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Diagnosis and treatment of lumbar disc herniation: an integrative review

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INTRODUCTION

Review question / Objective The target population comprises adults diagnosed with lumbar disc herniation, particularly those with symptoms of low back pain and sciatica. Within this group, different therapeutic interventions were analyzed. Surgical interventions include endoscopic discectomy, transforaminal discectomy, and open surgery. Conservative interventions involve methods such as physiotherapy, analgesia, manual therapy, rest, and strengthening exercises.

To establish comparisons, the study evaluated the effectiveness of the different approaches, comparing endoscopic discectomy with open surgery, and surgical treatment with conservative treatment. These comparisons allow us to identify which methods offer better results for patients.

The outcomes analyzed include both primary outcomes, such as pain reduction, improvement in

functionality (assessed by scales such as the Oswestry Disability Index), and recovery time, as well as secondary outcomes, such as long-term quality of life, herniation recurrence rate, and postoperative complications.

Finally, study selection encompassed a variety of study designs, including systematic reviews and meta-analyses, randomized controlled trials, observational studies (retrospective and prospective cohort), and literature reviews focused on diagnostic methods and therapeutic efficacy.

Rationale Lumbar disc herniation is one of the most prevalent and debilitating conditions affecting the spine, negatively impacting the quality of life of millions of people worldwide. In addition to causing severe and disabling pain, this condition is a leading cause of absence from work and early retirement, resulting in considerable economic impact and burden on health systems. In Brazil, low back pain, of which disc herniation is an important component, occupies a prominent

position as the main reason for granting sickness benefits and the third most common reason for disability retirement.

Despite its high prevalence and significant impact, the management of lumbar disc herniation still presents several controversies and challenges. The diversity of therapeutic approaches available, ranging from conservative treatments, such as physiotherapy and medication, to surgical interventions, such as endoscopic discectomy and open surgery, creates uncertainty about which strategy provides the best results for patients, especially in the long term. Furthermore, the choice of diagnostic methods, particularly magnetic resonance imaging, also raises questions about their accuracy and cost-effectiveness, considering the need for an accurate diagnosis to guide appropriate treatment. In this context, the integrative review proposed in this study is essential to synthesize the most recent evidence on the diagnosis and treatment of lumbar disc herniation. The objective is to provide a critical and comprehensive analysis of the literature that can clarify best practices and guide clinical decisions, reducing uncertainties and promoting more effective and evidence-based care. In addition, the review seeks to identify gaps in current knowledge, highlighting areas that require further investigation, and thus contribute to the advancement of clinical guidelines and the improvement of patients' quality of life. Therefore, this study is justified by the urgent need to consolidate existing knowledge and provide a solid basis for clinical practice that responds to the demands of both health professionals and patients in the search for more effective treatments and more accurate diagnoses for lumbar disc herniation.

Condition being studied Lumbar disc herniation is a common and debilitating condition that affects the spine, particularly the lumbar region, where the intervertebral discs support much of the body's weight and are responsible for the spine's flexibility. The intervertebral disc is a structure composed of a nucleus pulposus, a jelly-like substance in the center, and an annulus fibrosus, the tougher outer layer that surrounds the nucleus. A herniation occurs when the nucleus pulposus moves through a crack or tear in the annulus fibrosus, causing the disc to protrude beyond its normal limits. This displacement can put pressure on nearby nerve roots or the spinal cord, resulting in a range of symptoms, the most common of which are low back pain and sciatica (radiating pain down the legs). Other symptoms include muscle weakness, tingling, numbness, and loss of reflexes in the lower limbs, all resulting from nerve

