Review Article

Overview on Causes, Risk Factors and Management of Sciatica: A Simple Review Article

Abstract:

Root pain in the sciatic nerve distribution area caused by one or more herniated lumbar discs, it is a common and often debilitating event. The lifetime incidence of this condition is estimated to be between 13% and 40%. Fortunately, most cases can heal on their own with simple pain relief and physical therapy. However, this situation can become chronic and stubborn, and have a major impact on the social economy. This review looks at the epidemiology, causes, risk factors, and management of sciatica. Factors that influence the incidence of sciatica include height, age, genetic predisposition, walking, jogging (if there is a history of sciatica), and specific physical occupations, including driving. The influence of the protruding nucleus pulposus and the possible inflammatory response mediated by cytokines in the lumbar and sacral nerve roots are discussed. Abnormal immune response and possible mechanical factors are also considered factors that can mediate pain. The current topic of different treatment modalities is (are) also discussed.

Key words: Sciatic nerve, Overview, Causes, Risk Factors, Management, Sciatica, Review (font is different)

Introduction:

The sciatic nerve is the longest and thickest (almost finger-width) nerve in the body. It's (It is) actually made up of five nerve roots: two from the lower back region called the lumbar spine and three from the final section (coccyx forms the final section) of the spine called the sacrum. The five nerve roots come together to form a right and left sciatic nerve. On each side of your (our)body, one(the) sciatic nerve runs through your (the) hips, buttocks and down a leg,

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ending just below (at the upper angle of popliteal fossa) the knee. The sciatic nerve then branches into other nerves, which continue down your (to) leg and into your foot and toes. Sciatica refers to irritation of the sciatic nerve that causes pain that radiates along the path of the sciatic nerve, which branches from your lower back through your hips and buttocks and down each leg. Typically, sciatica affects only one side of your body, however, it's possible for sciatica to occur in both legs(the sides). It's simply a matter of where the nerve is being pinched along the spinal column. [1]

Sciatica is a very common complaint. About 40% of people in the U.S. experience sciatica sometime during their life. Back pain is the third most common reason people visit their healthcare provider. Sciatica most commonly caused from an injury or irritation to the sciatic nerve, which originates in the buttock/gluteal area which occurs when a herniated disk, bone spur on the spine or narrowing of the spine (spinal stenosis) compresses part of the nerve. [2] This causes inflammation, pain and often some numbness in the affected leg. Although the pain associated with sciatica can be severe, most cases resolve with non-operative treatments in a few weeks. People who have severe sciatica that's (which) associated with significant leg weakness or bowel or bladder changes might be candidates for surgery. Sciatica can be caused due to (a True injury to the sciatic nerve) is actually rare, but the term "sciatica" is commonly used to describe any pain that originates in the lower back and radiates down the leg. [1]

If the patient has "sciatica," he experiences mild to severe pain anywhere along the path of the sciatic nerve, that is, anywhere from the lower back, through the hips, buttocks and/or down the legs. It can also cause muscle weakness in the affected leg and foot, numbness, and an unpleasant tingling pins-and-needles sensation in the leg, foot and toes. People usually describe sciatica pain in different ways, depending on its cause. [3] Some people describe the pain as sharp, shooting, or jolts of pain. Others describe this pain as "burning," "electric" or "stabbing." The pain may be constant or may come and go. Also, the pain is usually more severe in your leg compared to your lower back. The pain may feel worse if you sit or stand for long periods of time, when you stand up and when your twist your upper body. A forced and sudden body movement, like a cough or sneeze, can also make the pain worse. For some people, the pain from sciatica can be severe and disabling. For others, the sciatica pain might be infrequent and irritating, but has the potential to get worse. [3]

Sciatica can come on(appear) suddenly or gradually. It depends on the cause. A disk herniation can cause sudden pain. Arthritis in the spine develops slowly over time.

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Objectives:

The study aims to summarize the updated evidence regards: epidemiology, risk factors, etiology, pathophysiology, clinical manifestation, diagnosis and management of sciatica.

