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Physiotherapeutic and Pharmacological Approaches to Conservative Treatment of Lumbar Intervertebral Disc Herniation: A Narrative Review

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Abstract

Low back pain (LBP) is one of the most common musculoskeletal disorders, with symptomatic lumbar disc herniation (LDH) accounting for approximately 1–3% of cases. LDH frequently presents with sciatica that stems from lumbar radiculopathy. Both mechanical compression of neural structures by displaced nucleus pulposus fragments and accompanying inflammatory responses are central to LDH pathophysiology, leading to its characteristic symptoms.

The primary aim of this study is to present current non-surgical treatment options for lumbar nucleus pulposus herniation and to evaluate the effectiveness of each approach. A literature review reveals that pharmacotherapy for LDH management is primarily symptomatic. Nonsteroidal anti-inflammatory drugs, muscle relaxants, and antidepressants may modestly reduce pain for some individuals, though the supporting evidence is limited. Systemic glucocorticosteroids might offer slight functional gains, and epidural steroid injections are mainly beneficial for achieving short-term radicular pain relief.

Furthermore, available data highlight the important role of physiotherapy in the conservative management of the condition. Biomechanical interventions may reduce pain, enhance patient function, and, in some cases, induce favorable structural changes in the intervertebral disc.

Keywords used in the search:

lumbar disc herniation, herniated disc, sciatica, lumbar radiculopathy, conservative treatment, physiotherapy, epidural steroid injection, NSAIDs, glucocorticosteroids.

1. Introduction

Low back pain (LBP) is one of the most common musculoskeletal disorders. Nearly two-thirds of adults experience it at least once during their lifetime [1]. One potential cause of LBP is symptomatic lumbar disc herniation (LDH), which affects approximately 1–3% of the general population [2,3]. A frequent clinical manifestation of LDH is sciatica resulting from lumbar radiculopathy, representing a symptomatic pain syndrome of the lower spine [4,5]. The highest incidence of LDH is observed in individuals aged 30–50 years, with a clear male predominance at a ratio of approximately 2:1 [6].

When discussing therapeutic strategies for this condition, it is important to first present the structure of the intervertebral disc and the fundamental pathophysiological mechanisms associated with disc herniation, as these factors determine subsequent treatment approaches.

The intervertebral disc (IVD) is a complex anatomical structure composed of the centrally located nucleus pulposus (NP), the surrounding annulus fibrosus (AF), and cartilaginous endplates that anchor the disc to the adjacent vertebral bodies [6]. The nucleus pulposus contains collagen and numerous proteoglycans (PGs), which, due to their ability to bind water, enable the maintenance of a high degree of hydration within this structure. Under physiological conditions, the NP is composed primarily of type II collagen, which constitutes approximately 20% of its dry mass. This distinguishes it from the annulus fibrosus, in which concentrically arranged type I collagen fibers predominate, accounting for approximately 70% of the dry mass of the AF [7]. The presence of proteoglycans enables the generation of hydrostatic pressure within the nucleus pulposus, allowing the intervertebral disc to resist axial compression of the spine and to participate in the proper transmission of mechanical loads [6,7].

Intervertebral disc herniation occurs when the continuity of the annulus fibrosus is disrupted, allowing the hydrated nucleus pulposus to migrate beyond its physiological boundaries. When the displaced fragment remains connected to the intervertebral disc space, the condition is referred to as extrusion. Another form is protrusion, an intermediate stage in which the nucleus pulposus material bulges through a weakened but intact annulus fibrosus. The most

advanced form is sequestration, in which the displaced fragment of the nucleus pulposus loses continuity with the parent disc and migrates into the spinal canal [7].

Such fragments may compress neural structures, particularly the spinal nerve roots and the dural sac. They may also initiate a local inflammatory response due to immunological stimulation by the nucleus pulposus outside its physiological environment. This process leads to characteristic clinical manifestations, including pain, muscle weakness, paresthesia, and sensory disturbances in the distribution of the affected nerve root [6,7]. When the involved structures include the roots of the sciatic nerve, the resulting clinical presentation is referred to as sciatica [4]. This represents one of the most common manifestations of intervertebral disc herniation resulting from radiculopathy in this region [3,5]. Although LDH is the most common cause of sciatica, it may also be associated with other pathologies, such as spinal canal stenosis, spondylolisthesis, tumors, or cysts [8].