compression. These symptoms can vary in intensity and duration, and in severe cases, prolonged nerve compression can lead to permanent neurological dysfunction. Lumbar disc herniation is particularly prevalent among middle-aged adults, especially those who perform activities that place excessive stress on the spine, such as lifting weights or performing repetitive movements. The natural degeneration of the intervertebral discs that occurs with aging is also a predisposing factor. The gradual wear and tear of the annulus fibrosus makes the disc more susceptible to rupture, increasing the risk of herniation. The diagnosis of lumbar disc herniation is based on a combination of clinical evaluation and imaging tests. Physical examination may reveal signs such as tenderness, limited range of motion, and decreased reflexes. The Lasègue test, which assesses the presence of pain when the leg is raised, is often used as an indication of nerve compression. Confirmation of the diagnosis usually requires imaging tests, with magnetic resonance imaging being the gold standard. This examination allows detailed visualization of the intervertebral discs, nerve roots, and surrounding structures, identifying the exact location and extent of the herniation. Treatment of lumbar disc herniation varies depending on the severity of symptoms and the impact on the patient's quality of life. In many cases, conservative treatment is the first line of treatment, including rest, physical therapy, anti-inflammatory medications, and pain medications. Physical therapy aims to strengthen the muscles around the spine, improve flexibility, and reduce pressure on the affected disc. If conservative treatment fails to relieve symptoms or if there are signs of severe neurological impairment, such as loss of bladder or bowel control, surgical intervention may be indicated. Among the surgical options, endoscopic discectomy and transforaminal discectomy are minimally invasive techniques that aim to remove the part of the disc that is compressing the nerves, relieving pain and improving neurological function. Open surgery, although more invasive, is still an option in complex cases or when minimally invasive techniques are not adequate. The choice of treatment should be personalized, taking into account the extent of the herniation, the response to conservative treatment, and the patient's preferences. It is important to note that although surgery may provide faster pain relief, the long-term results compared to conservative treatment are generally similar. In summary, lumbar disc herniation is a complex and multifactorial condition that requires a careful diagnostic and therapeutic approach. Appropriate management not only alleviates symptoms but also improves quality of

life and prevents future complications, making an accurate assessment and a personalized treatment plan for each patient essential.

METHODS

Search strategy In the study on "Diagnosis and treatment of lumbar disc herniation: an integrative review", the search strategy was carefully designed to ensure the inclusion of the most relevant and up-to-date evidence available in the scientific literature. The objective was to conduct a comprehensive analysis of the diagnostic criteria and therapeutic approaches for lumbar disc herniation, in order to provide a critical and informative synthesis that could guide clinical practices.

The search was conducted in electronic databases widely recognized for the quality and comprehensiveness of their scientific collections. The following databases were included:

PubMed: One of the most important biomedical databases in the world, maintained by the National Library of Medicine of the United States, which provides access to a wide range of articles in medicine and health sciences.

LILACS (Latin American and Caribbean Literature in Health Sciences): Database that covers the scientific literature on health produced in Latin America and the Caribbean, offering a relevant regional perspective.

SciELO (Scientific Electronic Library Online): An electronic library that includes a selected collection of scientific journals from several Latin American countries, Portugal, Spain, and South Africa.

Google Scholar: An academic search engine that indexes a wide variety of academic sources, including peer-reviewed articles, theses, books, and conference abstracts.

To ensure that the search was comprehensive and captured the most relevant studies, specific descriptors related to lumbar disc herniation were used. The search terms were selected based on the most commonly used keywords in the scientific literature and were applied in both Portuguese and English. The descriptors used included:

- In Portuguese:
 - "Hérnia de Disco Lumbar"
 - "Diagnosis"
 - "Treatment"
 - "Coluna Lumbo-sacral"
- In English:
 - "Lumbar Disc Herniation"

- "Diagnosis"
- "Treatment"
- "Lumbar Spine"

These terms were combined to cover the different aspects of the topic, from diagnostic methods to therapeutic options. The use of terms in both languages was essential to ensure the inclusion of articles published in both national and international journals, expanding the representativeness and diversity of sources.

After conducting searches in the aforementioned databases, 18,942 publications were initially identified. This large number of studies highlights the importance and volume of research on the topic. However, to ensure the relevance and quality of the data included in the review, it was necessary to apply strict inclusion and exclusion criteria.

The inclusion criteria were defined as:

- Publications in Portuguese and English: Articles that were available in these languages were selected to ensure accessibility of the content.
- Availability of full text: Only articles that were available in full were included, allowing a detailed analysis of their methods, results and conclusions.
- Publications in the last seven years: This criterion was established to ensure that the review included the most recent and up-to-date evidence.

After applying these criteria, the number of articles was significantly reduced. Eleven articles were selected that met all the inclusion criteria and that directly addressed the topic of lumbar disc herniation, focusing on diagnosis and treatment. The included studies were then analyzed in detail to compile the best available evidence on the different therapeutic approaches and diagnostic methods used.

