BALNEO RESEARCH Balneo and PRM Research Journal
English Edition
e ISSN 2734 - 8458 p ISSN 2734 - 844X ROMANIAN ASSOCIATION OF BALNEOLOGY

*Case report*

# The effectiveness of the P-DTR method used in the non-invasive treatment of L5-S1 disc herniations

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**Citation:** Iftimie G.S., Elena Costescu E.C. and Moraru C.E. - The effectiveness of the P-DTR method used in the non-invasive treatment of L5-S1 disc herniations
*Balneo and PRM Research Journal* **2025**, *16(2): 810*

Academic Editor(s):
Constantin Munteanu

Reviewer Officer:
Viorela Bembea

Production Officer:
Camil Filimon

Received: 27.04.2025
Published: 25.06.2025

**Reviewers:**
Adrian Melnic
Roxana Bistriceanu

**Publisher's Note:** Balneo and PRM Research Journal stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



**Abstract:** The recent increase in the incidence and prevalence of disc herniation in general, and particularly at the L5-S1 level, as observed in daily clinical practice, necessitates innovative approaches and non-invasive or minimally invasive treatment methods. The Proprioceptive Deep Tendon Reflex method was used to reduce a L5-S1 hernia with fragment migration from 9/12/23 mm visible on MRI, to 6/9/14 mm after 2 weeks of treatment and then to a "small hernia" after 24 weeks during which a total of 6 P-DTR therapy sessions were applied, each lasting approximately 50 min. To obtain consistent re-sults regarding the rehabilitation of a patient with disc herniation with frag-ment migration using the P-DTR method, as confirmed through successive MRI. Application of the principles and method of P-DTR. A considerable reduction in an L5-S1 herniation and migrated fragment is ob-served, with the condition being classified as a "small herniation" after six months of treatment. Proprioceptive Deep Tendon Reflex consti-tutes an effective non-invasive treatment method in L5-S1 herniation cases.

**Keywords:** P-DTR, proprioception, neuromuscular reflexes, dysfunctional receptors, sensory re-ceptors, pain modulation

## 1. Introduction

Lumbar disk herniation predominantly affects the lower segments of the lumbar spine, with the L5-S1 level being one of the most commonly involved sites. Approximately 95% of lumbar disk herniations occur at either the L4-L5 or L5-S1 levels, with the L5-S1 segment frecuently implicated due to its anatomical positioning and the mechanical stresses it endures [1, 2]. The annual incidence of herniated discs is estimated to be between 5 to 20 cases per 1,000 adults, predominantly affecting individuals in their third to fifth decades of life. The condition exhibits a higher prevalence in males, with a male-to-female ratio of approximately 2:1 [2, 3].

Disc herniation at the L5-S1 level (between the fifth lumbar vertebra and the first sacral vertebra) is one of the most common localizations of this condition. The frequent occurrence at the L5-S1 level is due to the fact that this segment bears a large part of the body's weight and is subjected to considerable overload and mechanical stress, especially due to incorrect postures adopted during daily activities, which displace the center of gravity abnormally and thereby exert excess strain on the lumbar area, predominantly on the L5-S1 segment.

Intervertebral disc herniation at the L5-S1 level is a frequent pathology of the lumbar spine, involving the protrusion or extrusion of the nucleus pulposus through a degenerated annulus fibrosus, potentially compressing the lumbosacral nerve roots. This localization is particularly vulnerable, as the L5-S1 segment supports much of the body's weight and is subjected to intense biomechanical demands, especially during trunk flexion and rotation [3, 4].

The main risk factors involved in the occurrence of L5-S1 disc herniation include: (1) *Biomechanical and occupational factors*: intense physical effort, frequent and incorrect handling of weights, as well as poor posture adopted during professional or daily activities are major causes of intervertebral disc degeneration [5, 6]. Chronic exposure to vibrations (e.g., heavy machinery drivers) also leads to cumulative microtraumas at the L5-S1 segment; (2) *Age and sex*: the incidence of disc herniation is higher in the third and fourth decades of life, with age being a risk factor due to reduced disc hydration and elasticity [7]. Additionally, males are more frequently affected, possibly due to more frequent involvement in physically demanding activities [8]; (3) *Genetic predisposition*: genetic studies have identified mutations in genes encoding type IX collagen, associated with premature disc degeneration [9]. Thus, a family history of disc pathology represents a significant predisposing factor; (4) *Excess body weight and sedentary lifestyle*: obesity increases pressure on the lumbar spine, contributing to early deterioration of intervertebral discs [10]. Meanwhile, lack of physical activity leads to weakening of the paravertebral and abdominal muscles, reducing spinal stability; (5) *Smoking*: chronic smoking affects the capillary perfusion of the intervertebral disc and accelerates degenerative processes by reducing oxygenation and nutrient supply [11]; (6) *Trauma*: acute traumatic injuries can suddenly rupture the annulus fibrosus, leading to herniation of disc material, especially if the disc is already degenerated [12]. Therefore, L5-S1 disc herniation is a multifactorial condition, generated by a complex interaction between individual predisposition, lifestyle, occupational factors, and degenerative processes. Understanding these risk factors is essential for developing prevention and clinical management strategies.

Common practice in the prevention of L5-S1 disc herniation focuses on reducing exposure to risk factors and strengthening spinal protection mechanisms. Preventive measures include: (1) *Postural and ergonomic education*, by adopting correct posture during daily and professional activities, including the use of ergonomic chairs and avoiding prolonged incorrect positions [13]; (2) *Regular physical exercise*, including strengthening of paravertebral and abdominal (core) muscles, regular stretching, and moderate physical activity, which reduce the risk of disc degeneration and ensure spinal stability [14, 15]; (3) *Weight control*, maintaining an optimal weight to reduce pressure on intervertebral discs and limit the progression of degenerative changes [15, 16]; (4) *Smoking cessation*, which improves disc vascularization and reduces the risk of degeneration [16]; (5) *Correct lifting techniques*, applying proper lifting methods by bending the knees and keeping the back straight to avoid overloading the lumbosacral segment [17]; (6) *Injury prevention*, by using protective equipment and workplace safety measures to prevent acute spinal injuries.

Treatment of L5-S1 disc herniation can be conservative or surgical, depending on symptom severity and response to initial measures. Conservative treatment is most frequently used, with most patients benefiting from this approach, which may include: *Relative rest, limiting activities that cause pain*, without recommending prolonged immobilization (more than 3–5 days) [18]; *Physiotherapy including kinetotherapy and electrotherapy*, focusing on muscle training, improving flexibility, and restoring mobility in the affected segment [19, 20] to which external or internal treatment with salt mineral waters can be added in sequelae after operated disk herniations [21]; *Medication*, using symptom-relieving drugs such as NSAIDs, analgesics, muscle relaxants, and, in some cases, corticosteroids [22]; *Epidural injections*, involving local administration of corticosteroids to reduce inflammation and radicular pain in patients with persistent symptoms [23].

