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Multifactorial Approach to Sciatica: Clinical Assessment and Evidence-Based Management

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Abstract **-** Sciatica is a common and often functionally limiting condition characterized by radiating leg pain caused by irritation or compression of the lumbosacral nerve roots. It is most frequently associated with lumbar disc herniation or spinal canal stenosis. Symptoms can persist over time, often affecting mobility and overall well-being. The aim of this review is to summarize the available knowledge about pathophysiology, risk factors, diagnostic methods, and treatment strategies for low back pain with sciatic radiation, with an emphasis on clinical relevance and management options. The literature available in the PubMed database was reviewed, based on 30 studies published between 2011 and 2024 and identified through a systematic search. Sciatica is a multifactorial condition requiring a multidisciplinary, patient-centered diagnostic and therapeutic approach. While conservative treatment remains first-line, surgical options offer promising outcomes in refractory cases. Preventive strategies targeting modifiable lifestyle and occupational risk factors are critical for reducing incidence. Further research into the pathomechanisms of sciatica is essential for optimizing clinical management and improving long-term quality of life.

Keywords - sciatica, low back pain, radiculopathy, chronic pain, sciatica management

1. INTRODUCTION

Low back pain (LBP) is the leading cause of disability and frequently causes individuals to seek medical care, with an estimated average prevalence of around 9% of the global population and is expected to become increasingly prevalent with the aging of the population [1,2]. While LBP is generally harmless and resolves on its own, it can sometimes indicate serious spinal conditions, such as malignancies, which are identified in 1.4–5% of cases. Sciatica commonly occurs alongside lower back pain, with an annual incidence reported between 1% and 5%, and a lifetime prevalence ranging from 10% to 40% [1]. Sciatica is a severe and often disabling condition resulting from compression of the sciatic nerve roots (L4–S3), most commonly due to narrowing of the vertebral canal or is triggered by mechanical trauma which leads to intervertebral disc protrusion or prolapse. Among the primary causes of sciatica are trauma-induced herniation and stenosis of the neural foramina. Clinically, sciatica presents as radicular pain originating in the lower back and radiating along the path of the sciatic nerve. This pain may be accompanied by unilateral or bilateral lower limb symptoms and, in some cases, neurological impairments such as muscle weakness, absence of tendon reflexes, sensory deficits, numbness, or even bladder dysfunction. Worldwide, sciatica is recognized as a major medical problem [3]. Patients suffering from sciatica typically report chronic pain that worsens with lumbar spine flexion, twisting, bending, or coughing [1,3]. Pain associated with sciatica can manifest as burning, a sense of heaviness, or a feeling of tightness along the affected nerve pathway. As the irritation or damage to the sciatic nerve worsens, symptoms often progress from sensory disturbances such as pain-paresthesia to more severe motor deficiency. This progression reflects increasing nerve damage [1]. The pain is alleviated by analgesic treatment, including non-steroidal anti-inflammatory drugs (NSAIDs). The condition affects both males and females, with the highest incidence observed during the fourth decade of life. Sciatica is uncommon in individuals under 20 years old, except in cases secondary to trauma and

triggered by physical activity and postures typical in certain work environments. Compression of the spinal nerve root may result in localized edema and ischemia, leading to inflammation and possible leakage from degenerated intervertebral discs. Typical clinical manifestations include tenderness on palpation, muscle weakness, sensory deficits, and pain exacerbated by movement. Recent research indicates that the prevalence of sciatic symptoms varies considerably, ranging from 1.6% to 43%. It has been suggested that the use of the term "sciatica" to describe involvement of the L1–L4 nerve roots may lead to misinterpretation of lower back pain radiating to the leg. When sciatica is defined more precisely based on pain distribution and/or duration, reported prevalence rates tend to be lower, and sciatica remains more common among individuals engaged in physically demanding occupations [3].

