



## Treatment of Degenerative-Dystrophic Diseases of the Spine and their Morphological Basis in New Analysis

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### ABSTRACT

This article presents information on the treatment of degenerative-dystrophic diseases of the lumbar region of the spine with new diagnostic methods, analysis of positive results and study of their morphological basis. Taking into account the results of the morphological examination, the indications for carrying out optimal surgical procedures for degenerative-dystrophic diseases of the lumbar region of the spine have been determined. As a result of arcotomy + discectomy + foraminotomy examination, it was found that the pain syndrome was eliminated in all patients (100%). The advantage of hemilaminectomy surgery is that the orthopedic properties of the spine are maximally preserved, the origin of instability is prevented, decompression of the spinal cord and brain roots is achieved, and congenital and acquired stenoses are opened. An extended hemilaminectomy procedure maximizes stability of the spine and surrounding tissues, allowing immediate decompression and revision of the lobules and preserved brain roots.

### Keywords:

spine, degeneration, dystrophy, hernia, scoliosis, scalioarthrosis, examination, morphology

**Research results and their discussion.** The following studies were carried out to determine the positive aspects of morphological changes and perform a new surgical procedure in patients with degenerative-dystrophic changes of the lumbar spine. On the basis of diagnostic examination and clinical-neurological data, the following surgical procedures were performed in 140 patients: in 32 patients - arcotomy + discectomy + foraminotomy; in 70 patients - hemilaminectomy + discectomy + foraminotomy + root canal decompression + ligamentectomy; 38 patients underwent extended hemilaminectomy + discectomy + foraminotomy + root canal decompression + ligamentectomy.

- 1) The technique of surgical practice in the first method: the skin is cut 8 cm long in the area of the patient's lumbar spine, the subcutaneous soft tissue is separated (skeletonized)

from the sharp cuts and soft tissues. After the vertebrae are separated from the soft tissues, they are expanded to the vertebral arch using a special expander. A certain vertebral arch is partially cut. The yellow ligament is cut without expanding the size of the resulting bone defect (see Fig. 1).

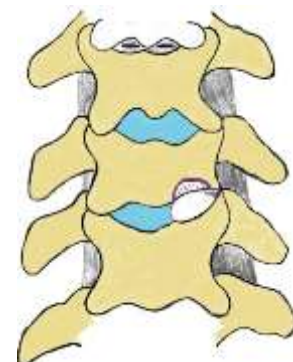


Figure 1. Schematic of arcotomy inspection method.

2) Hemilaminectomy + discectomy + foraminotomy + root canal decompression. The technique of hemilaminectomy operation is as follows: the patient is placed on his stomach under general endotracheal anesthesia with the help of assistants. An 8 cm long skin incision is made at a certain vertebral branch of the lumbar vertebrae. Soft tissues are skeletonized from the spinous processes of the spine, in which it is necessary to maintain integrity between the spinous processes. The muscle aponeuroses are cut and the vertebral arch is opened by separating the paravertebral muscle fibers without breaking the integrity of the muscle fibers. The spinal cord is resected. The lower articular growth of the upper spine is resected using scissors. Then the yellow bandage is removed. The upper part of the lower vertebral arch is partially resected, as a result of which it becomes possible to visually observe the spinal cord located in the dura mater and root canal.

Figure 2. Schematic view of hemilaminectomy examination.

3) Advanced hemilaminectomy technique.

Under general anesthesia, the skin is cut over the ridges of certain vertebrae, reaching the region of the ridges and arches. Ravok is obtained by resection method. The vertebral column and subarticular tumor are resected medially. The upper 1/3 of the lower spine is removed. As a result, the spinal cord and two roots can be controlled at the same time. After discectomy, hypertrophied posterior longitudinal ligament ligamentectomy is performed in the operative field. It is necessary to completely clean the border plate from the hyaline plate (see Figure 3).

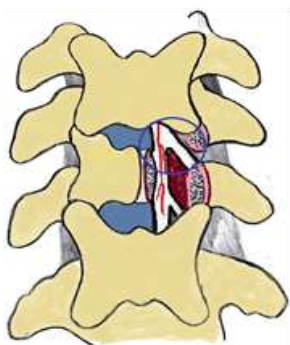


Figure 3. Schematic view of an extended hemylaminoectomy examination.

Each of the used surgical methods was carried out on the basis of special instructions, taking into account the nature of the volume of the compressive factor and the goals and objectives of the practice. In 70 out of 140 patients under observation, in the surgical treatment of osteochondrosis of the lumbar vertebrae, we performed hemilaminectomy + farominotomy + root decompression + ligamentectomy. In our observation, hemilaminectomy operation was served by the following indications: recurrent clinical type of osteochondrosis of lumbar vertebrae, sequestered state of disc herniation + yellow ligament hypertrophy + spondyloarthrosis; paramedial location of the intervertebral disc + hypertrophy of the posterior longitudinal ligament + root canal stenosis + spondyloarthrosis; osteochondrosis of the lumbar spine + disc herniation + spondyloarthrosis together with stenosis of the lumbar spinal canal.

