WEB OF SCIENTIST: INTERNATIONAL SCIENTIFIC RESEARCH JOURNAL
ISSN: 2776-0979, Volume 4, Issue 3, Mar., 2023

RESULTS OF EARLY POSTOPERATIVE TREATMENT OF PATIENTSINJURY TO THE THORACO-LUMBAR SPINE

A. R. Ergashov
Bukhara State Medical Institute, Bukhara

Annotation
This publication continues the analytical review of one of the most urgent problems of modern neurosurgery of injuries of the thoracolumbar spine. The indications, the choice of the optimal method of early surgical treatment of patients with damage to the thoracolumbar spine are consistently substantiated. The biomechanical bases of surgical stabilization of damaged motor segments of the thoracolumbar spine are revealed. Issues related to dorsal fixation of the spine and the technique of transpedicular fixation are discussed in detail.

Keywords: surgery for injuries of the thoracolumbar spine, dorsal fixation of the spine, transpedicular fixation.

Introduction

The principles and indications for surgical treatment of acute injuries of the thoracolumbar spine are well known and beyond doubt. Spinal injury with dysfunction of the spinal cord remains a major medical, social and economic problem. Treatment and rehabilitation of patients with complicated spinal injury is associated with disability and economic damage. To this day, there is dissatisfaction among clinicians with the outcomes of treatment for spinal injuries. This forces us to refine the treatment tactics and look for more effective methods of surgical interventions. Stable fixation of the damaged segment is important in the treatment of spinal injury, which allows for early activation of patients and avoiding complications in the postoperative period. The need for fixation of the thoracolumbar and lumbar spine is now beyond doubt. However, the issues of stabilization of the operated segment in case of injury of the thoracolumbar spine have not received proper coverage in the literature [1,2,3,4,5,6,7].

Material and Methods

The paper analyzes a comprehensive examination and treatment of 98 affected patients with acute trauma of the thoracolumbar spine. The patients were in the Republican Scientific Center for Neurosurgery and the Bukhara branch of the Republican Scientific Center for Emergency Medical Care for the period from 2008 to

2018. The age of patients fluctuated from 18 to 60 years; of them 63 men and 35 women. When assessing the neurological status in spinal patients, a general dynamic clinical and neurological assessment and the ASIA scale (American Spine Injury Association) were used.

Research Results

We considered the following indications for surgery:
- signs of compression of the spinal cord and cauda equina roots;
- the presence of instability of the damaged segment;
- the presence and increase of neurological symptoms.

We have applied the following types of surgical intervention, depending on the nature of the damage.

Table 1. Methods of surgical treatment of patients

Operation methods	Age (years)				
	Before 20	21-44	45-59	60 and Art	Total
Single-stage closed reclination, with MOSD Tsivyan plates	2	9	4	1	16 (26.7%
Open reclination, with MOSD Tsivyan plates	1	6	3	-	10 (16.7%)
One-time closed reclination, with TPF	1	4	6	1	12 (20%)
Open reclination, with TPF	3	16	1	2	22 (36.6%)
Total	7	35	14	4	60 (100%)

To date, there is no single approach to the implementation of the principles of surgical treatment. The development of a differentiated approach in the treatment of spinal injuries is highly desirable. In particular, this concerns trauma to the thoracolumbar junction, where it is practically impossible to use anterolateral and posterolateral approaches. In the Department of Pathology of the Spine and Spinal Cord of the Republican Scientific Center of Chemistry, an original method of decompression of the spinal canal for acute trauma of the thoracolumbar spine has been developed, indications and contraindications for this method have been developed. This method is an effective way to decompress the spinal cord. Reclination of the spine is performed under general intubation anesthesia on two tables of different heights, and the degree of extension of the spine is controlled dynamically by an image intensifier tube (electronic-optical converter).

