

Laser Acupuncture Therapy in Patients with Sciatica: A Case Study

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Objective: Sciatica and the disability that results from it are important issues among older patients. This case study illustrates the potential application of laser acupuncture for sciatica.

Clinical features: A 55-year-old woman complained of pain in the left buttock radiating to foot. The patient visited the emergency department and orthopedic clinic for initial treatment which was ineffective. Her sciatica and lumbosacral radicular syndrome was diagnosed.

Intervention and outcome: The patient was confined to a wheelchair and visited us for further treatment four days later. The gallium aluminum arsenide Handylaser Trion was used to apply 0.375 J of energy to each of the following acupuncture points once daily: GB30, GB34, GB44, BL25, BL40, BL54, BL60, BL67, ST36, and ST45. She experienced pain relief of more than 50% after one treatment, and was able to return to heavy work after eight treatments. She continued to receive laser acupuncture therapy about three times a week and was in complete remission after 56 therapeutic sessions. She was free of sciatica at her one-year follow-up.

Conclusion: We believe that an experienced physician may use laser acupuncture as alternative or complementary therapy in patients with sciatica who are ineffective to conventional treatment.

Key words: Sciatica, laser acupuncture therapy, traditional Chinese medicine

Introduction

Sciatica is a symptom rather than a specific diagnosis, and it is known by a range of terms, such as lumbosacral radicular syndrome, radiculopathy, nerve root pain, and nerve root entrapment or irritation.¹ It

is mainly diagnosed by history taking and physical examination. Its most important features are radiating leg pain and the disability that results, which are major issues among older patients.

In general, the clinical course of sciatica is considered to be favorable.² Most patients are treated

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conservatively in the first 6–12 weeks with either non pharmacological modalities (e.g. bed rest, physical therapy with or without advice to stay active, acupuncture, traction, manipulation, transcutaneous electrical nerve stimulation) or pharmacological modalities (e.g. analgesic, non-steroidal anti-inflammatory drugs, muscle relaxants, epidural corticosteroid injection).^{2,3} However, there have been few reports concerning the treatment of sciatica with laser acupuncture. Here, we present the case of a patient with sciatica treated with laser acupuncture therapy (LAT).

Case Report

History and Examination

A 55-year-old woman complained of pain in the left buttock radiating via the dorsal aspect of the thigh and lateral aspect of the calf to the second, third, and fourth toes since April 8, 2010. Her pain was aggravated by prolonged bending and heavy work and was not relieved by bed rest. It was sharp, burning, and tingling in nature, with muscular cramping in the left leg. As the pain progressed, she visited the emergency department for initial treatment on April 12, 2010. Lumbar spinal radiographs revealed degenerative change of lumbar spine with spurs formation. She was unable to walk or bend because of intense pain, even during simple movements of her left leg. Non-steroidal anti-inflammatory drugs (NSAIDs) were prescribed initially, and she was referred to the orthopedic outpatient service for evaluation. According to her history, the sciatica affected the L5 and S1 dermatomes, and lumbosacral radicular syndrome was diagnosed. Her sciatica was treated with NSAIDs and muscle relaxants, and physical therapy was recommended.

Because of ineffective pain management with the drugs and persisting disability, she soon sought complementary treatment for pain control.

Laser Acupuncture Therapy and Outcome

The patient visited our acupuncture clinic on April 16, 2010. According to her statement, she was confined to a wheelchair and unable to lie in bed. She suffered from agonizing pain (10-cm visual analog scale [VAS] = 9.6; 0–10 points, least to greatest pain intensity) and was completely exhausted over the previous four days. During the physical examination, local tenderness in the left buttock region was noted on palpation. The straight leg raise test was positive for the left leg at 30 degrees. As she experienced intolerable pain in this leg while changing her posture during the physical examination and was rather afraid of acupuncture needles, we suggested LAT instead of traditional acupuncture for pain relief. She underwent a therapeutic course once daily, except on holidays, in the initial two weeks.

