ORIGINAL RESEARCH

Magnet Therapy for the Treatment of Pain

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Abstract

This is a retrospective study of sixteen consecutive patients seen in a private practice who were treated using magnets of 1000 Gauss intensity for pain. This type of magnet treatment appeared effective for the treatment of acute or chronic dermatomal pain, acute injury, and arthritis according to this retrospective analysis. It appeared to have less value in chronic muscle spasm patients. (J of Naturopathic Med 2000; 9:40-43)

Introduction

There is always a need to find safer, more effective, non-invasive, methods to treat people with pain. While pain relief is one of the most common reasons for visits to physicians, it is still a poorly understood phenomenon. The International Association for the Study of Pain defines pain as "an unpleasant sensory and emotional experience associated with either actual or potential tissue damage, or described in terms of such damage (1)."

There are many conventional and complementary therapies that are employed in pain management. Acupuncture is a well known complementary therapy that is commonly employed for this use. Acupuncture theory calls for the manipulation of energy points to remove blockages of qi that can cause pain. More recently magnets have been used instead of needles to stimulate these energy points. In the Eisenberg studies of "alternative" therapies, magnets were listed as one of the most common energy therapies (2).

It is known that humans emit magnetic fields, and in some cases those fields can be relatively strong. Magnetic fields are measured in Gauss. One Gauss is the force necessary to induce an electromotive force of one one-hundred millionth of a volt per centimeter of wire at a speed of one centimeter per second. One study of two qigong masters showed emissions of 2-3 mGauss and 1.3 mGauss respectively from each of the two masters. Each were able to deflect a magnetic compass needle 30 degrees, and reach peak reproducible magnetic fields of 8-15 mGauss (3).

It is also known that humans and other mammals respond to magnetic fields. Cellular research has shown that cells respond to magnetic fields that are either parallel or perpendicular to the cell and that the response is distinctly and predictably different for each magnet orientation (4). Magnets have changed muscle membrane activity in experimental models. Biochemical studies have shown that a static magnetic field of 200 Gauss decreases the membrane potential, amplitude of muscle action potential, and force of muscle twitch, and increases latency (in isolated rat diaphragm muscle) by significantly increasing certain enzyme activity (Na^+, K^+-ATPase and Ca^{2+} ATPase) (5). An experiment by Takeshige found that application of a static magnetic field to guinea pig muscle seemed to induce pain relief (measured in muscle twitch height) by inducing inhibition of cholinesterase, thereby increasing local circulation (6). Electrophysiology has determined that magnetic fields produced by a qigong master and applied to a distal point on a human subject can lead to changes in membrane potentials in the cerebral cortex (7).

Clinical research is beginning to show the promise of magnet therapy. It has been shown that magnetic fields can influence pain without invasive treatment. Pujol, et al, applied 40 minutes of repetitive magnetic stimulation through a coil, or sham stimulation, to a randomized cohort with localized musculoskeletal injuries (n=30). After a single session, real magnetic stimulation significantly exceeded the sham effect: reduction of pain by 59% for real and 14% for the sham group ($p = 0.0001$) and the relief usually persisted for several days (8). A double blind randomized clinical trial found that 300-500 Gauss magnets, vs. sham magnets, used over pain trigger points in

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postpolio patients decreased pain 76% compared to 19% in the placebo group ($p<.0001$). The pain relief was rated as significant and prompt by study participants (9). In another study, however, no difference was found between the treatment group (n=19) and the placebo group (n=15) for the treatment of heel pain with magnetic insoles over a 4 week time period. Both groups reported a 60% improvement (10).

If effective, the use of magnets to treat pain will have many benefits. They are inexpensive, non-invasive, painless to administer, continue to provide therapeutic benefit after placement, and produce no biomedical waste products. Therefore a case series was undertaken to further assess the efficacy of magnets for patients with pain.

METHOD

To assess the effectiveness of magnet therapy in a private practice, treatments on consecutive patients were evaluated. The magnets used for this treatment are Magnetty brand 1000 Gauss magnets. The north/south axis of these magnets is parallel to the skin. There are also magnets with the north/south axis perpendicular to the skin but these were not used in this trial. The magnets are approximately 4mm in diameter and about 2 mm in height, similar to a small tablet. They are attached to an oblong plastic bandage approximately 2 x 2.5 cm. Five of these bandages with magnets come attached to a non-adhesive paper backing (see figure 1). The practitioner can pull off one bandage at a time with a magnet attached. These are ready to be pasted on the skin in the appropriate location.

