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**PHYSIOTHERAPY OPTIONS FOR LOW BACK PAIN**

Ovidiu Chiriac (a), Mariana Cordun (b), Carmen Liliana Gherghel (c)\*

\*Corresponding author

(a) National University of Physical Education and Sports, 140 Constantin Noica St., Bucharest, Romania  
(b) National University of Physical Education and Sports, 140 Constantin Noica St., Bucharest, Romania  
(c) National University of Physical Education and Sports, 140 Constantin Noica St., Bucharest, Romania

*Abstract*

Lumbar pain ranks second among the causes of chronic illness, is the fifth cause of hospitalisation and the third most common reason for surgery, its socio-economic impact being quite major. Lower back pain is a complex symptom, involving muscular, articular, vertebral and/or spinal structure and peripheral nerves. Despite the minimal number of studies aiming to prove the change in radiculopathy evolution, we believe that physiotherapy holds a major part. Some authors reported notable results from aggressive conservative (non-surgical) treatments (a strict exercise program associated with epidural steroid injections) applied to lumbar disc herniation with radiculopathy. The protocol of these studies is the foundation of many exercise programs currently used in treating lumbar disc herniation with radiculopathy. Regarding the efficiency of surgical treatment compared to conservative treatment, studies show that improvements have consistently been in favour of surgical interventions, but have been statistically insignificant. Due to the large number of patients combining the two treatments, the conclusions regarding the superiority or equivalence of the treatments are not justified on the basis of the analysis between the two treatments. The aim of this paper is to perform a study of specific literature and to present a series of physiotherapeutic elements with beneficial effects on the treatment of lumbar pain.

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**Keywords:** Low back pain, physiotherapy, active mobilisation.



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## **1. Introduction**

Lumbar pain (LP), the classic clinical manifestation of lumbar discogenic radiculopathy, is the most costly benign condition in developed countries. Experts have assessed that 80% of US population has or will suffer from spinal pathology caused by LP at one point in their life. The annual prevalence of lumbar pain is 15-45%. About 33.2% of patients with lower back pain show symptoms for less than a month, 33% report pain for 1-5 months, and 32.7% patients – more than 6 months. Chronic symptomatology is observed in about 2-7% of patients.

The lumbar spine has dichotomous roles and functions, namely its strength is coupled with flexibility. The spine holds is vital in supporting and protecting the contents of the spinal canal, at the same time offering flexibility for the movement needed in day-to-day activities.

The strength of the spine is a result of the size and position of bones, as well as of the arrangement of ligaments and muscles. Flexibility results from the large number of joints placed in series, close to one another. Each vertebral segment acts as a complex of three joints – an intervertebral disc with two vertebral terminals and two facet joints. These are coupled with the lobular appearance typical of the lumbar spine, offering flexibility and increasing the power to absorb mechanical shocks. (Braddom, 2015) In time, the spine undergoes changes impacting its function and gives way to common issues, such as the alteration of the intervertebral disc by protrusion/prolapse.

## **2. Problem Statement**

Although we have not identified studies proving a change in the evolution of acute radiculopathy, we believe that physiotherapy has a firm role in this theory. Some studies put forward very good results from an aggressive conservative (non-surgical) treatment of the lower back pain (a strict exercise program associated with epidural steroid injections) applied to lumbar disc herniation with radiculopathy. The protocol of these studies is the foundation of many exercise programs currently used in treating lumbar disc herniation with radiculopathy. Lumbar epidural steroid injections are now a frequent aid in treating lumbosacral radiculopathy. These injections aid in active therapies reducing pain and inflammation and are best used when combined with an active rehabilitation program. Physiotherapists are well educated and trained to administer interventions through the qualified use of physiotherapy techniques and methods in order to make changes according to the diagnosis, prognosis and set goals.

## **3. Research Questions**

Numerous research papers on the efficiency of various treatment options for lumbosacral pain showed limited improvement, especially in terms of acute lumbosacral pain.

The most commonly used therapies in large-scale clinical studies, such as medicine and physiotherapy, showed only a 10- or 20-point improvement out of the 100 points of the Visual Analogue Scale for Pain (Braddom, 2015).

Considering the above, we believe that therapeutic solutions are welcome in the complex treatment of lumbar pain, associating several therapeutic means for the set goals and pain relief.

