

Two Cases of Plantar Fasciitis Treated with Magnetic Acupuncture

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[Abstract]

Objectives : The aim of the study was to ascertain the effectiveness of magnetic acupuncture in patients with plantar fasciitis.

Methods : The patients were treated with magnetic acupuncture using a magnetic therapy stimulator (Whata 153), as well as with moxibustion therapy. Acupuncture treatment was conducted on the acupoints of Ashi—as well as on 太谿 (KI3), 崑崙 (BL60), and 委中 (BL40)—for 15 minutes. The intensity of pain was evaluated using the visual analogue scale (VAS), and the tenderness threshold (TT) was measured at each visit using an algometer.

Results : After treatment, evaluation using the VAS had improved, as had the TT; furthermore, plantar fasciitis pain was reduced.

Conclusion : Magnetic acupuncture relieved pain in plantar fasciitis. In further clinical study, more research on magnetic acupuncture is required.

Key words :

Plantar Fasciitis;
Heel pain;
Magnetic Acupuncture;
Magnetic Therapy
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I. Introduction

Plantar fasciitis is characterized by tenderness and pain localized on the medial tubercle of the calcaneus. The pain manifests upon heavy lifting, during the first steps after arising, or after periods of rest¹.

The etiology of the disease is unclear, but clinicians usually assume it is caused by a cumulative overload of stress. More specifically, as repeated stress compounds over time, it will exceed the acceptable range for the body to recover and adapt; this eventually leads to acute or chronic injury to the origin of the plantar fascia².

Chronic plantar fasciitis is one of the most difficult problems for the physician, because few treatments are available. Current treatments for heel pain include stretching and taping of the foot, orthotic devices, oral inflammatory medication, and cortisone injections. However, these drug treatments can cause serious side-effects, and thus a study into alternative therapies is required³⁻⁵.

Acupuncture is one of the most popular alternative and complementary medical treatments. Its specific effects on health, and its effectiveness against various kind of pain, have been confirmed in a great number of studies, including those focusing on plantar fasciitis⁶.

Moreover, many studies have used electrical stimulation to increase the effectiveness of acupuncture⁷, but few studies have been conducted using magnetic acupuncture^{8,9}. In the present investigation, two patients were treated with magnetic acupuncture—which has analgesic effects and facilitates recovery from muscle fatigue in musculoskeletal disorders^{10,11}—to show the effectiveness of magnetic acupuncture in patients with chronic plantar fasciitis.

II. Methods

Two patients with plantar fasciitis were treated using magnetic acupuncture at the Department of Acupuncture & Moxibustion Medicine, Cheonan Hospital of Daejeon University. Before the procedure, the patient was informed about the purpose and contents of the treatment; they were also given a description of the medical device and the anticipated side effects.

1. Treatment

All treatment procedures were performed by a skilled practitioner with 6 years of training and more than 2 years of clinical acupuncture experience.

1) Magnetic acupuncture

(1) Medical Device

In this study, the Whata 153 (Medi Lab, South Korea) was used; it is a medical device capable of magnetic stimulation. The Whata 153 causes a needle to act as a magnetic body by placing it into a magnetic field; the device forms the magnetic field by passing a current through a cylindrical coiled magnet (Fig. 1).

(2) Procedure

Acupuncture treatment was conducted on the acupoints of Ashi, which meant tender points. In addition, needles were applied to the following points: 太谿 (KI3), 崑崙 (BL60), and 委中 (BL40); to this end, we used single-use, 0.30 × 0.3mm, stainless steel needles (SMC, South Korea; Fig. 2). A double-sided sticker was attached to the underside of the magnetic cable, so that the stagnation of the inserted needle was located at the center of the circular magnetic field. All the needles were stimulated for 15 minutes using the Whata 153, and the intensity of stimulation was slowly increased until the participants felt a minimal throbbing sensation