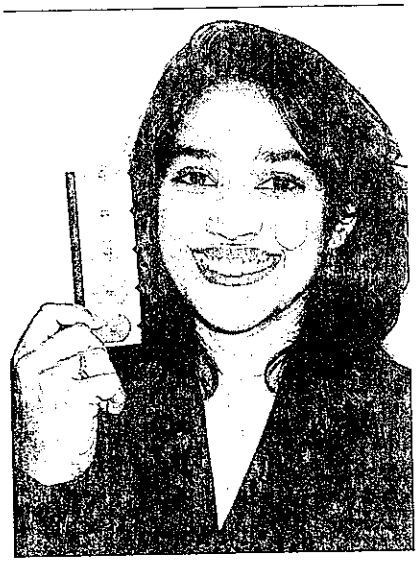

Figure 1: A row of Magnetty 1000 Gauss magnets and one attached to the skin

There were three criteria for choosing points for magnet placement:

1. The magnets were placed on the meridian points corresponding to the area of pain according to acupuncture meridian theory. This may have included points near the problem or points on the same meridian that were far from the pain.
2. Local points at or near the point of pain may have also been used. An indentation in the local soft tissue serves as a useful spot for the location of a magnet in the authors' experience.
3. Locations were selected at points that were sensed by the practitioner to have temperature differentials, inflammation, or an energetic dysfunction. These points may be close to, or far from, the injury. The method this practitioner used to sense a temperature differential or an energetic dysfunction was to hold the volar surface of his hand approximately 2 cm above the surface of the patient's body. The practitioner feels for differences in temperature or "energy" as the appropriate areas are scanned for dysfunction. The energetic dysfunction was felt as a local increase in heat or as a sensation similar to a faint blowing of air on the palm.

As mentioned above, acupuncture theory describes pain as a blockage of energy. Energy can neither be created nor destroyed. If the energy is blocked from flowing then there will be an accumulation. This accumulation can be measured, such as in the current of injury, and may be felt by sensitive individuals. Once feeling this sensation the practitioner looked for a small indentation in the tissue in that area that was suitable for placement of a magnet.

Once a magnet is in place it is important to assess if it is in an appropriate location. There are two immediate assessment criteria for proper magnet placement:

1. Subjective: After the placement of each magnet the patient is asked if there is a change in the subjective feeling of the pain. If the pain is worse the magnet is immediately removed. If it does not increase pain the second test is applied.
2. Applied kinesiology/"O Ring" test: Magnet placement is tested to determine if it weakens muscle strength using the muscle testing techniques of applied kinesiology (AK). This technique assesses muscle strength differentials in the presence of agents that may affect the energy fields (11). After the placement of each magnet, the practitioner determines the strength of the tested muscle.

The preferred test used is the "O Ring" test because of its ease of use. This test determines the strength of the thumb and little finger of either hand. The patient holds these fingers together in the shape of an O. The strength of this grip is tested as the practitioner gently pulls on each of these fingers (see figure 2). If the magnet is in the incorrect location,

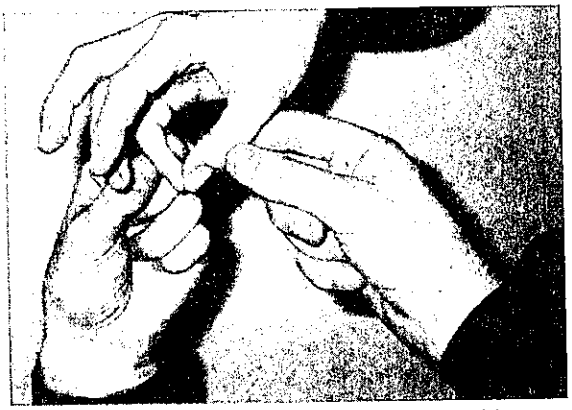

Figure 2: Demonstrating the "O ring" testing position.

Figure 3: Demonstrating a weak response to an "O ring" test.

it is theorized, this grip will be weak (see figure 3).

If the "O Ring" is weak the magnet is turned 180 degrees so that the other pole is pointing toward the head. The magnet is again retested. If the "O Ring" continues to be weak the magnet is either rotated 90 degrees and retested, or removed. Subsequent magnets are then placed until the practitioner is satisfied with the number and position of the magnets.