It is important to note that this condition is multifactorial and rarely results from a single causative factor. Genetic predisposition plays a significant role, particularly in factors affecting the structural integrity of the intervertebral disc. Examples include polymorphisms in genes encoding collagen IX, aggrecan, the vitamin D receptor, and matrix metalloproteinases [9]. At the same time, mechanical factors are also important, especially axial overload of the spine, as well as progressive degenerative changes involving loss of hydration of the nucleus pulposus, degradation of the extracellular matrix, and the development of an acidic microenvironment associated with impaired metabolite exchange [7].

Having outlined the structure and pathophysiology of intervertebral disc herniation, we can now consider the available therapeutic strategies for its treatment. When the disease becomes symptomatic, conservative management is usually the first-line approach. However, if such treatment fails to provide sufficient clinical improvement, surgical intervention is often recommended. Although surgery may lead to relatively rapid clinical improvement, its long-term outcomes remain a subject of ongoing debate. Moreover, surgical procedures carry a risk of intraoperative complications involving spinal nerve roots, which may subsequently lead to numbness and persistent pain [6]. It should also be emphasized that surgical treatment is indicated in no more than approximately 10% of patients with LDH [10].

In light of ongoing advances in conservative treatment, this publication aims to present current non-surgical options for nucleus pulposus herniation and to evaluate their effectiveness.

2. Methods

This study is a narrative literature review concerning non-surgical treatment methods for lumbar disc herniation (LDH). The analysis was based on publications available in the PubMed, Cochrane Library, ScienceDirect, and Google Scholar databases. Publications from 2010 to 2025 were included, comprising systematic reviews, meta-analyses, randomized controlled trials, and selected review articles addressing the epidemiology, pathophysiology, and treatment of LDH.

Studies on sciatica were also included, as it represents the most common clinical manifestation of symptomatic LDH. The analysed publications covered pharmacotherapy, epidural steroid injections, and physiotherapeutic interventions.

Use of Artificial Intelligence (AI): In this study, AI tools were used to analyze clinical reasoning narratives in order to identify linguistic patterns associated with specific logical fallacies. They also supported the linguistic refinement of the manuscript by improving clarity, consistency, and adherence to academic English standards.

AI tools were used strictly as assistive instruments under the authors' supervision. The final interpretation of results, classification of errors, and conclusions were determined by experts in clinical medicine and formal logic.

3. Non-surgical treatment methods

3.1 Systemic pharmacotherapy

3.1.1 NSAIDs

One mechanism contributing to symptomatic lumbar disc herniation is the development of inflammation within the compressed neural structures. In addition to the mechanical component, an inflammatory response within the affected nerve root and surrounding periradicular tissues plays an important role in exacerbating pain symptoms [7]. In this context, it is appropriate to consider studies evaluating the effectiveness of nonsteroidal anti-inflammatory drugs (NSAIDs), whose mechanism of action involves inhibiting cyclooxygenase enzymes (COX-1 and COX-2), which are key mediators in the synthesis of inflammatory factors [11]. It is also worth noting that medications from this group are commonly used in the management of discogenic pain.

In a systematic review by Penchev et al. (2024), which included studies published between

2019 and 2024, NSAIDs were identified as a fundamental component of conservative management for lumbar disc herniation in patients without neurological deficits or cauda equina syndrome [12]. In line with current recommendations from the World Federation of Neurosurgical Societies (WFNS), the authors emphasize that NSAIDs reduce acute low back pain and radiating leg pain associated with LDH [10,12]. However, the review did not provide a separate quantitative analysis of NSAID effectiveness or direct comparisons with placebo, instead presenting pharmacotherapy as part of a broader conservative treatment strategy that also includes activity modification and physiotherapy. Consequently, NSAIDs remain a first-line treatment option for symptomatic LDH, although their effectiveness should be interpreted in the context of limited evidence strength reported in other systematic reviews.

Considering the inflammatory component of LDH pathophysiology and the fact that sciatica frequently represents its clinical manifestation, it is also justified to consider evidence on the pharmacological treatment of sciatica. For this reason, this paper includes a Cochrane systematic review evaluating the effectiveness of NSAIDs in the treatment of sciatica, which is considered a relevant source of information for the symptomatic management of LDH. In the updated systematic review, including 10 clinical trials, the effectiveness of NSAIDs in patients with sciatica was assessed. The authors did not demonstrate a statistically significant superiority of NSAIDs over placebo in terms of pain reduction. Although a slight advantage of NSAIDs was observed in overall clinical improvement, the quality of evidence was rated as low or very low according to the GRADE classification, which substantially limits the reliability of these findings. It should be noted that most of the studies included in the review evaluated short-term NSAID use (<3 weeks). The authors also emphasized that the pathophysiology of sciatica is complex and involves not only inflammatory processes but also mechanical compression of neural structures, which may explain the limited effectiveness of drugs acting primarily through anti-inflammatory mechanisms. In the absence of clear evidence of effectiveness and given the increased risk of adverse effects, even with short-term use, the decision to initiate NSAID therapy should be based on an individual assessment of the risk–benefit ratio [8].