The search strategy adopted in this study was essential to ensure that the integrative review was based on solid and representative evidence. The careful selection of databases and search terms allowed the inclusion of a diverse sample of studies, covering different aspects of the diagnosis and treatment of lumbar disc herniation.

In addition, the application of filters such as language and publication period helped to focus the review on the most relevant and current research, avoiding the inclusion of outdated or irrelevant studies. This ensures that the conclusions and recommendations derived from the review can be reliably applied in current clinical practice.

In summary, the search strategy was a crucial component of this study, allowing the construction of a robust and informative integrative review, which can significantly contribute to more informed clinical decision-making and to the advancement of knowledge about the management of lumbar disc herniation.

Participant or population The target population comprises adults diagnosed with lumbar disc herniation, particularly those with symptoms of low back pain and sciatica. Within this group, different therapeutic interventions were analyzed. Surgical interventions include endoscopic discectomy, transforaminal discectomy, and open surgery. Conservative interventions involve methods such as physiotherapy, analgesia, manual therapy, rest, and strengthening exercises.

Intervention Based on the integrative review work on the diagnosis and treatment of lumbar disc herniation, the main intervention would be minimally invasive surgical treatment by percutaneous endoscopic discectomy. This technique has been shown to be effective in rapid pain relief and functional recovery, in addition to presenting a shorter hospital stay and lower morbidity compared to traditional open surgery.

The comparative intervention applied to the target population would be conservative treatment, which includes physical therapy, medication use and rest. The studies reviewed indicate that, although surgical treatment offers faster pain relief, the long-term results between surgery and conservative treatment tend to be equivalent.

Therefore, surgical intervention (endoscopic discectomy) would be compared to conservative treatment, with the aim of evaluating the efficacy, safety, recovery time and pain relief at different times, especially in the short and long term. The primary outcomes analyzed would be pain reduction, return to daily activities and the quality of life of patients..

Comparator In the context of the study on the treatment of lumbar disc herniation, the comparative intervention to be applied to the target population is conservative treatment, which includes physical therapy, medications (such as analgesics and anti-inflammatories) and rest. This conservative approach will be compared to the main intervention, which is percutaneous endoscopic discectomy.

The comparison between these two approaches aims to assess which one offers better results in terms of pain relief, functional recovery, return to

daily activities and associated complications. Conservative treatment is widely used as a first-line intervention, especially in patients who do not present severe or debilitating symptoms, while surgical treatment is indicated for cases that do not respond well to conservative treatment or that require rapid relief of symptoms.

Study designs to be included The integrative review will include randomized clinical trials, as they are the gold standard for evaluating the effectiveness of interventions; prospective and retrospective cohort studies, which will allow the analysis of short- and long-term outcomes; and systematic reviews and meta-analyses*, to synthesize and compare the best results available in the literature. These study models will ensure a comprehensive and evidence-based approach, covering both the diagnosis and the different therapeutic approaches for lumbar disc herniation.

Eligibility criteria Additional Inclusion Criteria: Only complete, peer-reviewed scientific articles were included, ensuring that the selected studies were of high methodological quality. The time frame included publications from the last seven years (from 2017 to 2023), with the aim of incorporating the most recent and relevant approaches in the management of lumbar disc herniation. In addition, only studies in Portuguese and English* were considered, as these are the predominant languages in publications accessible to the target audience of this review. Another important criterion was the full availability of articles: only those that were available in full, without access restrictions, were included, ensuring that all relevant information was analyzed in depth.

Additional Exclusion Criteria: Studies duplicated between different databases, such as Google Scholar and SciELO, were excluded to avoid redundant counting of the same data. Furthermore, studies that addressed topics outside the main scope of the review, such as spinal pathologies without a direct focus on lumbar disc herniation or that addressed other clinical conditions unrelated to the diagnosis or treatment of disc herniation, were excluded. Studies that focused on very specific populations, such as children, the elderly or patients with rheumatological comorbidities, were also excluded, since they did not represent the general population affected by lumbar disc herniation. Finally, studies that presented incomplete data or inadequate outcomes for the objectives of the review were disregarded, ensuring that only studies with sufficient information on clinical

outcomes (such as pain relief, functionality and recovery) were included.

These additional criteria ensured that the review was focused, current and rigorous, providing a comprehensive yet specific analysis of the most relevant therapeutic and diagnostic approaches for lumbar disc herniation.

