

## **Methods of Treating Pain in the Lumbosacral Spine in the Presence of Dysfunction of the Sacroiliac Joint. Indications for Use of PNF Correction and Suspension Systems. Clinical Observation**

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### **Abstract**

Theoretical and practical aspects of the treatment of back pain in the presence of sacroiliac joint dysfunction and pelvic instability are described, the importance of testing the muscles stabilizing the pelvis is emphasized. The features of rehabilitation treatment using PNF-therapy and work in an unstable support system are considered.

**Keywords:** *Back Pain; KPS Dysfunction; PNF Correction; Kinesiotherapy; Stabilizer Muscles; Gluteal Muscles; Pelvic Instability; Suspension Systems; Work with Unstable Support*

### **Introduction**

Back pain is still one of the topical and not always easily correctable problems. In 90 - 95% of cases, nonspecific back pain [1] is detected, which is based on both a purely muscular component and joint dysfunctions. Most often in practice, we observe dysfunction of the sacroiliac joint (KPS), but in order to adequately assess the contribution of these changes to the formation of pain, it is necessary to conduct a full examination, including neurological, vertebrological and kinesiological examination, and, if necessary, additional instrumental and laboratory diagnostics to exclude specific causes of back pain. There may be situations where an awkward movement leads to an acute displacement of the KPS and there is a characteristic lower back pain radiating to the leg along the lateral surface of the thigh to the upper third of the lower leg, less often to its lower third. The earlier the mobilization is carried out, the more favorable the outcome of the treatment will be. But KPS dysfunctions are possible that persist for a long time, are difficult to correct, and in which the pains are protracted, causing further asthenization of patients. To understand this problem in more detail, it is necessary to take into account some anatomical features of these structures.

Of primary importance to ensure the normal functioning of the pelvis are the sacroiliac joints (KPS). The question of mobility in these joints remains controversial, according to various sources, it ranges from 2 to 4 degrees, providing an elastic buffer function of the pelvis. KPS, despite its originality, is a true synovial joint with a powerful ligamentous apparatus that strengthens the joint bag and greatly reduces its mobility. In this case, there are no muscles that could initiate motor mobility in this joint. The most significant movement in the sacroiliac joint is rotation relative to the frontal plane in the form of a nodding movement called nutation (ventral nutation or just nutation and dorsal nutation or counternutation). Nutation can precede the movement of the spine up and down while walking, and it can

also be one-sided, when on the side of the supporting leg the sacrum bends under the load of the spine to the fixed ilium in the forward and downward directions, and the pelvic bone moves backward. Such a mechanism can be the cause of the sacroiliac displacement both when walking and when running [2], which is what we observe in long-distance runners. Especially in the presence of weakness of the gluteal muscles. But the most common causes of acute mobility impairment in this joint are twisting movements of the body or high-amplitude pitch, including when climbing stairs. This is important to consider when selecting exercises during physical therapy, excluding provocative movements for independent performance.

One of the most common functional disorders in the pelvic area is dysfunction/blockage of the KPS, ileo-sacral displacement, or a twisted pelvis. A visual examination reveals a mismatch between the posterior and anterior awns and iliac crests, asymmetry of the gluteal folds, external rotation of the legs on the affected side is possible, as well as the identification of the difference in leg length. During the tilt of the body forward by palpation for the first 20 seconds after straightening the spine, the advancing phenomenon is determined (the back spine moves cranially during extension) or, as it is also called, the flexion test. A “spine symptom” can reveal an impaired mobility of the sacroiliac joint when the leg is bent in the knee and hip joints in a standing position [3]. An analogue of Laseg’s symptom (Laseg’s pseudo-symptom according to K. Levit), Patrick’s phenomenon and Mennel’s symptom can also confirm KPS [2,3] dysfunction. Tests with pressure on the iliac spine both in the supine position and pressure on one spine in the side position are also used.



