Efficacy of static magnetic field therapy in chronic pelvic pain: A double-blind pilot study

Candace S. Brown, PharmD,[a] Frank W. Ling, MD,[b] Jim Y. Wan, PhD,[c] and Arthur A. Pilla, PhD[d]

Memphis, Tenn, and New York, NY

OBJECTIVE: The aim of the study was to determine the efficacy of static magnetic field therapy for the treatment of chronic pelvic pain (CPP) by measuring changes in pain relief and disability.

STUDY DESIGN: Thirty-two patients with CPP completed 2 weeks and 19 patients completed 4 weeks of randomized double-blind placebo-controlled treatment at a gynecology clinic. Active (500 G) or placebo magnets were applied to abdominal trigger points for 24 hour per day. The McGill Pain Questionnaire, Pain Disability Index, and Clinical Global Impressions Scale were outcome measures.

RESULTS: Patients receiving active magnets who completed 4 weeks of double-blind treatment had significantly lower Pain Disability Index ($P < .05$), Clinical Global Impressions-Severity ($P < .05$), and Clinical Global Impressions-Improvement ($P < .01$) scores than those receiving placebo magnets, but were more likely to correctly identify their treatment ($P < .05$).

CONCLUSION: SMF therapy significantly improves disability and may reduce pain when active magnets are worn continuously for 4 weeks in patients with CPP, but blinding efficacy is compromised. (Am J Obstet Gynecol 2002;187:1581-7.)

Key words: Static magnets, chronic pelvic pain

Chronic pelvic pain (CPP) is one of the most common disorders in women's health. It affects 1 of 7 women[1] and accounts for 10% to 15% of new referrals to gynecologists and family physicians.[2] Like other pain syndromes, CPP is costly to the consumer and to society, accounting for 25% to 35% of laparoscopies and 10% to 15% of hysterectomies performed in the United States.[3]

Static magnetic field (SMF) therapy has been used for centuries to control pain, but the mechanism by which it reduces pain is unclear. One theory proposes that nociceptive C-fibers have a lower threshold potential, and that magnetic fields selectively attenuate neuronal depolarization by shifting the membrane resting potential.[4] A second theory suggests that magnetic fields promote increased blood flow through the skin, subcutaneous, muscular, and ligamentous tissues.[5] A third theory suggests that the kinetics of ion binding at macromolecules are affected, thereby modulating cytokine and other factor release.[6] Therapy is delivered by placing magnets of different intensities (G = gauss) on the skin over the affected areas or over pain pressure points. Magnets may have a "unidirectional" configuration (north pole on one side, south pole on the other) or a "bipolar" configuration (alternating north and south poles on each side).[7]

Five double-blind studies that used SMF to treat chronic pain have been reported. Vallbona et al[8] found that a single 45-minute treatment with 300 to 500 G bipolar magnets significantly reduced chronic pain in 50 postpoliomyelitis patients. Magnets were placed on pain pressure points in a controlled clinic setting during treatment. In a 4-month study of 25 patients with fibromyalgia treated at home, Colbert et al[9] observed significant improvement in pain and physical function in those who slept on a mattress pad containing 1100 G unidirectional magnets compared with those sleeping on a sham (nonmagnetized) mattress. In a 6-month trial of 94 patients with fibromyalgia, Alfano et al[10] confirmed significant chronic pain reduction in those who slept on a unidirectional magnetic pad delivering 5 to 6 G at skin level compared with those who slept on a magnetic pad with alternating polarity delivering 0.3 to 0.9 G, sham magnetic pads, or those after usual treatment. Although both fibromyalgia studies[9,10] reported significant pain reduction after 2 to 6 months of sleeping on a magnetic mattress pad, neither pain pressure points

From the Departments of Pharmacy Practice and Pharmacoeconomics, Obstetrics and Gynecology, and Psychiatry,[a] the Department of Obstetrics and Gynecology,[b] and the Department of Preventive Medicine,[c] University of Tennessee Health Sciences Center, Memphis, and the Department of Orthopaedics, Mt Sinai School of Medicine.[d]