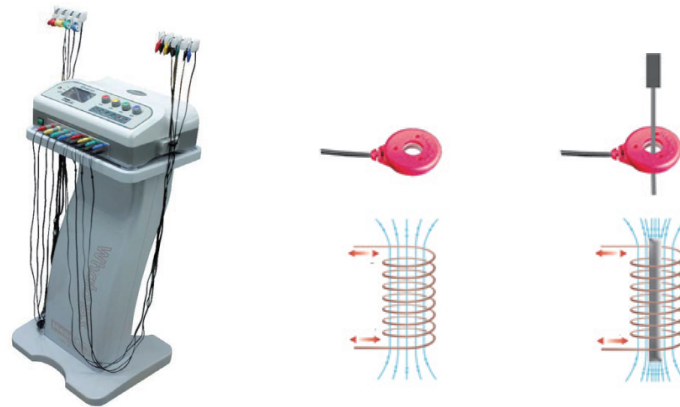


Fig. 1. The Whata 153 (Medi Lab, Korea) and a diagram of the coil for magnetization of the acupuncture needle. If currents are flowing on in the coil, the magnetic field is formed. When the a magnetic body is inserted into the coil, it changes into an electromagnet, and there is a more powerful magnetic field.

at the needling points.

2) Moxibustion

Moxibustion therapy on the heel was offered at the same acupuncture points (KI3, BL60, BL40, and Ashi). At each treatment session, the moxibus-

tion cones (Manina moxibustion; Haitnim Bosung Inc., South Korea) were applied indirectly to each point. Each burned moxibustion cone was held in place for approximately 5 to 10 minutes; it was removed when the patient could no longer tolerate the stimulation.



Fig. 2. Application of magnetic acupuncture in plantar fasciitis

2. Assessment

The pain level, measured using the VAS and TT, was evaluated by the same practitioner in all patients.

1) Visual Analogue Scale

The intensity of heel pain was measured using the VAS, which is a reliable and valid assessment of pain intensity. Patients rated their pain intensity from 0 (no pain) to 10 (worst possible pain) on four different scales.

2) Algometer Pressure¹²⁾

The most characteristic symptom of plantar fasciitis is tenderness, so the point of highest tenderness was determined using a pressure algometer (Wagner Instruments, Greenwich), which measures the TT. The pressure algometer is a force gauge fitted with a rubber disc that has a surface of 1 cm²; it was calibrated in kg/cm² up to 11 kg/cm².

With the patient lying down, and the foot in a comfortable position, the average of the three measurements was recorded.

III. Case studies

1. Case 1

1) Patient

Im ○○, Woman, 39 years old

2) Chief complaints

Right heel pain

3) Onset

First onset: January 2013, Recurrence: June 2016

4) Medical history

N/S

5) Family history

N/S

6) Present medication

N/S

7) Present complaints

She suffered from heel pain 3 years ago. After walking a lot in June 2016, the plantar heel pain became terrible. She visited the local hospital and was diagnosed—in a radiological examination—with plantar fasciitis as a result of an infracalcaneal spur. Although she received extracorporeal shock waves and physical therapy, the symptoms persisted; for this reason, she visited our hospital on September 22, 2016.

8) Treatment progress

At her first visit, she explained that her pain tended to worsen in the morning and subside during times of activity. Furthermore, when she walked down the stairs, she had severe pain in the heel of the foot; physical examination revealed severe tenderness on the sole of the foot at the inferior region of the heel.

From September 22, 2016 to October 17, 2016, she received a total of eight treatments. At the time of the last visit, her VAS had decreased from 8 to 2, and the algometer pressure value had increased to 6.18 Kgf from 3.12 Kgf (Fig. 3). She still felt some discomfort during walking, but there was no intense pain; furthermore, she had less pain than before when she came off the stairs.

