

# L4-5 FUSION VERSUS L4-5-S1 FUSION IN MANAGEMENT OF L4-5 INSTABILITY ASSOCIATED WITH L5-S1 DEGENERATED DISC

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## Introduction

Lumbar spine fusion surgery, commonly referred to as lumbar fusion, is a surgical procedure designed to join, or "fuse," two or more vertebrae in the lower back. The fusion process mimics the natural healing process of broken bones, ultimately creating a single, solid bone structure The primary goal of this surgery is to alleviate the patient's pain and improve the quality of life. This procedure is typically recommended when the source of pain is traced to the movement of specific spinal segments. This movement can be due to several conditions of spinal instability, such as degenerative disc disease, spondylolisthesis, recurrent disc herniation, spinal stenosis, and fractures.

## Aim of the work

The aim of this study is to determine the predictive value of adding L5-S1 fusion in isolated L4-L5 instability associated with L5-S1 degenerated disc.

## Patients and Methods

This study represents prospective and retrospective study of clinical and radiological outcomes in 60 patients admitted to the Neurosurgery Department of Alexandria Main University Hospital and operated for L4-L5 spondylolisthesis associated with L5-S1 degenerative disc disorders by Posterior Lumbar Interbody Fusion (PLIF) with pedicle screw fixation L4-L5 or L4-L5-S1. Approval of the Medical Ethics Committee of Alexandria Faculty of Medicine has been obtained. An informed written consent for study participation taken from every participant included in the study. Confidentiality and data security guaranteed throughout the research. **Inclusion criteria** •Adults aged 18 years old or older. •Patients having L4-L5 instability associated with L5-S1 degenerative disc.**Exclusion criteria** •Normal looking L5-S1 disc in MRI. •L5-S1 spondylolisthesis. •Patients with systemic inflammatory or autoimmune disease that can affect the spine.

Prospective and retrospective analysis of 60 patients diagnosed as having L4-L5 spondylolisthesis associated with L5-S1 degenerative disc.All patients included in the study assessed thoroughly by:1.Proper history taking.2.Complete clinical examination.3.Imaging (MRI, CT, X-ray lumbosacral spine). 4. Low back pain and radiating pain will be assessed using Numeric Rating Scale .

After obtaining informed written consent, patients will be brought to the OR for the procedure. Patients will be positioned supine and the procedure will be performed under general anesthesia and strict aseptic technique.Vital parameters including pulse rate, ECG, blood pressure, and oxygen saturation will be monitored during the procedure.All patients will undergo surgery through a midline posterior incision and subperiosteal retraction of the paraspinal muscles to expose the affected segment. This will be followed by wide decompression of the spinal canal with removal of the spinous process, the interspinous ligament, the lamina and the hypertrophic ligamentum flavum. Foraminotomy and nerve root decompression will be routinely done. Pedicle screws will be inserted under fluoroscopy guidance.The intervertebral disc will be entered through a posterolateral approach after securing the thecal sac and nerve root medially and inferiorly using nerve retractors. Radical discectomy with end-plate preparation will be done using a8.combination of standard disc rongeurs, disc shavers, and curettes. Rods of desired length will be contoured to the appropriate curve and applied over the pedicle screws. Patients will be divided into two groups, first group patients are those operated for L4-L5 fixation and interbody fusion, while second group patients are those operated for L4-L5-S1 fixation and interbody fusion. Their progress after surgery will be reported using Numeric Rating Scale; patients will be asked to rate their pain on a scale from 0 to 10, where 0 is no pain and 10 is the worst pain. Pain assessment numeric rating scale.

## Results

Degenerative sacroiliac joint disease as a complication in our study Degenerative sacroiliac joint disease is highly significant in group that underwent sacral fusion than group with L4 – L5 fusion. 40% of patients operated for sacral fusion were complicated by degenerative sacroiliac joint disease, while only 16% in patients operated for L4 – L5. Female patients accounted 80% of degenerative sacroiliac joint disease cases in L4-L5 cases and 75% in L4-L5-S1 cases. The mean age of patients that developed degeneration was significantly higher than the mean age of patients that did not develop degeneration (57.4 ± 3 years compared to 51.3 ± 4 years in L4-L5 cases and 57 ± 3 years compared to 53 ± 3 years in L4-L5-S1 cases). ASD as a complication in our study

Table (1): Relation between demographic criteria and associated diseases and occurrence of Degenerative sacroiliac joint disease in L4-L5 fusion cases.

L4 – L5 fusion cases	degenerative sacroiliac joint disease (SIJP)				p
	No (n = 25)		Yes (n = 5)		
	No.	%	No.	%	
Age (years)					0.018*
Mean ± SD.	51.32 ± 4.14		57.40 ± 3.58		
Gender					
Male	11	44.0	1	20.0	FEp=0.622
Female	14	56.0	4	80.0	
BMI (kg/m2)					
Mean ± SD.	26.3 ± 2.9		29.16 ± 2.5		0.0277*
DM	5	20.0	3	60.0	FEp=0.0445*
Hypertension	8	32.0	1	20.0	FEp=1.000

Table (2): Relation between demographic criteria and associated diseases and occurrence of Degenerative sacroiliac joint disease in L4-L5-S1 fusion cases.

Sacral fusion L4 – L5 – S1 fusion	Degenerative sacroiliac joint disease				p
	No (n = 18)		Yes (n =12)		
	No.	%	No.	%	
Age (years)					0.0331*
Mean ± SD.	53.5 ± 3.2		57.8 ± 3.1		
Gender					0.052
Male	11	61.1	3	25.0	
Female	7	38.9	9	75.0	
BMI (kg/m2)					0.009*
Mean ± SD.	26.5 ± 3.1		29.8 ± 2.8		
DM	4	22.2	6	50	0.0476*
Hypertension	5	27.8	3	25.0	1.000

## Conclusion

Sacral fusion carries more risk of occurrence of degenerative sacroiliac joint disease and ASD than isolated L4-L5 fusion.