2. PATHOPHYSIOLOGY OF THE PAIN

A. The role of inflammatory in painful radiculopathy

Numerous studies have highlighted the involvement of inflammatory processes in the pathophysiology of sciatica. Cells within the intervertebral disc are capable of synthesizing proinflammatory mediators, which contribute to the recruitment of immune cells, including macrophages and lymphocytes. This inflammatory cascade leads to the release of cytokines and other signaling molecules such as IL-1β, IL-6, IL-8, IL-17, TNF-α, IFN-γ, and PGE2, as well as the production of neuroactive substances like nerve growth factor (NGF) and substance P [4]. The findings indicate that patients with disc herniation (DH) exhibit elevated serum cytokine levels and that individual factors such as age, body mass index (BMI), and gender significantly influence the expression of certain cytokines. Among the 21 factors found to be elevated in individuals with disc herniation (DH), only three mediators - HMGB1, PDGFbb, and IL-9 demonstrated a significant association with the severity of the herniation [5]. A conducted study demonstrated elevated levels of proinflammatory cytokines in serum samples, as well as increased expression of proinflammatory cytokine genes in disc tissue - findings consistent with other studies involving patients with sciatica. However, these elevated cytokine levels did not show a significant correlation with pain intensity, indicating that inflammation may not be a primary factor influencing the severity of radicular pain. Additionally, the absence of any association between proinflammatory cytokine levels in both disc tissue and serum and pain duration suggests that this conclusion may apply to both acute and chronic forms of radicular pain [4].

B. The role of mechanical compression in painful radiculopathy

The role of nerve root compression in the development of pain associated with lumbar radiculopathy remains a subject of debate [4]. However, the nerve root involvement demonstrates the highest rate of diagnostic misinterpretation among eight commonly assessed spinal pathologies, highlighting the challenges in accurately identifying its clinical significance [6].

3. THE MOST COMMON RISK FACTORS

Numerous studies have been carried out to examine the impact of various risk factors on the development of sciatica. The conclusions consistently indicate that certain factors may increase the risk of developing sciatica in the future. A study carried out among the Northern Finnish population revealed a strong independent link between multisite pain and sciatica, reinforcing earlier findings that sciatica has a multifactorial origin [7]. Another conducted study showed that manual occupational status in both sexes, semi-professional occupations in males were identified as significant predictors of sciatica [8]. In addition, a likelihood of hospitalization due to sciatica appears to be high among individuals engaged in lifting or carrying heavy loads, as well as those in sedentary jobs that require handling moderately heavy objects [9]. Also, prior history of cervical spine and lumbar spine pain were identified as significant predictors of sciatica [8]. Obesity is another predisposing factor, which increases the risk of hospitalization for sciatica [7,9,10]. Obesity, as measured by body mass index, was associated with a 36% higher risk of hospitalization for sciatica, while abdominal obesity, determined by waist circumference, increased the risk by 41%. Individuals who were current smokers at baseline had a 33% higher risk of later hospitalization for sciatica,

while former smokers did not show an elevated risk [7,10]. Additional factors linked to sciatica are related to socioeconomic conditions, including low levels of education, unemployment, and living alone [7].

4. ACTIONS TO MINIMIZE THE RISK OF SCIATICA

Studies suggest that preventive interventions for sciatica should focus on reducing excessive physical workload, preventing overweight, encouraging smoking cessation, and promoting vigorous physical activity. Additionally, greater emphasis should be placed on the prevention and management of pain in other anatomical regions [8]. Although physical work is generally considered a risk factor, evidence suggests that heavy or very heavy work may actually act as a protective factor [9]. Engaging in active commuting, such as walking or cycling to work, has been correlated with a reduced risk, highlighting its significant potential implications for public health. In a conducted study, commuting to work by walking or cycling was associated with a 33% reduction in the incidence of hospitalization for sciatica, an effect that remained statistically significant after adjusting for body mass index and other recreational physical activities. In contrast, other types of leisure-time activities did not exhibit a significant protective effect [10]. Incorporating these factors into the therapeutic and rehabilitative approaches to sciatica may contribute to improved patient outcomes and a more efficient recovery process [7].

5. DIAGNOSIS

A. Physical examination

The study findings demonstrated a statistically significant association between the functional test and MRI findings at the L4–L5 vertebral level [11].