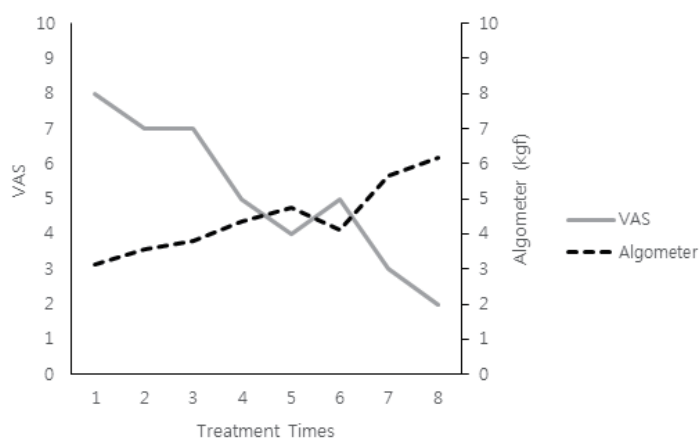


Fig. 3. Changes in VAS and algometer pressure after treatment in case 1

2. Case 2

1) Patient

Sim ○○, Man, 51 years old

2) Chief complaints

Left heel pain

3) Onset

Early onset: August 2006, Recurrence: October 2016

4) Medical history

Surgery for thyroid cancer 10 years ago, and periodical follow-up every 2 years

5) Family history

N/S

6) Present medication

N/S

7) Present complaints

Pain in the left plantar heel had been improving and deteriorating slightly for 10 years before the patient visited the local hospital. In around October 2016, his heel pain was worse during his

normal life. He visited the local hospital, and there were no findings upon radiological examination; he received acupuncture, bee venom acupuncture, and physical therapy. However, there was no improvement in pain, so he moved to the present hospital on October 18, 2016.

8) Treatment progress

At the first visit to our clinic, he felt severe pain in the plantar heel when he first started to walk or when he walked after resting. He experienced more pain when he walked in a slightly inclined place, describing the pain as a sharp sensation. Physical examination revealed localized tenderness in the antero-medial aspect of the calcaneus, as well as intermittent fever on the soles.

From October 18, 2016 to November 10, 2016, a total of eight treatments were performed. The patient's VAS score decreased from 10 to 3, and the algometer pressure value increased from 2.38 Kgf to 7.36 Kgf (Fig. 4). At the time of the last visit, he was experiencing little inconvenience in everyday life, and the pain was slight, even after walking on a flat or slightly inclined place, or just after the morning.

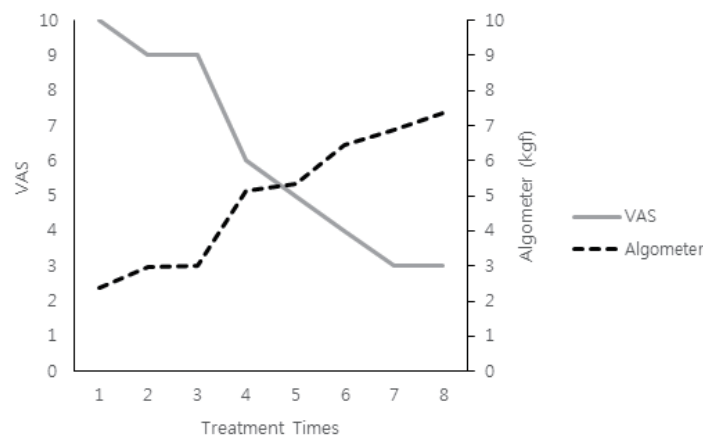


Fig. 4. Changes in VAS and algometer pressure after treatment in case 2

IV. Discussion

Plantar fasciitis, which has been referred to heel spur syndrome, is a representative cause of inferior heel pain; it accounts for such pain in about 10% of patients¹³. Specifically, it is a degeneration of the plantar fascia resulting from repeated stress at the tissue's origin at the calcaneus¹⁴.

The plantar fascia is a thickened fibrous sheet of connective tissue that originates from the medial tubercle on the undersurface of the calcaneus; it fans out, attaching to the plantar plates of the metatarsophalangeal joints to form the medial longitudinal arch of the foot¹⁵.

Plantar fasciitis is more likely to occur in people with a high body mass index, who work for most of the day on their feet, or who have limited range of motion as regards ankle dorsiflexion¹⁶.

Patients typically report plantar heel pain on weight-bearing, and they may complain of throbbing, searing, or piercing pain. The pain can persist for months or even years; it often improves after further ambulation, but worsens with prolonged activity, often limiting daily activities. Inappropriate footwear, walking barefoot, on toes, or up stairs may exacerbate the pain¹⁷.

