

Sacral Magnetic Stimulation for Pain Relief from Pudendal Neuralgia and Sciatica

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INTRODUCTION: Magnetic stimulation of the sacral nerve roots is used for neurologic examination. However, no one has reported therapeutic efficacy of pain relief from pudendal neuralgia with sacral magnetic stimulation. **METHODS:** Five patients with pudendal neuralgia or sciatica received 30 to 50 pulsed magnetic stimuli of the sacral nerve roots. The median age of the patients was 59 (range, 28–69) years; there were 3 females. **RESULTS:** Sacral magnetic stimulation immediately eliminated the pain. The pain relief lasted between 30 minutes and 56 days (median, 24 hours). Adverse effects were not observed. **CONCLUSIONS:** This pilot study indicates that magnetic stimulation of the sacral nerve roots may be a promising therapeutic modality for pain relief from pudendal neuralgia and sciatica. Further studies should be performed to determine the appropriate intensity and frequency, as well as the utility of a second course, of magnetic stimulation treatment. [Key words: Magnetic stimulation; Sacral nerve; Pudendal nerve; Pudendal neuralgia; Sciatica; Pain relief]

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Pudendal neuralgia, continuous perineal pain with the trigger point(s) on the pudendal nerve, is often refractory to treatment. We incidentally found that magnetic stimulation of the sacral nerve roots is effective for pain relief of pudendal neuralgia. A 69-year-old male presented with right chronic pudendal neuralgia that he had had for eight years, and he underwent the pudendal nerve function test.^{1,2} To measure the motor latency at the anal sphincters, magnetic stimulation was applied at the bilateral sacral region according to our previous report.^{1–3} We found that immediately after the sacral magnetic stimulation (SMS) was applied, the pudendal neuralgia disappeared. The pain relief lasted 56 days, at which

time the pudendal neuralgia recurred, triggered by an accidental lumbar sprain. We then prospectively treated four consecutive patients with pudendal neuralgia or sciatica with SMS.

PATIENTS AND METHODS

Five patients with pudendal neuralgia or sciatica, including the first patient treated with SMS (Patient 1), were included in this open pilot study (Table 1). The median age of the patients was 59 (range, 28–69) years; there were 3 females. A patient was diagnosed with pudendal neuralgia if the patient had both spontaneous pain at the perineum and tenderness to palpation at the point of the skin (trigger point) above the pudendal nerve. A patient was diagnosed with sciatica if the patient had both spontaneous pain that spread from the lower back down the leg and tenderness to palpation at the skin above the sciatic nerve. Patients 1, 2, and 3 visited our clinic and presented with anal pain as a chief complaint. Patient 1 had been taking clomipramine (50 mg/day), Patient 2 had been taking loxoprofen (180 mg/day), and Patient 3 had been taking diclofenac (75 mg/day) for the anal pain. Patients 4 and 5 came to our clinic for examination of anal function after giving birth and were incidentally found to have pudendal neuralgia (Patient 4) or sciatica (Patient 5); they had not been taking any medications. The duration between the onset of neuralgia and the SMS treatment in the five patients ranged from two months to eight years (median, 3 years 4 months).

As part of the examination of anal function, each patient underwent SMS to measure the latency of motor evoked potentials in the anal sphincter system.^{1, 2}

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Table 1.
Characteristics of Patients and Results of Pain Relief

Patient	Age (yr)/Sex	Type of Neuralgia (side)	Duration of Pain (years months)	Number of Stimuli*	Before SMS†		After SMS†			Period of Pain Relief
					Pain	Tenderness	0 hr	6 hr	24 hr	
1	69/M	Pudendal neuralgia (R)	8 Yr	40	8	10	0	0	0	56 days
2	65/F	Pudendal neuralgia (L)	0 Yr 2 mo	30	5	10	0	0	5	30 min
3	59/M	Pudendal neuralgia (L)	0 Yr 3 mo	50‡	9	10	0	2	8	24 hr
4	28/F	Pudendal neuralgia (L)	3 Yr 4 mo	30	9	10	1	0	1	40 days
5	31/F	Sciatica (L)	6 Yr	30	8	6	0	0	4	24 hr

SMS = sacral magnetic stimulation; M = male; F = female; R = right; L = left.

* Number of magnetic stimuli that were delivered during the SMS procedure.

† The patient was asked to verbally rate the degree of spontaneous pain (pain) or tenderness to palpation (tenderness) on a scale from 0 (no pain) to 10 (unbearable pain) at the indicated times before and after SMS therapy.

‡ In Patient 3, pain relief was confirmed at the time of the application of the 25th magnetic stimulus.

The magnetic stimulation was delivered from a circular coil that had an outer diameter of 90 mm by a Magstim® 200 (Magstim Co., Wales, United Kingdom). The coil was placed flat over the sacral region (S2-S3 interspace) with the patient in the left lateral position to stimulate the sacral nerve roots. The application of SMS was confirmed by recording the evoked potentials in the anal sphincters using a concentric needle electrode in Patient 1, and surface electrodes within the anal canal in the other patients. A total of 30 to 50 pulsed magnetic stimuli were delivered during the SMS procedure in the five patients, at an intensity of 75 percent of the maximal stimulator output (1.5 Tesla) under the conditions of frequency less than 0.5 Hz, rise decay of 0.1 milliseconds, and pulse duration of 1 millisecond. It took one to two minutes to give the entire treatment.

To assess the degree of spontaneous pain and the degree of tenderness to palpation before and after the SMS procedure, the intensity of pain was recorded using the verbal analog scale that ranged from 0 (no pain) to 10 (unbearable pain). The patients were then requested to report the duration of pain relief.

RESULTS

All five patients tolerated the SMS procedure well, and adverse effects were not observed. The degree of spontaneous pain and tenderness was dramatically ameliorated just after the SMS procedure in all five patients (Table 1). The duration of pain relief ranged from 30 minutes to 56 days.

DISCUSSION

Magnetic stimulation, the quick change of magnetism, can produce small electrical currents in deeply situated nervous structures to activate the nervous structures noninvasively. Recently, transcranial magnetic stimulation of the central nervous system has been attempted for the treatment of major depression,⁴ schizophrenia,⁵ and central pain,⁶ although its mechanism of action and effectiveness remain unclear. Pujol *et al.*⁷ reported that application of 8,000 pulsed magnetic stimuli to the tender body region reduced the pain in patients with localized musculoskeletal injuries. In our study, we did not stimulate the tender body region, but instead stimulated the innervating nerve roots with 30 to 50 pulsed magnetic stimuli, which was confirmed by recording the evoked potentials. Thus, the SMS therapy needs one to two minutes to give the entire treatment. This study

indicates that magnetic stimulation of the peripheral nerve roots is a promising therapeutic modality for pain relief, although SMS only resulted in temporary pain relief in this study. Further studies should be performed to determine the appropriate intensity and frequency, as well as the utility of a second course, of SMS treatment.

CONCLUSIONS

The degree of pudendal neuralgia and sciatica was ameliorated after just 30 to 50 pulsed magnetic stimuli of the sacral nerve roots. The pain relief lasted between 30 minutes and 56 days (median, 24 hours). Adverse effects were not observed. This study indicates that magnetic stimulation of sacral nerve roots can be a promising therapeutic modality for pain relief from pudendal neuralgia and sciatica.

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