MCID for ED-5D. Multivariate analysis demonstrated that SSPc grouping is an independent predictor of final VAS back, ODI, EQ-5D, and EQ-VAS as well as achieving the MCID for EQ-5D. Conclusions: The SSPc classification is associated with outcomes following lumbosacral fusion. In particular, patients with SSPc pattern 3 had better outcomes and improved QALY.

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Effect of postoperative pain control and other perioperative risk factors on length of stay after elective spine surgery

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Background: Prolonged length of stay (LOS) after elective spine surgery increases patients' risk for in-hospital complications and contributes significantly to healthcare costs. Here we explored the role of pain control and other perioperative factors on LOS. Methods: Consecutive adult patients undergoing elective spine surgery were enrolled. The primary outcome was in-hospital LOS following surgery. The primary independent variable was poor pain control on postoperative day 1 (POD1). Univariable analyses followed by multivariable regression analysis were used to investigate the relationship between poor pain control and LOS. Results: 1305 patients were enrolled. Mean LOS was 4.38 days. Incidence of poor pain control was 56.9%. Multivariable analysis revealed poor POD1 pain control was significantly associated with increased LOS (p=0.03), after adjusting for other significant predictors of increased LOS including perioperative hemodynamic instability (p=0.001), perioperative blood transfusion (p=0.000), delirium (p=0.000), POD1 morphine equivalent dose (p=0.000), urinary tract infection (p=0.000), urinary retention (p=0.003), surgical site infection (p=0.000), wound complication (p=0.000), neurologic deterioration (p=0.000), surgical levels (p=0.016), operative time (p=0.007), ASA score (p=0.000), preoperative disability score (p=0.001). Conclusions: Poor pain control on POD1 was an independent predictor of increased LOS after elective spine surgery, highlighting the importance of a proactive approach to addressing pain in the immediate postoperative period.

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A critical appraisal of the application of frailty and sarcopenia in the spinal oncology population

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Background: Frailty and sarcopenia predict worse surgical outcomes among spinal degenerative and deformity-related populations; this association is less clear in the context of spinal oncology. Here, we identified frailty and sarcopenia tools applied in spinal oncology and appraised their clinimetric properties. Methods: A systematic review was conducted from January 1st, 2000, until June 2022. Study characteristics, frailty tools, measures of sarcopenia, component domains, individual items, cut-off values, and measurement techniques were collected. Clinimetric assessment was performed according to Consensus-based Standards for Health Measurement Instruments. Results: Twenty-two studies were included (42,514 patients). The three most employed frailty tools were the Metastatic Spine tumor Frailty Index (MSTFI), Modified Frailty Index-11 (mFI-11), and the mFI-5. The three most common sarcopenia measures were the L3-Total Psoas Area (TPA)/Vertebral Body Area (VBA), L3-TPA/Height^2, and L3-Spinal Muscle Index (L3-Cross-Sectional Muscle Area/Height^2). Frailty and sarcopenia measures lacked content and construct validity. Positive predictive validity was observed in select studies employing the HFRS, mFI-5, MSTFI, and L3-TPA/VBA. All frailty tools had floor or ceiling effects. Conclusions: Existing tools for evaluating frailty and sarcopenia in surgical spine oncology have poor clinimetric properties. Here, we provide a pragmatic approach to utilizing existing frailty and sarcopenia tools, until more clinimetrically robust instruments are developed.

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In-vivo accuracy of pedicle screws utilizing a supervisory controlled 7DOF robot with OCT guidance

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Background: Pedicle screw fixation is an important technique in spine surgery. Violation of the pedicle can lead to neurovascular injury. Due to excellent pose repeatability, robotic technology may improve accuracy. Existing surgical spine robots use surgical assist architecture. This work explores the performance of a supervisory-control architecture robot (8i Robotics) for autonomous pedicle instrumentation. Methods: 3 porcine subjects underwent pedicle instrumentation utilizing the 7dof robot and were observed for 24 hours. Post-operative CT assessed screw location. Screws were graded clinically with the Gertzbein-Robbins Scale (GRS). Precision was assessed by a customized image processing pipeline. Euclidean error was calculated at screw head and screw tip. All points were normalized to a nominal screw, and confidence ellipses generated. Results: All animals were neurologically intact at 24 hours. All screws where GRS A. Mean tip and head Euclidean error where 2.47+/−1.25mm and 2.25+/-1.25mm respectively. Major and minor axes of the confidence ellipse at 99% was 2.19mm, and 1.28mm, and 2.07mm, and 0.42mm for tip and head respectively. Conclusions: 100% of screws obtained satisfactory clinical grading, with intact function in all animals post-operatively. This shows the capability of a supervisory-controlled 7DOF robot with OCT registration. Further investigation is warranted to further explore robotic capabilities, safety, and cost effectiveness.