

**Benefits of Utilizing Physical Therapies as Primary Treatment for Sciatic Nerve Pain Compared
To Invasive Surgical Procedures**

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Utilizing Physical Therapy as First Line Treatment for Sciatic Nerve Pain

Sciatica is a diagnosed condition that can cause the wearing down of the human body through fatigue and cause chronic extreme levels of pain. Sciatic nerve pain can manifest with brief or extended contact or impingement of the sciatic nerve or nerve root; research has shown no specific age group, gender, or one specific movement for the cause of diagnosed Sciatica (Davis et al., 2021).

Contemporary analysis conducted on monetary costs for patients that forgo having surgical procedures performed on their spine for relief of sciatic nerve pain were evaluated. Conclusion proved that expenditures for surgical procedures as treatment for sciatic nerve pain were costly, upwards of \$30,000 per patient; surgical interventions are currently the most preferred treatment elected by clinicians (Cram et al., 2019).

Hashemi & Halabachi (2016) address that historically, surgical intervention (or another invasive procedure) is commonly used as a preferred treatment option by providers for sciatica-based nerve pain or weakness because surgery is associated with being a quick fix for pain resolution. A surgical procedure is especially known as the commonplace referral, due to it being an accelerated treatment for combating pain from a bulging disk, herniated disk, or other causes for pain on the sciatic nerve when in comparison with other treatments such as physical therapy (PT) (Hashemi & Halabachi, 2016). However, although the historic procedure is not known to have universal superb results, according to Kobayashi et al. (2022), up to date studies show that near 2.5 times more spinal surgeries have been performed to treat sciatic nerve pain over the

past 15 years, than previous years recorded, potentially being the cause of increased morbidity and mortality to those patients.

Problem Statement

Invasive interventions, including surgical procedures, risk filled spinal injections, along with addictive narcotic medications, etc. have been used comparatively for centuries (Cram et al., 2019). Approximately 900,000 Americans annually, are referred by their primary care provider for surgical intervention to relieve sciatic nerve pain (Cram et al.,2019). Aljawadi et al. (2020) states that with any surgery, one cannot be sure of the outcome, concluding there are pre surgical facets to consider when determining if surgical intervention is the optimum treatment for an individual. Equally, socioeconomic factors, gender, age, and comorbidities must be scrutinized and determined to prove what will give the best desired outcome to a patient before a primary care provider and spinal specialty surgeon should even consider that [surgical] option (Kobayashi et al., 2022). Evaluation of patients that come into a clinical care setting allows for assessing the precondition status. Some considerations including a patient's support system (or lack of) is reliable, considers patient health history, addresses chief complaint, environmental factors, living conditions, and social determinants of health, to decide to use physical therapy versus an invasive procedure as treatment (Reid et al., 2021).

PICO Question

Research shows physical therapy has decreased pain levels in those diagnosed with acute sciatic nerve pain. In adults in the primary care setting diagnosed with acute sciatica, does physical therapy as a first line treatment improve sciatica pain as compared to invasive surgical intervention?

Background and Significance

The sciatic nerve is the longest nerve engaged in vascular supply, neurons, and receptors throughout the entire human body, both posterior and anterior; issues with the sciatic nerve can range from pain in the back, down to the bottom of the foot (Guiffre & Jeanmonod, 2021). Recent research shows that 40 percent of the American population, aged in their thirties and forties, will experience, or be diagnosed with sciatica, experience sciatic nerve pain. It is highly probable that an advanced practice registered nurse (APRN) will treat multiple patients experiencing sciatic nerve pain, in all different stages, various levels of pain, and varied patient knowledge of the disease (Davis et al., 2021; Jeong et al, 2016; Katz, 2016). It is important for the provider to understand that physical therapy (PT) is an evidence based, viable, first line treatment option for treating sciatic nerve pain and has been proven through research studies to reach optimal goal outcomes (Fritz et al., 2021).

Physical therapies offer less side effects than that of surgery or other invasive procedures for treatment of sciatic nerve pain, in addition to being a less costly approach for the healing process (Almeida et al., 2019). Changing from the standard treatments or usual care of referring patients to surgical intervention as first line treatment for diagnosed sciatica, the first line treatment may be changed by an early referral for treatment with PT by an educated provider (Goldsmith, Williams, & Wood, 2019). When a healthcare provider is armed with evidence-based resources, they can feel confident when building a treatment plan. Current evidence supports offering PT as first line treatment for diagnosed sciatica and offers positive outcomes. Health care providers can be assured that when they refer to PT it is a safe, suitable treatment for pain management (Goldsmith et al., 2019).

