A new cost-effective approach to pedicular screw placement

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The placement of pedicle screws in open spine surgery is difficult. Warranting the correct trajectory is crucial because a wrongly placed screw will lead to a bad fit or will harm the patient's neurovascular structure. Current state of the art techniques are based on the surgeon's experience and multiple fluoroscopic images or an expensive and complex intraoperative navigation system. This paper describes a novel method which is intended to support the surgeon during the insertion of pedicle screws in a simple yet cost-effective and reliable way. The approach uses inertial measurement sensors to track the pose of the surgical instruments and a software application for visualization and guiding. In a pre-clinical cadaver study a performance of 74 out of 80 clinically correctly placed screws has been reached without the use of any fluoroscopic images.

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