#### **4. Purpose of the Study**

Several authors offer the most accepted theory on the spinal degenerative cascade process, describing the sum of stages in the degenerative lumbar spine pathology, ultimately leading to spondylosis, herniated disc and vertebral canal stenosis. From a biomechanical point of view, many aspects have been observed that may lead to the appearance of various lumbar problems. In general, flexion exerts pressure on the anterior portion of the disc, pushing the nucleus to migrate backwards. When the forces are strong enough, the nucleus can get herniated between the fibres of the fibrous ring. Since lateral longitudinal ligament fibres are the thinnest, they make posterolateral disc extrusions the most frequent type of herniation.

The posterolateral portion of the disc is at the highest risk when spine flexion is associated with spine rotation. Interphasic joints cannot resist rotation when the column is flexed, thus increasing lumbar torsion and shear forces, making the flexion-rotation movements likely to be the most risky for intervertebral discs (Braddom, 2015). Lumbar muscle activity correlates well with intradiscal pressure (when the back muscles contract, it is associated with an increase in intradiscal pressure). These pressures change according to the posture of the spine and the undertaken activities. The vertical orthostatic posture is considered to be 100%, while other postures and activities are calculated relative to it. Combining rotation with a posture in flexion substantially increases pressure on the disc. To reduce the forces acting on the lumbar spine, the load should be raised as close as possible to the body, because the farther away from the body, the higher the pressure on the lumbar spine.

Knowing these mechanisms, the physiotherapist can select the appropriate means and methods for the medical recovery protocol. The program will also be designed based on the patient's general condition and current symptoms. A program that is not adapted to the patient's problems might worsen the symptoms.

#### **5. Research Methods**

Physical therapy can be used in all stages of lumbar disc sciatica, but should be individualised according to its clinical form. A classification allowing the synthesis of the means of treatment is useful to guide the therapist. Clinical examination will specify the current stage of the patient: acute, subacute, chronic, or remission (Kiss, 2007).

Several methods can generally be included in the complex treatment of lumbar radiculopathy.

*Active physical exercises*, in the form of free active mobilisations (Cordun, 1999), aim to achieve pain relief and restoration of joint mobility: whole spine and segments, lower limb joints (coxofemoral, knee) and upper limb joints.

Extension exercises are still commonly used by therapists for the treatment of lumbosacralgia, especially pain accompanied by lower-limb root pain. Extension-based exercises are often performed using the McKenzie principles of physical therapy. This therapeutic approach divides the diagnosis of lumbar pain into three categories: disorder, dysfunction and postural syndrome. Although initial studies were promising, subsequent studies have shown that this type of exercise is useful, but not more effective than other types of exercise (Braddom, 2015).

Flexion exercises, the Williams three-phase program, were very popular in treating acute lumbar pain, but the use of a series of flexion exercises has not been proven to be more useful in acute lumbar pain

compared to other interventions, such as spine manipulations. We have not found any research to highlight the effectiveness of flexion exercises in chronic lower back pain. Since lumbar radiculopathy may be caused by lumbar canal stenosis, flexion exercises are usually recommended to increase the size of the canal and reduce nerve irritation.

*Active resistance exercises* comprise exercises that have the general objective of ensuring lumbar stability by increasing strength and motor control of the muscles supporting the spine. Research shows that deep stabilising muscles, such as multifidus and transversus abdominis, are deficient in patients with lower back pain, therefore certain programs work by training these muscles. Such programs work progressively, including more and more complex tasks, both dynamic and functional ones – motor control exercises.

*Passive physical exercises* in the form of self-passive mobilisations. We included in this category static stretching exercises. A contracted muscle or retracted soft structures may lead to symptoms of lumbar and sciatic radiculopathy. The relaxation and flexibility of soft structures through stretching can reduce pressure on the nerves. Increasing flexibility of the paravertebral muscles, calves and buttocks can reduce pressure on the joints and the compressed nerve root, thus alleviating any associated symptoms.

*Manual mobilisations or handling.* There are several theories on how manual therapy works. One of these states that it restores normal movement to restricted segments. Another theory suggests that it causes neurological changes using reflex mechanisms, mainly the interaction between the autonomic nervous system and the spine (Braddom, 2015). Numerous controlled and random clinical studies were conducted in order to establish the efficiency of manual therapy. A series of countries have developed national handbooks for lumbar pain treatment, in which vertebral handling is recommended for acute lower back pain. Recommendations for chronic lumbar pain are much more varied. The specialists' conclusion is that vertebral handling in patients with lumbar pain is more effective than placebo and is one of the many modestly effective options.