Marabito (2022) indicated that better, more efficient, and cost-effective patient outcomes resulted when the provider was presented with vital updated research and education, feeling more assured suggesting a particular treatment plan, such as PT. Sciatic nerve pain alone is known to cause depression and emotional distress due to being accompanied by fatigue, extended pain durations, and intensity, these factors are essential in determining if a patient could withstand a rigid and severe treatment plan (Davis et al., 2021). Therapeutic privilege is taken into consideration when considering treatment options, such as the patient's state of mind or education level. This understanding can influence and encourage the provider in directing a patient away from an invasive procedure such as surgery, injections, etc. for the overall wellbeing (Douglas et al., 2020; Rosca et al., 2020). Ghoneim & O'Hara (2016) reported in their study that surgical procedures of all types is a recurring cause of increasing depression or new onset depression, sometimes severe.

There are pros and cons to utilizing physical therapy versus other treatments; costs involved for surgeries can cause financial hardship in comparison with less invasive PT. Frogner et al. (2018) determined PT costs for relief of lower back pain can be as low as less than \$300 out of pocket per patient. Other pros to using PT and rejecting surgery are complications can arise post-surgery to cause additional strain. An invasive surgical procedure that did not meet the patients' expectations, or post procedure was more difficult than originally thought, the patients began to lack the courage or wherewithal to achieve the desired outcome (Ghoneim & O'Hara 2016). All advantages and probable disadvantages must be disclosed to the patient and if all aspects cannot be met for physical, emotional, or financial reasons, that patient may not be a realistic candidate for surgical intervention (Jarry et al., 2022).

Woo et al. (2021) analyzed how commitment level by the patient can be affected directly by the attitude and care given by the provider, including how the provider discusses patient treatment. When a provider treats the patient as a whole person and aims to promote the best quality of care, a patient's motivation may be increased and if he/she feels the provider is dedicated to achieving patient satisfaction by considering all concerns such as costs, loss of workdays, additional pre-op and post op appointments, lack of support system, etc. Patients trust their provider, and through communication the patient is empowered to make an informed decision and is willing to participate in the plan of care. (Woo et al., 2021).

To remain confident in referring the patient to PT as the plan of care, a provider may want to reference studies such as a randomized control study that Fritz et al. (2021) concluded patients that were referred to PT for their acute back pain with sciatica responded positively. The results showed that most of the patients reported improvement of disability from baseline and improvements of pain within six months. While sciatic nerve pain can be known as mild, moderate, or severe, the PT intervention can range from person to person. Intervention to decrease pain, regardless of pain level, does not need to be invasive. As Jeong et al. (2016) concluded, participants that had mobilization or PT for six weeks experienced healing of the soft tissue that resulted in reported less pain and felt greater physical functioning is support of this proposal.

Bailey et al. (2020) ran a single-centered randomized trial that involved patients that forwent surgical procedure for sciatic nerve pain and patients that did not forego surgery, with results concluding no differences in recovery or less pain between those that had surgery versus

those that did not. The pain at six months was reported as the same, and showed surgical intervention was not necessary.

An additional study, Fritz et al. (2021) examined in their single-blind, randomized study the time frame for effectiveness of PT. The authors enrolled study participants with an age range from 18-60 years who were diagnosed with sciatica within 90 days. Study participants were enrolled for four weeks and had actual PT completed at different dates and times varying on enrollment date. Using the Oswestry Disability Index, pain level was measured. Results from the study were reported that sciatic pain was decreased after 4 weeks, continued with pain relief after 6 months, and 1 year (Fritz et al., 2021).

In the single arm clinical trial conducted by Almeida et al. (2019) resulted in patients experiencing sciatic nerve pain, treated with various methods of PT, including manual manipulation or self-manipulation, under the guidance of a physical therapist had results of feeling less pain measured by the Numerical Rating Scale (NRS 0-10) and Oswestry Disability Index (ODI). Some participants reported having complete resolved pain (Almeida et al., 2019). Each patient had PT treatment based on their pain location and severity, therefore the movements may have been different and adjusted, however, PT was used and incorporated to treat pinched nerves, stress fractures, spinal stenosis, or compression locations within the subject's pain tolerance, physical ability, and commitment (Almeida et al., 2019; Hochschuler, 2019; Moley, 2020). Some of the participant's level of pain tolerance, expectations, and length of disease only contribute to some barriers of using PT.