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Reprint requests: Candace Brown, PharmD, 9685 US Highway 70, Lakeland, TN 38002. E-mail: csbrown@utmem.edu

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Table I. Demographic characteristics of patient population

Characteristics	*Active magnet*		*Placebo magnet*	
	Baseline (n = 16)	*Week 4 (n = 8)*	*Baseline (n = 17)*	*Week 4 (n = 11)*
Age (y) (mean ± SD)	35.6 ± 8.7	34.3 ± 8.4	35.9 ± 5.4	37.3 ± 5.6
Race (No. [%])				
Caucasian	13 (81.2)	7 (87.5)	13 (76.5)	8 (72.7)
African American	3 (18.8)	1 (12.5)	4 (23.5)	3 (27.3)
Body mass index (mean ± SD)	22.8 ± 4.0	21.9 ± 3.8	23.1 ± 3.7	24.1 ± 3.9
Hysterectomy/oophorectomy (No. [%])				
Yes	6 (37.5)	3 (37.5)	6 (35.3)	4 (36.4)
No	10 (62.5)	5 (62.5)	11 (64.7)	7 (63.6)
Concomitant medications (No. [%])				
Analgesic	14 (87.5)	7 (87.5)	15 (88.2)	10 (90.9)
Muscle relaxant	12 (75.0)	6 (75.0)	14 (82.4)	9 (81.8)
Antidepressant	10 (62.5)	6 (75.0)	10 (58.8)	5 (45.5)

nor pain sites were directly targeted because of the random position of the patient while sleeping.

In contrast to the previous studies, Collacott et al[11] found that chronic lower back pain in 20 patients was not affected by application of 300 G bipolar magnets applied directly over the pain site for 6 hours per day, 3 times per week for 1 week in a natural setting. Similarly, Hong et al[12] observed that a necklace containing 1300 G unidirectional magnets was no more effective than a nonmagnetic necklace in reducing pain in 52 patients with chronic neck and shoulder pain when worn continuously for 3 weeks at home. In both of these studies, the magnets were not placed on pain pressure points, and field intensity was not above background at the deep tissue targets involved in lower back, neck, and shoulder pain.[13]

Three double-blind studies that used SMF on chronic pain have demonstrated some degree of success in pain reduction,[8-10] and two have shown no effect.[11,12] Those studies demonstrating a treatment effect have applied magnets directly over pain pressure points that were of sufficient magnetic field strength and exposure duration to reach the target organ.

Because up to 70% of women with CPP have pain pressure or "trigger" points,[14] the authors considered whether SMF therapy might be effective in this population. Because exposure duration for continuous SMF treatment effect has not been established in a natural setting, it was decided to choose an intermediate exposure time of 2 weeks of double-blind treatment, followed by an option of completing another 2 weeks of double-blind treatment.

The primary aim of our study was to evaluate the analgesic effect of static magnets worn continuously in women with CPP. We hypothesized that pain severity and disability ratings would significantly improve in patients with CPP receiving active compared with placebo magnets and that a longer duration of exposure could result in greater improvement.

Material and methods

Forty women from a university-based obstetrics and gynecology clinic who met inclusion and exclusion criteria were enrolled in the study. All patients gave written informed consent that was approved by the institutional review board. Subjects were between ages 18 and 50 years; were diagnosed by a gynecologist with CPP according to the American College of Obstetricians and Gynecologists (ACOG) criteria[15] (duration of 6 months or longer, persistent pain despite current treatment, significantly impaired function at home or work, and altered family roles); had a trigger point or a circumscribed painful region on the abdomen by palpation; were stabilized on medications for at least 6 months; had normal physical and pelvic examinations and Papanicolaou smears and laboratory tests within the past 2 years; had used an acceptable method of birth control; were able to complete questionnaires; and were willing to sign a written informed consent. Other causes for CPP were investigated and ruled out by using standard clinical evaluations (eg, no structural anatomic abnormalities on examination). Exclusion criteria included pregnancy or breast-feeding, any unstable medical disorder not controlled by standard treatment, use of a cardiac pacemaker or any electronic device, previous use of static magnetic therapy, or being grossly obese (body mass index >35).