B. SLR

The Straight Leg Raise (SLR) test is a diagnostic maneuver used to assess nerve root tension. It is effective in reproducing pain associated with disc herniation by stretching the affected nerve roots, thereby mimicking the symptoms of nerve compression - most notably at the L5 and S1 levels. This test aids in distinguishing sciatica-related pain from discomfort caused by other conditions. During the test, the patient lies in a supine position while the examiner elevates the affected leg with the knee fully extended until pain is elicited. Anatomically, this action results in displacement or deformation of the L5 and S1 nerve roots by approximately 2–6 mm at the foraminal level. Consequently, the SLR test tenses the L5–S1 nerve roots, with less impact on L4 and minimal effect on higher levels. A positive result is indicated by the onset of pain when the leg is raised to an angle of less than 60 degrees. Nerve root compression is more frequently detected by the SLR test in individuals under the age of 30. As age increases, the likelihood of a positive SLR result steadily decreases, with patients over 60 years old being approximately five times less likely to exhibit a positive response compared to those under 60. This decline in test sensitivity with age may be due to age-related physiological changes and degenerative alterations in musculoskeletal structures. Although advancing age appears to reduce the diagnostic accuracy of the Straight Leg Raise (SLR) test, this association has not been found to be statistically significant [12].

C. ESLR

The Extended Straight Leg Raise (ESLR) test begins similarly to SLR test. The patient is lying in a supine position on the examination table, the examiner passively elevates the patient's leg while maintaining full knee extension, a neutral hip rotation, and allowing the ankle to remain relaxed. Leg elevation is continued until either initial symptoms are provoked or the patient’s pre-existing lower limb symptoms are exacerbated by approximately 30%. If no symptoms are elicited by the time the hip flexion reaches 90 degrees, the maneuver is discontinued and the test result is considered negative. The Extended Straight Leg Raise test differs from the conventional SLR in several aspects related to symptom provocation: (i) elicited responses are not required to reach below the knee, (ii) symptoms may manifest at any point within a range of 0 to 90 degrees of hip flexion, rather than strictly below 70 degrees, and (iii) a structural differentiation movement is added. To determine whether the elicited responses are neural or musculoskeletal in origin, a

targeted structural differentiation maneuver is performed at the precise angle of hip flexion where the symptoms are provoked.

The choice of the added movement is guided by the anatomical location of the provoked symptoms. For distally located symptoms - specifically those occurring below the knee—hip internal rotation is applied at the same angle of hip flexion at which the responses were evoked. Conversely, if the symptoms are provoked proximally, within the buttock or hamstring region, ankle dorsiflexion is used as the structural differentiation maneuver, akin to the technique in the Bragard test. A critical aspect of performing structural differentiation maneuvers lies in recognizing the continuity of the nervous system. A movement applied at a musculoskeletal site that is asymptomatic - but known to mobilize the sciatic neural structures and its contiguous nerve roots - may provoke referred responses in the target region. The ESLR is considered positive when two criteria are met: (i) the standard SLR evokes at least a portion of the patient's symptoms or exacerbated existing symptoms by 30%, and (ii) a structural differentiation maneuver - specifically one that mobilizes the nerve roots without influencing spinal structures, such as ankle dorsiflexion or hip internal rotation - further intensifies the provoked symptoms. Nonetheless, the ESLR should not be used as a definitive diagnostic tool for identifying or ruling out specific pathological conditions. Rather, its use is recommended as a complementary component of the overall clinical assessment. When integrated with patient history and other clinical findings, the ESLR may serve as a valuable tool in identifying individuals presenting with sciatic or neural symptoms [13].

D. Femoral stretch test

The femoral stretch test (FST) is conducted with the patient positioned prone. The examiner passively flexes the knee on the affected side by holding the ipsilateral ankle. The test is considered positive if this maneuver elicits the patient's characteristic lower limb pain [14].

E. Slump test

The patient is seated at the edge of the examination table with knees flexed and hands placed behind the back. The spine is passively flexed forward into full thoracolumbar flexion. Cervical flexion is then added, maintained manually by the examiner. Reproduction or increase of radicular symptoms is noted. Next, the patient dorsiflexes the ankle and extends the knee on the tested side. The degree of knee extension is measured using a digital inclinometer, and symptom response is recorded. The patient then extends the cervical spine, and any reduction in symptoms is noted. The procedure is repeated on the contralateral side. The test is considered positive if symptoms are alleviated with cervical spine extension and if asymmetry in pain or knee extension range is observed [15].