Before reclination, the patient undergoes a lumbar puncture. Reclination of the vertebrae is carried out with constant X-ray monitoring of the damaged segment in the lateral and, if necessary, in the direct projection. Extension of the spine is carried out until complete reclination by achieving the maximum restoration of the height of the compressed vertebral bodies and the geometry of the spinal column. Constant monitoring allows you to observe the process of reclination of the contents of the spinal canal during the entire time of reclination and makes it possible to judge the completeness of decompression of the contents of the spinal canal, visualizes and prevents the possible occurrence of new compression factors in the process of reclination. Contraindications to the use of one-stage closed reclination can be divided into absolute and relative. Reclination of the vertebrae is carried out with constant X-ray monitoring of the damaged segment in the lateral and, if necessary, in the direct projection. Extension of the spine is carried out until complete reclination by achieving the maximum restoration of the height of the compressed vertebral bodies and the geometry of the spinal column. Constant monitoring allows you to observe the process of reclination of the contents of the spinal canal during the entire time of reclination and makes it possible to judge the completeness of decompression of the contents of the spinal canal, visualizes and prevents the possible occurrence of new compression factors in the process of reclination. Contraindications to the use of one-stage closed reclination can be divided into absolute and relative. Reclination of the vertebrae is carried out with constant X-ray monitoring of the damaged segment in the lateral and, if necessary, in the direct projection. Extension of the spine is carried out until complete reclination by achieving the maximum restoration of the height of the compressed vertebral bodies and the geometry of the spinal column. Constant monitoring allows you to observe the process of reclination of the contents of the spinal canal during the entire time of reclination and makes it possible to judge the completeness of decompression of the contents of the spinal canal, visualizes and prevents the possible occurrence of new compression factors in the process of reclination. Contraindications to the use of one-stage closed reclination can be divided into absolute and relative. Extension of the spine is carried out until complete reclination by achieving the maximum restoration of the height of the compressed vertebral bodies and the geometry of the spinal column. Constant monitoring allows you to observe the process of reclination of the contents of the spinal canal during the entire time of reclination and makes it possible to judge the completeness of decompression of the contents of the spinal canal, visualizes and prevents the possible occurrence of new compression factors in the process of reclination. Contraindications to the use of one-stage closed reclination can be divided into absolute and relative.

Extension of the spine is carried out until complete reclination by achieving the maximum restoration of the height of the compressed vertebral bodies and the geometry of the spinal column. Constant monitoring allows you to observe the process of reclination of the contents of the spinal canal during the entire time of reclination and makes it possible to judge the completeness of decompression of the contents of the spinal canal, visualizes and prevents the possible occurrence of new compression factors in the process of reclination. Contraindications to the use of one-stage closed reclination can be divided into absolute and relative. Constant monitoring allows you to observe the process of reclination of the contents of the spinal canal during the entire time of reclination and makes it possible to judge the completeness of decompression of the contents of the spinal canal, visualizes and prevents the possible occurrence of new compression factors in the process of reclination. Contraindications to the use of one-stage closed reclination can be divided into absolute and relative. Constant monitoring allows you to observe the process of reclination of the contents of the spinal canal during the entire time of reclination and makes it possible to judge the completeness of decompression of the contents of the spinal canal, visualizes and prevents the possible occurrence of new compression factors in the process of reclination. Contraindications to the use of one-stage closed reclination can be divided into absolute and relative.

The first group includes:

1. damage to the dural sac;
2. vertebral fractures with fractures of the arches;
3. comminuted fractures of the vertebral bodies with the introduction of fragments into the spinal canal;
4. large sequestered disc herniation;
5. general extremely serious condition of the patient.

Relative contraindications include:

1. vertebral fractures with fractures of the facet joints;
2. the duration of the injury is more than two to three weeks.

In all other cases, we consider it expedient to conduct a one-time closed reclination. After the reclination, the operation ended with the stabilization of the vertebrae with a metal structure. This technique was carried out in 28 patients. A more rapid regression of neurological disorders was noted compared with patients with similar degrees of spinal cord injury, but subjected to other methods of treatment.

