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Cracking the Code of Sciatica - A Review of the Sport Injury and Rehabilitation Literature

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Abstract

Introduction:

Chronic low back pain presents a significant challenge in healthcare, affecting numerous individuals globally. Despite the availability of various treatment options, optimal management remains elusive. This study aims to explore different treatment strategies for chronic low back pain, including exercise, pharmacological interventions, and emerging techniques in neural management.

Aim of the Study:

The aim of this study is to provide healthcare professionals with comprehensive insights into managing chronic low back pain. By examining the effectiveness and potential side effects of different treatment modalities, the study seeks to enhance clinicians' understanding and decision-making in pain management.

Brief Summary:

Through a thorough review of literature and evidence-based analysis, this study discusses the role of exercise, medications, and neural management techniques in managing chronic low back pain. It evaluates the efficacy, safety, and potential benefits of each approach, offering valuable guidance for healthcare professionals in optimizing patient care.

Conclusion:

This study underscores the importance of adopting a multidisciplinary approach to managing chronic low back pain. By incorporating a range of treatment modalities, including exercise, pharmacological interventions, and emerging techniques, healthcare professionals can deliver personalized and effective care to patients. Enhanced knowledge and understanding of these strategies empower clinicians to address the complex challenges associated with chronic low back pain and improve patient outcomes.

Keywords : sciatica, lower back pain, sciatica management

1.Introduction

In the majority of instances, sciatica arises from a lumbar disc herniation wherein the nerve root becomes compressed due to the rupture of disc material through its adjacent annulus. Less common origins include spondylolisthesis, lumbar stenosis, foraminal stenosis, and malignancy. The unifying factor across these etiologies is the compression of the lumbar nerve root, potentially leading to inflammation [1,2]. Emerging evidence suggests that

sciatica's onset is not solely attributable to nerve root pressure but rather involves a blend of pressure-related, inflammatory, and immunological mechanisms [3].

1.1 Aim

This article provides valuable insights into managing chronic low back pain, offering doctors effective strategies to help their patients. By exploring different treatment options like exercise, medications, and emerging techniques, doctors can tailor treatments to suit individual patients' needs. Understanding the benefits and potential side effects of each approach allows for informed decision-making in pain management. By incorporating these strategies into their practice, healthcare professionals can provide comprehensive care and improve outcomes for patients with chronic low back pain.

2. Diagnosis and history taking

When assessing patients with lower back pain and sciatica, consider the following common causes: lumbar intervertebral disc herniation, lumbar spinal stenosis, particularly in older patients, spondylolisthesis (vertebra misalignment), pelvic or lumbar muscular spasm and/or inflammation, presence of a spinal or paraspinal mass [4].

During the physical examination, aim to reproduce the sciatic pain and evaluate nerve function by performing a straight leg raise test. Instruct the patient to lie in a supine position while you raise their painful leg from the posterior aspect, flexing at the hip joint and keeping the knee in full extension. Note that pain typically arises between 30–70° of hip flexion in cases of lumbar disc herniation, indicating lateralized disc herniation compressing a peripheral nerve. Conversely, pain in musculoskeletal causes tends to manifest above 70° of flexion and/or below 30° of flexion [4].

Evaluate muscle strength in the thigh, hamstrings, and foot, and assess quadriceps and Achilles reflexes, comparing them with the contralateral side. These steps will help in diagnosing the underlying cause of lower back pain with sciatic radiation [4].

When diagnosing sciatica, rely on the patient's symptoms and what you find during the physical exam. Remember, no single symptom or test result is enough to diagnose sciatica on its own. Combine history-taking and physical tests to reach a conclusion [5,6].

During history-taking, look for signs like:

- Leg pain being more dominant than back pain
- Where is the leg pain (does it go below the knee?)
- Tingling or numbness, weakness, or changes in reflexes in specific muscle groups
- Leg pain getting worse when coughing, sneezing, or taking deep breaths
- Gradual increase in symptoms over time

Remember that a straight leg raise test can be particularly informative. A negative result suggests a lower likelihood of sciatica, while a positive crossed straight leg raise test indicates a higher likelihood [5,7,8]. Additionally, in the diagnostic process, it's essential to actively exclude serious underlying pathologies such as trauma, cancer, or severe infections. If patients exhibit symptoms such as saddle anesthesia, bladder disturbances, loss of anal sphincter tone, or reduced sexual function, these could indicate cauda equina syndrome, requiring immediate referral for further medical attention [9].