6. RADIOLOGICAL EXAMINATIONS

A. MRI

Imaging techniques play a crucial role in clinical diagnosis, with MRI being recognized as the gold standard detecting DH [11]. Magnetic resonance imaging is generally advised after six to eight weeks of ongoing pain unresponsive to conservative treatment. Nonetheless, urgent MRI evaluation is necessary if a patient is having an acute neurologic deficit or when a mass effect is suspected [1]. Analysis of the correlations between VAS scores and MRI findings revealed a moderate relationship between the intensity of pain and the size of the disc herniation at the L4-L5 intervertebral level [11].

B. CT

A non-contrast CT scan can be helpful in identifying fractures [1]. CT demonstrates high sensitivity and specificity. A study has been conducted and demonstrated that CT is comparably sensitive to lumbar MRI in assessing most of the analyzed items, aside from Modic changes, degenerative alterations, disc signal, and disc herniation [16].

C. X-Ray

X-ray imaging of the lumbosacral spine is used to detect instability, fractures, and spondylolisthesis [1].

D. EMG

In patients with chronic low back pain (CLBP) presenting with radicular symptoms, electromyography (EMG) can be a valuable diagnostic tool for identifying the underlying etiology. EMG allows for precise localization of the affected nerve root and helps differentiate between radiculopathy and peripheral neuropathy, thereby distinguishing intrinsic from peripheral nerve involvement - each requiring different therapeutic approaches [17]. However, it is not regarded as an essential diagnostic tool [1].

E. ODI - functional assessment scale

The Oswestry Disability Index (ODI) is the most widely used disease-specific patient-reported outcome measure for assessing functional disability associated with back pain. In a study evaluating the strengths and limitations of the ODI as a tool for assessing back pain patients, the index showed generally good performance. However, it also had some problematic findings that may complicate the interpretation of some results [18].

F. VAS

The relationship between the visual analog scale (VAS) and MRI findings was assessed, revealing a moderate but significant positive correlation between VAS scores and the presence of DH [11].

7. QUALITY OF LIFE

The term "quality of life" (QL) in the context of health emerged from the recognition that health is a vital (if not the most essential) component of overall quality of life. To obtain a comprehensive understanding of a patient's health condition, it is important to assess health-related quality of life (HRQL) in addition to standard clinical evaluations. These assessments should go beyond focusing solely on the affected organ or system and should include functional impairments - physical, emotional, and social - experienced by the patient as a result of their condition [19].

Data from 8,385 patients with back and leg pain, with a mean age of 52, were analyzed [20]. A strong correlation was found between the EQ-5D (mobility, self-care, usual activities, pain/discomfort and anxiety/depression assessment) and the ODI, as well as between the EQ-5D and back pain scores [20,21]. A moderate correlation was observed between the EQ-5D and leg pain scores. Greater levels of disability, as indicated by higher ODI scores, were associated with lower EQ-5D scores, demonstrating a similar pattern of response for both back and leg pain scores [20].

8. TREATMENT

A. Physiotherapy

Early referral to physical therapy following an initial primary care consultation for recent-onset low back pain with sciatica was associated with significantly greater improvements in disability and other clinical outcomes over a one-year follow-up period, compared to usual care [22]. Neurodynamic techniques and conventional exercise therapy are both commonly integrated into evidence-based rehabilitation protocols for managing sciatica-related symptoms. Both contribute to the reduction of radicular pain. However, the immediate application of neurodynamics in conjunction with conventional exercises demonstrated superior activation of the biceps femoris muscle compared to conventional exercises alone. Based on the findings, it may be concluded that combining neurodynamic techniques with conventional exercise therapy is effective in alleviating pain, enhancing biceps femoris muscle activation, and improving health-related quality of life (HRQL) in individuals with sciatica [23].