WEB OF SCIENTIST: INTERNATIONAL SCIENTIFIC RESEARCH JOURNAL
ISSN: 2776-0979, Volume 4, Issue 3, Mar., 2023

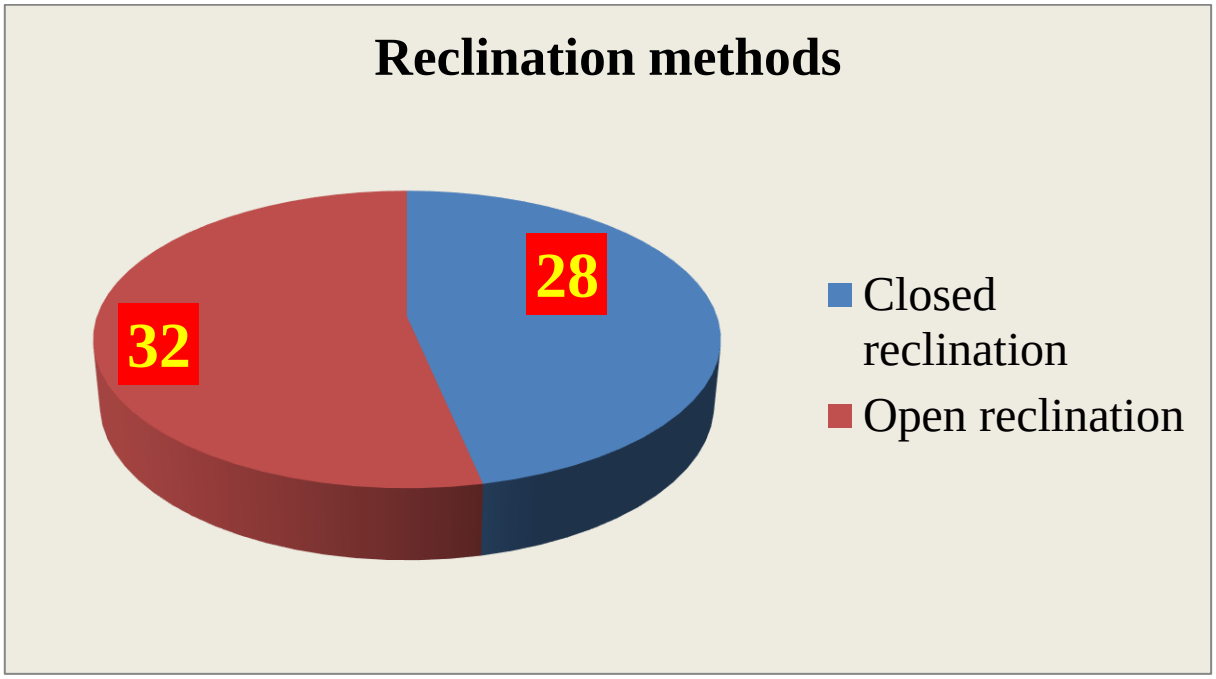


Diagram. By surgery patients were divided into 2 groups.

The method of closed reclination of compression and comminuted fractures has been used in the RSCH since 1986. Computed tomography clearly demonstrated the presence of spinal cord compression, and the control one, after closed reclination, reliably testified to persisting or eliminated spinal cord compression and restoration of CSF circulation at the level of the damaged spinal segment. With the elimination of spinal cord compression after closed reclination, there is no need for decompressive laminectomy, that is, reclination itself was a factor in decompression of the spinal cord and nerve roots, and if compression of the spinal cord persisted, the patient additionally underwent decompressive laminectomy. Decompressive laminectomy included resection of 1-3 arches with elimination of all factors of spinal cord compression (resection of the Urban wedge, removal of fallen fragments of the intervertebral disc, compressing bone fragments, epidural hematoma, or torn yellow ligaments). A significant advantage of closed reclination with CT guidance is the fact that in many cases reclination contributed to the elimination of compression of the spinal cord and nerve roots without laminectomy (the posterior support complex of the vertebrae remained intact) and the intervention ended only with the fixation of the damaged segment in the achieved, anatomically correct position of the vertebrae. In the presence of contraindications, an open reclination was performed. that in many cases, reclination contributed to the elimination of compression of the spinal cord and nerve roots without laminectomy (the posterior support complex of the vertebrae remained intact) and the intervention ended only with the fixation of the damaged

segment in the achieved, anatomically correct position of the vertebrae. In the presence of contraindications, an open reclination was performed. that in many cases, reclination contributed to the elimination of compression of the spinal cord and nerve roots without laminectomy (the posterior support complex of the vertebrae remained intact) and the intervention ended only with the fixation of the damaged segment in the achieved, anatomically correct position of the vertebrae. In the presence of contraindications, an open reclination was performed.

