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The Role of Stabilizing Surgical Interventions in Injuries of the Thoracolumbar Spine.

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Abstract: *Spinal injuries are a severe type of trauma, accompanied in most cases by disability of patients. Objective of the study: Improving the results of surgical treatment of spinal injuries and diseases using TPF systems. The analysis of the results of 154 patients with injuries of the thoracic and lumbar spine was carried out. The mechanism of injury: fall from a height - 111 patients, road traffic accident - 43 patients. Of the total number of examined patients, 53 patients underwent conservative treatment and 61 patients underwent surgical treatment. 1 Fixation of the damaged segment of the spine with various types of metal structures (TPF) - 42 patients. 2 Decompressive laminectomy with revision of the spinal canal and spinal cord at the level of injury - 37 patients. 3 Decompressive laminectomy at the level of injury + revision of the epi- and subdural spaces of the spinal cord and, as a final stage of the operation, fixation with metal structures - 12 patients. Results: During surgical interventions, during revision, a complete anatomical rupture of the spinal cord was detected in 9 patients, in 27 cases, a picture of hematomyelia and spinal cord contusion at the level of injury. Conclusions: 1 in the presence of symptoms of spinal cord injury, it is necessary to perform LE, revision of the spinal canal and spinal cord. 2 the most reliable fixation is achieved when using a structure for TPF, which allows for early activation of patients.*

Keywords: *injury, spine, spinal cord, revision, metal structure, TPF systems.*

Relevance: to date, according to domestic and foreign authors, the treatment of patients with spinal injuries remains a pressing issue in modern neurosurgery. According to statistics presented at the World Congress of Traumatologists in the USA in 1992, the lower thoracic and lumbar spine accounted for 25% of all spinal and spinal cord injuries. Of these, T11-L1 vertebrae injuries accounted for 80%, T7-T10 vertebrae injuries accounted for 10%, and L2-L5 vertebrae injuries accounted for 10% [1,7,45]. Mortality in T11-L1 vertebrae injuries ranges from 12 to 25%, and disability occurs in 19-58% of patients [11,171]. This is especially true for complicated spinal injuries, where disability reaches 100%. Leading to profound disability, trauma to the lower thoracic and lumbar spine and spinal cord affects not only the life of the patient, but also his family and society. This is due to the fact that the injury often occurs in young working age - the average age of which is 20-50 years [1,10,29,76]

The importance of this task is determined by the ever-increasing number of patients with severe spinal trauma. Making a decision on surgical intervention on a damaged spine without neurological deficit is a complex task and causes controversial judgments.

The transition from conservative to early surgical methods of treating severe spinal trauma has led to a significant decrease in disability and a decrease in negative consequences.

Research objective: Improving the results of surgical treatment of spinal trauma and diseases using TPF systems.

Materials and methods: from 2010 to 2020, 154 patients with injuries of varying severity to the thoracic and lumbar spine were treated in the Department of Neurosurgery of the Arkhangelsk Branch of the Russian Scientific Center for Emergency Medicine. The age of the patients ranged from 18 to 65 years. The duration of the spinal injury ranged from 3 hours to 5 days. When distributing patients by gender: 96 men and 58 women. By the mechanism of injury: fall from a height - 101 patients, road traffic injury - 43 patients.

Table 1.

Distribution of patients by type of injury.

Mechanism of injury	Men		Women		Total	
	abs.	V %	abs.	V %	abs.	V %
Catatrauma (fall from height)	75		36		111	72,0
Road accident (car injury)	29		14		43	28,0
Total:	104		50		154	100

The examination of patients was carried out according to the approved protocol (examination by specialists, radiography of the spine in standard projections, computed tomography and magnetic resonance imaging of the spine). Among the examined patients with complicated spinal injuries there were 88 patients and 66 patients with uncomplicated injuries. By the level of the injured spine: Th11 – Th12 – 26, Th12 - 75, Th12 – L1 – 26, L1 – 17 patients. As can be seen from the data provided, the largest number of patients were with injuries of the transitional spine – 111 patients. By the number of injured vertebrae: at the level of 1 vertebra – 87, at the level of 2 vertebrae – 62 patients. By the degree of compression of the vertebral bodies: I degree – 56, II degree – 79 patients, III degree – 16 patients and with IV degree of injury there were 3 patients.