Barriers for the implementation or referral for physical therapy as first line treatment is the paucity of research, lack of HCP awareness to offer it as first line treatment, surgery

historically being the first line treatment and the treatment plan needs to be based on evidence not tradition, and the lack of time frame for physical therapy as this is not defined in the current literature (Hashemi, M., & Halabchi, 2016). Additional barriers to providers referring PT as first line treatment for diagnosed sciatica is the lack of amount of current research for primary care providers to determine how long is too long since diagnoses of sciatica for PT to still be the best choice. How young is too young? (Almeida et al., 2019).

The role of an APRN in health promotion is providing quality patient care, with influence on patient empowerment, and contribution has on positive patient outcome is certain and undeniable (Douglas et al., 2020). An advanced practice nurse needs to be aware of the current evidence to understand that physical therapy is a viable option for first line treatment for sciatica in adult patients. The APRN, along with the patient, must agree that after full consideration of cost, risk, and potential outcome that a referral to a physical therapist is warranted. Physical therapy, providing patients the opportunity to use their own strengths at the pace they are comfortable with, may promote and provide a quality of life the patient desires, if the patient is willing to put forth the time and effort (Woo, 2017). Understanding the solid evidence regarding benefits of PT for sciatic nerve pain, advanced practices nurses can educate patients, preventing invasive unpredictable surgical interventions.

Theory

Caring for patients with acute sciatica as an APRN requires one to be at the forefront in applying authentic comprehensive knowledge in conjunction with critical thinking. To completely implement evidence-based practice regarding physical therapy as first line treatment for sciatica, an APRN needs current, up to date information about the benefits of

physical therapy for patients with sciatica and understanding what this encompasses is essential (Davis, 2021). The framework that will assist with the implementation of new information in the primary care setting is based on the clinical reasoning education theory and the goal attainment theory.

Clinical Reasoning Education Theory:

The clinical reasoning education theory provides indispensable theoretical aid for inquiry and direction. This theory helps to promote clinical education that improves growth of clinical reasoning ability (Jessee, 2018). Theoretical science must be used in conjunction with nursing judgement to build a practice. Natural sciences are standardized within a set range which allows all providers to practice in a guided logical framework. This is in opposition to subjective based practice (Butts & Rich, 2021).

An example would be lab values. Treating patients based on reference lab ranges allows a practitioner to determine abnormal versus normal in a wide range of population; In this instance there is no subjective reasoning. Conversely a neurological exam is a prime example of a subjective exam (Davis & Murray, 2016). Clinical reasoning education theory provides research and guidance for both.

Goal Attainment Theory:

Adib-Hajbaghery & Tahmouresi (2018) reviewed how King based her theory on four main elements. Each element states a unique relationship that progresses throughout patient care (Butts & Rich, 2018). These four elements facilitate goal attainment. To reach goals of all types in nursing practice, sufficient knowledge is required. Effective nurse–patient connection helps nurses empathize with patients' conditions, enhances care quality, and improves patients'

quality of life (Adib-Hajbaghery & Tahmouresi, 2018). Goal attainment theory helps to solidify realistic goals. This includes timeframe, education level, and an individual's learning capacity and range.

Theories Influence on Advanced Practice Nursing

Together by using the clinical reasoning education theory and the goal attainment theory in the framework, the basis of the MSN project for providing current evidence-based practice on benefits of physical therapy for those patients diagnosed with acute sciatica will unfold. The ultimate outcome of understanding the current evidence is to have more patients referred by providers, to physical therapy as a first line treatment when diagnosed with sciatic nerve pain.

Theoretical Framework Analysis

The clinical reasoning education theory may assist an APRN as a clinician/provider to listen, hear and understand the perspective of the patient. Guided with the knowledge of physical therapy benefits on those diagnosed with acute sciatica, the APRN will make informed decision for treatment. Physical therapy offers the body different levels of relief. However, having the framework in place to ascertain that physical therapy can promote the best outcome is the concrete foundation (Jeong et al, 2016).