Guidelines developed by the Brazilian Association of Physical Medicine and Rehabilitation (2013) also did not demonstrate a significant advantage of NSAIDs over placebo in the short-term treatment of pain associated with lumbar disc herniation. The analysis included meloxicam, diclofenac, piroxicam, and lornoxicam and showed no statistically significant effect on either overall pain or leg pain during a treatment period of up to 2 weeks. Comparisons between individual NSAIDs also failed to demonstrate clear clinical superiority,

with the exception of a higher dose of meloxicam (15 mg), which showed a slight advantage over diclofenac. The authors emphasized that the isolated use of NSAIDs, as well as their combination with other analgesic medications, does not demonstrate a clear clinically significant advantage over placebo in the treatment of radicular pain associated with LDH.
These findings are consistent with the results of systematic reviews, including Cochrane analyses, which indicate limited effectiveness of NSAIDs in the treatment of acute sciatica and a lack of clear superiority over placebo in short-term pain reduction [13].

3.1.2 Systemic glucocorticosteroids

Glucocorticosteroids (GCS) penetrate the cell membrane and primarily bind to cytoplasmic glucocorticoid receptors. The resulting complex translocates to the nucleus, where it interacts with transcription factors such as NF-κB, AP-1, and STAT1, thereby modulating gene expression. This leads to inhibition of the transcription of proinflammatory genes (including cytokines, chemokines, and adhesion molecules), suppression of MAPK signalling pathways, and induction of anti-inflammatory proteins, ultimately resulting in attenuation of the inflammatory response [14].
Lumbar disc herniation, which involves both inflammatory and mechanical components, is one of the most common causes of lumbar radiculopathy. Given the anti-inflammatory effects of glucocorticosteroids, studies have evaluated the therapeutic potential of this class of drugs when administered systemically.
A 2022 Cochrane systematic review included 13 randomized controlled trials, nine of which involved patients with lumbar radiculopathy. In this group, systemic corticosteroids were found to probably provide a slight reduction in pain intensity in short-term follow-up and to increase the likelihood of functional improvement. However, no reduction in the rate of surgical intervention was observed. Available data suggest that short-term use of systemic corticosteroids is not associated with an increased risk of serious adverse events or hyperglycaemia; however, the quality of safety data was limited [15].
One of the studies included in the Cochrane review demonstrated modest functional benefits already in the early phase of treatment. In a randomized clinical trial by Goldberg et al., the effectiveness of a 15-day course of oral prednisone was evaluated in patients with acute lumbar radiculopathy due to MRI-confirmed lumbar disc herniation. Treatment with prednisone was associated with a small but statistically significant improvement in function, as assessed by the Oswestry Disability Index (ODI), both at 3 weeks and 1 year of follow-up. However, no significant difference was observed between the prednisone and placebo groups in pain reduction as measured by the Numeric Rating Scale (NRS). Moreover, no reduction in

the frequency of surgical treatment was observed during the one-year follow-up period. During the first three weeks, adverse events were reported more frequently in the steroid group, although they were generally mild and transient. At the one-year follow-up, no significant differences in adverse event rates were observed between the groups [16].

These findings suggest that systemic glucocorticosteroids may provide modest functional improvement in patients with radiculopathy associated with lumbar disc herniation, although they do not appear to significantly reduce pain intensity. The clinical relevance of the observed functional improvement remains a matter of debate.

3.1.3 Opioid medications

The mechanism of action of opioid medications in lumbar disc herniation is limited exclusively to analgesic effects resulting from activation of opioid receptors and modulation of nociceptive signal transmission within the central nervous system. These agents do not affect the inflammatory process, nerve root oedema, or the mechanical component of neural compression, which represent key elements of the pathophysiology of LDH [17].