Acupoints located in or near the L5 and S1 dermatomes were chosen: GB30 (*Huantiao*), GB34 (*Yanglingquan*), GB44 (*Zuqiaoyin*), BL25 (*Dachangshu*), BL40 (*Weizhong*), BL54 (*Zhibian*), BL60 (*Kunlun*), BL67 (*Zhiyin*), ST36 (*Zusanli*), and ST45 (*Lidui*). She received gallium aluminum arsenide (GaAlAs) laser (Handylaser Trion; RJ-Laser, Reimers & Janssen GmbH, Winden, Germany) therapy (maximal power, 150 mW; wavelength, 810 nm; area of probe, 0.03 cm²; power density, 5 W/cm²; pulsed wave at Bahr frequencies [B1 = 599.5 Hz, B2 = 1199 Hz, B3 = 2388 Hz, B4 = 4776 Hz, B5 = 9552 Hz, B6 = 19104 Hz, B7 = 38208 Hz]). The laser was applied to each point for 5 s with Bahr frequencies (Table 1 and Fig. 1) to deliver 0.375 J of energy sequentially.

Table 1. Bahr frequencies applied to the relevant acupuncture points.

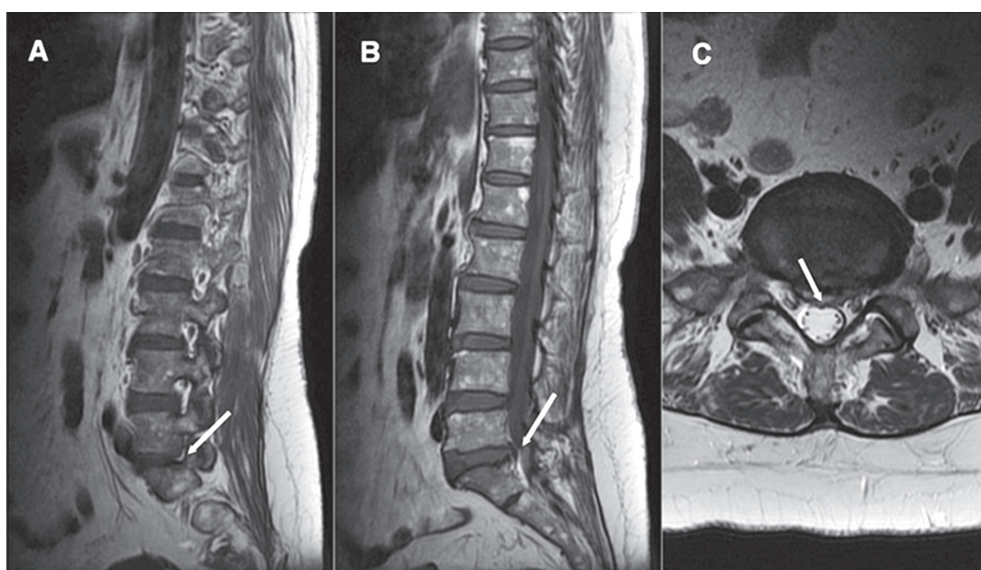
Acupuncture points	GB30, BL54	GB34, BL25, BL40, ST36	GB44, BL60, BL67, ST45
Bahr frequencies	B1: 599.5 Hz	B2: 1199 Hz	B3: 2388 Hz

The patient reported a decrease in pain of more than 50% after one therapeutic session (pain VAS = 4.5; Table 2). She could walk without assistance and returned to heavy work after eight treatments. Magnetic resonance imaging (MRI) scans performed on April 29, 2010 showed a bulging disc at L5–S1 with relative narrowing of the neural foramen on the left side (Fig. 2). She continued to receive LAT about three times a week and carried on her heavy work. The patient displayed complete remission (pain VAS = 0) after 56

**Fig. 1 Laser acupuncture at BL40.****Table 2. Laser acupuncture therapeutic sessions for sciatica.**

Tests/ sessions	Before treatment	1	8	40	56
SLRT	30 degree	60 degree	60 degree	Negative	Negative
Pain VAS	9.6	4.5	3.6	1.8	0

SLRT: straight leg raise test; VAS: visual analog scale.

**Fig. 2 MRI scans of the lumbo-sacral spine showing a bulging disc at L5–S1 with relative narrowing of the neural foramen on the left side (arrows).**

laser acupuncture sessions and was free of sciatica at her one-year follow-up.

Discussion

Sciatica is considered to result primarily from nerve root compression by disc herniation.² However, disc pathology and stenosis with apparent neural compromise are also common findings in asymptomatic patients. Symptomatic patients with disc herniation may experience marked improvement without addressing the original pathology by removal of the herniated disc or other causes of nerve root compression.⁴ These observations suggest that mechanisms other than pressure on the nerve roots are involved in the development of sciatica neuralgia.

