# DIFFERENT MODALITIES IN THE MANAGEMENT OF TRAUMATIC LUMBAR AND THORACOLUMBAR SPINE FRACTURES

**Thesis**

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# TO MY FATHER

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# ABSTRACT

The study aims at detecting the variable outcomes of traumatic thoracolumbar and lumbar spine fractures according to the line of management with special concern to the fusion rates and factors affecting it. The study is based on the radiological and clinical follow up of 30 patients with traumatic thoracolumbar and lumbar spine fractures for 6 months to detect the clinical, radiological and functional outcomes. It was found that the posterior fusion technique is more readily used than the anterior technique.

**Keywords**:

Thoracolumbar –lumbar- fractures-spine-management-fixation

# INTRODUCTION

Spinal fractures have an annual incidence of 64 per 100,000 and neurological deficit is seen in 10–30%, resulting in an estimated 12,000 new spinal cord injuries in the United States every year **(Jozef et al., 2006; Hu et al., 1996; Sekhon and Fehlings, 2001)**. Only 54% of all patients with spinal fractures return to their previous level of employment **(Jozef et al., 2006; Sekhon and Fehlings, 2001)**. Vertebral fractures are usually severe injuries caused by high-energy traumas. Vertebral injuries may be due to isolated traumas or multiple traumas **(Trivedi, 2002; McLain, 2004)**.

The treatment of thoracolumbar fractures remains controversial **(Kaneda et al., 1997)**. Although most authors believe that surgical treatment is needed for unstable burst fractures, the choice for operative approaches remains disputed **(Kaneda et al., 1997; Katonis et al. 1999; Li et al., 2005)**. Common opinion is to obtain the most stable fixation by fixating as few vertebrae as possible and neural canal decompression **(Kaneda et al., 1997; Murat et al., 2007; Muller et al., 1999)**.

The thoracolumbar spine fractures are classified into 4 principal types **(Sasso et al., 2005; Kaye et al., 2005)**.

Flexion–rotation injuries: these injuries occur most frequently at the T12/L1 level and result in anterior dislocation of the T12 on the L1 vertebral body. There is usually disruption of the posterior

longitudinal ligament and posterior bony elements. The inferior vertebral body often sustains an anterior superior wedge compression fracture. These are unstable injuries which usually result in complete neurological deficit of the spinal cord, conus or cauda equina.

Compression injuries: These injuries are common and the vertebral body is decreased in height. They are usually stable injuries and neurological damage is uncommon.

Hyperextension injury: This is a very uncommon mechanism of injury at the thoracolumbar spine. It involves rupture of the anterior longitudinal ligament, rupture of the intervertebral disc and fracture through the involved vertebral body anteriorly. The injuries are unstable and usually cause severe cord injury.

Chance fractures: This injury needs to be considered in patients who are involved in a high-speed accident wearing lap belts without a shoulder harness. They sustain a hyper flexion distraction injury to the thoracolumbar spine. The forward flexion and bending result in two potential types of injuries, and they can cause a fracture through the spinous process pedicle and vertebral body or a fracture through the end-plate with disruption of the facet joint and ligamentous structures These injuries can easily be missed because of the unusual radiological findings. They could well be associated with internal injuries, especially abdominal injuries.

The spinal cord injury is caused by **Kaye (2005)**:

- The direct force applied to the cord
- Ischemia due to vascular injury
- Secondary hemorrhage in and around the cord.

The degree of neurological injury will be determined by the extent and severity of these mechanisms.

Complete lesions The most severe consequence of spinal trauma is complete transverse myelopathy, in which all neurological function is absent below the level of the lesion, causing either a paraplegia or quadriplegia, depending on the level. There will also be impairment of autonomic function including bladder and bowel function.

Incomplete lesions due either to stretch applied by the attachment of the dentate ligaments at the equatorial plane of the cord or to ischemic injury from compromise of the anterior spinal artery which supplies the anterior two-thirds of the cord.

