons to easily identify resection margins precisely and preserve as much normal bone as possible. It has enabled the surgeons to perform tumor surgery that would otherwise be extremely difficult to achieve, and allowed accurate

fitting of custom made metallic prostheses. This advanced technique is particularly useful in joint saving resection in paediatric bone cancer patients and has been extended to complex pelvic surgery and revision surgery with distorted anatomy and severe tissue scarring.

Since early 2006, 15 bone tumor cases have been successfully operated by this advanced approach. Just like all new techniques, it raises the concern on safety. Among all 15 bone tumor cases operated by this new technique, resection margin was clear in all resected tumor specimens and post-operative radiological investigations confirmed accurate fitting of all custom made metallic prostheses. Compared with the conventional bone tumor surgery, the overall operative time of the computer assisted bone tumor surgery had been reduced as all the surgical planning was done prior to the surgery. Besides, the possibility of surgical contingency during the operation was largely reduced as the surgery could be done in a highly precise and accurate manner with the assistance of the computer navigation system.

CUHK is the world's pioneer in the use of computer navigation for bone tumor surgery because of its long-standing multidisciplinary team approach involving many academic departments of Faculty of Medicine CUHK. This new technique has been recognized and accepted internationally as two related articles have been published recently in international journals. The CUHK orthopaedic surgeons also received an award at the recent International Society of Limb Salvage meeting held in Germany in September 2007 for their outstanding work on computer assisted bone tumor surgery. The use of computer navigation in bone tumor surgery has been a rewarding experience to surgeons and patients alike. It will hopefully be accepted as the gold standard in musculoskeletal tumor surgery.