2.1 Role of imaging in establishing a diagnosis

In the beginning, imaging isn't usually necessary. But if you find it to be helpful, start with an X-ray of the lower spine to check for things like fractures or spine misalignment. If there's a chance of fracture, a non-contrast CT scan can provide more information. After about six to eight weeks of ongoing pain with no improvement from conservative treatments, an MRI is the best choice. Especially if there's a sudden loss of nerve function or you suspect something pressing on the nerves. [10,11]

Consider doing an EMG study if the patient's symptoms, exam findings, or imaging results don't quite match up. This test can help confirm which nerve is affected and how badly, but it's not always necessary. If the pain spreads across more than one area or the imaging

shows multiple nerve roots possibly involved, an EMG can provide more insight into the situation and how to treat it. [12]

3. Should the patient stay active?

In a comprehensive review encompassing 249 trials, researchers investigated the efficacy of exercise treatments for chronic low back pain across various regions and treatment comparisons. The majority of studies explored multiple exercise types and compared exercise treatments to non-exercise alternatives. Participants, averaging 43.7 years of age with a majority being female, underwent analysis for pain and functional limitation outcomes. Moderate-certainty evidence indicated exercise's effectiveness compared to no treatment, usual care, or placebos, yielding a clinically important difference in pain reduction. Furthermore, exercise treatment demonstrated improvement in pain and functional limitations compared to other conservative treatments, albeit with smaller effect sizes. Subgroup analysis suggested exercise may be more effective than certain alternative treatments, highlighting its potential as a primary intervention for chronic low back pain. Additionally, adverse effects were minimal and mostly minor, such as muscle soreness. These findings underscore exercise's role as a promising therapeutic approach for chronic low back pain management [13].

Interestingly, the association between physical activity and lumbar radicular pain varies depending on the frequency of exercise. High levels of physical activity (≥ 4 times/week) show the strongest inverse association with the onset of pain, followed by moderate activity (1-3 times/week). However, engaging in physical activity less than once a week does not seem to have a significant impact on reducing the risk of developing lumbar radicular pain or sciatica [14].

It's worth considering these findings when advising patients on the potential benefits of regular physical activity in reducing the risk of experiencing lumbar radicular pain or sciatica. However, it's important to keep in mind that the protective effect is modest and may not eliminate the risk entirely [14].

Based on the analysis conducted by Cook and others, it was found that several risk factors contribute to the development of first-time sciatica. These factors include smoking, obesity, occupational factors, and overall health status. Additionally, non-modifiable factors such as age, gender, and social class also play a role [15].

It's noteworthy that many of these risk factors are modifiable, indicating the potential benefits of focusing on primary prevention strategies. Furthermore, addressing these risk factors may also improve overall lifestyle habits, which could further reduce the likelihood of developing sciatica.

It's important to recognize that the definition of sciatica varies across studies, which may impact the reported incidence rates. Therefore, further research is needed to standardize the definition of sciatica for more accurate comparisons across studies [15].

4. Treatment

4.1 Nonpharmacological intervention

Start patients on a physiotherapy exercise program in a gentle environment to boost core strength, improve how the core muscles work, and increase flexibility [16]. This program should focus on the lower back and be the initial approach to recovery [17].

Make sure to prioritize strengthening the muscles that support the spine and the core [18]. Encourage patients to do isometric strengthening exercises every day to help keep the spine stable [19]. For low-impact options, suggest pool exercises as they're gentle on the body. After that, patients can move on to using exercise machines if they're comfortable with them [4]. Also, emphasize the importance of incorporating range of motion exercises, stretching, and maintaining proper posture to support overall spine health [17]. Additionally, advise patients to avoid smoking cigarettes, as smoking has been shown to speed up the degeneration process and reduce oxygen supply to the muscles [20].

Physiotherapists often provide spinal manual therapy (SMT) to their patients. SMT involves various techniques aimed at improving the movement or function of spinal joints by manually moving them within their normal range of motion [6].

