

## Clinical and Radiological Findings of Patients with Screw-Fixed Dorso-Lumbar Spine Fractures in a Tertiary Center

Prashant Priyadarshi<sup>1</sup>, M Azam<sup>2</sup>

<sup>1</sup>Assistant professor, Department of Orthopaedic, Jawaharlal Nehru Medical College and Hospital, Mayaganj, Bhagalpur, Bihar, India

<sup>2</sup>Associate professor, Department of Orthopaedic, Jawaharlal Nehru Medical College and Hospital, Mayaganj, Bhagalpur, Bihar, India

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Corresponding author: Prashant Priyadarshi

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### Abstract

**Background:** According to estimates, injuries to the dorsolumbar spine account for 75% of all spinal fractures. This investigation was done primarily to assess the clinical and radiological results of screw-stabilized dorsolumbar spine fractures and to examine any associated side effects.

**Materials and Methods:** In 55 cases of dorsolumbar spine fractures admitted to tertiary care facilities, prospective research was conducted. The patients had dorsolumbar fracture pedicle screw fixation surgery, and the results were evaluated clinically and radiologically utilising two views of a radiograph (AP and Lateral).

**Results:** With the help of screw fixation, about 35 patients with dorsolumbar spine fractures improved. The decrease in the kyphotic angle, AVBCP, and improvement in Beck's index served as indicators of the improvement. The majority of patients also said that the surgery had outstanding results.

**Conclusion:** In conclusion, the pedicle screw fixation is still the preferred implant for treating fractures of the dorsolumbar spine.

**Keywords:** Dorsolumbar spine, Fracture, Screw, Kyphotic angle, Beck's index.

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### Introduction

In the modern world, where people's lifestyles and personalities make them vulnerable to damage, spinal fractures are a significant orthopaedic problem [1]. According to the existing research, 90% of all fractures are found in the thoracic or lumbar areas, and 6% of all fractures harm the spinal column [2]. As there are more motor vehicles on the road, more people are exposed to high-energy trauma from thoracolumbar and dorsolumbar fractures

and dislocations. These injuries occur most frequently in males aged between 15 and 29 years of age and they usually present with neurological deficit[3]. The injury exceeding the strength and stability of spinal column can result in fracture of the spine.

Because the lumbar lordotic spine transitions from the rigid kyphotic spine to the movable lumbar lordotic spine, the surgical therapy of dorsolumbar vertebrae

is different from that of cervical and thoracic fractures [4]. The principal efferents of all lumbosacral roots are located in the portion of the spinal cord that extends and terminates close to the mechanically weak Thoraco Lumbar Junction (TLJ), which is also where the attachment of the diaphragm is located. These factors have a substantial neurological impact. This study was undertaken to evaluate the restoration and alignment of spine and canal using kyphotic angle and vertebral body height and to study the clinical and radiological outcome following fixation of dorsolumbar spine with the screws.

### Methods

53 participants were included in a prospective study conducted in the orthopaedics department of a tertiary care teaching hospital between February 2018 and May 2022. All of the patients who took part in the trial gave their informed consent after the institutional ethics committee gave its approval. For thoracolumbar junction spine fractures with screw fixation, all patients had surgery. For two months to three years, all of the patients were monitored. The study comprised individuals with traumatic thoracolumbar spine fractures who were between the ages of 20 and 65 and had stable hemodynamics. The patients with pathological fractures and with spondylolysis were excluded from the study.

All of the patients underwent thorough examinations that covered the mode and timing of the injuries as well as clinical checks of the head, cervical spine, belly, and chest. Before putting the patients under for surgery, they were first stabilised. According to the American Spinal and Injury Association of Neurological Evaluation, a complete investigation of the spine was made. The damaged spine was radiographed from both the lateral and AP views. The fractures were categorised using McAfee's classification system. Additionally, the

radiographs of the injured patients did not show any fractures. The radiograph also indicated the loss of sagittal angle and sagittal index. The time from injury to operation was 8 to 36 days. The status of the spinal cord was examined by using Magnetic Resonance Imaging. Posterior approach with pedicle screw fixation was for all the cases. The data thus obtained was compiled and analyzed using Statistical Package for Social Services (SPSS vs 20).

### Results

The patients in this study had an average age of 39.2 ( $\pm$  9.85) years. The majority of the patients ranged in age from 41 to 50. Males predominate over females. RTA was responsible for about 77.1% of the injuries, and falls were to blame for 22.9%. According to the AO categorization, Type A injuries were present in about 71.4% of the patients. 3.89 was the average load sharing. The majority of patients (60%) had operations 15–30 days following the accident. The mean kyphotic angle before the operation was 17.14 degrees which had improved to 10.31 degrees which was statistically significant. The mean Beck's Index (Sagittal index) before the operation was 0.52 which has improved to 0.64 which was statistically significant. The anterior vertebral body compression percentage was 50.82 before the operation and significantly decreased to 19.83. About 45.7% of the patients had excellent results, 42.9% had fair results and 11.4% had poor results. No complications were seen in 88.6% of the cases. Superficial infection was encountered in 5.7% of the cases, bed sore in 2.9% of the cases and UTI in 2.9% of the cases.