After the magnets are applied the patient is instructed to leave the magnets in place until the next appointment, which was usually 4-7 days. If a magnet seems to aggravate the pain the patient is instructed to remove it. There are no restrictions on bathing or activity, other than what is logical for the nature of injury. The magnets stay in place very well due to the adhesive nature of the bandages.

Results

Sixteen patients were given magnet treatment for pain from August 1997 to July 1998. The criterion for being part of this case presentation is that there were no concurrent therapies being administered to the patient that would generate the same response as the magnet treatment. Fourteen of these patients met this criteria. Two were disqualified from this cohort. One received a homeopathic remedy at the same time as the magnet treatment and had an immediate cessation of pain. However, it is unclear which intervention was responsible. The other disqualified patient received simultaneous acupuncture and magnet treatment. This patient showed no significant improvement. The final study group consisted of fourteen different patients presenting with sixteen different problems (table 1). Cases #2 and #7 are the same patient with a different presentation, as are cases #5 and #9.

The duration of pain of the group prior to magnet therapy ranged from 2 days to 23 years (average = 3.8 years). Ages ranged from 24 to 61 years. The average age was 40.5 years old. The duration of the treatment ranged from 7 to 75 days (median 14 days, average 22.1 days). The number of treatments ranged from 1 to 9 (median = 2, average = 3.4).

The presentation of symptoms varied widely. Seven patients presented with low back pain and/or pain that radiated from the low back to the legs. Four patients had neck pain. Concerns seen in single patients included arm pain without neck involvement, ankle sprain, herpetic neuralgia, vulvodynia, arthritis of hands, upper lumbar pain. Please see table 1 for individual symptoms.

The assessment of the efficacy of each magnet treatment was made by the patient. Subjective reports were documented at the time of each appointment and immediately after placing the magnets. These subjective reports were the only measurement tool used. Since the study was retrospective in nature no measurement scale was employed. Long term follow-up was not undertaken.

Magnet therapy reduced pain effectively in the patients in the group who had pain that was described as "radiating," or dermatomal pain. Only one (#1) of seven cases (#1,2, 3,8,9,11,16) failed to show consistent improvement. Of three patients with muscle spasms of less than 2 weeks onset before treatment, one had excellent response (#14, 2 days post onset), one had moderate response (#7, 5 days post onset), and one had minimal response (#13, 2 weeks post onset). Neither of the patients with chronic pain where muscle spasm was the chief complaint (#5,6) responded to treatment. The patients with herpes zoster (#11), arthritis (#12), and sprained ankle (#15) responded well to treatment. The patient with vulvodynia (#4) had no improvement. Patient #10 was lost to follow up.

Discussion

Magnet therapy was helpful in this cohort in reducing radiating or dermatomal pain, pain of acute injuries including muscles spasms, and arthritis pain. It was ineffective in treating pain due to chronic muscle spasms and vulvodynia. Further studies must be conducted with a larger sample size, better measurement tools and a broader range of conditions to find the most appropriate use of magnets for the treatment of pain. Long term follow-up in prospective studies is necessary to determine how this treatment compares with other treatments that have been shown to be effective for pain management.

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Biographies

Anne McClenon, ND graduated from Bastyr University with a midwifery specialty in 1993. She received her BA in anthropology from the University of Arizona. She was adjunct faculty at Bastyr University and lectures widely in her community. She specializes in pediatrics, women's health, mental health and craniosacral therapy. She currently shares a family practice with Elizabeth Wotton, ND in Plymouth, MA and is co-authoring a text on natural childbirth.

Shiva Barton, ND, LAc., graduated from Bastyr University in 1983. He has been in private practice since 1985. He is the coordinator of the Clinical Anecdotes sessions at the American Association of Naturopathic Physicians annual conference, as well as the founder of the on-line discussion group, the Clinical Support Network.

