



# **Unilateral versus bilateral Pedicle Screw Fixation associated with interbody fusion in degenerative Lumbar spine diseases**

## **Thesis**

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قالوا

سبحانك لا علم لنا  
إلا ما علمتنا إنك أنت  
العليم العظيم

صدقة الله العظيم

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## List of Abbreviations

Abbr.	Full-term
<b>ALIF</b>	: Anterior lumbar interbody fusion
<b>ASD</b>	: Adjacent segment disease
<b>BAK</b>	: Bagby and Kuslich
<b>BPSF</b>	: Bilateral pedicular screw fixation
<b>CT</b>	: Computed tomography
<b>DBM</b>	: Demineralized bone matrix
<b>DS</b>	: Degenerative Spondylolisthesis
<b>ECM</b>	: Extracellular matrix
<b>MRI</b>	: Magnetic resonance imaging
<b>NASS</b>	: North American Spine Society
<b>OA</b>	: Osteoarthritis
<b>ODI</b>	: Oswestry disability index
<b>PEEK</b>	: Polyetheretherketone
<b>PLIF</b>	: Posterior lumbar interbody fusion
<b>SD</b>	: Standard deviation
<b>SPSS</b>	: Statistical Package for Social Science
<b>TLIF</b>	: Transforaminal posterior lumbar interbody fusion
<b>UPSF</b>	: Unilateral pedicular screw fixation
<b>VAS</b>	: Visual Analog Scale
<b>VSP</b>	: Variable screw system

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# Introduction

**L**umbar arthrodesis is a commonly performed surgical procedure for the treatment of spondylosis, trauma, infection, neoplasm, and spinal instability.

A posterolateral fusion with autologous bone graft has traditionally resulted in acceptable clinical results; however, reported fusion rates have been Inconsistent (**Dickman et al., 1992**).

With the addition of internal fixation using pedicle screw instrumentation, fusion rates have improved significantly especially in cases of instability.

Performing an interbody arthrodesis may further Improve the clinical results by eliminating the disc as a potential pain generator, Improving fusion rates, and restoring intervertebral height and lumbar lordosis (**Vaccaro, 2002**).

Techniques to achieve anterior column interbody fusion include anterior lumbar interbody fusion (ALIF), posterior lumbar interbody fusion (PLIF) or transforaminal lumbar Interbody fusion (TLIF) (**JavemickKuklo, 2006**).

Over the last decade, TLIF has become a popular technique for achieving interbody fusion. The TLIF approach may reduce the risk of iatrogenic neurologic injury when compared with PLIF and

provide a circumferential arthrodesis and avoid anterior spinal exposure and its associated complications (**Mayer, 2006**).

The TILF approach carried out from the side that was symptomatic (**Paul et al., 2008**).

Bilateral Pedicle Screw (PS) Fixation after lumbar interbody fusion is accepted as a standard procedure. Providing rigid fixation, bilateral PS fixation has a great biomechanical stability and clinical benefits. However, the rigidity of bilateral PS fixation can lead to device-related osteoporosis of the vertebrae and makes the adjacent segment prone to load- and motion-induced degeneration. Therefore, the use of less rigid systems of fixation has been advocated. Some recent clinical and biomechanical studies on the suitability of unilateral Pedicle Screw fixation have demonstrated that a reliable fusion with fewer pedicle screws can be achieved (**Liu et al., 2014**).