Keeping this in mind, the goal attainment theory will provide an insight for APRNs. Acknowledging that the sciatica is disrupting the activity of daily life the patient may be experiencing (Daniel et al.2019). The nurse will gain knowledge and use this theory to adjust and put in perspective realistic goals and the benefits this physical therapy will achieve without having to endure invasive procedures that can have additional negative effects (Salmond,

2017). By including the goal attainment theory to the guided framework, the analyzation will break down the performance of the individual in all aspects of care. This will include comprehension by both the APRN and patient; benefits will include but are not limited to the impact on patient cost, quality of life, and outcome. The analysis will incorporate the individual's performance in time, while understanding that each patient learns at a different rate (Swan et al., 2020).

Theoretical Contribution to the APRN Profession

One of the theoretical contributions that may be credited in assisting the APRN profession, with the inclusion of the clinical reasoning education theory and the goal attainment theory, is that less invasive procedures may be conducted for those patients with acute sciatica in an APRNs practice. Using these two theories in conjunction, the APRN may increase their knowledge of the benefits for treatment with physical therapy and choose to treat with physical therapy solely.

Having the goal attainment theory and education theory with clinical reasoning, promotes the application of evidence-based practice. The goal attainment theory helps the patient fulfill the goal of decreasing sciatica pain, in realistic fashion. Improving pain offers improved mood, and improved quality of life (Almeida et al., 2019). Whereas the clinical reasoning and education theory offers the opportunity for the APRN to incorporate current evidence in treating patients with physical therapy to help manage the patient's pain who are suffering from sciatica (Aguilar-Shea et al., 2022; Jessee, 2018).

Theories Implications to Guide Personal APRN Practice

Nursing theories have helped to guide practices all around the world. In personal practices, theories have been ascertained to be a valuable tool in comparison to customary nursing practice (Younas & Quennell, 2019). With the APRN utilizing the methodology in the two theories to address and build a patient care plan, the process can be thorough and concrete. Essentially aligning the different integrant of patient dynamics, successful diagnosing and treatment may be achieved (Daniel et al., 2019). Having the guidance with theories activities of daily living for patients has been improved because it puts in perspective what a provider is considering with treatment and explains the concepts of the treatment (Younas & Quennell, 2019).

Literature Search

To determine the impact that physical therapy (PT) can have on sciatic nerve pain and to support this capstone project PICO question a literature search was completed. The databases that produced results were OVID research, EBSCO, Scopus, and NCBI Pub Med. Search terms, key words and phrases included “physical therapy for treatment of sciatica,” “exercise and sciatic nerve pain,” “physical therapy treatment sciatica education for providers,” “surgical intervention outcomes versus physical therapy outcomes for sciatica,” “injections for sciatica” with additional terms such as “education,” “lumbar,” “physiotherapy,” and “back pain.” To limit yielded results, a parameter of actual clinical trials and studies directly associated with physical therapy, and what the therapy encompasses such as self-moving mobilization, physical therapy accompanied with education, etc. and the outcomes each has on sciatic nerve pain, with a date seven years or less. A final inquest and exploration resulted in a total of nine studies, to include three randomized controlled trial studies (Almeida et al., 2019; Bailey et al., 2020; 2023; Fritz et

al., 2021; Jeong et al., 2016); one Delphi study (Thoomes et al., 2022); three qualitative study (Boote et al., 2017; Cram et al., 2019; Goldsmith et al., 2019); one prospective cohort study (Gugliotta et al., 2016).

Definitions

The following denotations and phrases were used in this project:

- 1) *Sciatica pain* is described as debilitating pain commonly caused with “flexion of the lumbar spine, twisting, bending, or coughing” directly affecting the sciatic nerve (Davis et al., 2022).
- 2) *Pain* can be described as radiating with or without tension, associated with a decrease in strength or flexibility, and decreasing body functioning, muscle movement or use, and/or balance (Jeong et al., 2016). “*ODI is a measure of physical disability*” and measurement for pain (Lee et al., 2017).
- 3) *Physiotherapy/Physical Therapy* worldwide can be interchangeable between kinesiotherapy, physiotherapy, and physical therapy when referencing movement or mobilization of the human body for treatment to restore or promote rehabilitation (Scurlock-Evan et al., 2014).
- 4) *Invasive Procedures* that are commonly used for relief of sciatic nerve pain can include procedures conducted in a minimally invasive way, such as the micro-discectomy and foraminotomy (widening the foramen that the nerve travels) (Aguilar-Shea et al., 2022).
- 5) *Therapeutic privilege* when a provider withholds information from a patient that they believe may be too devastating for the patient and could

cause distress (Rosca et al., 2020)