4.2 Pharmacological intervention

When prescribing medical treatment for patients, consider medications like non-steroidal anti-inflammatory drugs (NSAIDs), muscle relaxants such as cyclobenzaprine or tizanidine, or drugs specifically for nerve pain like gabapentin, pregabalin, or duloxetine [20,21]. Narcotic pain relievers can provide short-term relief during intense pain episodes, but avoid long-term use [22]. It's worth noting that gabapentin typically causes fewer and less severe side effects compared to pregabalin. Both medications have shown efficacy in reducing pain and disability [23].

4.3 Surgical management

When patients need surgery for symptomatic Lumbar Disc Herniation (LDH), conventional microdiscectomy (CMD) is often recommended as the top choice. This procedure, using a microscope for better visualization, has been around since the late 1970s and is considered the standard [24,25,26]. In 1999, a newer technique called microendoscopic discectomy (MED) was introduced by Foley and Smith. This technique provided an alternative to conventional microdiscectomy [27].

When nerves in the lower back get compressed, it's usually as they come out of small openings between the vertebrae. They can get squeezed by either a bulging disc in front of them or by the facet joints behind them, sometimes both. To fix this, surgeons can access the area from the front, side, or back [28].

The front approach, even if done minimally invasive, means moving the organs in the stomach out of the way. It also has risks like accidentally harming big blood vessels and a nerve bundle called the presacral plexus, which might affect ejaculation in males [28].

In the posterior approach, surgeons can do a classic micro-discectomy to deal with the root issue. They might also widen the opening where the nerve passes through, a procedure called foraminotomy. If the spinal canal is too narrow, they might need to do a decompressive laminectomy, which is one of the most common operations for the lower back [28].

When performing nerve root decompression and segment stabilization surgery, the goal is to relieve pressure on the nerves and create a strong connection between unstable vertebrae. This surgery is commonly done for conditions like spondylolisthesis [29].

Surgeons can approach the area from the front, side, or back. For the side approach, which is becoming more popular for higher levels of the spine, like L3 and above, there might be challenges with the iliac crest at lower levels like L4. The front approach involves removing the disc between the vertebrae and replacing it with a device to help fuse them together securely. With the posterior approach, there are different techniques available, but they all involve using hardware like screws and bone grafts to achieve a solid fusion [29].

Based on the analysis of eight randomized controlled trials and two retrospective studies involving 804 patients, it was found that there were no significant differences between transforaminal microdiscectomy (TMD) and conventional microdiscectomy (CMD) in terms of operative time, blood loss, length of hospital stay, complication rates, reoperation rates, or pain and disability scores both in the short-term and long-term [30].

5. Results of postoperative physiotherapy

Looking at the results from the intention-to-treat analysis, there seems to be close to no difference between tubular discectomy and conventional microdiscectomy when comparing how well patients did over two years after surgery. Both surgeries had similar scores on the Roland-Morris Disability Questionnaire for Sciatica [31].

But patients who had tubular discectomy had slightly more leg and low-back pain compared to those who had conventional microdiscectomy. However, these differences were small and didn't really make a big difference in how well the patients recovered [31].

In terms of recovery, about 71% of patients who had tubular discectomy felt better after two years, compared to 77% of those who had conventional microdiscectomy. The rate

of needing another surgery within two years after tubular discectomy was 15%, which was a bit higher than the 10% seen with conventional microdiscectomy [31].

Only 15% are able to return to work within 2 months [32]. Two years after surgery, about 71% of patients who had tubular discectomy and 77% who had conventional microdiscectomy report good recovery.

However, a review of many studies found that even after 5 years, patients still have some pain and difficulty with daily activities. On average, their pain score is 21 out of 100, and their disability score is 13 out of 100. [33]

6. Ending thoughts and conclusion:

Overall, the review of sciatica epidemiology and treatment underscores the complexity of this condition and the diverse approaches to its management. While conservative measures like physical therapy and medications remain the cornerstone of treatment for many patients, surgical interventions such as microdiscectomy offer significant relief for those with severe or refractory symptoms. However, it's essential to recognize that the optimal treatment strategy may vary depending on individual patient characteristics and preferences.

Efforts to improve early detection, develop targeted therapies, and enhance patient education can further contribute to better outcomes and quality of life for individuals affected by sciatica.

In conclusion, by understanding the multifaceted nature of sciatica and employing a comprehensive approach to its management, healthcare providers can effectively alleviate symptoms, improve functional outcomes, and enhance the overall well-being of patients dealing with this challenging condition.

Author's contribution

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