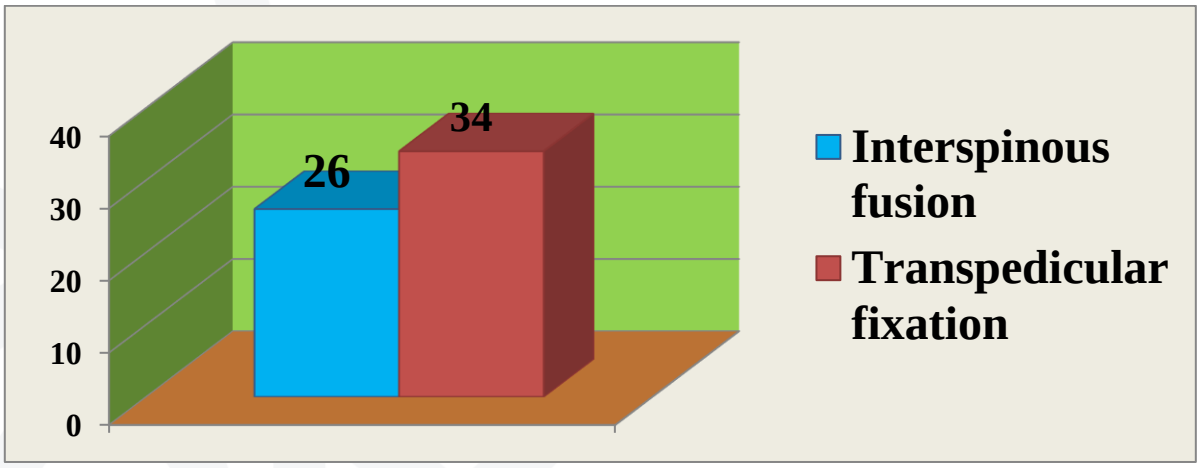
Features of surgical intervention. Surgical treatment of acute injuries of the thoracolumbar region included the fastest possible decompression, restoration of normal anatomical relationships in the damaged segments, and reliable stabilization. The choice of approach was based on the fulfillment of the basic requirements for surgical intervention in general: maximum visibility of the object of surgical intervention, preservation of important structures along the approach paths, possibly minimal access time, and ensuring the lowest likelihood of surgical and postoperative complications. Based on these requirements, in the surgical treatment of patients, we used the posterior approach. It allows, with minimal trauma to the bone base of the spinal column, a good examination of the state of the bone structures, the dural sac of the spinal cord and the most reliable stabilization of the damaged segment.
Prior to the incision, guided by anatomical landmarks, compared radiographs and computer images, the spinous process of the fractured vertebra was found and marked with an injection needle. In our observations, we used a median skin incision, since this access allows manipulation both on one and on the other side of the spinal column. At the same time, both the desired level and the revision of adjacent levels are available during the operation.

Muscle manipulation. We preferred to preserve the paravertebral muscles and moved them away from the interspinous and interarticular spaces, since in the postoperative period, in the rehabilitation process, the preservation of the muscular corset plays an important role. In order to minimize blood loss, it is better to retract the muscles from the place of their attachment in a blunt way using a raspator wrapped with gauze, as a result, the muscles are gradually retracted laterally from the interspinous space. Provided that this manipulation is carefully performed, bleeding will be minimal. After retracting the muscles and providing access, we introduced retractors, after which the spinous processes, arches and articular processes were exposed.

Landmarks in the wound. After stratification of the muscles in the wound, the bases of the spinous processes and the interspinous spaces become visible. In the studied material, ruptures of the interspinous ligaments were found in 28 cases, and more often the ligaments between the damaged and underlying vertebra are torn, which can also be a guideline for determining the damaged vertebra, with the integrity of the bone structures of the posterior supporting column. In the presence of contraindications to closed reclination, we performed spinal cord decompression by laminectomy and open reclination. We performed resection laminectomy by removing the spinous processes and arches; in 32 cases, sparing laminectomy was performed (without resection of the articular processes), in 23 cases, with fractures of two or more vertebrae, extended laminectomy was performed. After removal of bone fragments,

The next stage of the operation was an open reduction on the operating table by hyperextension of the damaged spine, and in case of damage to the lumbar vertebrae, a large hyperextension was given to the leg end of the body, if the lower thoracic vertebrae were damaged, then hyperextension was given to the head end of the body. In the position of the given hyperextension, the damaged segment was fixed with metal structures.