Literature Review

The following review offers evidence to support physical therapy may have beneficial outcomes as primary treatment for sciatica. In the literature review offered three themes related to the use of physical therapy to improve sciatic nerve pain. One theme was the importance of early intervention of physical therapy. The second theme was the comparison of the newly suggested intervention of physical therapy to an invasive surgical for the improvement of pain. And lastly, a third theme was pain evaluation. These themes are essential to giving awareness and understanding to the most effective overall outcome to a patient's wellbeing short and long term and are vital in support of this PICO question as it relates to this capstone project.

Early Treatment for Sciatica with Physical Therapy Proves Beneficial

Four studies established the benefits of treating sciatic nerve pain early on with some form of physical therapy had promising beneficial outcomes.-Fritz et al. (2021) determined through a randomized control study that those having a referral for physical therapy from a provider and implementation of physical therapy after an initial primary care visit for recent-onset sciatica resulted in overall beneficial better outcomes than the usual treatments without starting physical therapy. In another study, conducted as a single arm clinical trial by Almeida et al. (2019) concluded patients reported the most improvement from their baseline pain when using physical therapies such as neural mobilization, joint mobilization, and soft tissue techniques when pain onset had shorter periods in time before treatment, similarly in the Thoomes et al. (2022) Delphi study. Another study was the qualitative study nested within a

pilot randomized controlled trial by Boote et al. (2017) and where subjects that were scheduled for a surgical procedure and participated in physical therapy treatment during the waiting period and had reported results of greatly reduced pain prior to the next treatment, and/or some, elected to have no further treatments or surgical intervention because their pain was greatly reduced and manageable. Fritz et al. (2021) reported that those with early intervention of PT, seeking treatment less than 90 days from diagnosis, not only had positive results at the end of treatment but overall remained without pain. The Oswestry Disability Index (OSW) was used as measurement and a score after 6 months with secondary pain intensity results, patient-reported treatment success, health care use, and missed workdays all included with less pain reported (Fritz et al., 2021).

Compared treatments of sciatic nerve pain: less invasive PT versus invasive surgical intervention

Bailey et al. (2020) concluded from a single center randomized trial of subjects that had a diagnosis of sciatica for four months or longer that were treated surgically compared to those that were not treated by surgery noted that those patients combined, did not have a significant long-term difference but quick temporary relief of pain was achieved with surgery. Additionally, in the study by Bailey et al. (2020) results showed some of the participants had to undergo a second surgical procedures, to achieve results with the inclusion of some participants in the non-surgical group treated only with PT opted for surgical intervention after one year of sub optimum relief. Gugliotta et al. (2016) used a prospective cohort study comparing those that had surgical intervention for sciatic pain with those having less invasive therapy and the long-term outcome differences showed there was not a significant difference in pain reduction

between the two. Therefore, there was a population that forewent invasive surgery that could have had the same or perhaps better outcome with proposed physical therapy to reduce their sciatic nerve pain without the complexity of invasive surgery.

Measuring and Evaluating Pain

Pain relief was used in most of the clinical trials to determine success or failure in the outcome of treatment (Almeida et al., 2019; Bailey et al., 2020; Boote et al., 2020; Fritz et al., 2021; Gugliotta et al. 2016; Thoomes et al., 2022). Gugliotta et al. (2016) compared surgical intervention with different types of conservative interventions, long and short term, measuring success by surveying participants regarding improvement in their quality of life and a short form health survey to determine pain outcomes. The Oswestry Disability Index (OSW) was used as reliability at different intervals of time for other clinical trials (Almeida et al., 2019; Bailey et al., 2020; Fritz et al., 2021). Additionally, the Numerical Rating Scale (0–10) combined with the OSW (0–100), respectively were utilized by Almeida et al. (2019), whereas Fritz et al. (2021), measured results of success by adding in the determined number of days missed at work and number of provider visits during the study. In addition to the pain index a quality-of-life score was included to the results at 6 weeks, 3 months, 6 months, and 1 year for the single-center trial by Bailey et al. (2020). Boote et al. (2017) conducted the qualitative study which was resulted by measuring back pain with both the OSW at the beginning and the Pain Visual Analog scale (VAS) with a beginning mean of 58 (from 0-100) from patient reports, using patients with similar BMI, and beginning with using both genders equally, the final results were reported as pain being as low as a 2 (0-100) on the VAS. All interviewed participants were examined on their understanding of their treatment to ensure rigorous reduction in bias; with of 29 patients in

