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Introduction

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Endoscopic Approach for Low Back Pain and Foraminal Pathologies

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Low back pain (LBP) remains a globally pervasive issue, significantly impacting the quality of life and work capabilities of a large portion of the adult population [1]. It is one of the most common reasons for medical consultations and a major cause of disability worldwide [2]. The complexity of spinal anatomy and the diversity of potential pathologies make the management of LBP particularly challenging. These pathologies often involve the lumbar spine and may include disc degeneration, herniation, facet joint osteoarthritis, and foraminal stenosis, all of which can impinge on nerve roots and cause pain [3]. Traditional treatments for these conditions have typically involved medication, physical therapy, and open surgical interventions [4]. However, open surgeries, while often effective, can be associated with significant morbidity, prolonged recovery times, and substantial risks of complications such as infections, scar tissue development, and postoperative pain. This has spurred interest in the development of minimally invasive surgical techniques, particularly endoscopic spine surgery, which promises less tissue disruption, reduced recovery times, and fewer complications [5,6]. The advancements in endoscopic technology and the refinement of surgical techniques have led to a burgeoning interest in endoscopic approaches for the diagnosis and treatment of spinal disorders [7,8]. This collection of papers focuses on the use of endoscopic techniques to address LBP and foraminal pathologies. This review focuses on the less invasive endoscopic treatment of LBP through rhizotomy, along with a systematic review, and introduces various endoscopic surgical treatment techniques that address foraminal pathology and back pain. It aims to provide readers with useful information on endoscopic treatments for LBP.

The first paper in this collection offers a detailed review of the anatomy and pathology of the L5 nerve as it exits the lumbosacral spine. The L5 nerve compression is the most common pathologic of LBP and foraminal stenosis. Understanding the anatomical details of L5 nerve pathways is crucial for diagnosing the source of LBP and for planning surgical interventions that minimize the risk of nerve damage. This paper provides a foundational knowledge that supports the subsequent discussions on various surgical techniques. Subsequently, a systematic review examines the effectiveness of full-endoscopic lumbar rhizotomy in treating facetogenic LBP. This procedure involves the targeted severance of nerve roots to alleviate pain originating from

the facet joints, which are often implicated in chronic LBP. The review consolidates findings from various studies, highlighting the efficacy of this approach and discussing the nuances of the technique that improve patient outcomes.

Interbody fusion surgery is one of the most important and commonly used surgical methods for addressing LBP and foraminal pathology [9]. This special issue introduces the latest techniques in unilateral biportal and full-endoscopic interbody fusion. Significant contribution is an original article that evaluates the risks associated with nerve root injuries during endoscopic transforaminal lumbar interbody fusion (TLIF). Given the proximity of major nerve roots during this procedure, understanding the incidence and mechanisms of nerve injuries is crucial. This paper contributes valuable insights into the safety of endoscopic TLIF and suggests techniques to reduce the risk of such injuries. Another technical note presents a minimally invasive strategy for full-endoscopic TLIF using a large cage in oblique lumbar interbody fusion. This innovative approach facilitates spinal fusion with minimal disruption to surrounding tissues and is particularly advantageous for stabilizing the spine and alleviating pain in patients with advanced degenerative changes. The adaptability of endoscopic techniques is further demonstrated in a technical note on thoracic interbody cage insertion for the treatment of proximal junctional failure. This condition often occurs in patients with previous spinal surgeries and can lead to significant instability and pain. The endoscopic approach offers a minimally invasive solution to this complex problem. Finally, the collection concludes with a discussion on a novel full-endoscopic technique using a modified transfacet approach for lumbar interbody fusion. This technique aims to reduce the risk of inadvertent neurovascular injury, which is a critical concern in traditional approaches. By modifying the surgical pathway and using advanced full-endoscopic techniques, this method promises safer and more effective outcomes for patients undergoing spinal fusion.

The collection also includes several technical notes for various neural compressive lesion like tumor and mass that discuss specific endoscopic interventions in greater detail. One notable paper explores unilateral biportal endoscopy for the treatment of lumbar intradural lesions. This advanced technique uses 2 separate portals for enhanced visualization and instrumentation, which is particularly beneficial for delicate intradural surgeries where precision is paramount. In treating extramedullary spinal tumors, another technical note illustrates the application of unilateral biportal endoscopy. This method allows for precise tumor removal with minimal damage to the surrounding spinal structures, significantly reducing recovery times and improving surgical outcomes. Further, the collection addresses the management of postoperative complications such as cement leakage with neural compression. A dedicated technical note discusses the use of endoscopic techniques to directly address and rescue cement leaks, which can cause significant back pain and compromise the structural integrity of neural sturcture.

These papers collectively underscore a paradigm shift in the treatment of spinal disorders, moving away from traditional open surgeries towards minimally invasive endoscopic techniques. Each manuscript not only provides a detailed analysis of specific endoscopic procedures but also highlights the broader implications of this surgical evolution. The emphasis on reducing surgical trauma, decreasing recovery times, and improving patient outcomes is evident throughout the collection.

In conclusion, the "endoscopic approach for LBP and foraminal pathologies" represents a significant advancement in the field of minimally invasive and endoscopic spinal surgery. This approach integrates cutting-edge technology with a deep understanding of spinal anatomy to offer treatments that are not only less invasive but also highly effective. As these techniques continue to evolve and gain wider acceptance in the spine surgery community, they hold the promise of transforming the therapeutic landscape for patients suffering from LBP and other spinal disorders.

NOTES

Conflict of Interest

The authors are members of the Editorial Board of JMISST. However, they played no role whatsoever in the editorial evaluation of this article or the decision to publish it. No potential conflict of interest relevant to this article was reported.

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