To stabilize the damaged segment in 26 (43.3%) cases, Tsivyan's interspinous plates were used, and in 34 (56.7%) cases, stabilization with transpedicular fixation systems was performed.

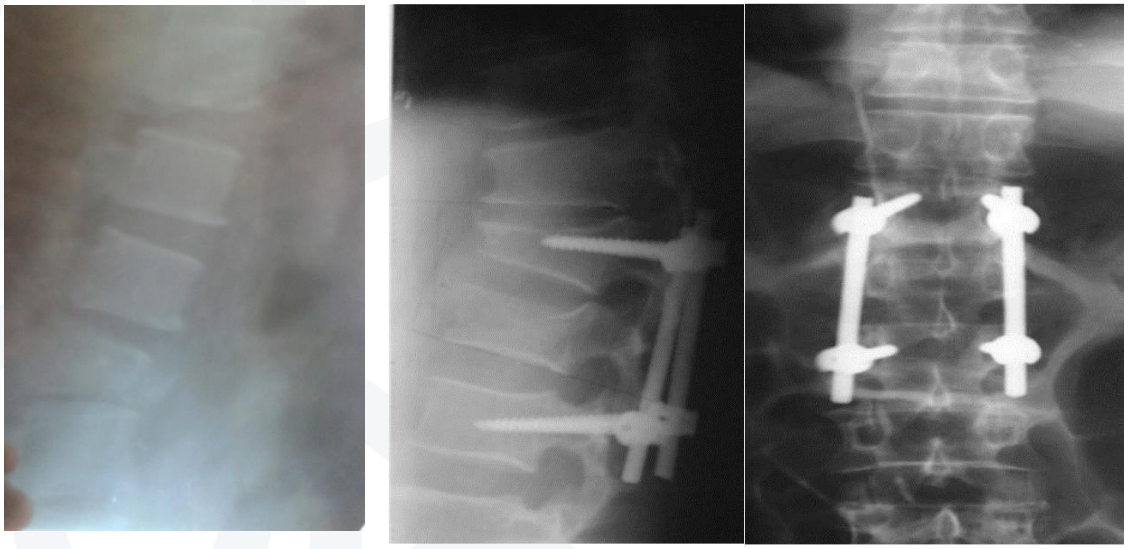


Bar chart. By stabilizing operations the patients were divided into 2 groups. The technique of spinal stabilization with Tsivyan's plates consisted of exposure and skeletonization of 5-6 spinous processes, formation of transverse channels in the isolated spinous processes for the passage of bolts, installation of parallel plates on both sides of the spinous processes, passage and tightening of the bolts, and layer-by-layer suturing of the wound.

The advantages of this method are the simplicity of the plate installation technology, its availability, and the minimal risk of intraoperative damage to the neurovascular structures of the spinal canal during the installation of the system.

The disadvantages of this method include the low stability of fixation of damaged segments of the spine, the trauma of the operation, in addition, this type of stabilization cannot be used for “explosive” body fractures and fracture-dislocations, when two or more vertebrae were laminectomy.

We give an example. Patient S., 39 years old and/b. No. 4062, was admitted to the department with complaints of pain in the thoracolumbar spine, weakness in the legs, urinary retention. From the anamnesis, 2 days before admission, he fell from a height of 2 meters onto his back. On examination, there is a sharp pain in the thoracolumbar spine, aggravated by the slightest movement, weakness in the legs, acute urinary retention. In the neurological status, the lower flaccid paraparesis, with a decrease in tendon reflexes, with muscle strength up to 3 points, hypesthesia in the anogenital region, acute urinary retention. Fracture-dislocation on spondylogramsVL2vertebra, with wedge-shaped deformityVL2with spinal cord compression. On November 14, 2012, the patient underwent decompressive laminectomy VL2-L3 vertebrae, with open reclination and subsequent transpedicular fixation. Was under dynamic supervision. We show the following pictures.



