Degenerative scoliosis in the lumbosacral spine

Skolioza zwyrodnieniowa w części lędźwiowo-krzyżowej kręgosłupa

Andrzej Nowakowski¹, Paweł Michalski², Mikołaj Dąbrowski¹

¹ Department of Spondyloorthopedics and Biomechanics, Poznań University of Medical Sciences
² Spinal Surgery and Orthopedics Ward, Institute of Mother and Child, Warsaw

Abstract

Degenerative scoliosis of the lumbosacral region occurs in 6% of the population over 50 years of age. It is often accompanied by low back pain resulting from fibular (in the majority of patients) or frontal decompensation. Radicular pain is common, radiating to one (more often) or both (less often) lower limbs and is most often caused by lateral stenosis.

Key words: degenerative scoliosis, lumbosacral spine

Streszczenie

Skolioza zwyrodnieniowa zlokalizowana w części lędźwiowo-krzyżowej występuje u 6% populacji powyżej 50 roku życia. Towarzyszy jej często ból mechaniczny grzbietu (low back pain) wynikający z dekompensacji strzałkowej (u większości chorych) lub czołowej. Ból korzeniowy (radicular pain) występuje powszechnie, promieniując do jednej (częściej) lub obu (rzadziej) kończyn dolnych i wynika najczęściej ze stenozy bocznej.

Słowa kluczowe: skolioza zwyrodnieniowa, kręgosłup lędźwiowo-krzyżowy
**Epidemiology and classification**

The first group consists of patients with secondary degenerative changes of the intervertebral joints, previously diagnosed with idiopathic scoliosis as children and adolescents (juvenile and adolescent scoliosis) - preexistent scoliosis.

The onset of changes takes place before the end of bone maturity and occurs more often in women. Scoliosis <30° usually does not progress, scoliosis >50° progresses, on average, at 1° to 2° per year. These changes may be accompanied by (co-occurring) spondylolysis, asymmetrical joint surfaces, oblique pelvic position, unequal length of the lower limbs, trauma and infection.

The second group consists of patients with degenerative scoliosis which is not secondary to idiopathic scoliosis. In such a case we deal with primary degenerative scoliosis (de novo scoliosis). It begins once the bone maturity ends, it is more common in men, with an average progression of 3° per year, and rarely exceeds 40° of Cobb angle. Degenerative changes affect the intervertebral disc, intervertebral joints and lateral displacement of the vertebrae (lateral translation – olisthesis) [1,2].

**Pathomechanism**

"Primary" degenerative scoliosis – de novo scoliosis (Fig. 1) [3,4,5].

Clinical symptoms are strictly connected with pathomorphology (Fig. 2).

Risk factors for degenerative scoliosis progression are presented in figure 3 [6,7,8].

![Diagram](image-url)
and nerve structures, CT + myelography – are currently used less frequently (but it provides a precise assessment of the location, radicular compression - 3D assessment is important in their correlation with clinical symptoms).

Paravertebral injections are sometimes helpful in identifying trigger points for pain. Also available are provocative discography, articular surface blocks, nerve root blocks and epidural blocks [4,5,10].

**Non-operative treatment**

The overall goal of the treatment is to relieve the patient's pain, neurogenic claudication, to reverse the neurological deficit and prevent the progression of curvature.

Possible therapeutic options are presented in Table 1 [1,13].

<table>
<thead>
<tr>
<th>Table 1. Possible therapeutic options.</th>
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<tbody>
<tr>
<td><strong>Back pain</strong></td>
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<td>NSAIDs</td>
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<td>Corset</td>
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<td>Joint injection</td>
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<td>Isometric exercises</td>
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<td>Swimming</td>
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<td><strong>Radicular pain, neurological deficit</strong></td>
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<td>NSAIDs</td>
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<td>Isometric exercises</td>
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<td>Orthosis</td>
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<td>Nerve root blocks</td>
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<td>Surgical decompression</td>
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<td><strong>Spinal claudication</strong></td>
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<td>Epidural blocks</td>
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<td>NSAIDs</td>
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<td>Isometric exercises</td>
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<td>Surgical decompression</td>
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<tr>
<td><strong>Curvature progression</strong></td>
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<tr>
<td>Corset</td>
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<tr>
<td>Surgical stabilization</td>
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<td>(instrumentarium spondylodesis)</td>
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</table>

**Surgical treatment**

The decision to introduce surgical treatment is often complex and depends on many factors: It is generally reserved for patients with persistent radicular pain (pain in the limb not relieved by non-operative therapy). The choice of technique depends on age, main symptoms, sagittal and frontal compensation, stiffness, secondary curvature correction. The surgical correction is recommended in patients with severe pain and significant spinal decompensation in both planes (especially in the sagittal plane). It should be clearly stressed that the need for surgical correction of degenerative curvature decreases with age. Surgical treatment is rarely warranted (it concerns 1 to 3% of patients), but may be the right choice in progressive curvatures and severe spinal sagittal decompensation. The use of segmented back fixation with transpedicular screws and posterolateral spondylodesis is currently the standard of surgical management: Serious “hard” curvatures in young adults require combined posterior and anterior
approach if the anterior-posterior release is not sufficient. Wedge osteotomy and curvature correction with transpedicular screws may be necessary to restore spinal compensation. In some cases, the indication may be the use of segmental correction using ALIF (anterior lumbar interbody fusion) and PLIF (posterior lumbar interbody fusion). Fixation to the sacral bone should be avoided, but if it proves necessary, interbody fusion of L5/S1 is obligatory (prevention against non-union) [9,11,15-20].

Treatment algorithm for degenerative scoliosis with low back pain is presented in Fig. 4.

Low back pain with neurogenic claudication /radiculopathy (Fig. 5).

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**Fig. 4.** Treatment algorithm for degenerative scoliosis with low back pain

**Fig. 5.** Low back pain with neurogenic claudication /radiculopathy
Fig. 6. F 56 y.o. Lumbar degenerative scoliosis, central and lateral stenosis, decompression of L4-S1 posterolateral fixation, segmental correction of the curvature with the restoration of lumbar lordosis.

Fig. 7. F. 59 y.o. Slight degenerative lumbar scoliosis, radiculopathy, L5/S1 decompression, segmental L4-S1 stabilization spondylodesis, restoration of lumbar lordosis.

Fig. 8. F. 62 y.o. Degenerative lumbar scoliosis Cobb angle 48°, central, lateral and recessal stenosis, L4/L5 decompression, transpedicular correction and stabilization of T11/S1 (instr. AESCULAP) lumbar kyphosis (-32° → +10°) restoration of lumbar lordosis.


**Summary**

In the majority of patients with degenerative scoliosis in the lumbosacral region slight deformities are diagnosed which do not exceed 30° of Cobb angle. About 95% of them do not require surgical intervention. Only 1 to 4% needs to be treated surgically (progressive curvature, persistent chronic low back pain with symptoms of radiculopathy and neurological deficit.) Today, the currently applied method of correction and stabilization of the spine in carefully selected patients is a multi-segmented instrumentation using transpedicular screws and posterior spondyloodesis.

**References**