A small hemilaminectomy operation, a half-size resection of the posterior ligament complex of the lumbar vertebrae, was performed based on the following guidelines. In the concepts of osteochondrosis + spondyloarthrosis, it is necessary to show the difference of several factors that cause pain syndrome: a) the presence of large amounts of osteophytes; b) joint tumor reactive hypertrophy and posterior longitudinal ligament ossification; c) hypertrophy of the upper articular tumor of the spine due to the degenerative-dystrophic process; g) narrowing of the intervertebral foramen and root canal stenosis.

It is known that the degenerative-dystrophic process can move from the damaged area of the intervertebral disc, and the involutive process can lead to the bone formation of the spine, thickening of the intervertebral discs and ligaments. Therefore, the symptoms of the clinical manifestation of the disease and its duration are the cause of clinical symptoms in the spinal segment of intervertebral spondyloarthrosis. We believe

that this situation should be taken into account before the operation.

Extended hemilaminectomy was performed in 38 of 140 patients under follow-up. The following indications for performing an extended hemilaminectomy operation were developed: chronic and recurrent clinical type of osteochondrosis of the lumbar vertebrae + stenosis of the lumbar spinal canal + disc herniation + spondyloarthrosis; spondyloarthrosis of the lumbar spine + complicated disc herniation + yellow ligament, hypertrophy of the posterior longitudinal ligament.

The pathomorphological changes revealed in the results of examination of fragments taken from the spine and surrounding soft tissues after the examinations in degenerative-dystrophic diseases of the lumbar spine were as follows.

Tissue fragments obtained during surgery, including the intervertebral disc and its fibrous membrane, the vertebral column and Schmorl's hernia, the intervertebral disc protrusion in the form of a protrusion, herniation and its sequestered part, osteophytes of the vertebral bone, all structural units of the joints with arcuate tumors in spondyloarthrosis, including The macroscopic appearance of the tendon, bone, fibrous membrane, ligaments and muscles around the joint, and the deep muscles of the back surface of the spine consisted of the following:

The cause of Schmorl's hernia is that the soft tissues of the spine develop rapidly as a result of the rapid growth of the body during the youth, the bone tissue lags behind the growth, and a gap appears in the spongy part of the bone, the membrane covering the joint surface of the spine sinks into the spongy part of the bone over time (Fig. 1). It is determined that in the porous part of the spine, strong and

irreversible dystrophic and destructive changes have developed in the compact bone trabeculae, fibrous dysplasia and calcinosis have appeared, and the bone columns have lost their histotopography and entered a structureless state. Instead of the normal bone marrow cells, it is determined that blood clots, carbohydrate and protein matter, connective tissue tufts and calcinosis, and in some cases, complete lipomatosis have developed in the porous bone pores. It is observed that in the elastic fibrous membrane that covers the spongy bone, the elastic fibers break down and homogenize, coarse protein appears, and the intermediate substance becomes vacuolated and disintegrated.

It has been proven that osteophytes appearing on the front edge of the spine in spondylosis have a morphologically concentric structure, fibrous structures and main substance are chaotically arranged, and it consists of tissue rich in calcification and pigmentation foci. As a result of the penetration of osteophytes into the fibrous tissue of the disc, it was observed that its fibrous structures were broken, destroyed, a coarse dispersed substance appeared, and calcification and chondromatous metaplasia developed in its composition (Fig. 2). In the vibrating core, it was found that the chondroid substance was roughened, its coloring was disturbed, its fibrous structures and interstitial substance were dispersed and thickened, the number of chondrocytes increased, and they underwent processes such as dystrophy and destruction in various degrees. In chronic spondylosis, it was confirmed that the chondrocytes in the core tissue of the patient were completely destroyed and necrobiized, turned into structureless substances (Fig. 3), and calcification foci appeared.

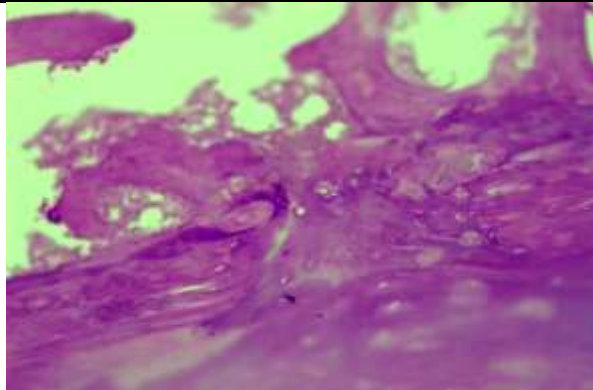


Figure 1. Schmorl's hernia. The penetration of spongy tissue into the cancellous bone by breaking through the fibrous and elastic membrane. Paint: G-E. Floor: 10x40.

