

Systematic Review

Full-Endoscopic Procedures Versus Traditional Discectomy Surgery for Discectomy: A Systematic Review and Meta-analysis of Current Global Clinical Trials

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Background: Traditional discectomy surgery (TDS) provides good or excellent results in clinical surgical discectomy but may induce neural adhesion, spinal structural damage, instability, and other complications. The potential advantages of full-endoscopic (FE) procedures over standard TDS include less blood loss, less postoperative pain, shorter hospitalization, and an earlier return to work. However, more evidence is needed to support this new technology in clinical applications.

Objective: The aim of this systematic review and meta-analysis was to compare the safety and efficacy of FE and TDS.

Study Design: Comprehensive systematic review and meta-analysis of the literature.

Methods: Electronic databases, including PubMed, EMBASE, SinoMed, and Cochrane Library, were searched to identify clinical therapeutic trials comparing FE to TDS for discectomy.

Results: Six trials comprising 730 patients were included, and the overall quality of the literature was moderate, including 4 Grade I levels of evidence (4 randomized controlled trials, [RCTs]) and 2 Grade II levels (2 non-RCTs). The pooled data revealed no difference in reoperation rates between FE and TDS ($P = 0.94$), but the complication rate was significantly lower in the FE group (3.86%) than in the TDS group (11.4%). Perioperative parameters (operation time, blood loss, hospitalization time, and return to work days) were significantly lower in the FE group ($P < 0.05$ for all groups using either score). Postoperative pain and neurology score assessments were conducted at 4 different time points at 3 months, 6 months, 12 months, and 24 months. Significant differences were detected in the following: lumbar North American Spine Society (NASS) pain at 6 months ($P = 0.008$); cervical NASS neurology at 6 months ($P = 0.03$); visual analog scale (VAS) score in leg at 3 months ($P < 0.001$); VAS score in arm at 24 months ($P = 0.002$); VAS score in neck at 3 months, 6 months, and 12 months after therapy ($P = 0.003$, $P = 0.004$, $P = 0.01$); and VAS score in neck at 3 months and 6 months ($P = 0.01$, $P = 0.004$). Moreover, the pooled data revealed no statistically significant differences in improvements in the Oswestry disability index (ODI), instability (X-ray), and Hillbrand criteria ($P > 0.05$ for all groups).

Limitations: Only 6 studies were included, 4 of which had the same authors. Between-study heterogeneity due to differences in socioeconomic factors, nutrition, and matching criteria is difficult to avoid.

Conclusions: Based on this meta-analysis of 24 months of clinical results, we conclude that the FE procedure is as effective as TDS but has the additional benefits of lower complication rates and superior perioperative parameters. In addition, patients may experience less pain with FE techniques due to a smaller incision and less operative injury. However, large-volume, well-designed RCTs with extensive follow-up are needed to confirm and update the findings of this analysis.

Key words: Full-endoscopic, minimally invasive, discectomy, meta-analysis

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