



## A STUDY OF FUNCTIONAL OUTCOME OF UNSTABLE THORACO LUMBAR SPINE INJURIES TREATED WITH PEDICLE SCREWS

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### ABSTRACT

Road traffic accidents cause more number of thoraco-lumbar spinal injuries. Decompression and early fusion with instrumentation is a generally accepted treatment method for patients with unstable injuries and with a neurological deficit; it helps in early mobilization, and avoids the complications of prolonged recumbence. The pedicle screw-rod system is versatile in that it stabilizes the three columns of the spine. The pedicle is the strongest part of the vertebra and is the force nucleus of the vertebral body. Through the pedicle all forces are transmitted from posterior elements to the vertebral body. Therefore, by fixation of the vertebral body through the pedicle, significant strength of the entire vertebral complex is possible. In this study we put in an effort to find out the functional outcome of unstable thoraco lumbar spine injuries treated with pedicle screws.

**KEYWORDS** : Thoraco-Lumbar Spine, Pedicle, Screw Fixation.

### INTRODUCTION:

With the advent of increased incidence of road traffic accidents and industrial trauma, there has been a significant increase in the number of thoraco-lumbar spinal injuries.<sup>1</sup> Treatment of these spinal fractures is one of the most interesting areas in modern spinal surgery. Decompression and early fusion with instrumentation is a generally accepted treatment method for patients with unstable injuries and with a neurological deficit; it helps in early mobilization, and avoids the complications associated with prolonged recumbency, of conservative regimen. The goals of surgical treatment are to get effective decompression of the spinal canal with adequate reduction, healing of the spine without deformity, limitation of movement, instability and pain, with early mobilization and rehabilitation.<sup>2</sup> The pedicle screw-rod system is versatile in that it stabilizes the three columns of the spine. The pullout strength of the pedicle screws depends on the diameter of the screw and its cortical purchase within the pedicle. Hence pre-operative assessment of the screw length and diameter, is very essential<sup>3,4</sup>. CT and MRI have proved invaluable in the evaluation of thoracolumbar injuries, CT -helps in assessing the integrity of the posterior aspects of the vertebral body and posterior osseous elements<sup>4,5</sup>. In this study we put in an effort to find out the functional outcome of unstable thoraco lumbar spine injuries treated with pedicle screws.

### AIMS AND OBJECTIVES:

To study the functional outcome of unstable thoraco lumbar spine injuries treated with pedicle screws.

### MATERIALS AND METHODS:

This study was done in the Department of Orthopedics, Kanachur Institute of Medical Sciences, Mangalore.

Thirty cases were studied that were admitted in our Hospital. This study was done from May 2017 to February 2018.

All patients were operated in the prone position. Hips and knees were moderately flexed to prevent stretching of the nerve roots. The transverse process and the facet joint are clearly exposed. In the thoracic spine, the point of entry is just below the rim of the upper facet, 3mm lateral to the center of joint near the base of the transverse process. The screw should be angled 7° to 10° towards the midline and 10° to 20° caudally. In the lumbar spine the long axis of the pedicle pierces the lamina at intersection of 2 lines- a vertical line which is tangential to the lateral border of the superior articular process and a horizontal line which bisects the transverse process. This point of intersection lies in the angle between the superior articular process and base of the transverse process. The screws should converge by 5° at the dorso-lumbar junction and by 10 to 15° as one progress from L2 to L5. Direct decompression was done for

patients with severe neurological impairment and when the encroachment of spinal canal was more than 50%. Indirect decompression through ligamentotaxis was done for the rest of the patients. Rod contouring was done according to the level of fixation, which aids in correction of the deformity.

### RESULTS:

**Table 1: Age Distribution**

Number	Mean age	Std Deviation
30	56.16 years	12.76 years

**Table 2: Sex Distribution**

Number	Male	Female
30	24	06

**Table 3: Co-Morbidities:**

Co-Morbidities:	Frequency
HTN	04
DM	01
DM and HTN	01

**Table 4: kyphotic angle**

Number	Pre-operative	Post-operative
30	16.86 degrees	6.2 degrees

**Table 5: Average canal diameter**

Number	Pre-operative	Post-operative
30	7.96 mm	13.52 mm

In 10 cases where kyphotic angle was more than 20° with Frankel grade A, Postoperatively they were improved to grade E in 3 cases, grade D in 3, grade B in 2 case and 2 case remained at Frankel grade A without improvement.

8 cases where kyphotic angle was more than 20° with Frankel grade C, improved to Grade E.

In 10 to 20° group, there were 08 cases of Frankel grade A, 2 Frankel grade C and 2 Frankel grade D which improved to grade E in 08 patients and Grade B in 2, and remained unchanged at grade A in 2.

**Table 6: Complications**

Number	Complications
01	screw misplacement
01	Root Irritation
Nil	CSF Leak
02	Screw Loosening

### DISCUSSION:

The concept of treatment of unstable thoraco-lumbar injuries has

evolved from conservative to open reduction and internal fixation. The pedicle is the strongest part of the vertebra and is the force nucleus of the vertebral body. Through the pedicle all forces are transmitted from posterior elements to the vertebral body. Therefore, by fixation of the vertebral body through the pedicle, significant strength of the entire vertebral complex is possible.<sup>6,7</sup> Dorso lumbar spine injuries have become common in the last 2 decades. In the treatment of fractures of the spine, pedicle screws allow easy manipulation and reduction of displaced vertebrae, even if the posterior elements are fractured. Their use facilitates decompression of the neural elements by distraction, avoiding the need for laminectomy, and permits stabilization of the segments without the requirement to extend fixation much beyond the injured area. Since anterior spinal instrumentation involves more risk, the posterior stabilization has become more popular as it involves indirect reduction and fixation of the spine.<sup>8,9</sup> Biomechanically double cortical purchase is better than unicortical purchase.<sup>10</sup> But, most of the surgeons avoid double cortical purchase in dorso-lumbar spine for the fear of injuring major vessels. In general distraction instrumentation is used for compression injuries with intact posterior elements and compression constructs are used for flexion-distraction injuries.<sup>11,12</sup>

#### CONCLUSION:

We observed that there were more Frankel grade A patients in the >20° group and the maximum neurological improvement was observed in the < 10° group. This could be due to less severe cord injury initially.

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