

Optimization and Validation of a Screening Prediction Model in Lumbar Spinal Fusion

Eelco van Leent (Venlo, Pays-Bas), M. Hulsbosch (Venlo, Pays-Bas), Anouk Smeets (Heerlen, Pays-Bas), F. Lambers Heerspink (Venlo, Pays-Bas), P. Willems (Maastricht, Pays-Bas), Esther Janssen (Nijmegen, Pays-Bas)

Introduction

Degenerative spinal disorders can severely impair physical function. Lumbar spinal fusion (LSF) is commonly performed, particularly in cases of neurogenic claudication. Previous research has developed a predictive tool for forecasting postoperative pain reduction at 1 year, based on factors such as smoking, BMI, ASA score, and pain duration. This study aims to improve this tool by incorporating preoperative physical tests.

Materials and Methods

A prospective cohort study was conducted across two hospitals between February 2017 and March 2024. Patients undergoing LSF were preoperatively assessed by a physiotherapist with various physical performance tests, including the Timed-Up-and-Go test, motor control test, finger-floor distance, Sørensen test, steep ramp test, and a cycling test. The Morton Mobility Index (DEMMI) was also calculated, and postoperative patient-reported outcomes (PROMs) were collected.

Results

A total of 202 patients were included. After 1 year, no significant difference in pain reduction was observed between the hospitals, with a mean reduction of -32.7 (SD 32.3) on the VAS scale for maximum pain. Of the physical tests, only the steep ramp test (SRT) was a significant predictor of pain reduction ($p < 0.000$). Adding the SRT to the prediction tool increased the AUC from 0.67 to 0.68 (95% CI 0.67–0.69).

Conclusion

This study demonstrated that only the SRT cycling test significantly predicts pain reduction at 1 year. It can be incorporated into the predictive tool to better forecast postoperative pain reduction at 1 year.