



## MODERN APPROACH TO THE DIAGNOSIS AND TREATMENT OF SPONDYLOLISTHESIS

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### ABSTRACT

*Pain syndrome and a variety of neurological syndromes resulting from degenerative-dystrophic changes of the lumbar spine lead to significant violations of labor and social adaptation. According to many researchers, pain in the lumbar spine radiating to the leg observed in 1/3 of patients with degenerative-dystrophic lesions of the lumbar spine, which in 40% of cases is due to the presence of herniated protrusions of the intervertebral discs and spondylolisthesis. The frequency of spondylolisthesis in the lumbar spine occurs to 50 out of 100,000 population. Spondylolisthesis is more common among middle-aged men.*

Spondylolisthesis is a pathology of displacement of the vertebra comparatively to the axis of the spine. The disease occurs in 4-7% of people, its severe forms lead to decrease of working capacity and quality of life even at early age.

The main problem with spondylolisthesis is that due to displacement spinal canal and intervertebral foramina narrows, leading to compression of the spinal cord and nerve roots. With spondylolisthesis, in a significant proportion of cases, patients do not have any complaints for a long time. Symptoms appear gradually during decompensation, showing signs of inflammation, development of instability and increase of compression of the nerve structures.

Spondylolisthesis is classified into 6 types :

1. Dysplastic, or congenital. Dysplastic spondylolisthesis is caused by a defect at the formation of part of a vertebra (the facet joints) that allows the vertebra to slide forward. This type of spondylolisthesis is congenital.
2. Isthmic spondylolisthesis: In isthmic spondylolisthesis, there is a defect in the interarticular part of the vertebra. Isthmic spondylolisthesis can be caused by repetitive injury and is more common amongst athletes with hyperextension movements, gymnasts and soccer players, and it can be found in occupations such as electricians.
3. Degenerative, or pseudospondylolisthesis. Degenerative spondylolisthesis occurs due to degenerative changes in the joints of the vertebrae and degeneration of the cartilage tissue. Degenerative spondylolisthesis is more common in older patients (over 50 years of age, and

much more common in those over 65 years of age). It is also more common in women than men in a 3:1 ratio. Degenerative spondylolisthesis usually occurs at one of two parts of the lumbar spine: at the L4-L5 part of the lumbar spine (this is the most common location for listhesis) and at the L3-L4 part. Degenerative spondylolisthesis is relatively rare in other parts of the spine. Nevertheless, spondylolisthesis can occur simultaneously in the lumbar and cervical spine.

4. Traumatic origin. Traumatic spondylolisthesis is associated with direct trauma or damage to the vertebrae. Damage to the arch, facet joints, or lamina can lead to the development of spondylolisthesis and, as a result, vertebra slides from its original place.

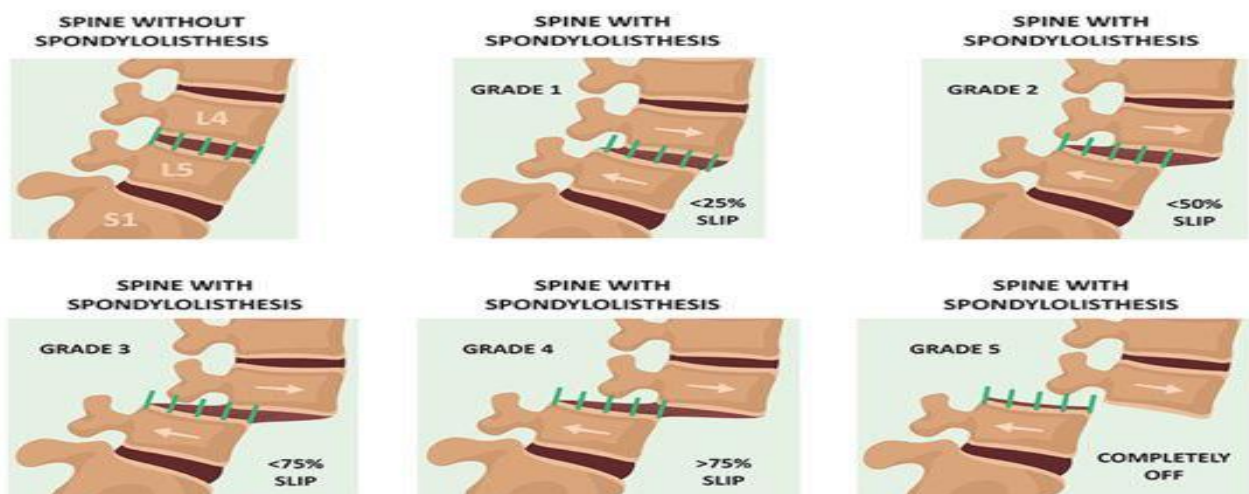
5. Pathological. Pathological spondylolisthesis is caused by a bone defect.

6. Post-surgical (post laminectomy syndrome).

Spondylolisthesis is easily detected using plain radiographs. A lateral radiograph will show if one of the vertebrae has moved forward in relation to the adjacent vertebra. Spondylolisthesis is divided into degrees depending on the percentage of displacement of the vertebra in relation to the adjacent vertebra.

I degree - 25% displacement of the vertebra, II degree - 50% displacement, III degree - 75% displacement, IV degree - 100% displacement. If there is more than 100% slippage, it is known as spondyloptosis or V degree of spondylolisthesis.

## SPONDYLOLISTHESIS STAGES



**Diagnosis.** X-ray examination. Patients with spondylolisthesis should undergo X-ray grams in anteroposterior, lateral projections and profile functions radiographs, if necessary - radiographs in  $\frac{3}{4}$  projections and tomograms. The radiograph in the anteroposterior projection is performed in the position lying on your back with bent at the knee and hip joints of lower limbs to reduce lumbar lordosis. Radiographs provide the following information about pathological pro- processes in spondylolisthesis:

- degenerative-dystrophic changes (deforming arthroz of the facet joints, lateral displacement of bodies, lateral deformation of the spinal column);
- adaptive changes (lateral osteophytes, neoarthrosis of the stiff processes).



- dysplastic changes (non-closure of the arches and sacral channel, the presence of sacralization or lumbarization of transitional bells, underdevelopment of articular processes, etc.);

Magnetic resonance imaging (MRI) is currently considered the most informative diagnostic method. MRI allows visualization of neural structures, evaluate the degree of their compression, get information about the state of intervertebral disc, capsular-ligamentous apparatus, vertebral canal, intervertebral foramen between the displaced vertebra and downstream. Performing an MRI helps to make correct decision when planning an operative intervention. With the help of MRI, spondylolisthesis can be diagnosed as early as 2–3 days after the disease. When the inflammatory process subsides, heterogeneous osteosclerosis of the vertebrae, formation of fixing osteophytes, persistent damage of spinal statics in the affected area are noted. Consolidation of paravertebral tissue preserves for a long time due to fibrosis.

**Conclusion:** Standard MRI study protocol for spine requires additions: performance blocks of axial sections 1–2 mm thick through area of interest in T1 and T2 modes. Rationality performing thin sections in other projections should be studied further. It requires clarifying the feasibility of using contrast, the need to connect fat suppression in post-contrast T1-WI, because these methods providing additional information, significantly lengthen the time of the study, which is difficult to tolerate for patients with severe pain syndrome. MRI and CT have fairly high sensitivity in detecting lesions of the spine and paravertebral tissues, it is expedient to perform for all patients with suspicion of spondylolisthesis.

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