Information sources The information sources used in this integrative review include electronic databases, specifically PubMed, Lilacs, SciELO and Google Scholar. These platforms were selected because they offer access to a wide variety of peer-reviewed scientific articles covering the diagnosis and treatment of lumbar disc herniation. No direct contact with authors was made for additional information, nor was grey literature (such as dissertations, theses or unpublished documents) included. Furthermore, no clinical trial registries were consulted. The search focused on articles available in full and published in the last seven years.

Main outcome(s) The results of this integrative review highlight the efficacy of percutaneous endoscopic discectomy in the treatment of lumbar disc herniation. This minimally invasive method provided faster pain relief and functional recovery compared to traditional open surgery. The length of hospital stay was shorter and the risk of postoperative complications, such as infections and fibrosis, was also reduced. In terms of effect measures, patients treated surgically showed faster improvements in pain scales, such as the Visual Analogue Scale (VAS), in the short term.

However, long-term results showed that, after a year or more, there were no significant differences between patients treated surgically and those who received conservative treatment, which includes physiotherapy, medication and rest. Both groups presented similar outcomes in terms of pain relief and return to function.

Regarding diagnosis, magnetic resonance imaging (MRI) was considered the most accurate method for identifying lumbar disc herniation, being essential for defining treatment and surgical planning. MRI allows detailed visualization of soft tissues and surrounding structures, overcoming the limitations of other imaging tests, such as plain radiography.

In summary, the results indicate that, while surgical treatment provides faster relief of symptoms, conservative treatment offers comparable long-term results. The choice between approaches

depends on the individual clinical presentation, the severity of symptoms and the patient's preferences, reinforcing the importance of an accurate and personalized diagnostic evaluation.

Additional outcome(s) In addition to the main results, the review highlighted some important additional findings. First, it was found that percutaneous endoscopic surgery, in addition to reducing hospital stay, also minimized intraoperative blood loss and trauma to surrounding tissues, such as the paraspinal muscles. This approach also demonstrated a lower risk of long-term complications, such as epidural fibrosis and spinal instability, which are common with open surgery.

Another important finding was that although conservative treatment (physical therapy, medication, rest) did not provide as immediate relief as surgery, it was effective for most patients over a period of one year or more. Many patients who followed conservative treatments returned to their normal activities without the need for surgery, especially those with less severe hernias.

Regarding diagnostic methods, the review confirmed that, in addition to magnetic resonance imaging (MRI), computed tomography (CT) and myelography are also useful in specific cases, although they are less accurate in detecting disc herniations compared to MRI. These methods were mentioned as complementary in cases of diagnostic doubts or in patients with contraindications for MRI.

Finally, the review pointed out that the learning curve for the percutaneous endoscopic discectomy technique is longer, which may influence the widespread adoption of the technique. However, the reviewed studies suggest that, as surgeons become more familiar with the procedure, the results become more consistent and satisfactory.

Data management Data management in this integrative review was carried out in a careful and structured manner to ensure the reliability and traceability of all information collected. The management process followed several essential steps:

First, the articles were collected from electronic databases such as PubMed, Lilacs, SciELO and Google Scholar. Specific filters were applied, limiting the search to publications from the last seven years, written in Portuguese and English, and related to the diagnosis and treatment of

lumbar disc herniation. The descriptors used in the search were carefully selected, ensuring the relevance of the retrieved studies. The results were then compiled in a centralized database.

The records were then organized in electronic spreadsheets, containing key information about each study, such as title, authors, year of publication, type of study, interventions addressed and main conclusions. In addition, the source and database from which the article was extracted were duly recorded to ensure the traceability of the information.

After this organization, the previously defined inclusion and exclusion criteria were applied. These criteria were used to select only the studies most relevant to the topic of the review. Duplicate articles or those that did not meet the established criteria, such as publications outside the scope or that did not contain complete data, were excluded. The review was conducted manually by qualified reviewers, ensuring accuracy in the selection of studies.

During the analysis phase, the extracted data were organized into tables and graphs, facilitating the comparison of results and the visualization of the main outcomes, such as pain relief and treatment efficacy.

To ensure the security and integrity of the data, all records were stored on a secure platform, with automatic backups and restricted access, preventing loss or unauthorized access. This approach ensured efficient and secure management, allowing for accurate analysis and reliable conclusions in the review.