This was a double-blind, randomized, parallel groups study. Subjects meeting screening eligibility criteria had placebo magnets applied to two sites on the abdomen for 1 week. Those who continued to meet eligibility criteria after 1 week of single-blind treatment were randomly selected to either active (500 G) or placebo magnetic devices for 2 weeks. At the end of the 2-week double-blind treatment phase, subjects were given the option of completing another 2 weeks of double-blind treatment.

Ten areas located in the upper, middle, and lower abdomen were palpated for localized tender areas, or "trigger points," by the same investigator. Deep palpation was applied by using the thumb or the first two fingers

Table II. McGill Pain Questionnaire subscale scores after each treatment cycle*

	Active magnet		*Placebo magnet*	
Treatment cycle	*No.*	*Mean ± SD*	*No.*	*Mean ± SD*
Baseline				
PPI	16	3.6 ± 1.3	17	3.2 ± 1.2
PRI-T		23.1 ± 9.7		21.7 ± 8.9
PRI-S		16.9 ± 6.8		16.7 ± 6.4
PRI-A		6.2 ± 3.4		5.0 ± 3.3
Double-blind treatment, 2 wk				
PPI	15	3.3 ± 1.4	17	2.9 ± 1.4
PRI-T		21.0 ± 11.7		22.1 ± 10.1
PRI-S		15.8 ± 8.3		16.4 ± 7.4
PRI-A		5.2 ± 4.0		5.7 ± 3.3
Double-blind treatment, 4 wk				
PPI	8	2.5 ± 1.6	11	3.0 ± 1.5
PRI-T		13.8 ± 12.1		24.2 ± 10.1
PRI-S		10.1 ± 8.4		18.6 ± 7.7
PRI-A		3.6 ± 4.3		5.6 ± 2.9

PRI-S, PRI Sensory Subscale; *PRI-A,* PRI Affective Subscale.
*Higher scores indicate more pain intensity or severity.
†$P < .10$ active vs placebo, adjusted for baseline, Wilcoxon rank sum test.

pressed firmly enough to blanch the examiner's fingernail. Devices were placed on the two areas most sensitive to palpation.

Active magnets and identical-appearing placebo magnets were supplied by BIOflex Medical Magnets (Avon, Conn). The magnets were concentric, of bipolar configuration, with a magnetic field intensity of 500 G at the surface, and 50 mm in diameter × 1.5 mm thick. Active and placebo (sham) magnets were kept in labeled packets and assigned code numbers according to a random numbers table in blocks of six.[16] The code numbers were recorded in a log kept by the investigators. One investigator dispensed the magnets, whereas a different investigator evaluated the subjects at each visit. Neither the investigators, research staff, nor the subjects knew whether magnets were active until study completion.

To establish blinding efficacy, subjects were told that the strength of the magnets might vary and that adherence of the device to metal surfaces was not related to their efficacy.[12] At the completion of the study, subjects were informed as to whether they had received active devices.

Outcomes were measured by the McGill Pain Questionnaire (MPQ),[17] the Pain Disability Index (PDI),[18] and the Clinical Global Impressions Scale (CGI).[19] The MPQ[17] is a patient-rated scale that identifies the quality of pain (Pain Rating Index, PRI) and the intensity of pain (Present Pain Intensity, PPI) where 0 = no pain and 5 = excruciating pain. The pain scale has been previously validated and is particularly applicable to patients with disabilities.

The PDI[18] is a 7-item self-report measure of pain-related disability that assesses family/home responsibilities, recreation, social activity, occupation, sexual behavior, self-care, and life-support activity where 0 = no disability and 10 = total disability.