*Neuromuscular rehabilitation techniques.* Activation of the trunk muscles can be approached through facilitation schemes, starting with the upper and lower limbs. Thus, the upper body schemas are based on combinations of head, neck and trunk movements using the asymmetric Kabat models for the upper limbs (Sbenghe, 1987). The lower body schemas are executed with the lower limbs respecting the upper-limb movement pattern. Facilitation techniques using the lower- or upper-body movement are aimed at achieving various goals: increasing muscle strength by mobilising the upper and lower limbs against resistance, fostering limited pain mobility, fostering restoration of muscle balance (Sbenghe, 1987).

*Massage.* This is one of the most used forms of therapy in treating lumbar pain. It is believed that its mechanism includes both muscle and mind relaxation, the therapeutic benefit of touching having a positive effect on the structure and function of tissues. Research on massage is usually split in two categories, one measuring the effect, and the other establishing the effectiveness of other therapies and using massage as a means of control due to its practical effects. In studies where massage is used as a means of control, its therapeutic superiority has not been demonstrated. In studies where massage is one of the main interventions, it has been observed that it is effective in relieving pain and restoring functionality. Ergotherapy through re-training activities, namely the use of lumbar support, is considered as a re-adaptation of the lumbar spine. It is used for both the prevention and treatment of lumbar pain. There are no accepted studies to compare the effectiveness of different types of lumbar support.

*Electrotherapy* is used for its analgic and relaxing effects. It generally uses different forms of currents. Galvanic current, in the form of galvanisation, Novocain ionisation, calcium chloride etc., has an analgic effect, decreasing the excitability of nerve structures.

Diadynamic currents – rectified and modulated currents deriving from the main one (a sinusoidal alternating current with a frequency of 50 Hz) show analgesic, hyperaemic and dynamic effects.

Trabert currents – rectangular currents, with a visible analgesic and hyperaemic effect, are indicated in painful spondylosis. Transcutaneous electrical nervous stimulation (TENS) is a non-traumatic method of fighting acute and chronic pain.

TENS – the Gate theory of Melzack and Wall underlies the development of TENS. Average frequency currents are sinusoidal alternating currents with a frequency between 3 and 10 KHz.

Interference currents – obtained by the interference of two medium frequency currents. High frequency currents – the types of high frequency therapy used in the treatment of spondylosis are: short waves; high-frequency pulse therapy (Diapulse). The caloric effect is the main effect of this therapy. Electromagnetic currents and magnetodiaflux are two forms of applying magnetic field therapy. The continuous form of application is used for its sedative effect. Low-frequency magnetotherapy can also be applied and interrupted – rhythmically or at no rhythm, resulting in a general stimulation effect.

Ultrasound – this therapeutic method is used in degenerative rheumatic conditions, with important therapeutic success.

*Hydrotherapy or exercising in water* has more benefits. Floating and reduction of gravitational forces are important benefits of this therapy. The lower the body sinks, the stronger the effect. Numerous studies have shown the beneficial effect of water exercise on patients with lumbar pain (Braddom, 2015).

## **6. Findings**

Studies on the effectiveness of various treatments for lumbosacralgia, especially in its chronic period, have shown limited efficacy. The most commonly prescribed treatments, such as drugs, physiotherapy (kinetotherapy, electrotherapy, manual therapy), achieved, during major clinical trials, only 10 or 20 points out of the 100 points in the Visual Analogue Scale for Pain (Braddom, 2015).

Considering the above, we believe that therapeutic solutions are welcome to address the complex issues of lumbar radiculopathy.

Physiotherapists are professionals educated and trained to administer interventions through the qualified use of kinetotherapy methods and techniques according to the diagnosis, prognosis and set goals.

## **7. Conclusion**

Studies targeting the effectiveness of various treatments for lumbosacralgia, particularly in its chronic period, have shown limited efficacy. The most commonly prescribed treatments are drugs and physiotherapy (electrotherapy, kinesiotherapy, manual therapy), which showed improvement in patients during clinical trials. We believe that therapeutic solutions are welcome to address the complex issues of lumbar radiculopathy.

Many opinions argue that the evolution of acute radiculopathy has not been shown to change with physiotherapy; recent studies have found that physiotherapy has a role in this regard; they have reported

very good results using an aggressive non-surgical treatment (an active kinetotherapy program associated with epidural steroid injections) in the treatment of lumbar disc herniation, combined with radiculopathy. The established protocol is the basis of many current exercise programs used to treat lumbar disc herniation associated with radiculopathy.

Cognitive-behavioural therapies, kinetotherapy, spinal handling and interdisciplinary rehabilitation have moderate effectiveness in chronic or subacute pain. For acute low back pain, the only therapy with evidence of efficacy consists in applying superficial heat. (Chou & Huffman, 2007)

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