B. Pharmacotherapy

Pharmacological treatment plays a critical role in managing low back pain, particularly when non-pharmacological interventions alone are insufficient [24]. Among available medications, nonsteroidal anti-inflammatory drugs (NSAIDs) and muscle relaxants such as cyclobenzaprine and tizanidine have demonstrated the most favorable balance of benefits and risks for short-term relief of pain and disability [1,24]. These medications are widely used during the acute phase to reduce symptoms in the early stages,

offering rapid relief from pain [24]. In addition to first-line treatments, several other pharmacological agents - including corticosteroids, anticonvulsants, and antidepressants can also be prescribed as part of therapeutic protocols [25]. In individuals with acute radiculopathy resulting from lumbar disc herniation, short-term oral corticosteroid therapy has been associated with slight improvements in functional outcomes but does not appear to significantly alleviate pain compared to placebo [26]. Although certain studies have also explored the efficacy of gabapentin and pregabalin in the management of pain associated with acute sciatica or low back pain, the supporting evidence remains insufficient. Furthermore, documented adverse effects and other clinical considerations raise concerns regarding their safety profile, and therefore, routine clinical use of these agents cannot be recommended [25]. Transforaminal epidural steroid injections (TESI) represent an alternative method of corticosteroid delivery that has been evaluated for their effectiveness in the treatment of acute sciatica. Evidence from a study comparing TESI interventions with standard care showed no significant differences in primary outcomes, apart from a modest improvement in leg pain observed in one intervention group. However, analysis of secondary outcomes demonstrated increased patient satisfaction. Furthermore, patients in the TESI groups achieved a 50% or greater reduction in leg pain at three months, along with decreased opioid consumption. Observed pain reduction and lower opioid usage suggest potential therapeutic value as a supportive treatment in appropriately selected patients [27].

C. Surgery

In cases where conservative treatment is ineffective in managing severe pain, surgical intervention may be indicated [28]. Surgical intervention for chronic low back pain (CLBP) involves complex, multifactorial decision-making. Patients are evaluated through clinical examination and diagnostic testing after failing to respond to conservative treatment, including physical therapy, pharmacologic management, and interventional pain procedures. Surgical candidacy depends not only on objective clinical criteria but also on a shared understanding of treatment goals between the patient and the surgeon. The potential limitations of non-surgical management should be clearly communicated, and any surgical plan must reflect the patient's treatment priorities. If a patient presents with imaging-confirmed pathology and matching clinical signs, and has clear, realistic treatment goals, operative management should be considered [17]. Among surgical options, microdiscectomy constitutes an important therapeutic approach for patients suffering from chronic sciatica secondary to herniation at the L4-L5 or L5-S1 levels. Studies have shown that microdiscectomy provides superior clinical outcomes compared to nonoperative treatment. These findings underscore the value of surgical intervention, particularly in cases not responding to non-surgical treatment [29]. Percutaneous transforaminal endoscopic discectomy (PTED) has gained attention as a potential alternative to traditional open surgery for lumbar disc herniation. It has been investigated for its efficacy in reducing leg pain caused by sciatica. Research aimed to determine whether PTED is at least as effective as conventional open microdiscectomy in improving clinical outcomes. Studies have demonstrated that PTED is non-inferior to open microdiscectomy in terms of leg pain reduction. Furthermore, PTED has demonstrated slightly better clinical results in terms of patient-reported outcomes, including back pain, functional status, quality of life, and overall recovery. Although the differences are present, their clinical impact may be limited. PTED represents an effective and less invasive option for managing sciatica in appropriately selected patients [30].

9. DIFFERENTIAL DIAGNOSIS OF CHRONIC LOW BACK PAIN (CLBP)

Chronic low back pain (CLBP) has a complex and heterogeneous etiology, which complicates diagnosis and management. It is commonly classified into five main types: radicular, axial, mechanical, claudicant, and oncologic.

Radicular pain: Originates in the lower back and radiates along a dermatomal distribution into the lower extremity, typically resulting from nerve root compression.

Axial pain: Localized to the lumbosacral region and worsens with standing or spinal loading.

Mechanical pain: Pain localized to the lumbar spine that intensifies with spinal flexion, extension, or movement.

Claudicant pain: Pain in both legs that limits walking and standing but improves with rest or sitting. It can be mistaken for vascular claudication, but unlike that, the pain also occurs while standing. This usually indicates spinal canal narrowing and compression of the cauda equina nerves.

Oncologic pain: Severe, persistent pain that intensifies at night. It should be suspected in patients with a history of cancer or recent unexplained weight loss accompanied by localized back pain. The pain may result from increased pressure within the bone, micro-fractures, and periosteal stretching. Its nocturnal worsening is thought to be related to the circadian decrease in endogenous corticosteroid production, which enhances inflammation [17].