The CGI[19] was completed to determine the investigator's perception of overall illness severity and improvement, based on scores from the PPI and the PDI. The CGI-S measures severity of illness on a 7-point scale where 1 = normal or not at all ill and 7 = among the most extremely ill patients, and the CGI-I measures global improvement where 1 = very much improved, 4 = no change, and 7 = very much worse. Adverse events were recorded on a 6-point adverse event scale where 1 = none and 6 = very severe.

The primary measure of effectiveness was the active versus placebo difference in change from baseline in mean PPI scores. PDI and CGI change scores were secondary measures. In addition, "response" to treatment (defined with a CGI-I score of 1 or 2) gave secondary evidence of effect.

Investigator and patient ratings were measured at baseline, after single-blind treatment, and after 2 and 4 weeks of double-blind treatment (where applicable). Change scores from baseline after single-blind treatment, and after 2 and 4 weeks of double-blind treatment were compared between the two groups with the Wilcoxon rank sum test. Frequency of adverse events and blinding efficacy were compared for active and placebo treatments by Fisher exact test. All hypotheses were two sided, and significance was declared at the 5% level. The appropriate response to a sample size too small to demonstrate a significant difference is to increase the sample size or site power, not change the significance level. Fourteen patients who completed treatment per treatment group were needed to provide 80% power to detect a 30% difference in PPI change scores between active and placebo

Table III. Pain Disability Index scores after each treatment cycle*

	Active magnet		*Placebo magnet*	
Treatment cycle	*No.*	*Mean ± SD*	*No.*	*Mean ± SD*
Baseline	16	39.9 ± 17.7	17	43.9 ± 14.4
Double-blind, 2 wk	15	39.8 ± 17.9	17	38.8 ± 18.5
Double-blind, 4 wk†	8	23.5 ± 20.6	11	40.2 ± 16.7

*Higher scores indicate more impairment.
†$P < .05$ active versus placebo, adjusted for baseline, Wilcoxon rank sum test.

Table IV. Clinical Global Impressions Scale scores after each treatment cycle*

	Active magnet		*Placebo magnet*	
Treatment cycle	*No.*	*Mean ± SD*	*No.*	*Mean ± SD*
Baseline				
CGI-S	16	4.6 ± 0.8	17	4.4 ± 0.7
CGI-I		3.9 ± 1.0		3.6 ± 0.7
Double-blind treatment, 2 wk				
CGI-S	15	4.2 ± 1.1	17	4.1 ± 0.9
CGI-I		3.6 ± 1.2		3.4 ± 1.3
Double-blind treatment, 4 wk				
CGI-S†	8	3.3 ± 1.3	11	4.2 ± 1.2
CGI-I‡		2.4 ± 1.2		3.3 ± 1.0

*Higher scores indicate either more severe illness (CGI-S) or less improvement (CGI-I).
†$P < .05$ active versus placebo, adjusted for baseline, Wilcoxon rank sum test.
‡$P < .01$ active versus placebo, adjusted for baseline, Wilcoxon rank sum test.

magnet groups. A 30% screen failure and dropout rate was assumed so that 40 patients were screened to ensure adequate power for patients completing the trial. All analyses were conducted with the Statistical Analysis System (Cary, NC).[20] Data are given as mean ± SD.

Results

Of the 40 women who were screened for the study, 33 met eligibility criteria and entered single-blind treatment. Thirty-three continued to meet eligibility criteria after single-blind treatment and were randomly selected for double-blind treatment. One subject assigned to the active treatment group was lost to follow-up after single-blind treatment. Fifteen subjects receiving active magnets and 17 subjects receiving placebo magnets completed 2 weeks of double-blind treatment. Nineteen subjects elected to complete another 2 weeks of double-blind treatment, including 8 subjects receiving active treatment and 11 subjects receiving placebo treatment. The 41% attrition rate did not significantly differ between the active (50%) and placebo (35%) magnet groups.