TABLE 1. SYNOPSIS OF 16 CASES TREATED WITH STATIC MAGNETS

Patient #	Date of First Tx	Age	Sex	Description of Symptoms	Onset before magnet Tx	Previous episodes	Previous types of Tx	Previous course of problem	# of magnet Txs	Duration of Tx	Results
1	8/11/97	54	F	Mid and LB pain radiating to legs, R>L. Gluteal, sacral, sharp leg pain.	3 wk	none	DC care with electric stimulation	unknown	9	7 wk	No consistent improvement
2	8/27/97	61	F	L4-5 disc herniation with bilateral impingement, "Unbearable at times." Low back pain radiating to both legs. L>R into calves, toes.	unknown, > 7 yr	many, continuous	PT, AI, corticosteroid injections.	1 episode of relief x9 months.	6	2.5 m	50% improved after tx #2. "Almost gone" after tx #3. No back or leg pain. Some minor pre-tibial and R foot pain after tx #5.
3	10/8/97	33	F	Sciatic pain L>R, dull ache of buttocks, front of thighs. Sharp shooting pain in waves down front of hips down to shins bilaterally.	23 yr	many, continuous	DC, rest, ice, heat, AI	no change	3	2 wk	Improved after tx #1 without constant ache. Few sharp twinges. Not worse after exercise. After tx #2 no shooting pains. Some tightness. Resolved after tx #3.
4	10/21/97	49	F	Vulvodynia. Raw burning pain, plus toothache-like pain.	3 yr	none	hormones, AI, sitz baths, herbs	no change	8	2 m	No consistent improvement.
5	10/22/97	51	F	Back and neck muscle spasms. Facet surgery x2 1980. Muscle spasm L erector spinae-constant. R sciatic pain. R neck spasm.	17 yr	Remission 1980-91, Pain since	DC/PT, cranial-sacral, exercises.	no change	4	3 wk	20% improvement after tx #2. No further change with magnets.
6	11/11/97	27	F	Cervical disc herniation x2 due to MVA 6/96. Daily, chronic muscle spasm; constant pain of occiput, neck, scalp, shoulders, neck. Burning or shooting.	1.8 yr	none	PT, exercise, weights, stretching	no change	2	4 wk	No change
7	1/12/98	61	F	Low back strain after lifting object. Lumbar/sacral ache.	5 d	none	none	NA	2	2 wk	Little change after tx #1. Slowly improved after tx #2. Another episode 3/18/98
8	1/29/98	44	F	L sided numbness of hand and arm. Unknown origin. MRI negative for disc disease or MS.	1 m	none	none	NA	1	1 wk	Immediate disappearance of symptoms.
9	2/2/98	51	F	Back stiffness, pain radiating out from coccyx	4 d	many	DC, PT	no change	2	1 wk	Pain resolved after tx #1.
10	2/2/98	63	M	Neck and shoulder pain due to spinal stenosis. C2-5 laminectomy 3 yr ago. Pulling pain in R shoulder, upper chest. R arm numb (intermittent). Cold sensitive.	3 yr	continuous	acupuncture, AI, massage	no change	1	1 d	Lost to follow up
11	2/25/98	30	F	Herpes zoster L abdomen. Burning pain	5 d	0	none	none	2	1 wk	50% improved after tx #1. Pain returned on day 6. Pain 95% gone after tx #2.
12	3/17/98	73	F	Arthritis of hands, especially thumbs. Aching pain.	>5 yr	many	AI, acupuncture	moderate improvement	7	5 wk	No improvement after tx #1-3. Significant improvement tx #4, then almost gone with magnets in place. Slight return of pain when magnets removed.
13	3/27/98	37	M	Spasmodic L gluteal, occasional leg pain from muscle strain of back.	2 wk	none	none	N/A	2	2 wk	Decrease leg pain after tx #1. Back pain persisted until PT treatments.
14	3/27/98	32	F	L sided upper lumbar pain interfering with sleep.	2 d	none	none	N/A	1	1 wk	Immediate disappearance of pain.
15	4/9/98	24	F	Sprained ankle with sharp pain, redness and swelling	1 wk	none	none	N/A	1	1 wk	Pain improved immediately. Resolved in 2 days.
16	5/20/98	26	F	MVA caused pain that migrated up R arm and down L. Now constant aching of R neck to shoulder. Pain in both forearms and fingers 4 & 5.	1.2 yr	none	PT, massage, US, nerve block x2	Temp improvement with nerve block.	4	5 wk	Immediate disappearance of neck pain with placement of magnet in tx #1. No change in arm. 70% improved after tx #2. No pain when magnets on after tx #3, but returned when magnets removed. Pain resolved after tx #4.

Abbreviations: > = greater/worse than, AI = anti-inflammatory agents, d = day, DC = chiropractic care, L = left, m = month, MS = multiple sclerosis, MVA = motor vehicle accident, N/A = not applicable, PT = physical therapy, R = right, Tx = treatment, US = therapeutic ultrasound, wk = week, yr = year