**Figure 1:** A symptom of advancing (before correction).



*Figure 2: Spine symptom (before correction).*



*Figure 3: (PNF correction).*



*Figure 4: Symptom of advancing after PNF correction.*



*Figure 5: Spine symptom after PNF correction.*

### **Management tactics for identifying sacroiliac joint dysfunction**

There are standard methods for mobilizing KPS: modification of Kubis (1968) in the patient's position on the side, when KPS is located below, and the doctor puts pressure on the sacral end of the joint, mobilization in the patient's position on the stomach according to Stoddart (1964), etc [3]. Often these manipulations are completely restore normal function and lead to a complete regression of pain, but this only happens when there is an acute displacement on the background of an awkward movement when twisting the body or a sharp step load. There are often situations when the pain does not completely go away, there is a violation of mobility in these joints and you have to resort to additional manual techniques. One of the most effective methods is used in PNF therapy (proprioceptive neuromuscular facilitation). When due to the posterior lowering of the pelvis we can restore the functional mobility of the specified joint. When performing motor patterns of the pelvis, with adequate resistance by the doctor's hands, it is possible to gently restore the mobility of the KPS, which is important in the presence of degenerative changes in the sacroiliac joint or in osteoporosis. And also, when working in this system with the inclusion of short leverage, we stabilize the pelvis by activating diagonal muscle tapes.

In difficult cases, we get an insufficient or short-term effect from the correction. One of the reasons is the dysfunction of the surrounding muscles, and more often - a spasm of the square muscle of the lower back. In this case, the most effective PNF correction aimed at relieving spasm of the square muscle of the lower back during simultaneous work with the scapula and pelvis on the affected side and activating the transverse, internal and external oblique muscles of the abdomen on the opposite side, which are in a hypotonic state with the syndrome of square muscle of the lower back contralateral side. The effect of such therapy occurs after 1 - 3 manipulations in standard situations. If it is impossible to achieve a stable positive result and after a short period of time, KPS dysfunction and pain resume, then it is necessary to more carefully analyze the features of the postural and motor patterns of this patient. To conduct a reliable assessment of the characteristics of movement and identify key problems, it is necessary to consider circumstances that can provoke recurrent dysfunction.

Given the data on the absence of muscles that directly cause this joint to move, the gluteal muscles stabilizing the pelvis can play a special role, without the proper functioning of which the correct functioning of the KPS is impossible. Maximum attention should be paid to the large and medium gluteus maximus muscles. If these muscles are not included in the motor act, then with functional muscle testing we will reveal their weakness even in the absence of organic pathology.

In this case, carrying out manipulations aimed at mobilizing the KPS will not provide a significant clinical effect, if other rehabilitation methods do not contribute to the inclusion of weakened pelvic stabilizer muscles.

Techniques that activate these muscles can be both the above-mentioned PNF technique and techniques based on work with suspension systems. The advantage of the latter is the inclusion of deep muscles, which can be carried out with significant support of the lower limbs and pelvis, significantly reducing the load and making it possible to work without pain and applying the principle of the "progression ladder", when starting from the most easily performed movements, you can gradually increase in a painless mode the complexity of the exercises, achieving complete stability of the pelvis with significant motor load.

It is important to consider the reasons for the occurrence of KPS mobility disorders, which are not often discussed in the literature: whether the KPS hypermobility itself is the main problem on the one hand, or is it secondary and occurs against the background of block or low mobility of the contralateral joint. In this regard, we often observe patients who regularly experience pain in the lumbosacral spine. They turn to neurologists, chiropractors or kinesiotherapists. They undergo mobilization, perform blockades from the side of dysfunction, without including the hypokinetic zone in the motor work. The effectiveness of such therapy is insufficient, due to the short-term effect achieved.