Typical alternatives in medical rehabilitation that also find applicability in neurological conditions may include the use of therapeutic mud treatments, mineral waters for internal or external use, consistent exposure to natural therapeutic factors, and thalassotherapy [24,25, 26].

If conservative treatments fail to yield the desired results, surgical treatment may be applied. Surgical indication is generally reserved for cases involving cauda equina syndrome (a neurosurgical emergency), progressive neurological deficits (e.g., significant muscle weakness), or severe, disabling pain resistant to conservative treatment after 6–12 weeks. Procedures typically include discectomy (removal of the herniated fragment), performed either traditionally or minimally invasively (microdiscectomy), with favorable outcomes for symptom relief and functional recovery [27].

Going beyond classical treatment methods, the approach known as P-DTR (Proprioceptive – Deep Tendon Reflex) represents a modern neurological interventional method based on neurophysiology, biomechanics, and applied kinesiology, used in the treatment of functional dysfunctions and related pain. Proprioceptive – Deep Tendon Reflex (P-DTR) is an innovative interventional neurological therapeutic method developed by Dr. Jose Palomar, based on evaluating and correcting dysfunctions of the nervous system through proprioceptive receptors and deep reflex responses. This technique focuses on the relationship between distorted sensory stimuli and inadequate motor responses, aiming to restore normal neurological functionality by reprogramming pathological reflexes [28]. P-DTR GLOBAL AG is currently collaborating with leading universities to integrate the P-DTR method into academic programs worldwide. Any unauthorized use of P-DTR intellectual property by third parties is subject to legal consequences under Swiss law [28].

P-DTR acts directly on the central nervous system, using applied muscle testing, stimulation of peripheral receptors, and reflex response evaluation to identify functional imbalances. Neurological muscle testing is a refined and advanced diagnostic method designed to assess the integrity and responsiveness of myotatic stretch reflexes in relation to various sensory inputs. Evolving from traditional manual muscle testing (MMT), this technique offers a more nuanced understanding of the nervous system's functional state and its adaptive capabilities. Its conceptual basis lies in the dynamic interaction between internal physiological reflexes and external stimuli, highlighting the reflexive nature of the vast majority of Central Nervous System (CNS) activity—a principle supported by Dr. Pavlov's findings, which indicate that approximately 99% of CNS processes operate reflexively. According to Palomar (2017), this reflex activity is mediated through a complex system of protective primitive reflexes, each corresponding to distinct muscle inhibition patterns established during intrauterine development and modified throughout life.

In contrast to classical MMT, neurological muscle testing introduces several fundamental advancements. Notably, it evaluates muscular responses under load conditions rather than in a passive state, thereby enhancing diagnostic precision. Furthermore, it distinguishes between two types of muscle contraction: phasic, governed by cortical (conscious) control, and tonic, regulated by the thalamo-pallidal system (unconscious). This dual-phase assessment enables practitioners to detect six different types of responses, including failure to achieve the testing position, inability to resist the initial applied force, failure to maintain resistance over time, a normal inhibitory response, an excessively facilitated response, and a modified reflex pattern in a neutral or "basic" state. These distinctions offer valuable insight into neuromuscular function and dysfunction, making neurological muscle testing a critical component of functional neurology diagnostics. The technique is undergoing continuous research, progressively documented in the scientific literature, and its clinical application area is constantly expanding, especially in the fields of functional neurology and integrative manual therapy [29, 30].

Clinically, P-DTR is a non-invasive and painless therapeutic intervention applicable to a wide range of patients regardless of age. One of the remarkable advantages of the method lies in the immediate and long-lasting effects observed after correcting neuro-muscular dysfunctions. The therapy is mainly indicated for functional disorders – those situations in which there is no evident structural lesion, but symptoms arise from sensory or motor processing disturbances. Within the P-DTR therapeutic protocol, sessions are 50 minutes long and they are scheduled with at least one day of rest between them to allow the patient's body and central nervous system (CNS) to process and integrate the neurophysiological and biomechanical changes induced by the treatment. This interval is essential for consolidating corrected reflex responses and preventing overstimulation of the nervous system. Typically, two to three sessions per week are recommended, a frequency that enables effective therapeutic progress without overloading the patient's adaptive capacity. This gradual approach supports the stabilization of outcomes and promotes sustainable functional recovery [31].

By recalibrating proprioceptive reflexes, P-DTR favorably influences the entire nervous system, with direct benefits on the functioning of the musculoskeletal, digestive, circulatory, and lymphatic systems. The P-DTR technique is used to treat a wide range of problems, conditions, and functional disorders, including both general categories and specific diagnoses. It can address acute or chronic musculoskeletal pain (such as low back pain, neck pain, and shoulder pain), movement restrictions (like frozen shoulder or limited joint mobility), muscle weakness or imbalances, postural problems (including scoliosis and antalgic posture), gait disturbances, joint dysfunctions (such as temporomandibular joint dysfunction), functional gastrointestinal disorders (like irritable bowel syndrome), hormonal and metabolic imbalances, chronic fatigue syndrome, stress-related emotional or psychosomatic disorders, autonomic dysfunctions (such as orthostatic intolerance or excessive sweating), functional cranial nerve disorders (like trigeminal neuralgia or facial nerve dysfunction), delayed recovery after trauma or surgery, and vague, nonspecific symptoms like persistent fatigue, general weakness, and difficulty with focus and attention.

P-DTR is effective both as a primary and adjunctive therapy, especially for cases where dysfunction results from abnormal integration of nerve signals rather than clear structural lesions, with rapid effects often observed in terms of pain reduction, improved mobility, muscle tone normalization, and posture correction. Clinical studies and case reports suggest significant improvement in mobility, motor control, and subjective symptoms following the application of this method [28,31].

However, the applicability of P-DTR is limited in the case of structural organic conditions. Major contraindications include: cerebral and spinal cord injuries, rheumatological diseases in acute inflammatory phases, severe psychiatric disorders, acute visceral pain of inflammatory origin, and congenital pathologies [31].

## 2. Results

### *2.1. Characteristics of the patient (age, gender, environment)*

A 45-year-old female patient from an urban environment, working as a teacher—a profession that constitutes a risk factor for L5-S1 disc herniation—entered into study, observations and treatment.

### *2.2. Results obtained after using the treatment*

The results obtained are consistent and consist of a reduction in the size of the herniation and disc fragmentation after 24 weeks of treatment using the Proprioceptive Deep-Tendon Reflex method, as revealed by Figure 2 and Figure 3 through visual comparison. The treatment consisted of 6 sessions conducted at the EMPATIO Clinic in Iași between 20.12.2022 and 21.04.2023, each lasting 50 minutes.