According to the review by Tong et al., opioids may be considered only in cases of acute, severe pain that cannot be adequately controlled with nonsteroidal anti-inflammatory drugs or medications targeting the neuropathic component of pain. Their use should be short-term and closely monitored due to the well-documented risk of adverse effects, including sedation, constipation, respiratory depression, and the development of tolerance and dependence. The authors emphasize that opioids do not provide causal treatment for LDH, and current clinical guidelines do not recommend their routine use. Additionally, epidemiological data cited in the review indicate that patients treated exclusively with conservative therapy may exhibit a greater long-term opioid burden, which may result from prolonged symptomatic treatment without addressing the underlying structural pathology [18].

Therefore, in the management of LDH, opioid medications should be considered only as short-term rescue therapy for severe pain rather than as a component of standard therapeutic management.

3.1.4 Muscle relaxants

In a review article by Magdalena Kocot-Kępska et al., the current state of knowledge regarding centrally acting skeletal muscle relaxants used to treat musculoskeletal pain was presented. The authors emphasize that this is a heterogeneous group of drugs that differ in their mechanisms of action and pharmacological profiles but produce a similar clinical effect – reduced muscle tension. In the treatment of musculoskeletal pain, their effect primarily

results from their action on structures of the central nervous system, leading to inhibition of reflex activity of spinal motor neurons and a reduction in increased skeletal muscle tone. Clinically, this results in decreased pain intensity and improved patient functioning in the short term [19].

For this reason, it is relevant to refer to studies addressing pain management in lumbar radiculopathy, for which lumbar disc herniation is one of the most common causes.

Muscle relaxants may be used as part of symptomatic pain management in lumbar radiculopathy. However, available clinical data indicate low-quality evidence supporting their effectiveness. In a systematic review by Pinto et al., no clear superiority of muscle relaxants over placebo was demonstrated for pain reduction or functional improvement in patients with sciatica, while the incidence of adverse events was higher in the active treatment groups [20]. Similarly, in the WFNS recommendations on conservative management of LDH, muscle relaxants are mentioned only as a pharmacological option for low back pain, without evidence of an effect on the natural course or pathophysiology of lumbar disc herniation [10]. At the same time, the use of muscle relaxants is associated with an increased risk of adverse effects, particularly those involving the central nervous system. For this reason, they are not recommended as first-line therapy but rather as an adjunctive treatment, used for a short period and only after an individual assessment of the potential benefits and risks [19].

3.1.5 Antidepressants

Although antidepressants are not classical analgesics, they exhibit neuromodulatory effects by increasing noradrenergic and serotonergic transmission within descending inhibitory pain pathways and by modulating neuroinflammatory processes. For this reason, they have been investigated in the context of neuropathic pain management [21].

Vanelderen et al. conducted a randomized, double-blind clinical trial evaluating the effect of amitriptyline (25 mg/day for 14 days) on pain intensity in patients with subacute lumbar radicular pain of neuropathic origin. The study included patients with pain radiating below the knee, in whom the level of pathology, confirmed by CT or MRI, corresponded with the dermatome distribution of symptoms. In the amitriptyline-treated group, 80% of patients had lumbar disc herniation (LDH) as the underlying cause of symptoms. This justifies the inclusion of this study in the analysis of pain management in LDH, as the therapeutic effect was assessed primarily in a population with confirmed nucleus pulposus herniation.

After two weeks of treatment, amitriptyline resulted in a statistically significant reduction in pain intensity compared with placebo. However, the magnitude of the observed effect was small, and the authors considered it of limited clinical significance. No significant differences

were observed in the severity of neuropathic symptoms, as assessed using the DN4 scale, or in the use of rescue medications.

These findings suggest that amitriptyline may provide a short-term reduction in radicular pain, including in patients with confirmed nucleus pulposus herniation; however, the magnitude of the therapeutic effect remains modest and warrants cautious clinical interpretation [22].

Duloxetine, a serotonin–norepinephrine reuptake inhibitor (SNRI), exerts neuromodulatory effects by enhancing the activity of descending inhibitory pain pathways within the central nervous system, which may contribute to the reduction of neuropathic symptoms associated with radiculopathy. Preclinical studies suggest that, in addition to its central mechanism of action, duloxetine may also exert peripheral effects, including modulation of neuroinflammatory processes, which may make it potentially useful in conditions characterized by both inflammatory and neuropathic components. Despite these pathophysiological premises, there is currently a lack of high-quality and conclusive evidence supporting the effectiveness of duloxetine in the treatment of sciatica, including symptomatic lumbar disc herniation, and the available data remain of limited certainty. Nevertheless, duloxetine remains a promising therapeutic option, which provides a rationale for further well-designed clinical trials in this patient population [23].