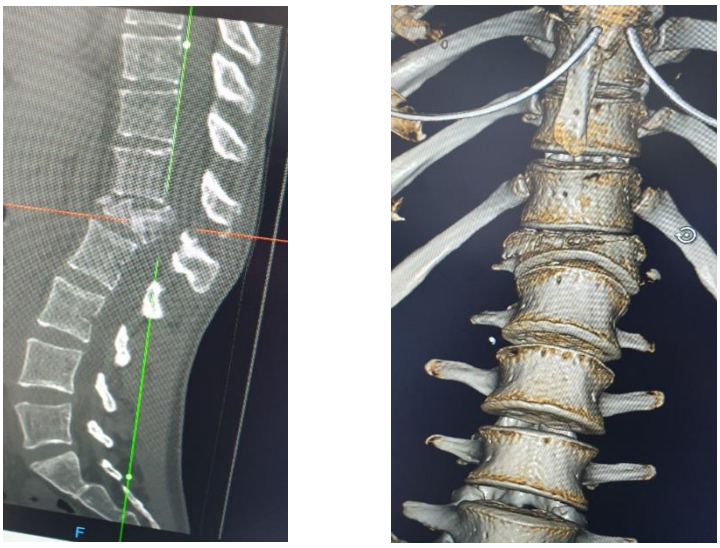

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Fig. 1. a) MSCT image of a compression fracture of the L1 vertebral body with kyphotic deformity; b) 3D reconstruction of the damaged segment of the thoracolumbar spine

Of the total number of examined patients, 63 patients underwent conservative treatment and 91 patients underwent surgical treatment.

After the examinations, the following types of surgical interventions were performed on 91 patients:

1 Fixation of the damaged segment of the spine with various types of metal structures (TPF) - 42 patients.

2 Decompressive laminectomy with revision of the spinal canal and spinal cord at the level of injury - 37 patients.

3 Decompressive laminectomy at the level of injury + revision of the epi- and subdural spaces of the spinal cord and, as the final stage of the operation, fixation with metal structures - 12 patients.
Of the 91 patients, 12 used metal structures from the Medbiotekh company (Republic of Belarus) and in 79 cases, structures for TPF from the ChM company (Republic of Poland).

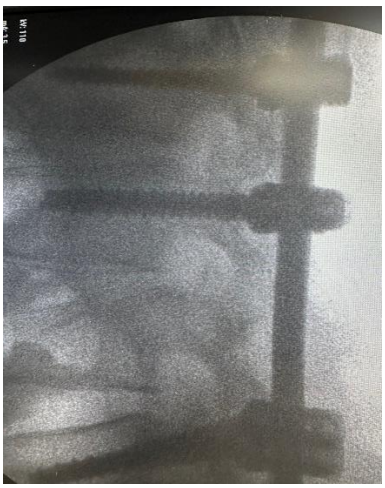
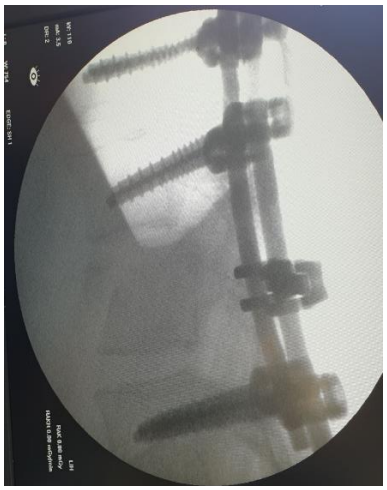

Fig.2 Stabilization of the damaged segment of the spine using TPF.

Results: During surgical interventions, during revision, a complete anatomical rupture of the spinal cord was found in 9 patients, in 27 cases, a picture of hematomyelia and contusion of the spinal cord at the level of injury.

During repeated examinations of patients after 3 and 6 months, satisfactory functioning of the fixing metal structures was noted, after 1 year, loose structures were found in 6 patients, in these cases, operations were performed with repeated installation of the structure and in 2 cases, their removal.

Conclusions: Thus, based on the analysis of the results of surgical treatment of patients with spinal injuries, it can be concluded that the most reliable fixation is achieved when using a structure for TPF, which allows for early activation of patients.

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