MRI of the lumbar spine was performed using a 1.5 Tesla Siemens MAGNETOM Amira scanner and Philips 1.5 T. Imaging protocols included sagittal T1-weighted, sagittal and axial T2-weighted sequences and sagittal STIR. All sequences were acquired in both sagittal and axial planes to allow optimal visualization of disc morphology, neural structures, and foraminal involvement. No contrast agent was used during the lumbar MRI.

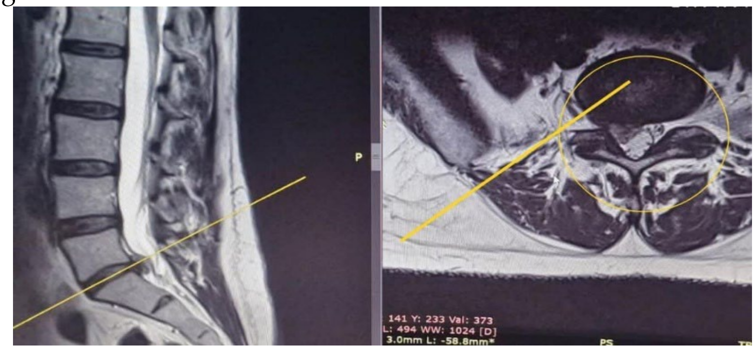
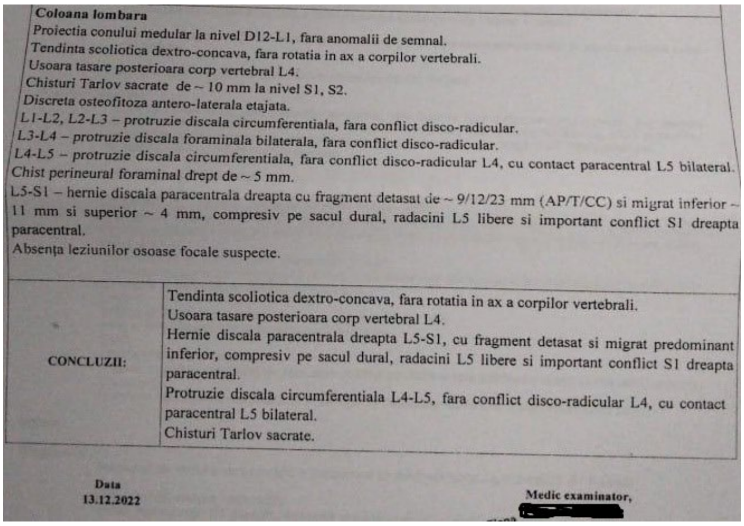



**Figure 1.** MRI imaging result of the first scan performed on 13.12.2022, at the neurologist's recommendation.



**Coloana lombara**
Proiectia conului medular la nivel D12-L1, fara anomalii de semnal.
Tendinta scoliotica dextro-concava, fara rotatia in ax a corpilor vertebrali.
Usoara tasare posterioara corp vertebral L4.
Chisturi Tarlov sacrate de ~ 10 mm la nivel S1, S2.
Discreta osteofitoza antero-laterala etajata.
L1-L2, L2-L3 – protruzie discala circumferentiala, fara conflict disco-radicular.
L3-L4 – protruzie discala foraminala bilaterala, fara conflict disco-radicular.
L4-L5 – protruzie discala circumferentiala, fara conflict disco-radicular L4, cu contact paracentral L5 bilateral.
Chist perineural foraminal drept de ~ 5 mm.
L5-S1 – hernie discala paracentrala dreapta cu fragment detasat de ~ 9/12/23 mm (AP/T/CC) si migrat inferior ~ 11 mm si superior ~ 4 mm, compresiv pe sacul dural, radacini L5 libere si important conflict S1 dreapta paracentral.
Absența leziunilor osoase focale suspecte.

| | |
|---|---|
| CONCLUZII: | Tendinta scoliotica dextro-concava, fara rotatia in ax a corpilor vertebrali.<br>Usoara tasare posterioara corp vertebral L4.<br>Hernie discala paracentrala dreapta L5-S1, cu fragment detasat si migrat predominant inferior, compresiv pe sacul dural, radacini L5 libere si important conflict S1 dreapta paracentral.<br>Protruzie discala circumferentiala L4-L5, fara conflict disco-radicular L4, cu contact paracentral L5 bilateral.<br>Chisturi Tarlov sacrate. |

Data
13.12.2022

Medic examinator,
[redacted]

**Figure 2.** MRI result of the first scan performed on 13.12.2022, on presentation

The initial MRI imaging result (Figure 1 and Figure 2) indicates a massive L5-S1 disc herniation with a migrated fragment size: 9/12/23 mm.

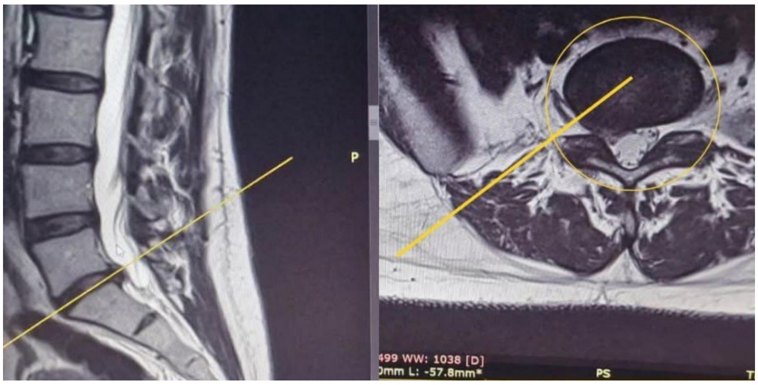
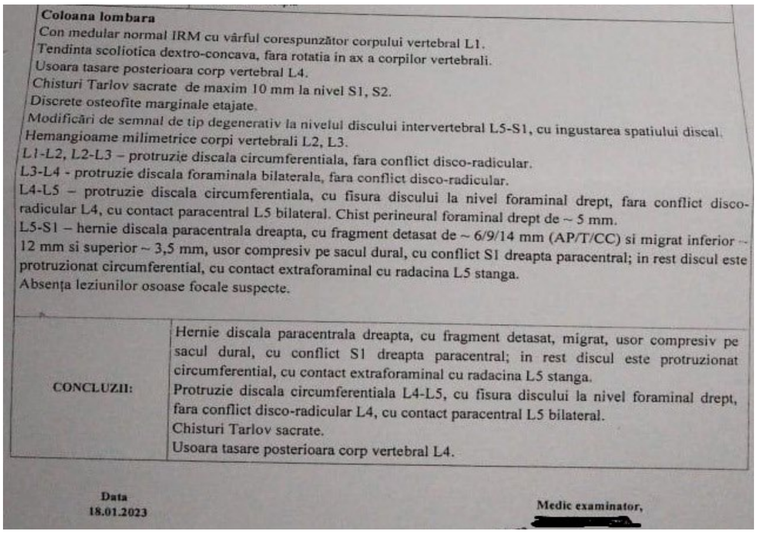



**Figure 3.** MRI imaging result of the second scan performed on 18.01.2023, two weeks ( 4 sessions) after non-invasive P-DTR treatment. Reveals L5-S1 disc herniation with disc fragment with dimensions of 6/9/14 mm.