Quality assessment / Risk of bias analysis The quality assessment of the primary studies included in this integrative review was conducted rigorously, using standardized and recognized tools to ensure the reliability of the results and reduce the risk of bias. The assessment process followed several fundamental steps.

For the randomized clinical trials, the Jadad scale or the Cochrane Risk of Bias Tool, both widely used in the assessment of methodological quality, were used. These tools analyze aspects such as the randomization method, the clarity in the description of the participant allocation process, the use of blinding (both for patients and evaluators) and the description of losses to follow-up. These criteria were essential to determine the internal validity of the studies and the robustness of their conclusions.

In the observational studies, such as cohort or retrospective studies, the Newcastle-Ottawa scale was used. This tool assesses the quality of participant selection, comparability between groups and the precision in measuring outcomes. Factors such as control of confounding variables and the way outcomes were assessed received special attention to ensure the quality of the evidence.

Regarding the risk of bias, each study was thoroughly assessed in different domains, such as selection bias (related to the inclusion of participants), performance bias (differences in treatment of groups), detection bias (inadequate methods of measuring outcomes) and attrition bias (significant loss of participants). Studies with a high risk of bias in any of these domains were classified as of lower quality and considered with caution in the final analysis.

The heterogeneity between studies was also considered, especially in relation to the variation in outcomes and methods. Studies with major methodological inconsistencies or very divergent results were reviewed more rigorously and were excluded or treated separately in the analysis.

Finally, the studies were classified as high, moderate or low quality, depending on the severity of the bias identified. Only studies with moderate or high quality evidence were included in the final synthesis, ensuring a solid and reliable basis for the review's conclusions.

Strategy of data synthesis The data synthesis strategy in this integrative review will be conducted in a systematic and structured manner, with the aim of analyzing and comparing the results of the selected studies in a precise and coherent manner. The approach will follow several essential steps, ensuring a comprehensive and clear view of the available evidence on the diagnosis and treatment of lumbar disc herniation.

1. Data Extraction:

Initially, data will be extracted from each study using a standardized spreadsheet to ensure uniformity of collection. Key information will include the type of study, year of publication, number of participants, interventions performed, comparators, and the main outcomes analyzed, such as pain relief, return to function, length of hospital stay, and complications. In addition, demographic characteristics of the participants, such as age and sex, will also be recorded to allow for more detailed analyses and subgroups where appropriate.

2. Grouping and Comparison of Interventions:

After extraction, the studies will be grouped based on the interventions performed. Separate groups will be created for studies addressing surgical treatments, such as endoscopic discectomy, open surgery and microdiscectomy, and for those evaluating conservative treatments, such as physiotherapy, medication and rest. Within each group, the interventions will be compared in relation to primary and secondary outcomes, such as pain relief and functional recovery time, allowing us to identify which approach is most effective in different situations.

3. Outcome Analysis:

The primary outcomes, such as pain reduction and return to functionality, will be analyzed in detail. To measure pain relief, the Visual Analogue Scale (VAS) will be used, while functional recovery time will be an important indicator of treatment efficacy. Secondary outcomes, such as postoperative complications and length of hospital stay, will also be compared between the different therapeutic approaches.

4. Heterogeneity Assessment:

Assessing heterogeneity will be a crucial step in determining the consistency of results across studies. Both clinical heterogeneity (differences in participants and interventions) and methodological heterogeneity (differences in study designs) will be assessed. If heterogeneity is low, a quantitative analysis, such as a meta-analysis, can be performed to combine the results statistically. Otherwise, a narrative synthesis will be used, highlighting the similarities and differences between the studies.

5. Meta-Analysis (if applicable):

If there are a sufficient number of studies with homogeneous results, a meta-analysis will be performed. Continuous data, such as pain reduction, will be analyzed using the standardized mean difference (SMD), while categorical data, such as complications, will be assessed using risk ratios (RR). Depending on the degree of heterogeneity identified, a fixed or random effects model will be used.

6. Sensitivity Analysis:

A sensitivity analysis will be performed to test the robustness of the results. This will be done by excluding low-quality studies or those with a high risk of bias, checking whether the exclusion of these studies significantly affects the final results.

7. Presentation of Results:

Finally, the results will be presented in tables and graphs, facilitating visualization and comparison between the different treatments and outcomes. The conclusions will be based on the combined evidence.