total many elected to not have surgery and five reporting not having surgery specifically due to reports of PT eliminating their pain and additional improvements were lifestyle gains such as returning full range of motion and strength in limbs (Boote et al., 2017).

Limitations and Strengths

Research regarding utilizing physical therapy versus the more invasive forms of treatment for acute sciatica had strengths and limitations. There were both pros and cons of each study that helps retain their validity and provides practitioners with evidence-based resources to provide adequate care. Limitations to the case studies were, but not limited to, as follows: having small sample size, bias in the selection processes, time constraint, dropout rate after an extended time period, subject view of and expectations of the care provided, and understanding the cause of the disease (Almeida et al., 2019; Bailey et al., 2019) Other limitations were the lack of set number of physical therapy session, length of sessions, and lacked a comparison group (Almeida et al., 2019; Cram et al., 2019; Thoomes et al., 2022). Finding qualified candidates that could both be followed 24/7 to ensure complete cooperation of not using additional aids to combat the pain, such as medications, massages, etc. and while using a pain scale, consideration that for each individual pain is subjective and each had a different threshold, small sample size, and pain tolerance (Almeida et al., 2019; Bailey et al., 2020; Boote et al., 2020; Fritz et al., 2021; Gugliotta et al. 2016; Thoomes et al., 2022).

Strengths in the Delphi study were that research was completed by different panelist from various countries with specialties in neurology, surgery, and physical therapy (Thoomes et al., 2022). Strengths in the nested qualitative study completed by Boote et al. (2020) were grounded in the meticulous and incipient data collection and analysis approach that were

allowed partially due to nature of the study design. The strengths in the randomized studies were that all participants had pre-enrollment qualifications ensure relative equality when comparing outcomes (Boote et al., 2020; Fritz et al., 2021, Thoomes et al., 2022).

Gaps in Literature

There was limited current literature available that showed studies on the beneficial outcomes in using physical therapy intervention for sciatic nerve pain. Searching results and attempting to go as far back as ten and fifteen years resulted in limited studies with results that were aimed at beneficial surgical outcomes and not comparing any physical therapy or having incomplete data on the physical therapy aspect. Almeida et al. (2019) concluded that gaps in literature includes quality studies and added how additional studies will need to be conducted to determine if physical therapy is good for all stages of sciatica with optimal sample sizes, including equal comparison groups such as similar ages, similar stage of disease, and participants equal understanding of the disease pathology (Almeida et al., 2019; Bailey et al., 2020).

Although there is not an abundance of research, providers have evidence that positive measurable outcomes with physical therapy. Providers have referred some patients to PT as concluded by Fritz et al. (2021) showing a referral from a provider to treat acute sciatica with physical therapy, regardless of the type of physical therapy, for new onset sciatic nerve pain, all outcomes resulted in a change for the better, including disability compared to those referred to usual care.

Conclusion

In conclusion, a diagnosis of sciatica will continue to cause illness and health decline in a large part of the population. As primary care providers using the evidence-based studies available to make an informed decision of the best, safest, and least invasive treatment such as PT early on can prevent and aid in pain management. Patients are suffering with the illness long term with treatment plans such as medication only, surgical interventions, and other invasive treatment that have been shown to prolong the duration of sciatica. For long term healing and non-invasive, safe treatment of sciatica, primary care providers may want to consider early intervention to PT. Reviewing the recent literature results and using the clinical reasoning educational framework will help guide an APRN's clinical decision making based on the analytical results of PT intervention for relief of sciatica. Thus, with confidence and competence, using physical therapy as first line treatment evidence shows this may allow for improvement in lowering pain, result in better health outcomes and wellbeing of patients with sciatic nerve pain.

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