Epidural steroid injections

Epidural steroid injections (ESIs) act primarily by inhibiting the local inflammatory response within the affected nerve root, including suppression of the expression of proinflammatory cytokines released in the course of nucleus pulposus herniation. It has also been proposed that administering medication into the epidural space may lead to partial “washout” or dilution of inflammatory mediators, as well as a reduction in nerve root edema and ectopic neural activity, thereby contributing to the alleviation of radicular pain. This mechanism mainly affects the inflammatory component and does not directly address the mechanical cause of nerve root compression [24].

In a systematic review and meta-analysis including 11 randomized controlled trials, Zhang et al. demonstrated that epidural steroid administration in patients with sciatica secondary to lumbar disc herniation results in a significant reduction in pain in the short- and medium-term follow-up periods. However, this effect did not persist over the long term, suggesting that ESIs represent symptomatic treatment rather than influencing the natural course of the disease. In terms of functional improvement, assessed using standardized disability scales, no significant differences were observed compared with control groups. The authors emphasized

that the lack of functional improvement may be explained by the fact that many patients at baseline presented primarily with pain without substantial functional impairment, which limited the potential for measurable improvement in functional scales. At the same time, a reduction in opioid consumption was observed, which strengthens the clinical relevance of ESIs as a method of short-term control of radicular pain in LDH [25].

In a prospective, randomized study, Budrovac et al. evaluated the effectiveness of transforaminal epidural steroid injection (TFESI) in patients with unilateral lumbar radiculopathy due to lumbar disc herniation. The procedure involved combination therapy consisting of 40 mg of methylprednisolone administered together with 5 ml of 0.25% levobupivacaine under fluoroscopic guidance. It should be emphasized that the observed clinical effect reflects the combined treatment; however, given that the outcomes were assessed at 1 and 3 months, the dominant therapeutic effect is attributed to the anti-inflammatory action of the corticosteroid rather than to the short-term anesthetic effect of the local anesthetic. In both analyzed groups (patients with and without contact between the herniated disc and the nerve root), a significant reduction in pain intensity, measured by the Visual Analog Scale (VAS), was observed after 1 month, and this effect persisted at 3 months of follow-up, with no significant differences between the groups. Clinically significant improvement (≥50% reduction in pain or a decrease of ≥3 points on the VAS scale) was achieved in approximately 60–70% of patients. In terms of functional outcomes assessed by the Oswestry Disability Index, improvement was more pronounced in patients without disc–nerve root contact, whereas in patients with contact, the significant reduction primarily affected pain intensity. These findings suggest that the effectiveness of TFESI in LDH does not clearly depend on mechanical contact on MRI, which indirectly supports the important role of the inflammatory component in the pathophysiology of lumbar radiculopathy [26].

3.2 Physiotherapy

Physiotherapy may influence the course of lumbar disc herniation through various biomechanical and physiological mechanisms. The use of manual techniques, traction, and other physiotherapeutic interventions may contribute to correcting intervertebral disc displacement, increasing the intervertebral space, and widening the intervertebral foramina. Additionally, decompression therapy may reduce intradiscal pressure, facilitating a reduction in herniation size and the migration of the nucleus pulposus toward the central part of the disc. These changes may decrease the load on neural structures, improve spinal mobility, and reduce pain and disability in patients. Consequently, physiotherapy may contribute to clinical

improvement in patients with LDH and, in some cases, may also lead to partial reduction of the intervertebral disc herniation [27].

In a randomized clinical trial conducted by Kilpikoski et al., the effects of physiotherapeutic management were evaluated in patients with sciatica who had lumbar disc herniation with nerve root compression confirmed by MRI. Patients were assigned to either a group treated with the McKenzie method or a group receiving education and guideline-based advice emphasizing the importance of maintaining physical activity and continuing daily activities within pain tolerance. In both groups, a clinically significant reduction in low back and leg pain, along with improvement in functional capacity, was observed. These improvements were maintained both in short-term follow-up and in long-term observation extending up to 24 months. Health-related quality of life also improved. Importantly, despite clear clinical improvement, no significant differences were observed between the therapeutic strategies, suggesting that both targeted physiotherapy and education, combined with an active conservative approach, may lead to comparable improvements in symptoms and functional outcomes in patients with MRI-confirmed lumbar disc herniation [28]. It should also be emphasized that both groups maintained some form of physical activity – targeted therapy using the McKenzie method in the first group and general physical activity according to recommendations in the second – which may indicate a positive overall trend regarding the role of movement in the treatment of lumbar disc herniation.