**Coloana lombara**
Con medular normal IRM cu vârful corespunzător corpului vertebral L1.
Tendinta scoliotica dextro-concava, fara rotatia in ax a corpilor vertebrali.
Usoara tasare posterioara corp vertebral L4.
Chisturi Tarlov sacrate de maxim 10 mm la nivel S1, S2.
Discrete osteofite marginale etajate.
Modificări de semnal de tip degenerativ la nivelul discului intervertebral L5-S1, cu ingustarea spatiului discal.
Hemangioame milimetrice corpi vertebrali L2, L3.
L1-L2, L2-L3 – protruzie discala circumferentiala, fara conflict disco-radicular.
L3-L4 - protruzie discala foraminala bilaterala, fara conflict disco-radicular.
L4-L5 – protruzie discala circumferentiala, cu fisura discului la nivel foraminal drept, fara conflict disco-radicular L4, cu contact paracentral L5 bilateral. Chist perineural foraminal drept de ~ 5 mm.
L5-S1 – hernie discala paracentrala dreapta, cu fragment detasat de ~ 6/9/14 mm (AP/T/CC) si migrat inferior ~ 12 mm si superior ~ 3,5 mm, usor compresiv pe sacul dural, cu conflict S1 dreapta paracentral; in rest discul este protruzionat circumferential, cu contact extraforaminal cu radacina L5 stanga.
Absența leziunilor osoase focale suspecte.

| | |
|---|---|
| CONCLUZII: | Hernie discala paracentrala dreapta, cu fragment detasat, migrat, usor compresiv pe sacul dural, cu conflict S1 dreapta paracentral; in rest discul este protruzionat circumferential, cu contact extraforaminal cu radacina L5 stanga.<br>Protruzie discala circumferentiala L4-L5, cu fisura discului la nivel foraminal drept, fara conflict disco-radicular L4, cu contact paracentral L5 bilateral.<br>Chisturi Tarlov sacrate.<br>Usoara tasare posterioara corp vertebral L4. |

Data
18.01.2023

Medic examinator,
[redacted]

**Figure 4.** MRI imaging result of the second scan performed on 18.01.2023, after 2 weeks (4 sessions) of non-invasive P-DTR treatment.

The result of the second MRI (Figure 3, Figure 4), performed on 18.01.2023, shows a consistent reduction in the herniation and disc fragment size—6/9/14 mm—after only two weeks of treatment in which 3 P-DTR sessions were conducted.

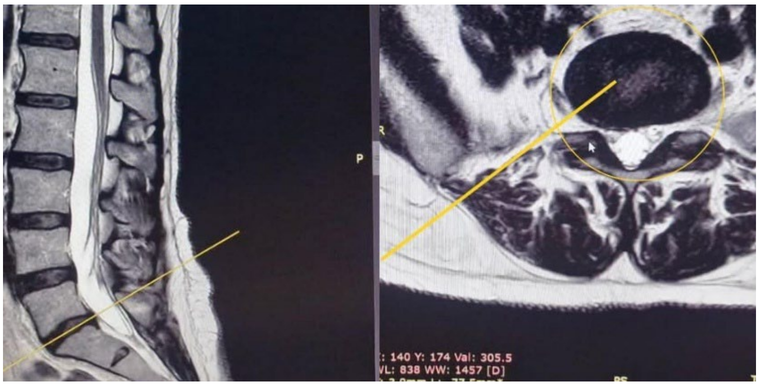
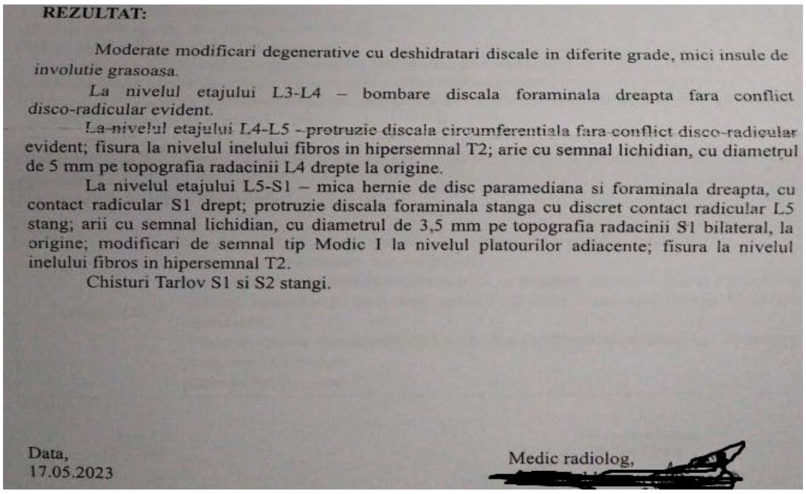



**Figure 5.** MRI imaging result of the third scan performed on 17.05.2023, after 24 weeks (x sessions) of non-invasive P-DTR treatment.



**REZULTAT:**

Moderate modificari degenerative cu deshidratari discale in diferite grade, mici insule de involutie grasoasa.

La nivelul etajului L3-L4 – bombare discala foraminala dreapta fara conflict disco-radicular evident.

La nivelul etajului L4-L5 – protruzie discala circumferentiala fara conflict disco-radicular evident; fisura la nivelul inelului fibros in hipersemnal T2; arie cu semnal lichidian, cu diametrul de 5 mm pe topografia radacinii L4 drepte la origine.

La nivelul etajului L5-S1 – mica hernie de disc paramediana si foraminala dreapta, cu contact radicular S1 drept; protruzie discala foraminala stanga cu discret contact radicular L5 stang; arii cu semnal lichidian, cu diametrul de 3,5 mm pe topografia radacinii S1 bilateral, la origine; modificari de semnal tip Modic I la nivelul platourilor adiacente; fisura la nivelul inelului fibros in hipersemnal T2.

Chisturi Tarlov S1 si S2 stangi.

Data,
17.05.2023

Medic radiolog,
[redacted]

**Figure 6.** MRI imaging result of the third scan performed on 17.05.2023, after 24 weeks of non-invasive P-DTR treatment.

In the third MRI examination (Figure 5, Figure 6), performed on 17.05.2023, at 24 weeks after initial presentation, a significant reduction in herniation size is observed, with no longer any evidence of a migrated fragment, revealing only a "small herniation."