a **b**

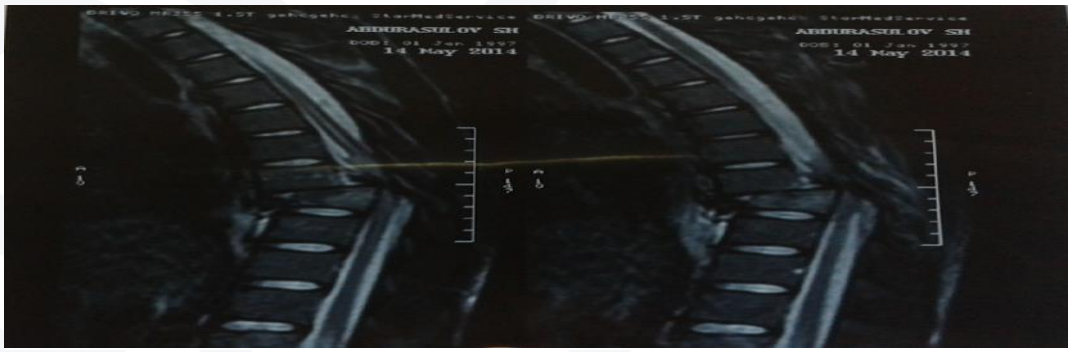
Draw. 1 Spondylograms in direct and lateral projection, a) before surgery, fracture-dislocationVL2vertebra, with wedge-shaped deformityVL2, with spinal cord compression, Figures b) 3 days after open reclination with subsequent transpedicular fixation.

Patient S., 39 years old and/b. No. 4062, a) before surgery, b) 3 days after open reclination surgery with subsequent transpedicular fixation. It can be seen that 3 days after stabilization, there is a progression of kyphotic deformity of the spinal segment, a violation of the integrity of the damaged vertebra.

According to the three-pillar theory of Denis (1983), the spine is a flexible single support system in which the main load (80%) is borne by the anterior sections of the spine /anterior and middle support columns/ and only part of the load (20%) is transmitted through the posterior structures /posterior support column / vertebrae. Given this, from a biomechanical point of view, for the most reliable stabilization, it is preferable to fix the anterior structures, that is, the bodies and vertebral arches.

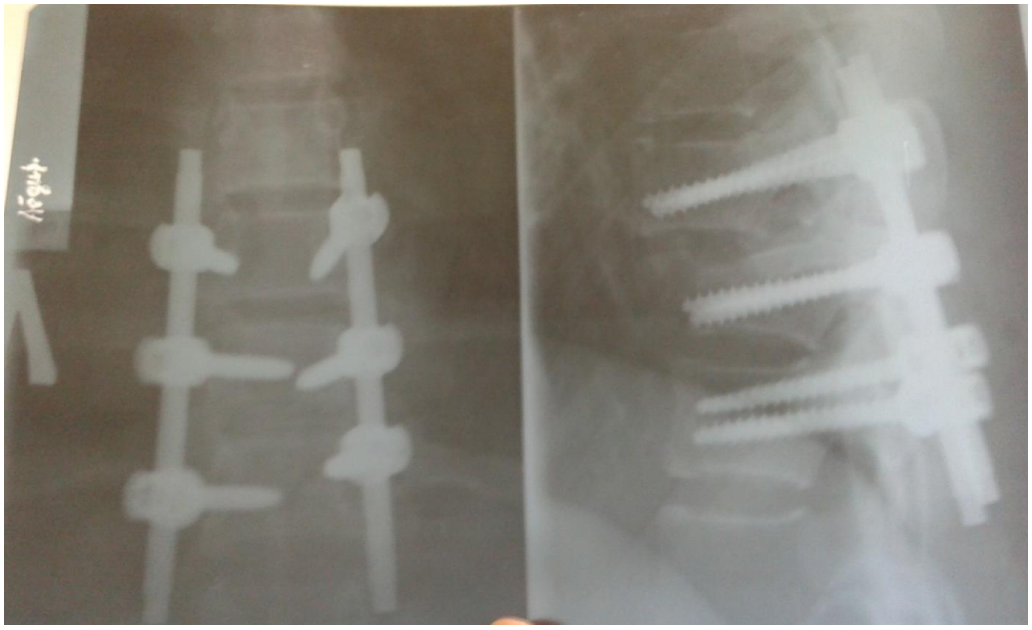
The establishment of a transpedicular fixation system allows achieving primary stabilization of the vertebrae and early rehabilitation. It was allowed to transfer the patient to a vertical position after 2-3 days, from the 1st day to start physical therapy in order to form a muscular corset around the spine.