Patient characteristics were similar in the active and placebo magnet groups (Table I). They were typically Caucasian, in their mid-30s, and of normal body weight. About a third of the women had undergone a hysterectomy or oophorectomy, and most were receiving an analgesic, muscle relaxant, and/or antidepressant for pain management. Thirty-one (91%) of the patients had palpable trigger points in the lower abdomen, whereas the remaining 3 (9%) had trigger points in the middle abdomen. There were no significant correlations between demographic characteristics and treatment assignment or treatment effect.

There was no significant difference between the scores of all pain measures at baseline and the single-blind point, suggesting no significant placebo effect from the use of sham magnets. Nevertheless, baseline was defined as the single-blind time point. Table II depicts scores on the MPQ. At baseline, the mean PPI rating was moderate to severe, and the total PRI-T showed the use of severe word descriptors, particularly in regard to the affective component (PRI-A). Scores on the MPQ showed consistently greater improvement among those patients completing 4 weeks of double-blind treatment who received active compared with placebo magnets (Table II). In these subjects, PPI total scores decreased by 22% after active magnet treatment and by 6% after placebo magnet treatment, but this was not statistically significant. Quality of pain (PRI-T) scores improved by 40% after use of active magnets, whereas the use of placebo magnets led to a 3% worsening of symptoms ($P = .08$). This was true particularly for sensory (PRI-S) ($P = .06$) as opposed to affective (PRI-A) ($P = .26$) quality of pain.

Table V. Data (mean ± SD) after 2 weeks of double-blind treatment according to continuation status and outcome measure

	Active magnet		*Placebo magnet*	
Outcome measure	*Continued (n = 8)*	*Discontinued (n = 7)*	*Continued (n = 11)*	*Discontinued (n = 6)*
PPI	2.8 ± 1.6	3.9 ± 1.1	2.8 ± 1.4	3.0 ± 1.4
PRI-T	16.4 ± 9.4	26.3 ± 12.4	23.5 ± 10.0	19.5 ± 10.8
PRI-S	12.3 ± 6.7	19.9 ± 8.5	17.7 ± 7.6	14.0 ± 6.9
PRI-A	4.1 ± 3.2	6.4 ± 4.7	5.8 ± 2.7	5.5 ± 4.5
PDI	31.0 ± 17.2*	49.9 ± 13.4	36.9 ± 18.5	42.3 ± 19.6
CGI-S6	3.9 ± 1.4	4.6 ± 0.5	4.2 ± 0.8	3.8 ± 1.2
CGI-I	3.4 ± 1.2	3.9 ± 1.2	3.2 ± 1.3	3.7 ± 1.4

*$P < .05$ continued versus discontinued, adjusted for baseline, Wilcoxon rank sum test.

Baseline ratings on the PDI indicated moderate impairment (Table III). As with the MPQ mean scores, treatment differences were seen only in patients completing 4 weeks of double-blind treatment. In these patients, PDI ratings improved significantly in the active magnet group (38%) compared with the placebo group (4%) ($P = .02$). The PDI scores dropped from 37.8 ± 19.2 to 23.5 ± 20.6 in the active group and from 41.7 ± 12.9 to 40.2 ± 16.7 in the placebo group.

Ratings on the investigator-rated CGI-S scale were consistent with patient ratings, indicating moderate to severe illness (Table IV). As with patient ratings, investigator ratings showed significant treatment effects only in those completing 4 weeks of double-blind treatment. In these patients, CGI-S scores decreased significantly in the active magnet group (28%) compared with the placebo group (10%) ($P = .02$). Similarly, CGI-I scores decreased by 43% in those receiving active magnets compared with 1% in those receiving placebo magnets ($P = .007$). "Responders" were defined as those who scored very much (1) or much (2) improved on the CGI-I. After 2 weeks of double-blind treatment, two (13%) of those receiving active magnets and three (18%) of those receiving placebo magnets were responders. After 4 weeks of double-blind treatment, five (63%) receiving active magnets and two (18%) receiving placebo magnets were responders, but these findings were not statistically significant.