In a study conducted by Karimi et al., the effect of segmental lumbar traction on patients with acute lumbar disc herniation was evaluated. The study included 15 patients with LDH confirmed by magnetic resonance imaging who underwent a 3-week intervention (15 sessions) consisting of segmental lumbar traction using a decompression system, along with standard physiotherapeutic modalities such as transcutaneous electrical nerve stimulation (TENS), ultrasound therapy, and heat therapy. After completion of the intervention, significant reductions in pain intensity, improvements in lumbar flexion range of motion, and reductions in disc herniation size were observed. Importantly, the reduction in herniation size was confirmed not only clinically but also objectively by MRI, which demonstrated a statistically significant decrease in the mass of the herniated disc material [29]. These findings suggest that appropriately selected physiotherapeutic interventions may contribute not only to the reduction of pain and improvement of functional outcomes in patients with LDH but also to favorable structural changes observed on imaging studies, providing further evidence of the beneficial role of physiotherapy in the treatment of this condition.

In a study conducted by Shokri et al., the effect of spinal manipulation on pain intensity and

disability level was evaluated in patients with lumbar disc herniation confirmed by MRI and concomitant sacroiliac joint hypomobility. The study included 20 participants aged 20–50 years who underwent 5 sessions of manual therapy over 2 weeks, consisting of rotational manipulation of the lumbar spine and sacroiliac joint manipulation. Back and leg pain intensity were assessed using the Numeric Rating Scale (NRS), while functional disability was evaluated using the Oswestry Disability Index (ODI). After completion of therapy and at one-month follow-up, a statistically significant reduction in pain intensity and improvement in patient functioning were observed, along with a marked improvement in tests assessing sacroiliac joint mobility. However, the observed changes did not reach the threshold for minimal clinically important difference for the applied scales [30]. The results suggest that manipulation of the lumbar spine and sacroiliac joint may be a component of conservative management in patients with lumbar disc herniation, contributing to pain reduction and improved functional capacity.

In a study conducted by Jeong et al., the effects of lumbar stabilization exercises in patients with lumbar disc herniation were evaluated. The study included 30 patients, divided into two groups performing different forms of stabilization training: resistance-based stabilization exercises on a balance platform and three-dimensional stabilization exercises. The intervention lasted 4 weeks and was performed 3 times per week for 30 minutes each session. Treatment outcomes were assessed using magnetic resonance imaging to measure the disc herniation index, radiography to evaluate the sacral angle, and the Korean Oswestry Disability Index (KODI) to assess functional status. After completion of the exercise program, both groups demonstrated a significant reduction in the disc herniation index and improvement in functional outcomes, whereas a significant change in the sacral angle was observed only in one group [31]. These findings indicate that lumbar stabilization exercises may represent an effective physiotherapeutic intervention for patients with lumbar disc herniation.

4. Conclusion

Lumbar disc herniation is a complex condition in which both mechanical and inflammatory components contribute to the development of lumbar radiculopathy. Analysis of the available evidence indicates that pharmacotherapy used in the conservative management of LDH is primarily symptomatic and, in most cases, demonstrates limited clinical effectiveness. Nonsteroidal anti-inflammatory drugs, muscle relaxants, and antidepressants may lead to modest pain reduction in some patients; however, the quality of available evidence remains limited, and the therapeutic effects are often moderate. Systemic glucocorticosteroids may

provide slight functional improvement, whereas epidural steroid injections have demonstrated effectiveness in short-term reduction of radicular pain, although they do not appear to significantly influence the long-term course of the disease.

In this review, studies on sciatica were also partially included, as sciatica frequently represents the clinical manifestation of radiculopathy caused by lumbar disc herniation, allowing for indirect assessment of the effectiveness of therapeutic interventions used in LDH. Available data indicate that physiotherapeutic interventions – including therapeutic exercises, manual therapy techniques, and decompression therapy – may lead to significant pain reduction, improved patient functioning, and, in some cases, favorable structural changes detectable on imaging studies. These findings suggest that appropriately selected physiotherapy represents an important component of conservative management of lumbar disc herniation and may play a key role in improving patients' clinical outcomes. However, the best therapeutic outcomes appear to be achieved with multimodal treatment strategies that combine different conservative treatment approaches.

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