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Prevalence of Sciatica:

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There is a lack of accurate data on the incidence and prevalence of sciatica. Overall, it is estimated that between 5% and 10% of patients with low back pain suffer from sciatica, and the lifetime prevalence of low back pain is reported to be 49% to 70%. [2] The annual prevalence of intervertebral disc-related sciatica in the general population is estimated to be 2.2%. [3] Some personal and occupational risk factors for sciatica have been reported, including age, height, mental stress, smoking, and exposure to vehicle vibrations. [3] The evidence for the link between sciatica and sex or physical health is conflicting. [3]

Causes and risk factors of sciatica:

A number of environmental and inherent factors thought to influence the development of sciatica have been studied, including gender, body habitus, parity, age, genetic factors, occupation, and environmental factors**.** Understanding the possible causes of sciatica helps to focus treatment on the root cause of the problem, rather than simply masking the symptoms. The mechanism of sciatic nerve injury is the result of direct nerve compression, inflammation, abnormal response of the body's immune system, or a combination of all these factors. [4, 5]

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Common causes of sciatica:

Lumbar disc herniation. Studies have shown that up to 90% of sciatica is caused by lumbar disc herniation. [5] A herniated disc usually compresses one or more spinal nerve roots (L4S3) that form the sciatic nerve. Lumbar disc herniation can cause sciatica in two ways:

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1. Direct compression. When a lumbar disc herniation occurs (including sex disc disease) or when the soft internal material of the intervertebral disc leaks or bulges through the extrafibrous nucleus (non-closed disc disease) and compresses the nerve, compression can occur direct sciatic nerve.

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2. Chemical inflammation. Acidic chemical irritants from the intervertebral disc material (hyaluronic acid) can leak out, causing inflammation and irritation in the area around the sciatic nerve. [5,7]

A herniated intervertebral disc can compress the sciatic nerve on one side and cause symptoms in one leg, or the intervertebral disc can bulge or protrude on both sides and cause symptoms in both legs (bilateral sciatica). Bilateral sciatica can also be caused by two adjacent herniated discs, although this possibility is rare. Chapter

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Depravity Degeneration of the lumbar spine tissue can compress or irritate the sciatic nerve. Degeneration of the facet joints can also cause inflammation of the synovial tissue in the joint capsule and increase its volume. Degeneration of the vertebrae can lead to abnormal bone growth (bone spurs or osteophytes). These abnormally large tissues in the lumbar spine can cause compression of one or more nerve roots of the sciatic nerve. The degenerated intervertebral disc can secrete inflammatory proteins, causing inflammation of the sciatic nerve. [8,9]

Lumbar spinal stenosis. Spinal stenosis is a narrowing of the spinal canal and is relatively common in adults over 60 years of age. [10] Studies have shown that lateral recess stenosis can be a common cause of sciatica in the elderly. [11]

Spondylolisthesis. Spondylolisthesis occurs when a small stress fracture causes one vertebral body to slide forward over another vertebral body. For example, the L5 vertebra can slide forward over the S1 vertebra. Sciatica can be caused by the collapse of the intervertebral disc, fractures, and compression of the nerves after the vertebral body slides forward. Spondylolisthesis can cause bilateral sciatica and is more common in young people. [11]

These conditions may develop spontaneously over time or due to trauma or physical stress injuries. Car accidents, sports injuries or falls can directly damage the sciatic nerve. Disorders such as spondylolisthesis and herniated discs can be caused by physical stress injuries (such as lifting weights).

Less common causes of sciatica:

Rarely, sciatica can be caused by tumors, infections, scar tissue formation, fluid accumulation, Pott's disease (tuberculosis of the spine), or lumbar fractures. Although rare, sciatica can also be a complication of improper gluteal injection or hip replacement surgery. [13] Approximately 1% of pregnant women may develop sciatica at some point during pregnancy. [14]

Risk factors of sciatica:

Regarding the risk factors of sciatica, there are some common risk factors that can cause irritation and inflammation of the sciatic nerve. Understanding risk factors can help prevent problems. [12] The most common risk factors are:

Aging: As the patient gets older, his body loses flexibility and it takes longer to heal after the injury. A common form of pain associated with aging is back pain, which is closely related to sciatica. Fortunately, chiropractic is a good way to overcome back pain in its entirety.

Smoking: Smoking is not only harmful to the lungs, it also increases the risk of back pain and sciatica. Smoking increases inflammation, reduces blood circulation, and weakens the immune system. Also, it will make it harder for your body to function and heal from injuries.

History of low back pain: Studies have shown that patients with low back pain are more likely to suffer from sciatica. Because low back pain can cause inflammation of the lower back and spine, if left untreated, it can spread to the sciatic nerve.