The general principles of management are **Kaye (2005)**:

- Prevention of further injury to the spinal cord
- Reduction and stabilization of bony injuries
- Prevention of complications resulting from spinal cord injury
- Rehabilitation.

# AIM OF THE WORK

The study aims at detecting the variable outcomes of traumatic thoracolumbar and lumbar spine fractures according to the line of management and clarifies the best time of intervention with special concern to the fusion rates and factors affecting it.

The study is based on the radiological and clinical follow up of 24 patients with traumatic thoracolumbar and lumbar spine fractures for 6 months following the onset of trauma to detect the clinical, radiological and functional outcomes.

# ANATOMY

## CURVES OF THE SPINE:

The spine develops from anterior to posterior curves two kyphoses and two lordoses.

These include the thoracic and pelvic curvatures **(Fig. 1)**. They are referred to as primary curves because they are seen from the earliest stages of fetal development.

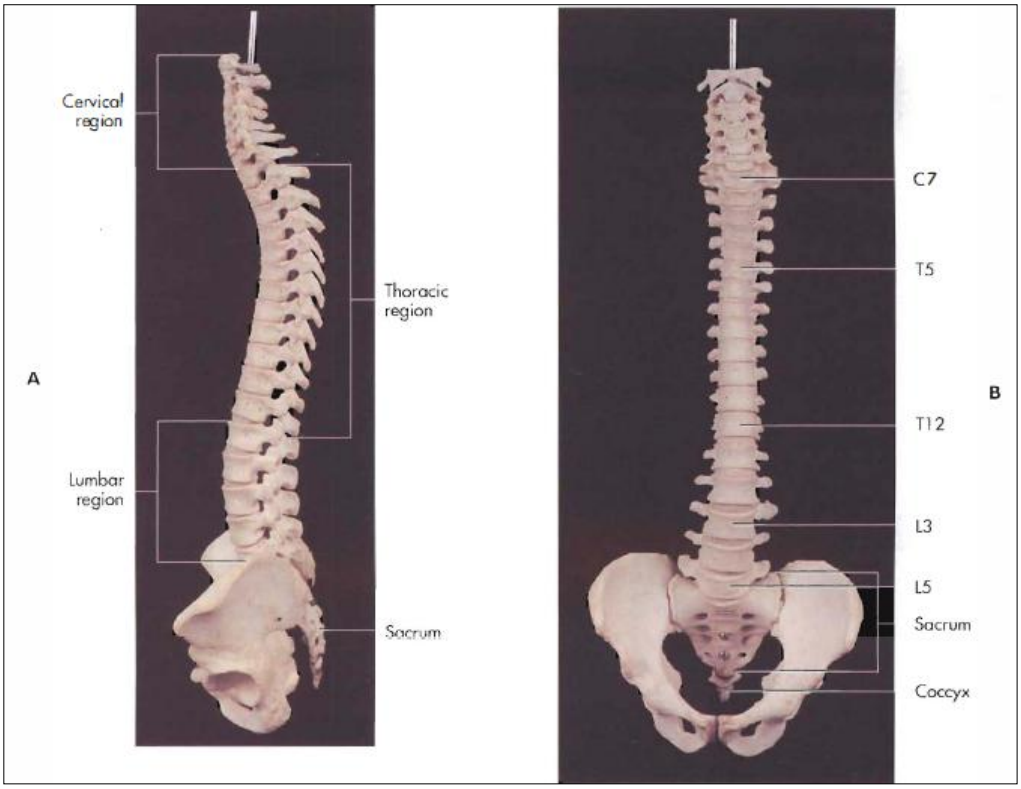


**Fig. (1):** Three views of the vertebral column. A, Lateral view showing the cervical, thoracic, lumbar and sacral regions. Also notice the cervical and lumbar lordoses and the thoracic and sacral kyphoses. B, Anterior view.