To help determine whether the results obtained after 4 weeks of double-blind treatment were due to selection of responders (subjects who elected to continue treatment) or due to a delayed onset of effect, data were separated from those who continued and those who did not continue after 2 weeks of double-blind treatment (Table V). The active and placebo groups were not different in terms of change from baseline for any of the outcome measures ($P > .10$). The continued and discontinued groups, within active and placebo groups, were not different for any outcome measure ($P > .10$), except for the PDI within the active group where $P < .05$.

Compliance was determined by self-report. Overall, subjects were 98.3% compliant during the study. There were no significant differences in compliance rates among subjects receiving active versus placebo treatment or between treatment cycles.

Treatment-related adverse events were common in both groups (46% of active magnet-treated patients and 54% of placebo magnet-treated patients), but none necessitated withdrawal from the study. There were no significant differences between the frequency of adverse events among treatment groups or treatment cycles. Adverse events occurring in at least 5% of patients included irritation from the adhesive tape (43%), bruising (14%), and erythema (7%) around the site.

Analysis of blinding efficacy revealed that patients receiving active magnets were more likely than those receiving placebo magnets to correctly guess their treatment. After 2 weeks of double-blind treatment, 92.3% of subjects in the active treatment group correctly guessed that they were wearing an active magnet, whereas 53.3% in the placebo group incorrectly guessed that they were wearing an active magnet ($P < .05$). After 4 weeks of double-blind treatment, 100% of subjects in the active treatment group correctly guessed that they were wearing an active magnet, whereas 45.5% in the placebo group incorrectly guessed that they were wearing an active magnet ($P < .05$).

Comment

The results of this randomized double-blind, placebo-controlled trial show that SMF therapy with bipolar magnets of ±500 G intensity significantly improve disability and may reduce pain when worn continuously for 4 weeks in women with CPP. We found a 22% reduction in pain intensity in patients with CPP wearing active magnets compared with 6% in those wearing sham magnets. The percent improvement was comparable to other studies demonstrating significant findings. Both Colbert et al[9] and Alfano et al[10] separately reported a 32% reduction in

pain in patients with fibromyalgia sleeping on active unidirectional magnetic pads compared with a 7% reduction in those sleeping on sham magnetic pads. In a more controlled setting, Vallbona et al[8] reported a 54% reduction in pain scores in postpoliomyelitis patients wearing active magnets compared with a 12% decrease in those wearing sham magnets.

Disability in patients with CPP was significantly improved in patients wearing active bipolar magnets for 4 weeks compared with those wearing sham magnets (38% vs 4%). Our findings are in agreement with those of Colbert et al,[9] who reported significant improvement in physical functioning in fibromyalgia patients sleeping on active unidirectional magnetic pads (30%) compared with a 3% worsening in those sleeping on sham magnetic pads. Similarly, Alfano et al[10] reported improved physical functioning in patients with fibromyalgia sleeping on unidirectional magnetic pads versus sham magnetic pads (26% vs 7%), but the findings were not statistically significant. Neither Vallbona et al[8] nor Hong et al[12] measured changes in disability in their chronic pain populations. Because disability measures physical, occupational, and social function, improvement in this area may represent one of the more important outcomes in a population whose symptoms remain chronic.

Successful treatment with SMF therapy depends on application of a dose of magnetic field intensity above the background ambient field (≈0.5 G). Dosimetry from a permanent magnet depends on the distance between the target and the magnet surface and the relative sizes of the target and magnet.[13] Unidirectional magnets achieve greater depth of penetration than bipolar magnets and are optimum for deep tissue targets such as the lower back.[13] The three successful double-blind chronic pain studies[8-10] all provided adequate dosimetry because pain pressure points were on or close to the skin surface. Unfortunately, the use of a mattress pad did not ensure that all pain pressure points would be exposed to minimum required fields throughout the total treatment time. This is most likely the reason the Colbert and Alfano studies required in excess of 2 months to achieve clinically meaningful effects.