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Poor general health: Healthy eating and regular exercise are not just to feel and/or look good, they can also reduce the likelihood of sciatica and help reduce inflammation.

Happiness can improve activity ability. If our overall health is not good, it will be difficult to stay active and healthy. By staying active, you can reduce the chance of back pain.

5) Obesity

is beautiful, but it is important to be healthy. Being overweight is one of the strongest predictors of back pain and other musculoskeletal problems, including sciatica. Studies have shown that adipose tissue can produce an inflammatory market that affects the entire body. This is important because sciatica is caused by inflammation of the sciatic nerve. Therefore, if your body is inflamed, you are more likely to experience pain problems.

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Work-related injuries: Work-related injuries caused by sedentary or repetitive exercise can increase the risk of sciatica. In particular, the following working conditions are related to sciatica in the medical literature; Standing or walking for a long time, Driving for a long time, Whole body vibration, Pulling or kneeling for more than 15 minutes at a time.

To avoid work-related injuries, it is important to take breaks, rest and stretch muscles frequently.

Sleep problems: Have you ever had sleep problems? If so, your risk of back pain and sciatica will increase. Insufficient sleep is associated with a variety of

diseases, including general poor health, obesity, and chronic pain. Adequate sleep can reduce inflammation, which is why it is critical for sciatica.

Psychological distress: Low back pain and sciatica are related to being overwhelmed or under pressure. Monotonous work and general stress can exacerbate musculoskeletal diseases, including nerve pain.

Direct injury: Occasionally, sciatica can be caused by an injury to the hip or buttocks. For example, sitting on a big wallet will directly put pressure on the nerves.

Diagnosis of Sciatica:

Sciatica is diagnosed mainly through medical history and physical examination. By definition, patients report radioactive leg pain. They may be asked to report the distribution of pain and whether it radiates below the knee, and can use drawings to assess the distribution. Sciatica is characterized by radiating pain that follows a skin disease pattern. Patients may also report sensory symptoms.

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Physical examination is highly dependent on neurological examination. The most used research is the straight leg elevation test or Lasègue sign. People with sciatica can also have low back pain, but it is usually not as severe as leg pain. The diagnostic value of the history and physical examination has not been well studied. [15] There is no item in the history or physical examination with high sensitivity and high specificity. The overall sensitivity of the straight leg lift test is estimated to be 91% and the corresponding overall specificity is 26%. [16] The only test with high specificity is the straight cross leg lift test. Its overall specificity is 88%, but the sensitivity is only 29%. [16] In general, if a patient reports typical radiating leg pain and shows a positive result on one or more neurologic tests, indicating nerve root tension or neurologic deficits, the diagnosis of sciatica appears reasonable.

Role of Imaging in Sciatica Diagnosis:

Diagnostic imaging is only useful if the results influence further management. In acute sciatica the diagnosis is based on history taking and physical examination and treatment is conservative (non-surgical). Imaging may be indicated at this stage only if there are indications or “red flags” that the sciatica may be caused by underlying disease (infections, malignancies) rather than disc herniation.

Diagnostic imaging may also be indicated in patients with severe symptoms who fail to respond to conservative care for 6-8 weeks. In these cases surgery might be considered and imaging used to identify if a herniated disc with nerve root compression is present and its location and extent. It is important as part of the decision to operate that the clinical findings and symptoms

correspond well with the scan findings. This is especially relevant because disc herniations identified by computed tomography or magnetic resonance imaging are highly prevalent (20%-36%) in people without symptoms who do not have sciatica. [17] In many people with clinical symptoms of sciatica no lumbar disc herniations are present on scans.[18, 19] At present no one type of imaging method shows a clear advantage over others. Although some authors favour magnetic resonance imaging above other imaging techniques because computed tomography has a higher radiation dose or because soft tissues are better visualized, [20, 21] evidence shows that both are equally accurate at diagnosing lumbar disc herniation.[22] Radiography for the diagnosis of lumbar disc herniation is not recommended because discs cannot be visualised by x rays. [22]

Treatment of sciatica:

- **Conservative treatment:**

The main objective of conservative treatment of sciatica is to reduce pain, using analgesics or to reduce pressure on the nerve root. A recent systematic review found that conservative treatment does not significantly improve the natural course of sciatica or relieve symptoms in most patients. [25] Properly informing patients of the cause and expected prognosis can be an important part of the management strategy. However, the education of patients about sciatica has not been specifically studied in randomized controlled trials.