The symptoms of plantar heel pain are well known, and diagnosis is relatively simple. Pain upon rising in the morning or after periods of inactivity is typical of plantar fasciitis¹⁵. In addition, an inferior calcaneal spur—viewed using radiology—is frequently associated with the symptomatology of plantar fasciitis, although the presence or absence of such a spur may not necessarily correlate with the patient's symptoms¹⁸.

Many treatment options can be used in cases of plantar fasciitis, such as rest, stretching, orthotics, arch supports, strapping, and night splinting. Other interventions include corticosteroid injections, low energy shock wave therapy and surgery, but few high-quality, randomized, controlled trials have been conducted to support these therapies⁹.

In Korean medicine, plantar fasciitis is classified

among various kinds of pain in the foot. With regards to treatment, research is actively being carried out into electroacupuncture, pharmacopuncture, and catgut-embedding acupuncture^{7,19}. Among these treatments, studies on acupuncture have been published steadily, and acupuncture is now recommended for the management of patients with plantar heel pain^{6,20}. However, no study has used magnetic acupuncture in plantar fasciitis patients.

Magnetic therapy is effective in relieving fatigue, musculoskeletal diseases, localized pain, rheumatic arthritis, and chronic pain syndromes¹⁰. According to Lee et al.¹⁰, acupuncture treatment with a magnetic ring produces better effects on pain threshold.

In the present study, patients were found to have chronic pain in the heel of the foot. One report claimed that, when the disease becomes chronic, it is difficult to predict the effects of treatment, and that surgery should be considered after all other forms of treatment have failed¹⁵. Therefore, because aggressive means of treatment other than acupuncture are required, a medical device (Whata 153) was used in the present study to stimulate the plantar fascia and relieve symptoms.

The Whata 153 is a medical device that is used to stimulate a magnetic field through the inserted needle. In addition to this magnetization, it can also generate heat in the needle, thus achieving the effects of heat therapy such as moxibustion. In addition, magnetic acupuncture continuously induces changes in the electric charge in the needle. It is similar to the effect of manipulation during acupuncture therapy (手技刺戟); in this way, it maximizes the effect of the acupuncture treatment⁹.

In the present study, not only the VAS, but also the algometer pressure evaluation showed a significant improvement; moreover, it showed that magnetic acupuncture improved the symptoms of plantar fasciitis.

The patients in case No. 1 of the present study had suffered from heel pain for three years and had undergone extracorporeal shock wave and

physical therapy. Nonetheless, she did not show any improvement. In case 2, the pain had lasted for 10 years, although the patient had received acupuncture, bee venom acupuncture, and physical therapy as conservative treatments.

In Case 1, the VAS decreased from 8 to 2, and the algometer pressure value increased from 3.12 Kgf to 6.18 Kgf. In Case 2, the VAS decreased from 10 to 3, and the algometer pressure value increased from 2.38 Kgf to 7.36 Kgf. Both patients could be defined as having chronic plantar fasciitis; in cases of this disease that are unresponsive to conservative treatments, plantar fasciotomy is usually considered^{15,17}. Therefore, it is meaningful that the pain was significantly reduced after eight treatments, and that the symptoms had improved after a month in the present study.

This case report was limited in a number of ways. The number of cases in the study was insufficient, and the patients were not observed in the long term. Furthermore, it was not a prospectively designed study; it is impossible to exclude the effects of moxibustion therapy on the outcome, and there is no way to conclude that the results were caused by magnetic acupuncture alone.

Nevertheless, this was the first study to report the use of magnetic acupuncture to treat plantar fasciitis. Therefore, this case is significant in that few studies have addressed the use of magnetic acupuncture to treat musculoskeletal pain.

In future, research must be based on the objective outcome measurements, more cases should be collected, and a comparative study with other treatment methods should be carried out. Fundamentally though, we conclude that acupuncture using a magnetic field can increase the effectiveness of acupuncture treatment.

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