Blinding procedures for MRI interpretation were implemented to minimize observer bias. The images were independently evaluated by radiologists who were blinded to the clinical data, treatment allocation, and the chronological sequence of the scans. In order to ensure consistency, multiple blinded observers assessed the images, and discrepancies were resolved by consensus and by a third independent blinded reviewer – a neurologist. This methodology ensured objective image interpretation and enhanced the validity of the imaging-related outcomes.

During the anamnesis and treatment, the Lasegue, SLUMP, Fingers-to-Floor, and Schober tests were performed.

The absolut values obtained during the tests are shown in the Table 1.

**Table 1.** The absolut value on nerve sliding test and mobility test.

| Category | Test | On presentation | Session 2 | Session 3 | Session 4 | On 6 month |
|---|---|---|---|---|---|---|
| Nerve sliding test | Lasegue | 16 | 23 | 38 | 53 | 61 |
| | Slump | 3 | 3 | 4 | 5 | 5 |
| Mobility test (in cm) | Finger-to-Floor | 47 | 44 | 27 | 14 | 11 |
| | Schober | 18.1 | 18.4 | 19.1 | 20.1 | 20.3 |

The initial result of the Lasegue test (Figure 7 – yellow)), used to verify sciatic nerve involvement, was 16 degrees. It showed positive evolution after the first 3 sessions, reaching 53 degrees (Table 1).

The SLUMP test (Figure 7 - orange), in the initial phase, confirmed nerve compression, with pain appearing in the third phase of the test, and knee extension was impossible to perform. Pain relief during the SLUMP test coincided with improvement in the Lasegue test result.

The evolution of values in the Lasegue and SLUMP tests highlighting the reduction of nerve compression.

In the Figure 7 and Figure 8 the test results are visualy revealed.

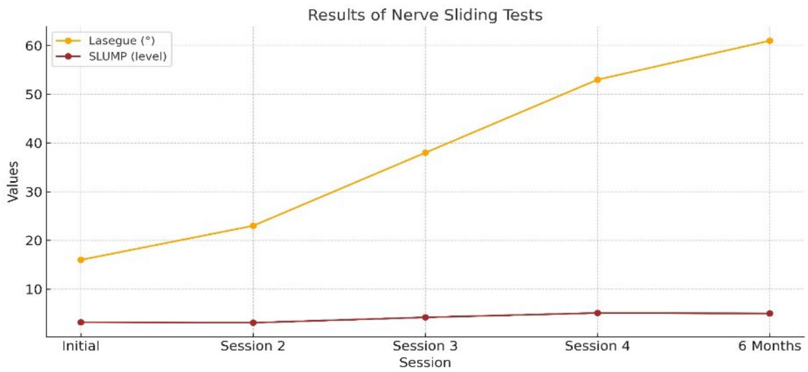



**Figure 7.** Nerve sliding test results: Lasegue & SLUMP

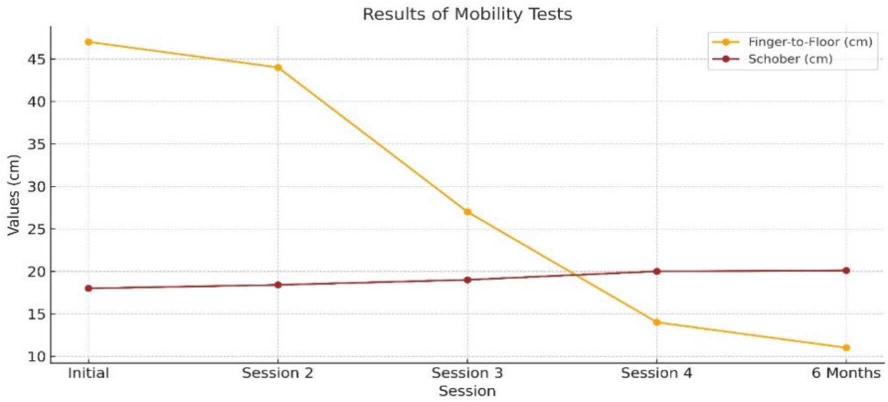



**Figure 8.** Mobility test results: Fingers-to-Floor & Schober

The Fingers-to-Floor (Figure test was used to assess the patient's degree of flexion, together with the Schober test to isolate lumbar spine flexion from hip joint flexion) – in Figure 8. At the beginning of the treatment, pain appeared at 47 cm from the floor in the Fingers-to-Floor test, and the Schober test showed a deficit of 1.9 cm. Following the first 3 sessions, at the time of the second MRI, an improvement was observed: 33 cm in the Fingers-to-Floor test and 2 cm in the Schober test.

Progress in the Finger-to-Floor (decreased distance to the ground) and Schober (increased lumbar mobility) tests reflected increased spinal flexibility.

## 3. Discussion

Upon presentation, the patient reported significant lower back pain and paresthesia in the right lower limb, affecting the lateral side of the heel and involving the fifth toe. A motor deficit of the internal popliteal sciatic nerve (SPI) in the right leg was also observed.

The imaging investigation (MRI) was performed in three sequences: the first at presentation, on 13.12.2022, revealed a massive herniated disc at the L5-S1 level with a migrated fragment. The hernia and disc fragment size shown in the result of the investigation revealed dimensions of 9/12/23 mm (Figure 1). At presentation, the patient exhibited paresthesia in the right lower limb on the lateral side of the heel and the fifth toe of the same limb. Furthermore, the patient showed a motor deficit of the internal popliteal sciatic nerve in the right lower limb. The second MRI scan revealed a reduction in hernia and disc fragment size and the disappearance of the migrated fragment, while the third MRI scan was interpreted as showing a "small hernia," with no further evidence of a migrated fragment.

Comparison of the results obtained through P-DTR therapy with the rates of spontaneous regression of disc herniations (without active therapeutic intervention) is essential to evaluate the method's effectiveness. We will conduct an analysis based on relevant scientific literature.

Regarding the spontaneous regression of disc herniations, what the studies show—according to meta-analyses and longitudinal imaging studies—is presented in Table 2.

**Table 2.** Spontaneous Regression of Disc Herniations – What the Studies Show [33,34,35,36]

| | **Spontaneous regression rate** | **Average time interval** | **Reference** |
|---|---|---|---|
| Protrusion | -41% | 6 months | Chi [33] |
| Herniation | 47% | 6 months | Komori [34] |
| Herniation with migrated fragment | 43% | 6-12 months | Zhong [35], Zidan [36] |

The average time for significant spontaneous regression is between 6 and 12 months, while for migrated herniations it may take more than 12 months.