Subgroup analysis Subgroup analysis in this integrative review will be performed to explore how individual variables may influence the effectiveness of different interventions for the treatment of lumbar disc herniation. By dividing patients into specific categories, we aim to identify nuances in the results that may be hidden in a global analysis. The main subgroup categories to be analyzed include:

1. Patient Age:

Patients will be divided into different age groups, such as young adults (18-39 years), middle-aged adults (40-59 years) and elderly (60 years and older). The analysis will allow us to assess whether age impacts the response to treatment, since the process of disc degeneration tends to be more advanced in older patients. This may influence the effectiveness of both surgical and conservative approaches.

2. Gender:

A comparison will be made between the results in men and women, as some studies suggest that there may be differences in the course of the disease and response to treatments between genders. Subgroup analysis will help determine whether these variations are significant, especially with regard to functional recovery and pain relief.

3. Severity of the Disease:

Patients will be categorized according to the severity of their lumbar disc herniation, using criteria such as the size of the herniation (protrusion, extrusion or sequestration) and the presence of complications, such as nerve root compression. This analysis will be important to determine whether patients with more severe herniations benefit more from surgical treatments compared to conservative ones.

4. Type of Treatment:

Subgroups will be created to compare different types of treatment. In the case of surgical interventions, a comparison will be made between endoscopic discectomy and open surgery. In conservative treatment, subgroups will be established to compare different types of physiotherapy and the use of medications. This approach will allow us to identify which treatment is most effective for different patient profiles.

5. Follow-up Time:

Finally, the studies will be analyzed based on the follow-up time after treatment. A comparison will be made between short-term (less than six months) and long-term (more than one year) results

to verify the durability of the therapeutic effects of the interventions.

This subgroup analysis will provide a more detailed and accurate view of the effects of the different therapeutic approaches, helping to personalize the treatment of lumbar disc herniation based on the specific characteristics of each patient.

Sensitivity analysis Sensitivity analysis in this integrative review will be performed to ensure the robustness and reliability of the results, verifying that the conclusions are not significantly influenced by specific characteristics of some included studies. This step will allow testing whether the inclusion or exclusion of certain studies alters the overall results, strengthening the validity of the conclusions.

One approach to sensitivity analysis will be to exclude studies that present a high risk of bias or that have been classified as having low methodological quality, based on assessment tools such as the Jadad scale or the Newcastle-Ottawa scale. The aim is to assess whether the exclusion of these lower-quality studies affects the final results. If the results remain consistent, this will indicate that the conclusions are robust and do not depend on potentially fragile studies. If the results are significantly altered, it may be a sign that the overall conclusions may be compromised by these lower-quality studies.

In addition, sensitivity analysis will be applied to different treatment models, such as surgical versus conservative treatments. Studies using different treatment approaches, such as endoscopic discectomy versus open surgery, will be assessed separately to ensure that variations in intervention methods are not unduly influencing the overall results. This will allow the effectiveness of each approach to be assessed fairly and consistently.

It will also be important to consider the variation in patient follow-up times. Studies with very short or excessively long follow-up times will be analysed separately to see if the length of follow-up impacts the results, particularly with regard to the short- and long-term efficacy of treatments.

Finally, studies with large sample sizes will also be considered in a separate analysis. This will help to determine whether the statistical weight of these larger studies is disproportionately influencing the overall results. By temporarily excluding these studies, it will be possible to assess whether the conclusions of the smaller, less powerful studies are consistent with the findings of the larger studies.

The sensitivity analysis will therefore provide a more detailed view of the robustness of the review findings. If the results remain consistent after these exclusions and adjustments, the final conclusions will be considered more reliable and robust.

Language restriction Yes, language limits will be imposed, including only studies in Portuguese and English, ensuring accessibility and relevance of the research, while studies in other languages will be excluded.

Country(ies) involved The studies included in the review were mostly authored by Brazil, with some contributions from authors from the United States and China, reflecting a diversity of multinational approaches.

Other relevant information This paper provides a comprehensive integrative review of the diagnosis and treatment of lumbar disc herniation, covering both surgical and conservative interventions, and highlighting the importance of diagnostic methods, with a focus on magnetic resonance imaging (MRI). The review is based on a systematic analysis of studies published in the last seven years, collected from databases such as PubMed, Lilacs, SciELO and Google Scholar, seeking to gather the most effective and current approaches for the management of this prevalent condition.

