

## Short Communication

# Things you need to know about the Intra-Operative Imaging and Navigation in today's Computer-Assisted Spine Surgery

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## EDITORIAL

The use of intraoperative CT-Quality O-arm and Neuronavigation is still under investigation as aiding tools in complex spine surgeries at different institutes. These systems are still unfamiliar tools to spine surgeons worldwide due to technical and financial limitations as compared to ordinary fluoroscopy [1].

A group of physical limitations to these systems exist. The O-arm images are planar and orthogonal and their views are made through digital volumetric construction affecting their spacial accuracy, though, an accuracy of a pexil representation of 1 mm is now available and acceptable [2]. The neuronavigator camera is a static one so far, and the precision of its optical tracking system depends on the position of the reference to the camera. Overall, a precision of 0.11 mm is currently available which is quite acceptable [3].

Both systems combined offer a manufactured not a true real-time quality image. That is basically a 2-D version that needs some training to transform it into a 3-D image in the mind of the user. One must expect a steep learning curve which is at times a real challenge to the surgeons [4].

The amount of radiation to which the patient is exposed depends mainly on the scanning protocol, sequence optimization and mode during setup of the O-arm. In experienced hands the dose of radiation delivered to the patient could be reduced by a factor of 40% as compared to the beginner user. In another words trained personals might get a delivered patient dose as low as 0.5 of a conventional 64-slice CT. By practice you will learn to adjust the exposure in a way that does not hazard the quality of image [5].

By using this technology day-in and day-out, certain

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precautions need to be followed by the surgeon and the OR team to avoid exceeding the guidelines of cumulative radiologic exposure. The radiology technician needs to stay shielded behind the body of the machine, while all other staff needs to stay at least 3 meters away from the machine doughnut to be safe. A surgeon need to limit his dependence on such technology to 2-3 surgeries per week if he wishes to delay reaching such dangerous exposure limit for up to 8 years of his practice.

A registration error of < 1.5 mm is acceptable worldwide. You might achieve this through single or multiple-time registrations. One must keep in mind the time consumed by multiple-time registration that will add to the surgical time [6].

The accuracy of pedicle screw placement with such technology is good. Their use might lower the pedicular cortex perforation rate down to 2.7% in experienced hands [7].

We found these tools very helpful during our series of 600 plus cases of complex spine surgeries.

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