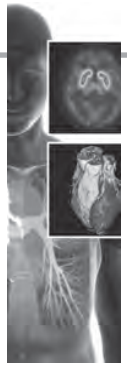

Short commentary on the recently published paper patient-specific instrument can achieve same accuracy with less resection time than navigation assistance in periacetabular pelvic tumor surgery: a cadaveric study

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Post-Orthopaedic oncology surgeons perform bone sarcoma resections to include some normal tissue beyond the tumor. The extent of this so-called margin, beyond the boundary of the tumor, is based on the assessment of the preoperative radiological images. An inadequate resection is one with an insufficient margin between tumor and normal tissue; this may be life threatening, as it is associated with higher risk of recurrence and poor patient survival [1]. The surgeon is often faced with the dilemma of deciding how much normal tissue to preserve in order to retain good function without compromising the resection margin. Such preoperative mental planning of a resection and its intraoperative execution is even more difficult in complex anatomical areas such as the pelvis. Given that the pelvic bone has a complex geometry and several vital neurovascular structures are intricately related, surgeons often are forced to resect much more margin than necessary to take into account the inaccuracy of mental planning and unguided resection In last decade, computer-assisted technology has been thoroughly investigated in orthopaedic oncology; this not only enhances the surgeons' capability of making accurate three-dimensional surgical plans, but also enables to execute precisely these surgical plans during surgery. Although the long-term clinical results using the technology are still lacking, the early results show significantly improved surgical accuracy and the oncological outcomes too are promising. To date, this paper is the first cadaveric study to compare the two currently available computer-assisted surgical techniques in pelvic tumor resection, a) Navigation (NAVI) and b) Patient Specific Instruments (PSI). Tumors vary in their anatomical extent and locations and are seldom identical; therefore it would be difficult to compare the two techniques in real clinical patients. Hence a comparison of the two techniques in cadavers may provide the best information about their relative accuracy and efficacy. In the study published, we have shown that in simulated periacetabular pelvic tumor resections, PSI technique enabled surgeons to reproduce the virtual surgical plan with an accuracy that was comparable with that attained using NAVI Assistance. At the ideal cadaveric experimental setting, the time required for the resection in the cadaver was however significantly less (16.2 minutes vs. 1.1 minutes). This however may not be clinically significant given that the actual surgery takes much longer. Therefore, surgeons may choose the technique that they are more familiar with, or perhaps the technique that yields the least registration error they can achieve in their hands. These techniques augment the surgeons' ability to perform accurate and even complex multi-planar bone resections. Therefore it may also improve the implant design used for the complex limb reconstruction. With the advances in 3D printing technology, complex patient-specific implants that match the patient's bony shapes could be designed and manufactured to perfectly fit into defects created following computer-assisted resections [2]. One of the pitfalls of using the current computer-assisted technique is that the process involves multiple steps and integration of multiple softwares. This is not user-friendly, involves a steep learning curve and is inordinately time consuming. In the future, an all-in-one computer platform that may allow easy planning of resection and reconstruction needs to be developed so as to facilitate customized patient treatments in

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orthopaedic oncology. Surgeons may then freely choose between one of the two techniques (NAVI or PSI) that seems more suitable in their hands for their patients [3].

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