We give an example. Patient A., 16 years old, i/b. No. 1633 was admitted to the clinic with complaints of pain in the thoracolumbar spine, weakness in the legs. From the anamnesis, 2 days before admission, he fell from the height of his height to the lumbar region, pain in the lower back, weakness in the legs immediately appeared. After consulting a neurosurgeon, he was transferred to us through medical aviation. When examined in the neurological status, the lower paraparesis is determined according to the flaccid type, with muscle strength from the legs 3 points, conduction hypoesthesia from the level VTh11. On the performed MRI (Rice. 2) a compression fracture is determinedVTh11vertebrae, with compression of the spinal cord. On May 19, 2014, the patient underwent a one-stage closed reclination operation.VTh12vertebra, followed by transpedicular fixation. In dynamics, after 1 year, the paraparesis regressed, on the control spondylograms (Rice. 3) the condition of the plates is satisfactory, there are signs of stabilization of the fracture, the wedge-shaped deformity of the spine has significantly regressed.



Draw. 2 MRI images before surgery, signs of a compression fractureVTh11vertebrae, with compression of the spinal cord.

WEB OF SCIENTIST: INTERNATIONAL SCIENTIFIC RESEARCH JOURNAL
ISSN: 2776-0979, Volume 4, Issue 3, Mar., 2023



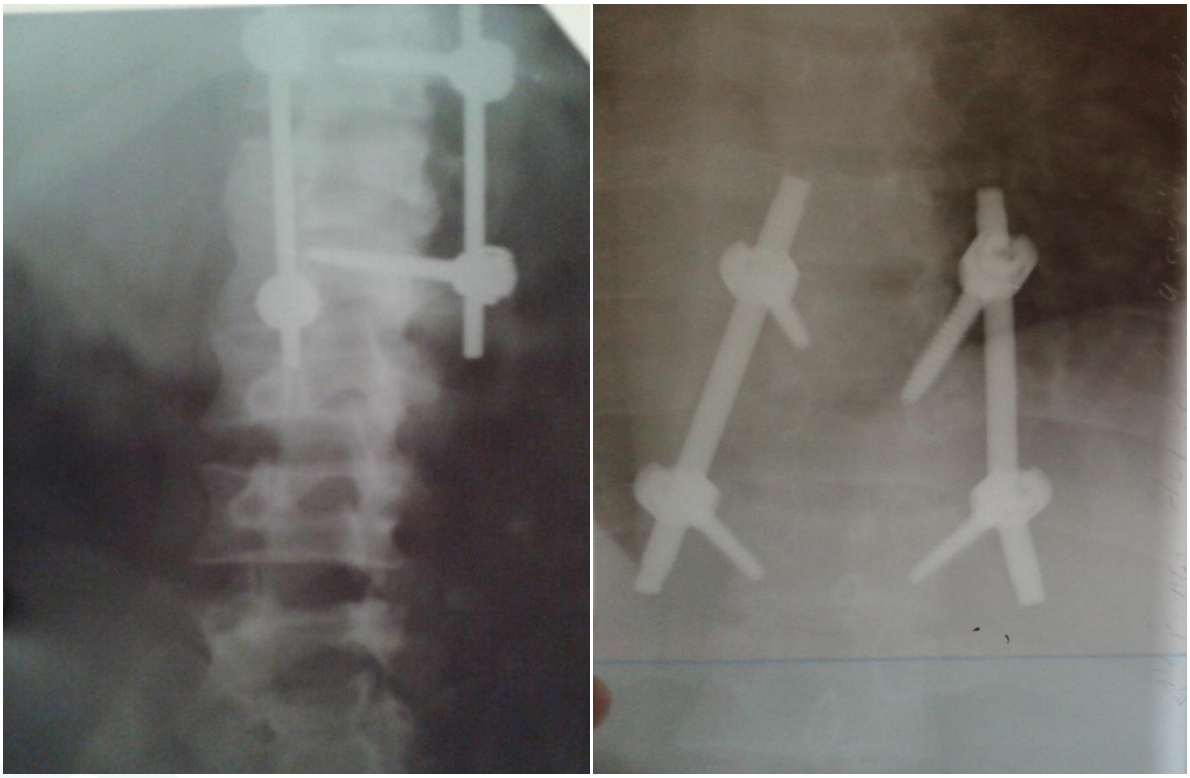
Draw. 3 Spondylograms in direct and lateral projection - 1 year after the operation of closed reclination with subsequent transpedicular fixation to the levelsVTh10-VTh12.