10. CONCLUSIONS

Sciatica, as a common manifestation of low back pain, represents a clinically heterogeneous condition with multifactorial etiology. Although nerve root compression due to disc herniation remains the primary cause, increasing evidence highlights the role of systemic and local inflammatory mediators, as well as lifestyle and occupational risk factors.

Effective diagnosis requires a comprehensive clinical evaluation, integrating patient history, physical examination, and imaging modalities - particularly magnetic resonance imaging (MRI), which remains the gold standard for detecting disc pathology. Functional diagnostic tests (such as SLR and ESLR), disability assessment scales (e.g., Oswestry Disability Index), and quality of life tools (e.g., EQ-5D) are valuable for characterizing symptom severity and guiding treatment decisions.

Management should follow a stepwise approach, beginning with conservative therapies, including pharmacological treatment and physiotherapy, with escalation to surgical interventions in refractory cases. Minimally invasive techniques, such as percutaneous transforaminal endoscopic discectomy (PTED), have emerged as effective alternatives to traditional surgery, offering comparable outcomes with reduced perioperative morbidity.

Preventive strategies focused on modifiable risk factors - such as obesity, physical inactivity, tobacco use, and physical job - are essential for reducing the incidence of sciatica. Given the complex pathophysiology and variable clinical presentation, a personalized, multidisciplinary approach remains essential for optimizing outcomes.

Further interdisciplinary research is warranted to better elucidate the underlying mechanisms of sciatica and refine diagnostic and therapeutic protocols. A patient-centered framework, integrating both physical and psychosocial aspects, is crucial in improving long-term prognosis and health-related quality of life in affected individuals.

REFERENCES:

[1] Aguilar-Shea AL, Gallardo-Mayo C, Sanz-González R, Paredes I. Sciatica. Management for family physicians. *J Family Med Prim Care*. 2022 Aug;11(8):4174-9. doi: 10.4103/jfmpc.jfmpc_1061_21. PMID: 36353002; PMCID: PMC9638590.

[2] Cunha C, Silva AJ, Pereira P, Vaz R, Gonçalves RM, Barbosa MA. The inflammatory response in the regression of lumbar disc herniation. *Arthritis Res Ther*. 2018 Nov 6;20(1):251. doi: 10.1186/s13075-018-1743-4. PMID: 30400975; PMCID: PMC6235196.

[3] Fairag M, Kurdi R, Alkathiry A, Alghamdi N, Alshehri R, Alturkistany FO, et al. Risk Factors, Prevention, and Primary and Secondary Management of Sciatica: An Updated Overview. *Cureus*. 2022 Nov 12;14(11):e31405. doi: 10.7759/cureus.31405. PMID: 36514653; PMCID: PMC9743914.

[4] Samuelly-Leichtag G, Eisenberg E, Zohar Y, Andraous M, Eran A, Sviri GE, et al. Mechanism underlying painful radiculopathy in patients with lumbar disc herniation. *Eur J Pain*. 2022 Jul;26(6):1269-81. doi: 10.1002/ejp.1947. PMID: 35357731; PMCID: PMC10083974.

[5] Jacobsen HE, Khan AN, Levine ME, Filippi CG, Chahine NO. Severity of intervertebral disc herniation regulates cytokine and chemokine levels in patients with chronic radicular back pain. *Osteoarthritis Cartilage*. 2020 Oct;28(10):1341-50. doi: 10.1016/j.joca.2020.06.009. PMID: 32653386; PMCID: PMC7529955.

[6] Herzog R, Elgort DR, Flanders AE, Moley PJ. Variability in diagnostic error rates of 10 MRI centers performing lumbar spine MRI examinations on the same patient within a 3-week period. *Spine J*. 2017 Apr;17(4):554-61. doi: 10.1016/j.spinee.2016.11.009. PMID: 27867079.

[7] Anttila S, Määttä J, Heikkala E, Arokoski J, Karppinen J, Oura P. Associations of socioeconomic and lifestyle characteristics, psychological symptoms, multimorbidity, and multisite pain with sciatica - a 15-year longitudinal study. *Spine J*. 2024 May;24(5):842-50. doi: 10.1016/j.spinee.2023.12.013. PMID: 38211903.