**Table 3.** Objective comparison with the results of a patient treated with P-DTR

| Criterion | P-DTR | Spontaneous regression |
|---|---|---|
| Time | 2-6 weeks | 26 weeks (6 months) |
| Reduction | After 2 weeks | rare |
| Reduction of pain and symptoms | Improvement in 1 week | 6-12 months |
| Number of interventions required | 6 | Not known |
| Estimated duration of the process | Under 6 | Minimum 6 |

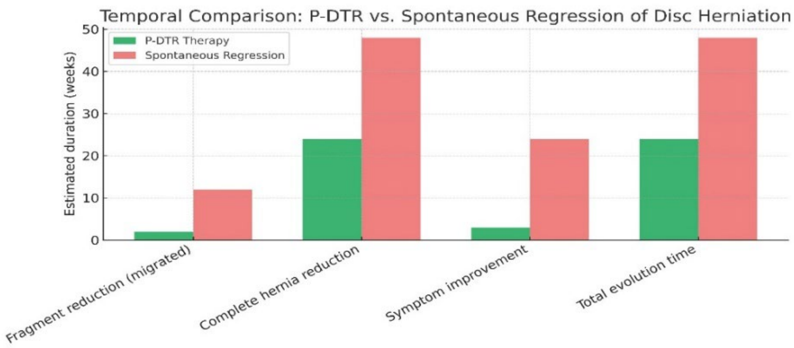



**Figure 9.** Temporal comparison of P-DTR versus spontaneous regression of disc herniation

The comparative chart highlights the major differences in estimated duration (in weeks) between the P-DTR method and spontaneous regression of lumbar disc herniation: (1) Reduction of the migrated fragment occurs in only 2 weeks with P-DTR, compared to approximately 12 weeks in spontaneous cases; (2) Complete reduction of the herniation is observed at 24 weeks with P-DTR, compared to up to 48 weeks for natural regression; (3) Improvement of neurological symptoms is rapid (3 weeks) with the therapy, whereas spontaneous regression may take up to 24 weeks.

The total duration of favorable clinical evolution is significantly shorter with P-DTR, offering a visible advantage in terms of speed of clinical response and imaging regression of the herniation (proven by MRI), being applied in a personalized and non-invasive manner.

Spontaneous regression remains a known phenomenon, but with high variability and a long course of evolution.

Thus, we observe that P-DTR therapy has led to a rapid and sustained reduction in herniation size and neurological symptoms within a significantly shorter time interval compared to what is reported in the literature for spontaneous regression. This supports the hypothesis of the method's efficacy as an active, non-invasive, and effective therapeutic intervention.

**Research limitations** include a small sample size, absence of a control group, and the potential influence of placebo effects.

## 4. Materials and Methods

This research was conducted at the Empatio Center in Iași, Romania, during the period 20.12.2022 – 21.04.2023, involving the observation of a 45-year-old female patient. Upon presentation, the patient exhibited symptoms of lumbar pain radiating throughout the lower limb; numbness and tingling in the lower limb; and motor deficit. During the specialized neurological consultation, the Lasegue, SLUMP, Fingers-to-Floor, and Schober tests (specific functional tests) were performed, and an MRI scan was recommended.

The Proprioceptive Deep Tendon Reflex (P-DTR) method was used in the patient's treatment. The P-DTR method is a manual therapy technique aimed at identifying and correcting proprioceptive dysfunctions in the body. P-DTR uses neurofunctional tests to locate areas where proprioceptive dysfunctions appear and applies manual pressure to correct them. This treatment is based on principles of neuroplasticity, suggesting that the nervous system can be reconfigured to optimize function and reduce pain. P-DTR has been shown to be effective in managing various musculoskeletal conditions, including chronic pain, joint dysfunction, and postural imbalances. Currently, there are very few case reports regarding the use of P-DTR for sciatica, highlighting the need for further studies to evaluate the safety and efficacy of this method in such cases. P-DTR is based on fundamental concepts from neurophysiology and neuroanatomy. It examines the interaction between the proprioceptive system and the nervous system, as well as the role of reflexes in the body's response to sensory stimuli. Proprioception refers to the body's ability to perceive its position and movement in space, involving receptors located in muscles, tendons, joints, and other tissues, which provide feedback to the nervous system regarding the body's position and movement. P-DTR uses a systematic methodology to evaluate and correct proprioceptive dysfunctions that may contribute to sciatica symptoms. The evaluation involves testing reflexes and sensory receptors in specific muscles and tissues to identify possible aberrant sensory inputs or reflex responses. Once identified, P-DTR applies specific manual techniques to reset and normalize proprioceptive signals, aiming to restore correct function and reduce pain and dysfunctions [29].

The Proprioceptive Deep Tendon Reflex (P-DTR) methodology operates across various neurological levels within the central nervous system (CNS). Through innovative research, Dr. Palomar discovered that irregular receptor signals could be effectively addressed at higher CNS control centers. His breakthrough came when he successfully implemented alternative breathing techniques, rather than traditional DTR methods, to reset cranial nerve nuclei and other brain structures like the basal ganglia, ultimately influencing motor control systems.

This therapeutic approach encompasses comprehensive diagnostic and treatment protocols specifically designed for all twelve cranial nerve pairs, addressing their sensory, motor, and visceromotor components. The assessment process integrates manual muscle testing (MMT) with targeted nuclei stimulation to evaluate CNS responses, enabling practitioners to identify both primary dysfunctions and the brain's adaptive responses for each affected cranial nerve. Following this systematic evaluation, the P-DTR methodology verifies the relationship between these elements, culminating in a simultaneous stimulation of both primary and secondary dysfunctions combined with specific breathing patterns to facilitate CNS recalibration.

Recent scientific investigation has yielded promising results. Notable research from Smolensk State Medical University's Department of Neuroscience, Physiotherapy and Reflex Therapy utilized electroneuromyographic studies to demonstrate the connection between primary and compensatory receptor fields, validating the paired signal hypothesis. Investigation of pain mechanisms through exteroceptive suppression revealed decreased inhibitory activity in brainstem interneurons responsible for pain processing. This suggests P-DTR's effectiveness extends beyond peripheral pain management to influence central anti-nociceptive mechanisms. Studies of autonomic responses, measured through skin sympathetic potential, showed significant reductions in sympathetic reactions following treatment

Clinical observations across numerous cases have demonstrated P-DTR's versatility. It can function either as a standalone treatment for biomechanical restoration without medication or as a complementary therapy alongside conventional medical and surgical interventions. The treatment has shown remarkable effectiveness in enhancing proprioception, normalizing muscle tone, correcting posture, eliminating pain-induced postural compensations, improving gait patterns, and augmenting the benefits of other therapeutic approaches. The fundamental principles of the P-DTR concept lie in the fact that the CNS controls all the body's functional processes at the physical, biochemical, endocrine, emotional, and mental levels and that any functional or dysfunctional changes are defined by it. The CNS constantly receives and interprets internal and external information 24/7, and any motor, glandular, or conscious thought response depends on the quality of this information. A distorted, excessive threshold signal from receptors will cause neuromuscular, endocrine, or behavioral dysfunctions—the main cause being aberrant afferent information received by the CNS. Neurological dysfunction may persist for an undetermined period, affecting the individual's optimal performance (in many cases, long after the initial physiological trauma), with the afferent signals continuing to influence perception and response to the environment.

