

# Impact of Segmental Spinal Instrumentation and Spinal Decompression on Lower Limb Function in Patients with Spinal Osteoarthritis

Zoran Milan\*

Department of Sport and Physical Education, University of Belgrade, 11000 Belgrade, Serbia

## Introduction

Segmental spinal instrumentation and spinal decompression are two primary surgical techniques used to manage the effects of spinal osteoarthritis, particularly when there is neurological compromise affecting lower limb function. Segmental spinal instrumentation involves stabilizing the spine using rods, screws, or plates, while spinal decompression focuses on relieving pressure on compressed nerves by removing bony or soft tissue obstructions. This article explores the impact of these surgical interventions on lower limb function in patients with spinal OA, examining both their effectiveness and potential complications. Spinal osteoarthritis is primarily a degenerative condition that affects the spine's facet joints and intervertebral discs. Over time, the cartilage in these joints wears down, leading to the development of osteophytes and disc degeneration, which narrows the spinal canal and foramina. This can result in spinal stenosis, which compresses the spinal cord or nerve roots, and subsequently, neurological symptoms may develop in the lower limbs. The lumbar region is the most commonly affected part of the spine in osteoarthritis because it bears the weight of the upper body and undergoes significant mechanical stress. This stress, along with the degeneration of spinal structures, can lead to lumbar radiculopathy, which occurs when nerve roots are compressed, resulting in radiating pain, weakness, or numbness in the lower limbs. Additionally, severe cases of spinal stenosis can lead to neurogenic claudication—a condition where patients experience pain and weakness in the legs after walking a short distance, forcing them to stop and rest frequently. Commonly known as sciatica, patients may feel pain radiating from the lower back down one or both legs, often caused by compression of the sciatic nerve [1-3].

## Description

Several studies have shown that segmental spinal instrumentation, particularly when combined with spinal decompression, can lead to significant improvements in lower limb function in patients with spinal osteoarthritis. A retrospective study of patients who underwent lumbar fusion with instrumentation for spinal OA and stenosis demonstrated that the majority experienced a reduction in leg pain and an improvement in walking ability. Additionally, many patients reported improved lower extremity strength and sensation, which contributed to better functional outcomes overall. While the results of instrumentation are generally positive, it is important to note that the success of the procedure depends on several factors, including the patient's overall health, the extent of spinal degeneration, and the precision of the

surgical technique. Spinal decompression surgery is indicated when nerve roots or the spinal cord are compressed due to osteoarthritic changes, such as the formation of osteophytes, disc herniation, or thickening of the ligaments.

Decompression can be achieved through various techniques, including laminectomy. The primary goal of decompression is to relieve pressure on the affected nerves, thereby alleviating symptoms such as pain, weakness, and sensory loss in the lower limbs. Multiple studies have demonstrated the positive impact of spinal decompression on lower limb function in patients with spinal OA. In a large cohort study of patients undergoing laminectomy for lumbar stenosis, over 80% reported significant improvements in leg pain and motor function within six months of surgery. Long-term follow-up revealed sustained improvements in lower limb strength and mobility, with many patients returning to normal activities, including walking and exercise. However, it is important to recognize that patient selection is critical for the success of decompression surgery. Patients with severe spinal deformities or instability may require a combination of decompression and instrumentation to achieve optimal outcomes [4,5].

## Conclusion

In many cases of spinal osteoarthritis, particularly those involving both nerve compression and spinal instability, a combined approach of segmental spinal instrumentation and decompression is necessary to achieve the best outcomes. This approach involves stabilizing the spine with instrumentation while simultaneously relieving nerve pressure through decompression techniques. Studies evaluating the combined approach of segmental spinal instrumentation and decompression have shown excellent outcomes in patients with spinal OA. A randomized controlled trial comparing decompression alone with decompression plus fusion for lumbar spinal stenosis found that patients who underwent the combined procedure had greater improvements in leg pain, walking ability, and overall functional status at two years post-surgery. Furthermore, these patients had lower rates of reoperation compared to those who underwent decompression alone. Segmental spinal instrumentation and spinal decompression are powerful surgical tools in the management of lower limb dysfunction caused by spinal osteoarthritis.

## Acknowledgement

None.

## Conflict of Interest

None.

## References

1. Mirković, Milan, Filip Kukić, Dragan Mirkov and Dejan Marinković, et al. "Effects of spinal decompression and segmental spinal instrumentation on lower limb functionality in patients with spinal osteoarthritis." *Life* 14 (2024): 1072.

\*Address for Correspondence: Zoran Milan, Department of Sport and Physical Education, University of Belgrade, 11000 Belgrade, Serbia, E-mail: milan.z@gmail.com

Copyright: © 2024 Milan Z. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Received: 27 July, 2024, Manuscript No. jsp-24-149945; Editor assigned: 30 July, 2024, PreQC No. P-149945; Reviewed: 15 August, 2024, QC No. Q-149945; Revised: 20 August, 2024, Manuscript No. R-149945; Published: 29 August, 2024, DOI: 10.37421/2165-7939.2024.13.675

2. Laplante, Ben L. and Michael J. DePalma. "Spine osteoarthritis." *PM&R* 4 (2012): S28-S36.
3. Winter, Corinna C., Mirko Brandes, Carsten Müller and Tim Schubert, et al. "Walking ability during daily life in patients with osteoarthritis of the knee or the hip and lumbar spinal stenosis: A cross sectional study." *BMC Musculoskelet Disord* 11 (2010): 1-7.
4. Syx, Delfien, Phuong B. Tran, Rachel E. Miller and Anne-Marie Malfait. "Peripheral mechanisms contributing to osteoarthritis pain." *Curr Rheumatol Rep* 20 (2018): 1-11.
5. Hunter, David J., Jason J. McDougall and Francis J. Keefe. "The symptoms of osteoarthritis and the genesis of pain." *Rheum Dis Clin N Am* 34 (2008): 623-643.

**How to cite this article:** Milan, Zoran. "Impact of Segmental Spinal Instrumentation and Spinal Decompression on Lower Limb Function in Patients with Spinal Osteoarthritis." *J Spine* 13 (2024): 675.