### Discussion

The primary purpose of this study was to examine the clinical and radiological results following the fixation of the dorsolumbar spine with screws. It has been demonstrated that the screw fixation outperforms other stabilisation

constructions biomechanically. An approach that is frequently utilised is screw fixation. In this study, the average age was 39.2 years. The patients were male and ranged in age from 41 to 50. A study by Rajaiah et al had noted that the mean age was 33 years [4]. The spinal injuries related sports are common in younger individuals as result of sports in contrary to the results of this study [5]. A study by Camille et al had reported that the mean age was 30 years [6]. High velocity road traffic accidents were the main causative factor for the accidents.

According to a study by Rajaiah et al, falling from a height caused the majority of injuries [4]. The greatest cause of injury, according to research by Sen et al, was falling from a height [7]. According to this study, the mean kyphotic angle dramatically decreased following screw fixation. A study by Yung & Thng et al had shown a significant decrease in the kyphotic angle to 3.68 degrees at the follow up [8]. Similarly, Kim et al also noted that the decrease in the angle to 8.2 degrees [9]. Butt et al had also shown decrease in loss of sagittal angle to 3.4 [10]. The Sagittal index (Beck's index) also increased significantly as evidenced in this study.

The sagittal index had increased to 0.79 at the end of the follow-up, according to research by Yung et al. [8]. Following surgery, the anterior vertebral body compression was also greatly alleviated. According to a study by Ekapichon et al, the AVBCP was lowered to 24 [11]. According to a study by Yung et al, the AVBCP was reduced to 24 [8]. About 45.7% of the patients had excellent results, 42.9% had fair results and 11.4% had poor results. Superficial infection was encountered in 5.7% of the cases, bed sore in 2.9% of the cases and UTI in 2.9% of the cases. The complications were less with this procedure as evidenced by this study. [12]

## Conclusion

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Clinical and radiological indicators had improved favourably following screw treatment of the dorsolumbar fractures. As a result, pedicle screw fixation is suggested as the preferred implant for the management of dorsolumbar spine fractures.

## References

1. Tran NT, Watson NA, Tencer AF, Ching RP, Anderson PA. Mechanism of burst fracture in the thoracolumbar spine: the effect of loading rate. *Spine* 1995; 20: 1438-40.
2. DeWald RL. Burst fractures of the thoracic and lumbar spine. *Clin Orthop Relat Res.* 1984; 189:150–61.
3. Denis F. The three 7 column spine and its significance in the classification of acute thoracolumbar spinal injuries. *Spine.* 1983;8:817– 31.
4. Rajaiah D, Ramana Y, Srinivas K, et al. A study of clinical and radiological outcome in dorsolumbar spine fractures stabilised by pedicle screw fixation. *J. Evid. Based Med. Healthc.* 2017; 4(61): 3672- 3675.
5. Premkumar TC, Karthi MN, A prospective study on radiological and functional outcome in dorsolumbar burst fractures treated with dorsal instrumentation and transpedicular bone grafting, *IJOS* 2018; 4(1): 1103-1108.
6. Roy-Comille R, Saillant G, Mazel C. Internal fixation of the lumbar spine with pedicle screw plating. *Clin Orthop Relat Res* 1986;(203):7-17.
7. Sen D, Patro DK. Management of unstable spine fracture with segmental spinal instrumentation (VSP System): result at 5 years follow up. *Indian Journal of Orthopaedics* 2005;39(4): 232-236.
8. Yung AW, Thng PL et al. Radiological Outcome of Short Segment Posterior Stabilisation and Fusion in Thoracolumbar Spine Acute Fracture. *Ann Acad Med Singapore.* 2011; 40:140-144.

9. Kim KS. Dorsal Short-Segment Fixation for Unstable Thoracolumbar Junction Fractures. J Korean Neurosurg Soc: 2006; 40: 249-255.
10. Butt MF, Farooq M, Mir B, et al. Management of unstable thoracolumbar spinal injuries by posterior short segment spinal fixation. Int Orthop 2007; 31 (2):259- 264.
11. Ekapichon S. Intermediate Screws in Short Segment Pedicular Fixation for Thoracolumbar and Lumbar Burst Fractures. The Thai Journal of orthopaedic surgery.2009; 33: 1: 10-15.
12. Chola J. M., Albert M. T., Jules N. T., Manteka K., Herman T. K., Shombo Mutangala N., Prosper K. L., Xavier K. K., Prosper K. M. K., & Baptiste K. S. Z. J. Profile Hématologique, Biochimique Et Hormonal Au Cours De La Grossesse: Cas Des Pre-Eclamptiques Versus Gestantes En Bonne Sante Apparente Dans La Ville De Lubumbashi, RDC. Journal of Medical Research and Health Sciences. 2022; 5(12): 2355–2367.