Most of the available interventions lack strong evidence of efficacy. The recommendations of bed rest and staying active have little difference in the effects of pain and functional status. [26] Due to this discovery, long-term bed rest, the backbone of sciatica treatment, is no longer widely recommended. Analgesics, non-steroidal anti-inflammatory drugs, and muscle relaxants do not seem to be more effective than placebos in reducing symptoms. There is a lack of evidence of opioids and various combination drugs. A systematic review reported that there is no evidence that traction, non-steroidal anti-inflammatory drugs, intramuscular steroids or tizanidine are superior to placebo. [24] This review suggests that epidural steroids may be effective in patients with acute sciatica. [24] However, a recent systematic review of a large number of randomized trials reported that there is no evidence for the short-term positive effects of corticosteroid injections, and the long-term effects are unknown. [25] The same systematic review reported that active physical therapy (exercise) does not appear to be better than inactivity (bed rest) therapy and other conservative treatments such as traction, massage, heat, or corsets). [25]

As regards the level of evidence for conservative treatment of sciatica; Stay active, unlike bed rest (may be beneficial) while pain relievers or non-steroidal anti-inflammatory drugs, acupuncture, epidural steroid injection, spinal manipulation, traction therapy, physical therapy, behavioral therapy, multidisciplinary therapy (effect unknown)

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- **Surgical treatment:**

Surgical intervention for sciatica approaches in herniated disc removal and removal definitive part of the disc or foraminal stenosis. the purpose is to eliminate the probable cause of sciatica in the patient. The purpose of treatment is to relieve leg pain and associated symptoms, not to relieve back pain. The consensus is that cauda equina syndrome is an absolute indication for immediate surgery. Elective surgery is the option for unilateral sciatica. Until recently, only one relatively old randomized trial was available comparing surgical intervention with conservative treatment in patients with sciatica. [27] This study showed that surgical intervention was better after one year, but after four and ten years of follow-up, no significant differences were found. [27]

Prognosis of sciatica:

The Cochrane Review summarizes the available randomized clinical trials evaluating disc surgery and chemical nucleolysis. [28] In nuclear chemical dissolution, papaya chymotrypsin is injected into the disc to shrink the nucleus pulposus. The review reported that for people with severe sciatica whose duration ranges from more than 4 weeks to more than 4 months, the results of intervertebral disc surgery are better than chemolysis. Nuclear chemical dissolution is more effective than placebo. Therefore, this review indirectly indicates that disc surgery is more effective than placebo. Based on data from all three trials, the authors concluded that there is considerable evidence that surgical discectomy can provide effective clinical relief for carefully selected sciatica patients who cannot be treated conservatively due to lumbar disc prolapse. A recent review came to the same conclusion. [29] The Cochrane review further concluded that the long-term effects of surgical interventions are unclear and there is a lack of evidence on the optimal timing of surgery. [28]

Generally, the clinical course of acute sciatica is favorable, and most pain and related disability will subside within 2 weeks. For example, in a randomized trial comparing non-steroidal anti-inflammatory drugs with placebo in the treatment of acute sciatica in primary care, 60% of patients recovered within three months and 70% recovered within 12 months. [23] In a randomized trial of non-surgical intervention, approximately 50% of patients with acute sciatica in the placebo group reported improvement within 10 days, and approximately 75% reported improvement after 4 weeks. [24] Therefore, in most patients, the prognosis is good, but at the same time, a significant proportion (up to 30%) continue to experience pain for a year or more. [23, 24]

Conclusion:

Sciatica is a common disease, the main cause of absenteeism and the main economic burden of industrial and health services. Although the intervertebral disc is closely related to the pathophysiology of the disease, the exact nature

of its relationship to the intervertebral disc, nerves, and pain is uncertain. Current evidence suggests that the nucleus pulposus can cause a strong inflammatory response at the root of the sciatic nerve, which may be the source of pain. There is also evidence that inflammation, abnormal immune factors, and mechanical deformation of nerves are necessary to produce pain, which appears to be a possible combination. However, the bulge of the nucleus pulposus is not the only cause of sciatica and other causes cannot be ignored. Fortunately, most cases of sciatica are self-limiting, and the pain tends to subside within a few months. However, some cases will progress to chronicity. Unfortunately, these may be difficult to treat.

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