The P-DTR method provides the tools and evaluations needed to locate and diagnose dysfunctional receptors, to stimulate all parts of a dysfunction, to find the priority area (which is the most important to the nervous system), to control afferent information flow, and to reset it when dysfunctional, thus altering the integration of stimuli and not the perception of pain itself.

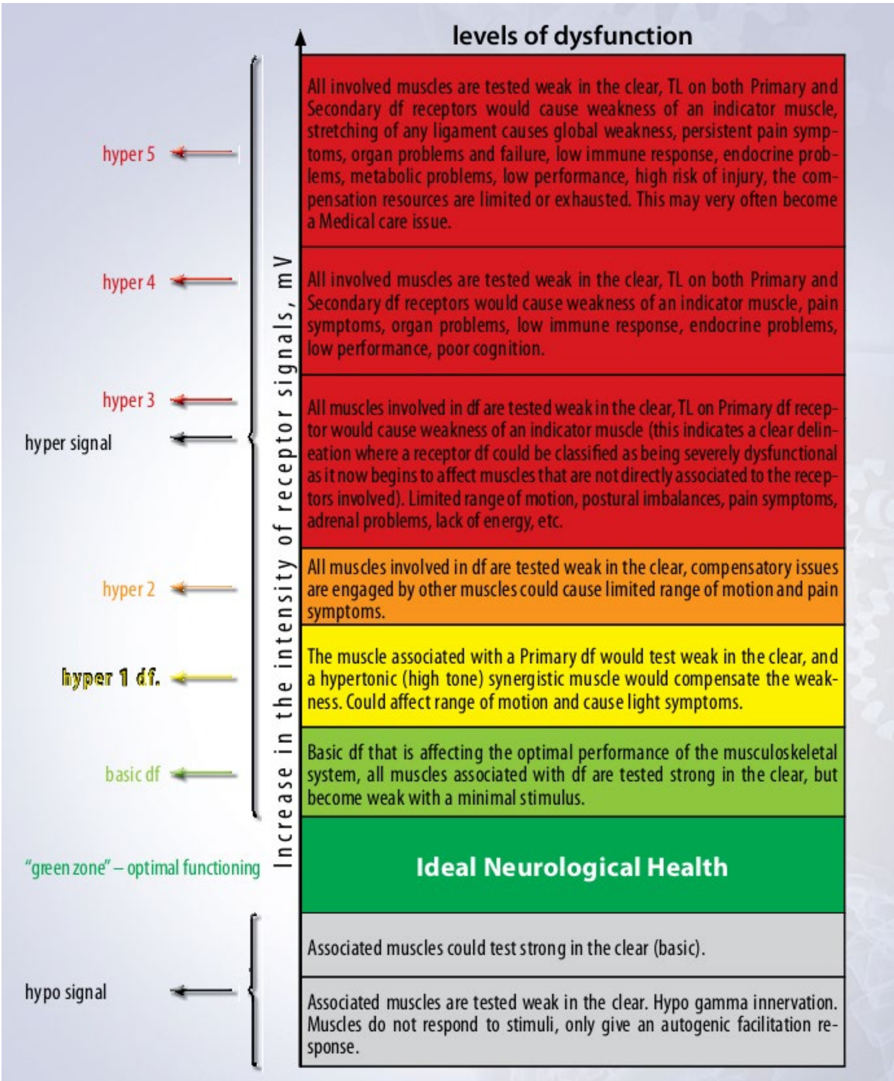



**Figure 10.** Schematic scale of dysfunction levels. The stronger the signal from a dysfunctional receptor, the more compensations are required from the CNS, which in turn will generate symptoms corresponding to the compensation level and the number of structures involved [29].

The theoretical core of the method is the pairing of dysfunctional afferent signals. Excessive afferent information arriving at the CNS from paired receptor fields and the quantitative alteration of the information flow from one field inevitably leads to a direct change in the flow from another field. In other words, any stimulus to the CNS from a dysfunctional receptor will be compensated. A healthy and neurologically well-organized CNS constantly receives and analyzes incoming information to generate an appropriate motor and/or glandular response. Thus, when the threshold signals from receptors are in the so-called "green zone" (optimal functioning zone), the information is under control, managed by the CNS, which has sufficient resources for self-compensation, self-regulation, and optimal daily performance. These receptors are termed “functional” and are triggered at a specific optimal action potential threshold.

A “dysfunctional” receptor has a modified action potential threshold (either too high or too low), making it energetically inefficient and a source of systemic stress for the CNS, as the altered normal function must be compensated. In the case of strong signals from such receptors, the CNS will always choose to compensate, regardless of the consequences on the body, which can lead to a range of dysfunctions such as illness, instability, limited range of motion, lack of energy, emotional problems, etc.

The physiological explanation of the method is that each type of receptor (e.g., Golgi, Pacini, vibration, nociceptors, etc.) is stimulated, and when the threshold for that receptor is exceeded by the amount of stimuli, those stimuli are converted into electrical impulses. These impulses form the afferent information that reaches the CNS, each input type being transmitted along its respective pathways. The CNS receives this information, interprets it, and generates a motor or glandular response based on the synthesis of all received data. For example, the sensation of pain. This is synthesized directly in the brain and is a complex product of information from the nociceptive, proprioceptive, and exteroceptive systems. Simply put, the sensation of pain is the brain’s interpretation based on a complex integration of information from various sources.

Through extensive research, Dr. Palomar identified that among receptors exhibiting abnormally elevated signals, a single dysfunctional receptor field consistently emerges as the dominant or Primary zone. This primary field, characterized by heightened signal activity, invariably triggers a compensatory response from another receptor, designated as the Main Secondary compensatory zone, which also displays elevated signaling.

When the initial compensatory mechanism proves insufficient, the nervous system initiates additional virtual compensatory responses. If these secondary measures fall short, the brain develops new dysfunctional patterns specifically designed to enhance compensation for the Primary receptor disturbance. This cascading effect creates what Dr. Palomar terms a "compensatory tree" - a complex network of interconnected compensatory responses that can impact multiple body systems, leading to significant disruptions in physiological, hormonal, and immunological functions.

Research shows that these dysfunctional signals influence muscle spindle cells, altering the myotatic reflex and consequently affecting muscle response patterns, which can be evaluated through Manual Muscle Testing. Such irregular signaling may result in either localized muscle weakness/hypertonicity or trigger system-wide muscle tone changes. Each dysfunctional receptor - whether Primary, Secondary, or Tertiary - correlates with specific muscles and exhibits distinct inhibition patterns, determined by where the signal disruption occurs within the CNS.

Upon identification and verification of both primary and secondary dysfunctional receptor fields, the irregular afferent signals can be normalized through simultaneous stimulation of both fields combined with Deep Tendon Reflex (DTR) activation. This concurrent stimulation creates compensating signals that enable the brain to reset its aberrant processing patterns.