[8] Kääriä S, Leino-Arjas P, Rahkonen O, Lahti J, Lahelma E, Laaksonen M. Risk factors of sciatic pain: a prospective study among middle-aged employees. *Eur J Pain*. 2011 Jul;15(6):584-90. doi: 10.1016/j.ejpain.2010.11.008. PMID: 21163676.

[9] Euro U, Heliövaara M, Shiri R, Knekt P, Rissanen H, Aromaa A, Karppinen J. Work-related risk factors for sciatica leading to hospitalization. *Sci Rep*. 2019 Apr 25;9(1):6562. doi: 10.1038/s41598-019-42597-w. PMID: 31024023; PMCID: PMC6484005.

[10] Shiri R, Euro U, Heliövaara M, Hirvensalo M, Husgafvel-Pursiainen K, Karppinen J, et al. Lifestyle risk factors increase the risk of hospitalization for sciatica: findings of four prospective cohort studies. *Am J Med*. 2017 Dec;130(12):1408-16.e6. doi: 10.1016/j.amjmed.2017.06.027. PMID: 28750940.

[11] Antohe BA, Uysal HŞ, Panaet AE, Iacob GS, Rață M. The relationship between magnetic resonance imaging and functional tests assessment in patients with lumbar disk hernia. *Healthcare (Basel)*. 2023 Oct 1;11(19):2669. doi: 10.3390/healthcare11192669. PMID: 37830706; PMCID: PMC10572759.

[12] Qazi SA, Qazi RA, Ahmed T, Rehman L, Javeed F, Aziz HF. The diagnostic accuracy of straight leg raise test in patients more than 60 years of age suffering lumbar disk herniation with low back pain and sciatica. *J Neurosci Rural Pract*. 2023 Oct-Dec;14(4):610-4. doi: 10.25259/JNRP_97_2023. PMID: 38059256; PMCID: PMC10696343.

[13] Pesonen J, Shacklock M, Suomalainen JS, Karttunen L, Mäki J, Airaksinen O, et al. Extending the straight leg raise test for improved clinical evaluation of sciatica: validity and diagnostic performance with reference to the magnetic resonance imaging. *BMC Musculoskelet Disord*. 2021 Sep 21;22(1):808. doi: 10.1186/s12891-021-04649-z. PMID: 34548049; PMCID: PMC8456642.

[14] Suri P, Rainville J, Katz JN, Jouve C, Hartigan C, Limke J, et al. The accuracy of the physical examination for the diagnosis of midlumbar and low lumbar nerve root impingement. *Spine (Phila Pa 1976)*. 2011 Jan 1;36(1):63-73. doi: 10.1097/BRS.0b013e3181c953cc. PMID: 20543768; PMCID: PMC2978791.

[15] Urban LM, MacNeil BJ. Diagnostic accuracy of the slump test for identifying neuropathic pain in the lower limb. *J Orthop Sports Phys Ther*. 2015 Aug;45(8):596-603. doi: 10.2519/jospt.2015.5414. PMID: 26107044.

[16] Martel Villagrán J, Martínez-Sánchez RT, Cebada-Chaparro E, Bueno Horcajadas AL, Pérez-Fernández E. Diagnostic accuracy of lumbar CT and MRI in the evaluation of chronic low back pain without red flag symptoms. *Radiologia (Engl Ed)*. 2023 Oct;65 Suppl 2:S59-S70. doi: 10.1016/j.rxeng.2023.02.004. PMID: 37858354.

[17] Franco D, Mahtabfar A, Hines K, Sabourin V, Stefanelli A, Harrop J. Neurosurgical evaluation for patients with chronic lower back pain. *Curr Pain Headache Rep*. 2020 Aug 17;24(10):58. doi: 10.1007/s11916-020-00894-4. PMID: 32803429.

[18] Brodke DS, Goz V, Lawrence BD, Spiker WR, Neese A, Hung M. Oswestry Disability Index: a psychometric analysis with 1,610 patients. *Spine J*. 2017 Mar;17(3):321-7. doi: 10.1016/j.spinee.2016.09.020. PMID: 27693732.

[19] Mahmutović E, Safiye T, Biševac E, Ajdinović A, Salihagić Z, Minić S, et al. Quality of life and functional status of patients with lumbar radiculopathy. *Iran J Public Health*. 2024 Aug;53(8):1837-46. doi: 10.18502/ijph.v53i8.16289. PMID: 39415857; PMCID: PMC11475174.

