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Effectiveness of interspinous process devices in managing adjacent segment degeneration following lumbar spinal fusion: A systematic Review and meta-Analysis**Harris Mangal***Medway NHS Foundation Trust, UK*

Background: Adjacent segment degeneration (ASD) is a common complication following lumbar spinal fusion, often leading to further surgical interventions. Interspinous process devices (IPDs) have been introduced as a potential alternative to mitigate ASD by preserving range of motion and reducing mechanical stress on adjacent segments.

Methods: Electronic databases, including PubMed, Embase, and the Cochrane Library, were queried for studies assessing IPDs against traditional lumbar fusion methods for managing ASD after previous lumbar fusion, which had been published between January 2014 and the present. Statistical analysis was conducted using Review Manager 5.4.

Results: Seven retrospective cohort studies involving 546 patients met the inclusion criteria. The analysis revealed that IPDs were associated with a statistically significant reduction in the incidence of ASD (OR = 0.28, 95% CI: 0.16 to 0.51, $p < 0.0001$, and $I^2 = 0\%$ after excluding outliers). The ODI demonstrated a non-significant trend towards improved outcomes with IPDs at the 2-year follow-up (SMD = -3.94; 95% CI: -11.72 to 3.85). Range of motion (ROM) was better preserved with IPDs compared to fusion (SMD = 0.00, 95% CI: -0.41 to 0.41, $p = 1.00$, $I^2 = 60\%$). The visual analogue scale or VAS lower back pain scores were significantly reduced at the 2-year follow-up (SMD = -0.69, 95% CI: -1.18 to -0.19, $p = 0.006$, and $I^2 = 74\%$). VAS leg pain showed consistent improvements (SMD = -0.29; 95% CI: -0.63 to 0.04). Intraoperative blood loss was significantly lower with IPDs (SMD = -2.07; 95% CI: -3.27 to -0.87, $p = 0.0007$, and $I^2 = 95\%$), and operation times were shorter (SMD = -2.22, 95% CI: -3.31 to -1.12, $p < 0.0001$, and $I^2 = 94\%$).

Conclusions: The judicious use of IPDs might benefit a subset of patients, particularly those who are not suitable candidates for major corrective surgery.

Biography

Dr. Harris Mangal is a resident doctor at Medway Maritime Hospital with a strong interest in Trauma & Orthopedic surgery, health technology, and artificial intelligence. Driven by a passion for innovation and research, he actively seeks to integrate cutting-edge technologies into clinical practice to improve patient care and streamline surgical procedures. His entrepreneurial spirit fuels his pursuit of novel solutions that enhance healthcare delivery and outcomes.