Endoscopic Spine Surgery: A Scoping Review of the Literature

Dr Drew Mulhall, Dr Chien Yew Kow, Dr Catherine Veilleux, Dr Anand Oliveira Masson, Dr Steve Casha, Dr Stephan du Plessis, Dr Ken Thomas, Dr Michael MH Yang

University of Calgary, Calgary, AB, Canada

ABSTRACT SECTION #1: Objectives

To map the landscape of the endoscopic spine surgery literature, identify areas of clinical application, and highlight gaps in evidence to inform future research efforts.

ABSTRACT SECTION #2: Method

Following PRISMA-ScR guidelines, systematic searches were conducted across MEDLINE, EMBASE, CINAHL, and Cochrane Library from January 1, 2010 to September 22, 2024. We included human studies of adult patients (>18 years) undergoing uniportal or biportal endoscopic spine surgery. We excluded non-English studies, case reports (<5 patients), and conference abstracts. Two reviewers independently screened studies, with disagreements resolved by a senior author.

ABSTRACT SECTION #3: Results

We included 1194 studies encompassing 877,370 patients, and noted a marked increase in publications over the past decade. Most studies were low-level evidence, predominantly case series (n=588, 49.2%) and retrospective cohort studies (n=392, 32.8%) focusing on the clinical effectiveness of spinal endoscopy without comparison groups (n=422, 35.3%). Lumbar disc herniation (n=565, 47.3%) and uniportal endoscopy (n=1002, 83.9%) were the most studied pathology and technique, respectively. The transforaminal approach (n=602, 50.4%) was more commonly studied than the interlaminar approach (n=358, 30.0%). Outcomes frequently reported included pain scores (85.5%) and complication/readmission rates (79.5%), while few studies addressed learning curve (0.8%), economic impact (0.7%), or neuromonitoring needs (0.5%). Notably, enabling technologies such as navigation, robotics, and augmented reality represented less than 4% of studies.