A key discovery by Dr. Palomar revealed that DTR's influence extends beyond local reflex responses, affecting the entire central nervous system and modifying overall brain response patterns. This broader impact may be attributed to DTR's role as a CNS protective mechanism, facilitating rapid evaluation and response to incoming sensory information. When both Primary and Secondary fields receive stimulation, these areas become prioritized in the brain's processing hierarchy, leading to enhanced sensitivity.

The DTR activation helps reconstruct and normalize irregular information processing, effectively reducing elevated signal levels to optimal ranges ("green zone"), eliminating the need for compensatory mechanisms. Clinical outcomes are typically immediate and notable, including significant pain reduction, improved range of motion, normalized muscle tone, and elimination of inhibitory patterns.

This groundbreaking idea of dysfunctional receptors gives us a fresh perspective on how we perceive health and illness. It proposes that achieving true well-being is not only about maintaining physical structure or regulating chemistry, but also about ensuring efficient receptor activity and accurate neural signaling. With this broader viewpoint, both the prevention and treatment of medical issues can take a more thorough, root-cause approach rather than simply alleviating symptoms.

Understanding receptor dysfunction as a core element in health marks a significant change in medical philosophy. It indicates that many long-standing disorders could be more effectively treated by reestablishing healthy receptor function instead of relying only on conventional symptom-focused therapies.

This research is considered a pilot study in the field of medical rehabilitation, representing a preliminary stage aimed at evaluating the feasibility of the intervention and identifying potential issues or relevant aspects before conducting a larger-scale study on the non-invasive P-DTR method used in the rehabilitation of L5-S1 disc herniation.

The statistic analysis for this study was carried out by using Origin Lab version 19.

A search in the PubMed database using the keyword "L5-S1 disk herniations" was performed in April 2025. It revealed 1,028 publications between the years 1968–2025, indicating increased interest in recent years (Figure 10), alongside the exponential rise in the prevalence and incidence of disc pathology. Of these, 408 results were registered in the past 10 years, 208 results in the past 5 years, and 40 items related to publications recorded in the last year, namely 2024.

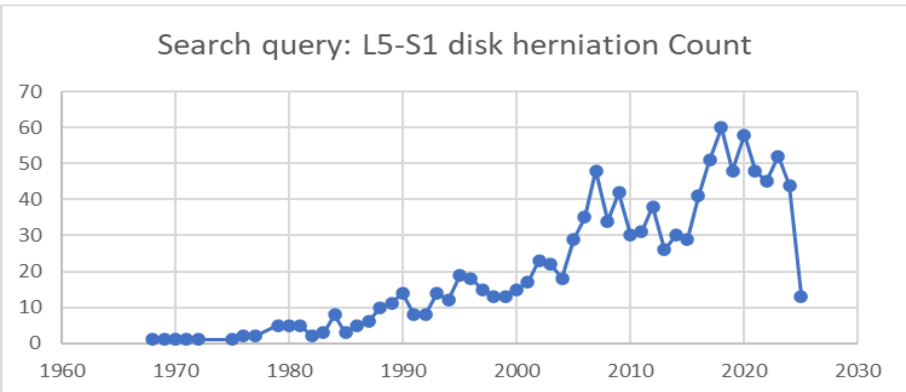



**Figure 11.** Number and frequency of publications using the search criterion "L5-S1 disk herniation"

When initiating a search using the term "Proprioceptive Deep Tendon Reflex," the portal returned 20 results published between 1979–2025, reflecting articles that sporadically used the terms from the search item ("reflex," "tendon," "proprioception," "deep"), but returned 0 results for the exact combined terminology "Proprioceptive Deep Tendon Reflex," indicating that the method is still new, not yet widely used, and with no published articles, books, or other scientific materials to date. When searching with the item "P-DTR," PubMed found no results.

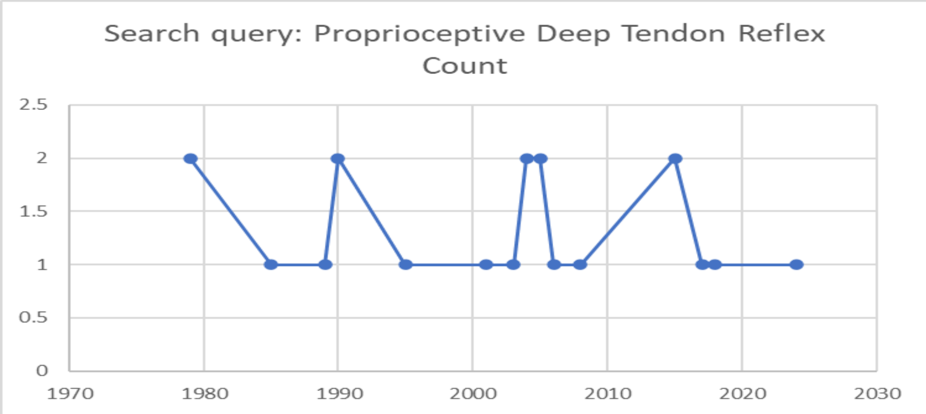



**Figure 12.** Number and frequency of publications using the search criterion "Proprioceptive Deep Tendon Reflex" involving separate terms (not the exact block terminology)

The Figure 12 shows us the number of articles found using the separate terms "proprioceptive", "deep", "tendon", "reflex" on the PubMed.

The above-mentioned findings demonstrate that up to the present moment, the non-invasive P-DTR method has not been the subject of any scientific article or support, even though the recorded results are indisputable.

## 5. Conclusions

Recent research highlights the importance of individualized evaluation of patients with L5-S1 disc herniation, taking into account specific risk factors and the selection of an appropriate specialized intervention technique. The non-invasive P-DTR technique has proven effective by significantly reducing the initial L5-S1 hernia and disc fragment size by 19.5 mm. Thus, we observe that non-invasive approaches offer promising results, with rapid recovery, reduced or even absent complications and adverse effects. We conclude that the Proprioceptive Deep Tendon Reflex (P-DTR) method, focused on treating proprioceptive dysfunctions, records consistent success in treating disc herniations by reducing their size, using proprioception—the body's ability to perceive position and mobilize joints, muscles, and tendons.

**Contributions:** All authors contributed equally to this article.

**Funding:** This research received no external funding.

**Institutional Review Board Statement:** The study was conducted under the Declaration of Helsinki, and approved by the Ethics Committee of EMPATIO CLINICS (nr. 9 from 10.01.2022) for studies involving humans.

**Informed Consent Statement:** Informed consent was received from all subjects involved in the study. The patient(s) has(have) given their written informed consent for this paper to be published.

**Data Availability Statement:** available on EMPATIO Clinic.

**Acknowledgments:** Thanks to all involved collaborators.

**Conflicts of Interest:** The authors declare no conflict of interest.

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