Lumbar disc herniation is one of the main causes of back pain and functional disability, affecting a large number of people around the world. In Brazil, it stands out as one of the most frequent conditions that lead to absence from work and disability retirement, which reflects not only the individual impact on patients, but also major economic and social costs. This context highlights the importance of seeking therapeutic interventions that are effective and that provide a lasting improvement in the quality of life of patients.

The studies included in this review address the main surgical techniques used to treat lumbar disc herniation, with emphasis on endoscopic discectomy. This minimally invasive technique has been shown to be superior in several aspects, such as reducing hospital stay and postoperative recovery time, when compared to traditional open surgery. In addition, the review also explores the advantages and limitations of microdiscectomy, which, although effective, has disadvantages such as greater surgical morbidity and longer recovery time. On the other hand, conservative treatment, which includes physical therapy, rest and medication, continues to be widely indicated for

patients with less severe disc herniation, and has demonstrated similar results to surgical methods in the long term.

A crucial aspect for the adequate management of lumbar disc herniation is the use of accurate diagnostic methods. The review reaffirms that magnetic resonance imaging (MRI) is the gold standard for diagnosis, due to its ability to evaluate in detail the soft tissues and adjacent structures of the spine. MRI allows for clear visualization of the herniation, facilitating decision-making on the type of intervention required, especially in cases of protrusions, extrusions or sequestration of the disc material. Compared to other methods, such as computed tomography (CT) or plain radiographs, MRI offers significantly greater accuracy, which is essential to ensure appropriate treatment.

However, the review also identified some challenges in the treatment of lumbar disc herniation. One of the main ones is the learning curve associated with endoscopic discectomy, which requires greater experience and skill from surgeons, but offers better results when performed correctly. Another challenge is determining the best approach for each patient, whether conservative or surgical, based on individual factors such as age, severity of herniation and patient preferences. Although surgery offers faster pain relief, conservative treatment has been shown to provide equivalent long-term results, reinforcing the importance of personalizing the treatment plan.

The review suggests that more long-term studies are needed to fully assess the effectiveness of minimally invasive techniques and compare them to conventional treatments. Furthermore, the research highlights the need for a multidisciplinary approach in the management of lumbar disc herniation, integrating specialists from different areas, such as physiotherapy, orthopedics and neurosurgery, to ensure that patients receive comprehensive and effective treatment.

One of the limitations of this review is related to the availability of high-quality studies, especially large-scale randomized clinical trials. Furthermore, many of the articles reviewed focused on specific populations, such as middle-aged adults, with less focus on groups such as the elderly or patients with associated comorbidities, which limits the generalizability of the findings to the entire population. There were also restrictions on the language of the included articles, focusing only on publications in Portuguese and English, which may have excluded relevant studies in other languages.

Nevertheless, this review offers an important contribution to clinical practice, providing a clear and up-to-date overview of best practices in the diagnosis and treatment of lumbar disc herniation. By synthesizing the available evidence, the study can guide health professionals in choosing the most appropriate approaches for their patients, considering both the most effective diagnostic methods and the safest and most efficient therapeutic interventions.

Another important point addressed in the review is ethical consideration and the absence of conflicts of interest.

Keywords Lumbar disc herniation; diagnosis; surgical treatment; conservative treatment; endoscopic discectomy; magnetic resonance imaging; spine surgery; physiotherapy; low back pain; spine.

Dissemination plans As authors, our dissemination plan aims to ensure that the findings of the integrative review on the diagnosis and treatment of lumbar disc herniation reach both the scientific community and healthcare professionals involved in the management of this condition. Initially, we plan to submit the article for publication in national and international high-impact scientific journals in the areas of orthopedics, neurosurgery and physiotherapy. This will include journals indexed in databases such as PubMed and SciELO, ensuring broad visibility.

In addition, we will participate in medical congresses and conferences, both in person and online, where the results will be presented through lectures and posters. This will allow for direct dialogue with experts in the field and the exchange of experiences with other professionals.

We will also disseminate the article and the conclusions of the review on social media and academic platforms, such as ResearchGate, facilitating access to the data by professionals and researchers around the world. We also intend to develop educational material, such as summaries and infographics, aimed at the general clinical public, with the aim of disseminating information in a more practical and accessible way for the daily lives of health professionals who deal with lumbar disc herniation.

In this way, we hope that the results of the review will contribute to improving clinical practices and patients' quality of life.

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