Short Communication

Method of Dramatic Reduction of Radiation Dosage in Deformity Surgery

Harry Shufflebarger MD

ABSTRACT: Introduction: Current robotic technology for spinal surgery requires massive expensive hardware and complicated software. The latter requires tiresome registration of multiple instruments and appliances. Intra-operative CT scan is required for robotic functioning. Due to capital and space limitations, many facilities cannot implement usage of robotic technology.

Methods: Utilizing off the shelf medical grade components, an existing robot developed for brain and a camera from orthopedics, a miniaturized system results. Software was developed to optimize workflows (image importation, intraoperative planning, easy rapid positioning and precision targeting). Integrated cleaning and storage results in a total footprint of 30"x36", facilitating storage. The development of compatibility with outside CT imaging and real time fluoroscopic imaging is near complete.

It is recognized that Rigidity is critical for accuracy. A unique assembly of components creates an environment of robust rigidity, without the need for large heavy platforms. The surgical frame, ala Jackson etc, is a common fixation point. The components are rigid connections points to frame, rigid positioning arms, an ultralight camera, and patient fixation materials.

Results: A comprehensive array of quantative and qualitative studies have been conducted to validate the clinical usability and accuracy of the FR system for the placement of pedicle screws. These include surgical usability testing, CT imaging validation, ANSI standard validation, and cadaveric accuracy validation. 100% clinical efficacy and accuracy of <2.0mm with 95% confidence by all measures was obtained.

Summary: A small portable robot is available meeting all accuracy needs. Cost is a fraction of current robots, as are space requirements. This facilitates use of robotics as standard of care options without economic and practability constraints. Permits robotics without O-arm reliance.

Biography:-

Harry Shufflebarger, Works st Robert Isaacs MD, Farah Hamouda BS , USA

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Robert Isaacs MD, Farah Hamouda BS