[20] Mueller B, Carreon LY, Glassman SD. Comparison of the EuroQOL-5D with the Oswestry Disability Index, back and leg pain scores in patients with degenerative lumbar spine pathology. *Spine (Phila Pa 1976)*. 2013 Apr 20;38(9):757-61. doi: 10.1097/BRS.0b013e31827ab803. PMID: 23124265.

[21] Devlin NJ, Brooks R. EQ-5D and the EuroQol Group: past, present and future. *Appl Health Econ Health Policy*. 2017 Apr;15(2):127-37. doi: 10.1007/s40258-017-0310-5. PMID: 28194657; PMCID: PMC5343080.

[22] Fritz JM, Lane E, McFadden M, Brennan G, Magel JS, Thackeray A, et al. Physical therapy referral from primary care for acute back pain with sciatica: a randomized controlled trial. *Ann Intern Med*. 2021 Jan;174(1):8-17. doi: 10.7326/M20-4187. PMID: 33017565; PMCID: PMC7856080.

[23] Pradhan A, J M. Effects of neurodynamics along with conventional exercises on sciatica patients: a single-blinded randomized clinical trial. *Cureus*. 2024 May 6;16(5):e59722. doi: 10.7759/cureus.59722. PMID: 38840988; PMCID: PMC11151706.

[24] Gianola S, Bargeri S, Del Castillo G, Corbetta D, Turolla A, Andreano A, et al. Effectiveness of treatments for acute and subacute mechanical non-specific low back pain: a systematic review with network meta-analysis. *Br J Sports Med*. 2022 Jan;56(1):41-50. doi: 10.1136/bjsports-2020-103596. PMID: 33849907; PMCID: PMC8685632.

[25] Giménez-Campos MS, Pimenta-Fermisson-Ramos P, Díaz-Cambronero JI, Carbonell-Sanchís R, López-Briz E, Ruíz-García V. A systematic review and meta-analysis of the effectiveness and adverse events of gabapentin and pregabalin for sciatica pain. *Aten Primaria*. 2022 Jan;54(1):102144. doi: 10.1016/j.aprim.2021.102144. PMID: 34637958; PMCID: PMC8515246.

[26] Goldberg H, Firtch W, Tyburski M, Pressman A, Ackerson L, Hamilton L, et al. Oral steroids for acute radiculopathy due to a herniated lumbar disk: a randomized clinical trial. *JAMA*. 2015 May 19;313(19):1915-23. doi: 10.1001/jama.2015.4468. PMID: 25988461; PMCID: PMC5875432.

[27] Ter Meulen BC, van Dongen JM, Maas E, van de Vegt MH, Haumann J, Weinstein HC, et al. Effect of transforaminal epidural corticosteroid injections in acute sciatica: a randomized controlled trial. *Clin J Pain*. 2023 Dec 1;39(12):654-62. doi: 10.1097/AJP.0000000000001155. PMID: 37712323.

[28] Lang SAJ, Bohn T, Barleben L, Pumberger M, Roll S, Büttner-Janz K. Advanced meta-analyses comparing the three surgical techniques total disc replacement, anterior stand-alone fusion and circumferential fusion regarding pain, function and complications up to 3 years to treat lumbar degenerative disc disease. *Eur Spine J*. 2021 Dec;30(12):3688-701. doi: 10.1007/s00586-021-06784-6. PMID: 33837832.

[29] Bailey CS, Glennie A, Rasoulinejad P, Kanawati A, Taylor D, Sequeira K, et al. Discectomy compared with standardized nonoperative care for chronic sciatica due to a lumbar disc herniation: a secondary analysis of a randomized controlled trial with 2-year follow-up. *J Bone Joint Surg Am*. 2021 Dec 1;103(23):2161-9. doi: 10.2106/JBJS.21.00448. PMID: 34637408.

[30] Gadjradj PS, Rubinstein SM, Peul WC, Depauw PR, Vleggeert-Lankamp CL, Seiger A, et al. Full endoscopic versus open discectomy for sciatica: randomised controlled non-inferiority trial. *BMJ*. 2022 Feb 21;376:e065846. doi: 10.1136/bmj-2021-065846. PMID: 35190388; PMCID: PMC8859734.