This figure clearly demonstrates the advantage of transpedicular fixation, restoration of the height of the body of the damaged vertebra, and the absence of the Urban wedge 3 days after the operation.

The main advantage of TPF, compared with MOSD, is that transpedicular fixators allow not only stable fixation, but also complete elimination of spinal segment deformity and spinal canal stenosis in the area of injury. They provide stable fixation after laminectomy. It is also important that transpedicular fixators stabilize only the damaged motor segment. An unjustified increase in the length of fusion should be avoided. The advantage of TPP is that it is a simple and versatile system; installation does not depend on the type of fracture; possible fixation one segment; easy reposition by pities. The disadvantage is that they are not applied above the VTh4 vertebra due to the small size of the vertebral pedicles.

Analysis of the results of treatment of fractures of the thoracolumbar spine with TPF systems allowed us to identify the most common complications that occurred when using this method:

1. intraoperative (incorrect insertion of screws - 11;fractures of the temples - 2)
2. postoperative (suppuration - 3; transient neuropraxia - 4; permanent damage to the roots of the cauda equina - 2; screw fractures - 1).



Draw. 4. Spondylograms in direct projection. Variants of the incorrect location of the screws.

Conclusion

The developed method of simultaneous closed reclination is a fast and less traumatic method of spinal cord decompression compared to other decompression methods. When stabilizing the damaged segment, preference should be given to transpedicular fixation, as it allows fixing the main supporting structures of the spinal segment. With strict adherence to the rules for installing bolts, the rules of asepsis and antisepsis, the system allows achieving reliable primary and long-term stabilization of the vertebrae, which will allow early activation of patients, contributing to the most rapid recovery of lost functions.

References

1. Ergashov , A. R. (2022). Modern Clinical Analysis of Injuries of the Thoracolumbar Spine. INTERNATIONAL JOURNAL OF HEALTH SYSTEMS AND MEDICAL SCIENCES, 1(4), 59–63. Retrieved from https://inter-publishing.com/index.php/IJHSMS/article/view/146
2. A. R., E. (2022). Principles of Diagnosis and Surgical Treatment of Injuries of the Thoraco-Lumbar Spine. INTERNATIONAL JOURNAL OF HEALTH SYSTEMS

AND MEDICAL SCIENCES, 1(4), 69–73. Retrieved from https://inter-publishing.com/index.php/IJHSMS/article/view/149

3. Ilyasov, A., & Ergashov, A. (2022). A MODERN VIEW OF THE IMPACT XENOBIOTICS ON ORGANISMS. Miasto Przyszłości, 24, 218–223. Retrieved from https://miastoprzyszlosci.com.pl/index.php/mp/article/view/68
4. Кариев М.Х., Сабуренко Ю.Ф., Перфильев С.В., Бабаханов Ф.Х. Нестабильность позвоночника и транспедикулярная фиксация позвонков. // Методические рекомендации. Ташкент – 2002г. – 16с.//
5. Эргашов , А. Р. (2022). Отдаленные Результаты Хирургического Лечения при Острой Травме Грудопоясничного Отдела Позвоночника. Central Asian Journal of Medical and Natural Science, 3(2), 256-260. https://doi.org/10.17605/OSF.IO/7A4EG
6. Эргашов, А. Р. (2021). Характеристика Острой Травмы Грудопоясничного Отдела Позвоночника. Central Asian Journal of Medical and Natural Science, 150-153. https://doi.org/10.47494/cajmns.vi0.367
7. Эргашов А. Р. (2022). ОЦЕНКА ОСТРОЙ ТРАВМЫ ГРУДОПОЯСНИЧНОГО ОТДЕЛА ПОЗВОНОЧНИКА ПО КЛИНИКО-НЕВРОЛОГИЧЕСКИМ НАРУШЕНИЯМ ДО И ПОСЛЕ СТАБИЛИЗИРУЮЩИМИ ОПЕРАЦИЯМИ. Journal of Advanced Research and Stability Volume: 02 Issue: 12 | Dec - 2022 ISSN: 2181-2608 www.sciencebox.uz