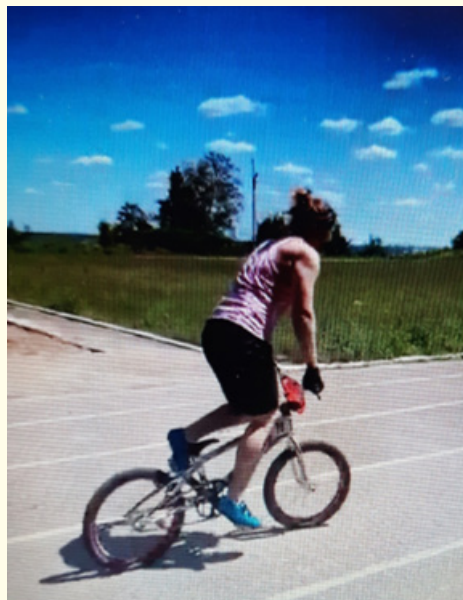
### **Clinical Case**

We analyzed the clinical case of a patient T., aged 20, professionally involved in BMX (cycling motocross), who, as a master of sports, began to note the occurrence of episodic pain in the lumbar and gluteal regions with right-sided lateralization during the last 3 - 4



months, arising from motor effort and also there was a feeling of some weakness in the legs, significantly reducing her athletic activity and adversely affecting her performances. The indicated patient experienced the greatest difficulties at the start, when maximum mobilization and leg strength were needed. The patient denied significant injuries, while there were repeated episodes of falling, without any traumatic damage to the pelvic ring.

During examination, a pronounced weakness in the iliac-lumbar, large and middle gluteal muscles on the right was revealed, which clearly did not correspond to muscle hypertrophy of the gluteal region and hips, and a positive right-sided symptom of advancing and spine symptom confirming KPS dysfunction were also revealed. At the same time, hypokinesia of the left KPS was noted. The neurological status was without features: symmetrical, moderate reflexes, sensitivity was not changed. Initially, assuming that pelvic ring instability is possible, a correction was performed with a pelvic fixation belt, as a result of which muscle strength was restored and the patient had a subjective feeling of confidence and support during movement. Later, a PNF correction was carried out, including the rear lowering pattern [4] on the right with positive effects in the form of the restoration of the functioning of the right KPS. A more difficult task was the development of a motor rehabilitation program aimed at obtaining a long-term result with the exception of the occurrence of KPS instability during a sharp motor load in a patient who is professionally involved in sports, implying active mobility of the pelvic joints and requiring maximum power inclusion of the lower extremities. For several months, PNF therapy was carried out, including the study of the patterns of the pelvis, kinesiotherapeutic treatment, including work on an unstable support, aimed at turning on the muscles that stabilize the pelvis [5]. Against the background of the treatment, a significant improvement was noted, muscle weakness in the proximal hips and gluteus muscles regressed, the patient was able to continue sports activities.



**Figure 6**

This example demonstrates the importance of accurately diagnosing the involvement of interested muscle groups using detailed manual and muscle testing.

Thus, the treatment of pain in the lumbosacral spine, in the presence of sacroiliac joint dysfunction, requires a thorough assessment of the condition of the stabilizing muscles, followed by correction of their functional state using PNF methods and other necessary methods and means that are adequate for the tasks.

## **Discussion and Conclusion**

When examining patients with chronic back pain against a background of neuroorthopedic pathology, methods of testing the sacroiliac joint are used. At the same time, some patients may experience pain not only from the sacroiliac joint, where a block with a positive advancing symptom and Spine symptom was detected, but also from the opposite side, where a hypokinesia zone or complete lack of movement in the contralateral sacroiliac joint is detected. This significantly changes the tactics of treatment: it is necessary not only to restore the correct stereotype of movement from the identified pathology, namely the joint block, but also gently include in the movement of the sacroiliac joint, adequate in amplitude and strength, on the opposite side.

It is necessary to conduct not only neuroorthopedic testing of the joint itself, but also the mandatory assessment of the strength of the surrounding muscles that have a stabilizing function. Without their adequate functioning and harmonious interaction, manual mobilization will not lead to a long-term positive result and in the near future, with minimal static and/or dynamic load, pain relapse may occur.

As a rehabilitation treatment, the most effective methods are those that include diagonal muscle ribbons in the movement, involving not only the muscles of the gluteal region, but also the trunk, including the latissimus dorsi. The effectiveness of motor therapy with the use of suspension systems giving unstable support significantly increases due to the maximum connection of deep muscle stabilizers.

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