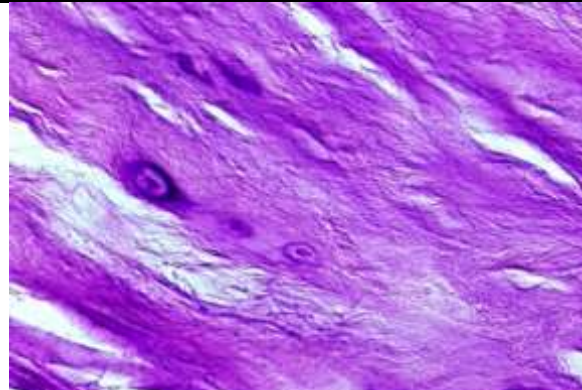


Figure 2. Histological structure of the external fibrotic ring of the disc in the area where osteophytes appeared. Paint: G-E. Floor: 10x40.

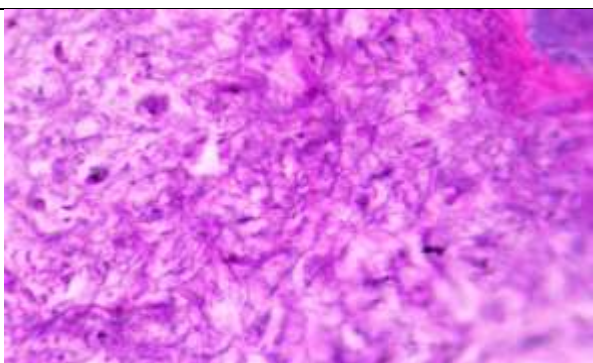


Figure 3. Pathomorphological changes in the spinal cord in the severe form of spondylosis. Paint: G-E. Floor: 10x40.

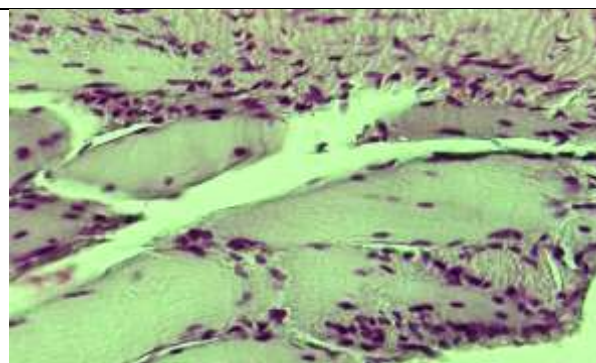


Figure 4. Densely surrounded by proliferative infiltrate and fibrous tissue around skeletal muscle bundles. Paint: G-E. Floor: 10x40.

It is known that if degenerative processes develop in the structures of the spine, including spondyloarthrosis of the faceted joint, appropriate changes can develop in the skeletal muscle tissue that provides the spine's mobility. In spondyloarthrosis, both dystrophic and degenerative changes develop in the skeletal muscles that connect adjacent vertebrae. In this case, it is observed that the muscle fibers are different in thickness, their nuclei are dystrophied and colorless, due to the development of dystrophy in myofibrils, they become homogenized and their coloring is disturbed. It is determined that visible changes have developed in the interstitial tissue, that is, the interstitial substance has become hydrated and vacuolated, as a result of which interstitial tissue cells are compressed, destroyed, and reduced in number.

As a result of degenerative-dystrophic diseases of the spine, the development of destructive, inflammatory and fibromatous changes is also observed in the deep muscles of the back surface of the spine. It is determined that proliferative inflammatory and fibromatous changes surround muscle fibers (Fig. 4), destroy myofibrils of muscle fibers and penetrate into them. In some cases, lymphoproliferative infiltration around muscle fibers, immunological lysis of myofibrils indicate the development of an autoimmune process. It was proved that chondromatous and ossifying metaplasia developed in the fibrous tissue that appeared in the place of muscle fibers.

The following defects and complications were found after the examination of the lumbar spine in degenerative-dystrophic diseases. All of the above-selected diagnostic methods have

shown their effectiveness over the years, but the most advanced treatment method and the analysis of the results of the post-diagnosis period show that the percentage of defects and complications is reduced if we follow the experience, the anatomy of the field of examination and follow all the technologies of the applied examinations. After conducting clinical-diagnostic and morphological examinations again, the defects (complications) of the sheep appeared, and according to the purpose of the thesis, the complications were eliminated and the diagnostic-treatment algorithm was created.

### Conclusion

Degenerative-dystrophic diseases of the lumbar region of the spine, taking into account the results of the morphological examination to support the optimal hemilaminectomy surgical production, the following supports, including: maintaining the orthopedic payments of the hernia, preventing the origin of instability such as acquisition, retraction, retraction, and support for acquired stenosis have been elucidated.

Arcotomy + discectomy + foraminotomy is the essence of the examination, which revealed pain syndrome in the symptoms of patients (100%). In these patients, the existing antalgic scoliosis was confirmed by the 3rd postoperative day.

The advantage of hemilaminectomy surgery is that the orthopedic conditions of the spine are maintained as much as possible, the origin of instability is prevented, decompression of the spinal cord and brain roots is achieved, and congenital and acquired stenoses are opened.

An extended hemylaminectomy incision maximizes the stability of the spine and its collaterals, allowing immediate decompression and revision of the pedicles and preserved brainstem.

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