In contrast, Collacott et al[11] used a bipolar magnet placed directly over the chronic pain site in the lower back, not on a pain pressure point. The field from the particular magnet used in the Collacott study decayed to background levels within a few millimeters from its surface.[13] Therefore, an inadequate magnetic field dose was applied to the deep tissue site of lower back pain and no clinically meaningful effect could have been expected. The study by Hong et al[12] selected a patient population without trigger points and used small magnets that had limited depth of penetration. Field decay measurements for the typical jewelry magnet of a few millimeters in diameter indicate background values are achieved within 5 to 10 mm of its surface[13]; again, not enough for the deep tissue sites of shoulder and neck pain.

Our study demonstrates that it is difficult to establish adequate blinding where patients receive continuous magnetic exposure in a natural setting. In the Colbert and Alfano studies,[9,10] blinding was more effectively established in a noncontrolled environment because patients were intermittently exposed to magnets embedded in pads, so that the field level at the surface of the magnet made it difficult to detect light objects such as a paper clip. It has been stated that it is difficult to apply the blind test to magnet studies because the participant can easily notice whether the device has a magnetic field.[21] However, even in pharmacologic trials, both patients and raters are able to guess whether the treatment is an active drug or a placebo at rates that exceed chance.[22,23] It is possible a more controlled setting, such as a research unit, might have improved blinding. Nevertheless, there is a clear need for research into better study designs and methods for maintaining the blind and minimizing bias in all controlled trials.

Other than mild local reactions, which were commonly reported, treatment was well tolerated. Four of the magnetic trials described no adverse reactions,[8-11] whereas one[12] did not report adverse effects. Because magnetic devices were worn for shorter durations in two studies,[8,12] and intermittently in three others,[9-11] compared with up to 4 weeks continuously in our study, it is not surprising that we reported more local reactions. Nevertheless, future studies should investigate more sensitive brands of adhesive tape, or other methods of directly placing magnets on the body to increase tolerability.

Strengths of our pilot study include the use of a randomized, double-blind, placebo-controlled experimental design, the use of a validated and reliable pain rating scale, measurement of disability, and the use of both subject- and investigator-rated scales.

A major weakness of the study was the small sample size after 4 weeks of double-blind treatment because of a 41% attrition rate. The attrition rate in other trials, where reported, ranged from 0% to 20%.[8-11] It is possible that the experimental design contributed to the relatively high attrition rate in our study. A 2-week double-blind trial with an option to continue may have resulted in early termination because of the delayed treatment effect. Alternatively, the optional 2-week double-blind phase could have selected for treatment responders.

Analysis of the 2-week data separately for continued and discontinued subjects showed that there was no significant difference from baseline within the active and placebo groups according to continuation status, with the exception of the PDI scores within the active group. This implies that less-impaired subjects within the active group were more likely to continue treatment after 2 weeks of therapy. However, the failure to find any self-selection bi-

ases in any of the patient-rated pain measures or investigator-rated global measures suggest that these improvements were more likely a result of a delayed onset of effect.

Another weakness of our study was the reduced power to detect a difference in pain scores. The reduced power may have been due to a less robust treatment effect in patients with CPP compared with other chronic pain patients. Alternatively, the reduced power may have been due to the compromised blinding in our study, which was not observed in any of the other successful trials.[8-11]

This is the sixth randomized double-blind, placebo-controlled study to investigate SMF therapy in a chronic pain population, and the first evaluation of magnetic therapy in patients with CPP. A controlled study with a larger sample of patients with CPP receiving magnetic therapy over a longer period is needed to strengthen our findings. Evaluation of other chronic pain populations, with and without trigger points, receiving magnetic therapy of varying intensities and treatment duration is warranted. These studies will determine whether magnetic therapy is useful in the management of CPP as well as in other pain syndromes commonly treated in primary care settings.

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