

## Optimization of Differentiated Surgical Treatment of Herniated Discs at the Lumbar Level

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**Abstract:** According to statistical data, degenerative-dystrophic diseases of the spine are observed in 60-70% of the able-bodied population (Brotman M.K., 1975; Oleinik V.F., 2006). The level of disability in this pathology is 4 per 100 thousand of the population. Among people with disabilities from diseases of the musculoskeletal system, one in five (20.4%) suffers from degenerative changes in the spine (Bogacheva J.I.A., Snetkova E.P., 2005). In the last 1015 years, there has been an increase in the incidence of degenerative-dystrophic spine pathology (Oleinik V.F., 2006; Silva F.E., Lenke L.G., 2010).

**Key words:** scoliosis and the development, number, degeneration

**Relevance problems.** According to statistical data, degenerative-dystrophic diseases of the spine are observed in 60-70% of the able-bodied population (Brotman M.K., 1975; Oleinik V.F., 2006). The level of disability in this pathology is 4 per 100 thousand of the population. Among people with disabilities from diseases of the musculoskeletal system, one in five (20.4%) suffers from degenerative changes in the spine (Bogacheva J.I.A., Snetkova E.P., 2005). In the last 1015 years, there has been an increase in the incidence of degenerative-dystrophic spine pathology (Oleinik V.F., 2006; Silva F.E., Lenke L.G., 2010). One of the manifestations of DDZP is scoliosis by G.I. Gaivoronsky (2007). The primary pathology of the central nervous system plays a leading role in its development, resulting in endochondral bone formation dysfunction in the vertebrae. The choice of treatment tactics largely depends on the accurate diagnosis of pathomorphological substrates, pathogenetic situations and related clinical phases of the course (Dulaev A.K., Shulev Yu.A., Orlov V.P., 2005, Aebi M., 2008). According to American researchers (Kebaish K.M. et al., 2010), the prevalence of scoliosis in patients 40 years and older reaches an average of 8.85%, and this indicator increases with age. Thus, in the age group from 40 to 50 years, 3.14% of patients are diagnosed with scoliosis, while among centenarians aged 90 and older, every second patient (50%) suffers from this disease. According to K.R. Chin et al. (2009), the rate of progression of degenerative scoliosis also depends on age: in patients of the older age group (69 years and older), the disease progresses at a rate of 2.5° per year, and in younger patients — 1.5° per year. Japanese researchers (Murata Y. et al., 2002), studying the development of degenerative scoliosis in the early stages, came to the conclusion that its development can be triggered by any degeneration of the disc at the lumbar level, and in the early stages of the degenerative process, the curvature can be reversible. The presence of a feedback mechanism in various injuries of the neuromuscular apparatus, including in degenerative processes of the spine, is indicated by Krylov V.V., Grin A.A. (2005). In general, a number of studies comparing the outcomes of conservative and surgical treatment of patients with degenerative scoliosis have shown that surgical treatment improves the quality of life of patients to a greater extent than conservative treatment (Kasumov R.D., Davydov E.A., 2000; Dulaev A.K., Shulev Yu.A., Orlov V.P., 2005; Bridwell Akbarnia V.A. et al., 2006; Glassman S.D. et al., 2007; Miyamoto H. et al., 2008; K.H. et al., 2009; Klub T. et al., 2009; Li G. et al., 2009; Park D.K. et al., 2010).

An analysis of the literature confirms the role of intervertebral disc herniations in the occurrence of degenerative scoliosis and the development of spinal biomechanical disorders, including its scoliotic deformity. At the same time, there is still no single approach to the choice of surgical treatment tactics for intervertebral disc herniations, including against the background of scoliotic spinal deformity, This problem requires further study and practical development. Questions about the timing, scope, and order of surgical intervention are still debatable. All of the above is the basis for conducting scientific research. The role of dysraphy and degenerative processes of intervertebral discs in the

development of degenerative antalgic scoliosis has been shown for the first time. Diagnostic criteria are given and the phenomenon of two-part pulpous nuclei is considered in detail according to neuroimaging methods. Prognostic criteria and differentiated surgical tactics have been developed for herniated discs of the lumbar spine accompanied by degenerative scoliosis. For the first time, the causes, nature and dynamics of degenerative antalgic scoliosis in both the pre- and postoperative periods have been studied on well-verified material, a treatment regimen has been proposed taking into account the severity of the degenerative process, the localization of disc herniation and the degree of scoliotic deformity of the lumbar spine, individual and age characteristics; indications for various types of surgical treatment depending on the degree of scoliotic deformity and the presence of signs of intervertebral disc dysraphy. Unlike previous studies, based on the preoperative application of modern neuroimaging methods, an algorithm for surgical treatment of patients with herniated discs has been formulated.

Antalgic scoliosis is a consequence of the asymmetric development of degenerative processes of the spine. In 34% of cases, one of the pathogenesis factors in the development of scoliosis is the presence of a two-part pulpous nucleus, which, during the formation of a lateral disc herniation, contributes to an increase in asymmetry in the spinal-motor segment, and in 100% of cases led to progressive scoliosis. Factors contributing to the progression of degenerative scoliosis are the patient's age, the presence of elements of dysraphy, lateral localization of a herniated disc, severity of scoliosis of more than 20 degrees according to the Cobb method, and a second-degree rotation disorder. Comprehensive diagnosis of degenerative scoliosis included neurological examination with visual assessment of spinal biomechanics, radiography with Cobb angle measurement, CT and MRI with identification of two-part pulpous nuclei, as well as myelography and/or CT myelography. Surgical tactics were determined by the degree of neurological deficit, the patient's age, the location of the herniation, the presence of signs of pre-morbid disc dysraphy, the severity of scoliosis and vertebral rotation, as well as segmental instability. The method of choosing the type of surgery in most cases (68.6%) remains the transligamentous removal of a herniated disc without installing fixation systems, which made it possible to reduce the degree of scoliosis from 22.2 to 2.4 degrees in the average group ( $p < 0.5$ ). With the development of instability, spinal canal stenosis, multilevel lesions and lateral hernias on the background of disc dysraphy, it is necessary to use broader root decompression with the mandatory use of transpedicular fixation at the lesion level. The use of the VAS, Cobb and ODI scales in dynamics made it possible to reliably assess the results of treatment: excellent and good results were obtained in 57 patients (85.1%); satisfactory in 8 patients (11.9%); only 2 patients (2.9%) rated the result as unsatisfactory. The diagnostic algorithm for the examination of patients suffering from herniated discs of the lumbosacral spine in combination with antalgic degenerative scoliosis should include: clinical and neurological status, visual assessment of spinal biomechanics in 3 planes, radiography in 2 projections with measurement of Cobb angle, lumbar lordosis and degree of vertebral rotation. CT and MRI in 3 projections, detection of dysraphy of the nucleus pulposus, dystrophic changes in PDS. If elements of intervertebral disc dysraphy of the lumbosacral region are detected according to radiography, it is necessary to perform an MRI in the frontal projection to identify two-part pulpous nuclei.

**Conclusion.** When choosing the method of surgical tactics and prognosis, it is necessary to take into account the degree of neurological deficit, the age of the patient, the location of the herniation, the presence of signs of pre-morbid disc dysraphy, the severity of scoliosis and vertebral rotation, segmental instability. In the absence of instability of the spinal-motor segments and spinal canal stenosis, the method of choice is transligamentous removal of a herniated disc without installing fixation systems. With the development of instability, spinal canal stenosis, multilevel lesions and lateral hernias on the background of disc dysraphy, it is necessary to perform extensive root decompression with the mandatory use of transpedicular or dynamic fixation at the lesion level.

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