Inflammation rather than pressure was first described as the mechanism underlying sciatica in the early 1950s, when Lindahl and Rexed found histological evidence of inflammation in disc herniations.⁵ In the early 1990s, Saal et al. reported high levels of Phospholipase A2 (PLA2), an important enzyme in the inflammatory process, in disc herniations of patients with radicular pain.⁶ PLA2 acts on the cell membrane and releases arachidonic acid (a precursor of inflammatory mediators), leukotrienes, and thromboxanes, which may cause nerve dysfunction and induce radicular pain.^{2,4} Cytokines such as interleukin (IL)-1, IL-6, and tumor necrosis factor (TNF)- α have also been implicated in the genesis of this inflammatory response.^{2,4}

According to the theory of traditional Chinese medicine (TCM), the straining injury leads to the blood stasis due to *qi* stagnation (a pathological change in which a long-standing or severe stagnation of *qi* impedes blood flow, a condition characterized

by the coexistence of *qi* stagnation and blood stasis) of her low back and leg thus causes her sciatica.^{7,8} We chose the acupoints according to the distribution of the L5, S1 dermatomes, the sciatic nerve and the related meridians. By stimulating acupoints along the meridians according to the distribution of pain, the flow of *qi* and blood in the body is realigned to restore internal homeostasis and resolve the symptoms of disease.

Acupuncture is a common complementary treatment option for musculoskeletal disorders, and electro-acupuncture has been found to be effective for lower back pain and radicular sciatica due to its influences on pain inhibitory systems and blood flow to the sciatic nerve.⁹ However, acupuncture is difficult to perform in children and those with needle phobia. LAT is a non-invasive technique involving the stimulation of traditional acupoints with low-intensity, non-thermal laser irradiation. The clinical application of laser acupuncture is widespread, although the mechanism is not well understood. Low-level laser therapy can modulate inflammation by reducing the levels of biochemical markers (PGE2, mRNA Cox-2, IL-1 β , TNF- α), neutrophil influx, oxidative stress, edema, and hemorrhaging in a dose-dependent manner.¹⁰ LAT integrates the positive effects of acupuncture and low-level lasers.¹¹ Compared with needle-based acupuncture for achieving *qi*, laser acupuncture is not associated with somatosensation and has the advantage of being non-invasive and aseptic. Moreover, LAT is painless and safe because no heat is generated during the procedure. It is also more effective and requires less time than needle-based acupuncture.¹¹

In general, conservative treatment is the first-line option for patients with sciatica. However, the best evidence available does not clearly show

that one specific type of conservative treatment is more effective than others.¹² In this case study, after ineffective pain relief with the drugs and rest in the first one week, we observed that the patient's sciatica improved with LAT within 10 days. LAT has potential as a conservative treatment for sciatica in certain cases. Given the relative scarcity of research on this topic, further experimental studies should be conducted to examine the efficacy of LAT for sciatica.

Conclusion

Laser acupuncture therapy was associated with pain control in this patient with sciatica, whereas conventional medical treatment failed to relieve her radicular pain and its related disability. An experienced physician may use laser acupuncture as alternative or complementary therapy in patients with sciatica who are ineffective to conventional treatment.

Acknowledgments

We thank the patient for consenting to publication of this report. The study was approved by the Human Ethics Committee of our hospital. (Chang Gung Medical Foundation Institutional Review Board no. 99-3439B)

Conflict of Interest Statement

None declared.

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雷射針灸治療坐骨神經痛－病例研究

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目的：坐骨神經痛及其所致殘疾是老年患者中的重要議題，本病例研究說明雷射針灸治療坐骨神經痛的重大應用前景。

臨床特徵：一位55歲女士主訴左臀部疼痛放射到腳，起初到急診和骨科就醫，被診斷為坐骨神經痛及腰骶神經根症候群，但罔效。

治療及結果：四天後患者坐輪椅來針灸科求診，我們使用錄鋁砷"治立安雷射"照射穴位，治療能量為每穴0.375 J，每天一次，穴取環跳、陽陵泉、足竅陰、大腸俞、秩邊、委中、崑崙、至陰、足三里、厲兌。單次治療後患者疼痛緩解達50%以上，治療8次後能夠重返粗重工作。患者持續接受每週約3次的雷射針灸治療，在56次治療後得到完全緩解，追蹤一年並未復發。

結論：我們認為有經驗的醫師能使用雷射針灸作為替代或輔助療法，應用於常規治療無效的坐骨神經痛患者。

關鍵字：坐骨神經痛、雷射針灸治療、傳統中國醫學

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