Comparative Study Between Mini-Open and Open Transforaminal Lumbar Interbody Fusion as a Treatment in Patients with Degenerative Lumbar Spine

A Thesis

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List of Abbreviations

Abb.	Full term
AP	*Anterior-posterior*
CT	*Computed tomography*
DDD	*Degenerative Disc Disease*
FSU	*Functional Spine Unit*
IAP	*Inferior antroposterior*
IVD	*Intervertebral disc*
IVF	*Intervertebral Foramen*
LL	*Lumbar lordosis*
MRI	*Magnetic resonance imaging*
NIC	*Neurogenic intermittent Claudication*
ODI	*Oswestry Disability Index*
PI	*Pelvic incidence*
PLIF	*Posterior lumbar interbody fusion*
PT	*Pelvic tilt*
RBCs	*Red blood cells*
SAP	*Superior antroposterior dimension*
SD	*Standard deviation*
SI	*Superior to Inferior*
SPSS	*Statistical Program for Social Science*
SS	*Sacral slope*
TK	*Thoracic kyphosis*
TLIF	*Tranforaminal lumbar interbody fusion*
VAS	*Visual Analogue Score*

INTRODUCTION

Spinal canal stenosis is a common degenerative condition of the lumbar spine, which - with aging - is seen with increasing frequency. Spinal stenosis can lead to significant impairment in the quality of life and the ability to perform activities of daily living. Spinal canal stenosis is predominantly a disease of the elderly with the exception of lumbosacral congenital spinal stenosis, which presents with symptoms as early as the second through the fourth decade of life. Although symptoms develop as patients reach their fifties and sixties, the pathognomonic degenerative changes which contribute to lumbar stenosis begin as early as the fourth decade [(1)].

Patients with spinal stenosis will usually present with neurogenic claudication, which must be differentiated from vascular claudication. Flexion of the spine will usually partially relieve symptoms; thus, patients will often report needing to sit down or lean over an assistive walking device (e.g, walker, cane, shopping cart). Patients will most commonly present with complaints of limited walking tolerance, " progressive shortening of walking distance", and this is often what leads them to seek treatment[(1)].

Open decompression laminotomy via a posterior approach is the most widely performed surgical procedure for decompression lumbar canal stenosis. [(2)].

The safety of traditional open techniques for pedicle screw placement for spinal fixation is well documented [3][4]. However, conventional open spine surgery has several disadvantages reported including: extensive blood loss, postoperative muscle pain and infection risk. Paraspinal muscle dissection involved in open spine surgery can cause muscular denervation, increased intramuscular pressure, ischaemia and necrosis resulting in muscle atrophy and scarring which is associated with prolonged postoperative pain and disability [5][6]. This approach-related morbidity is then often associated with lengthy hospital stay and significant costs [7].

The current trend favors minimally invasive surgery of the spine due to lower complication rates and approach-related morbidity with minimal soft tissue trauma, reduced intra operative blood loss and risk of transfusion, improved cosmoses, decreased postoperative pain and narcotic usage, shorter hospital stays, earlier mobilization with faster return to work and thus reduced overall health care costs [8].

In 1968, Wiltse et all first described the paraspinal sacrospinalis muscle-splitting approach to the lumbar spine. The Wiltse approach decreased bleeding and provided a more direct approach to the transverse processes and pedicles. Unlike the traditional midline incision, it was also thought to decrease postoperative pain and avoid disruption of the supraspinous and interspinous ligaments. The Wiltse approach has recently been adapted for tranforaminal lumbar interbody fusion (TLIF). The

safety and efficacy of TLIF have been demonstrated previously by several authors[9-11].

Advances in the technique have led to 3 predominant approaches for TLIF: open by using a standard midline approach, mini-open by using a bilateral Wiltse plane approach with expandable tubular retractors, and minimally invasive with a non-expandable or expandable tubular retractor and bilateral percutaneous screw placement [12].