



Centre for Clinical Effectiveness

ENHANCING PATIENT OUTCOMES THROUGH CLINICAL APPLICATION OF THE BEST AVAILABLE EVIDENCE

EVIDENCE CENTRE CRITICAL APPRAISAL

The use of magnets in the alleviation of chronic muscular
pain

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SUMMARY STATEMENT:

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Publication of materials – please use the following format when citing this article:

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<http://www.med.monash.edu.au/publichealth/cce>

REQUEST:

Does the use of therapeutic magnets alleviate and reduce pain?

REQUESTED BY:

Ms Krishen Pandita, Chief Occupational Therapist, Aged Care, Kingston Centre.

METHODOLOGY

Search Strategy

The Centre for Clinical Effectiveness defined the 'best available evidence' as that research we can identify that is least susceptible to bias. We determine this according to pre-defined NHMRC criteria (see Appendix).

First we search for systematic reviews, evidence-based clinical practice guidelines, or health technology assessments, and randomized controlled trials. If we identify sound, relevant material of this type, the search stops. Otherwise, our search strategy broadens to include studies that are more prone to bias, less generalizable, or have other methodologic difficulties. We include case-control and longitudinal cohort studies in our critical appraisal reports. While we cite observational and case series studies, and narrative reviews and consensus statements, in our reports we do not critically appraise them. Some studies can produce accurate results but they are generally too prone to bias to allow determination of their validity beyond their immediate setting.

Details of Evidence Request:

Search terms:

The following search terms were used to scour electronic databases and websites:

Field of focus	Search term
Patient-related	Adults with chronic muscular pain
Intervention-related	Magnets; bipolar magnets; unipolar magnets
Comparison-related	Not applicable
Outcome-related	Pain levels

Resources Searched

We searched the following databases and Internet websites:

- Cochrane Library CD-ROM
- Best Evidence CD-ROM
- Medline (OVID)
- Pubmed
- National Guidelines Clearinghouse
- Agency for Health Care Policy and Research (AHCPR)
- NHS Centre for Reviews and Dissemination (NHS CRD)
- Aggressive Research Intelligence Facility (ARIF)
- Turning Research into Practice (TRIP)

Refinements, Searching & Reporting Constraints:

We included items of evidence that were available to us on 16 June 2000. We only included articles published in the last 10 years. A paucity of information on the therapeutic role of magnets for chronic muscular pain existed in the literature resulting in the critical appraisal of an English article in the Journal of the American Medical Association by Collacott et al. A narrative review is enclosed but is not examined.

RESULTS:

From our sources we identified 2 articles which we categorised as follows:

Study Design	Number included
Systematic reviews or meta-analyses	0
Evidence-based clinical practice guidelines	0
Randomised controlled trials	1
Controlled trials, cohort or case-control analytic studies	0
Descriptive case series	0
Consensus reports, non-evidence-based clinical practice guidelines	0
Narrative reviews	1

This left only one well designed randomised controlled trial (Collacott 2000) available for critical appraisal. We are reasonably confident these articles represent the most important findings published to date based on our refinements, searching and reporting constraints.

EVIDENCE SUMMARIES

Format

Evidence summaries are in the form of spreadsheets reproduced at the end of this report. Each spreadsheet contains the article citation, the study design, patient description, scientific validity of the article, results, and pertinent remarks from the authors and Centre for Clinical Effectiveness reviewer.

Findings

Collacott et al (2000) compared the effectiveness of one type of therapeutic magnet, a bipolar permanent magnet, with a matching placebo device for patients with chronic low back pain (n=20). The trial lasted from February 9, 1998, to May 21, 1999. All subjects followed the treatment protocol for 2 weeks: 1 week with the magnets and 1 week with the sham devices. There was a 1 week wash out period between the 2 treatment weeks. The protocol consisted of application of the devices 6 hours a day, 3 days a week (Monday, Wednesday and Friday of each treatment week). Therefore, all participants were exposed to a total of 18 hours of treatment for both real and sham devices.

The visual analog scale (VAS) was chosen as the primary outcome measure and used to quantify pain intensity. Participants were told to estimate their current level of pain by an appropriate mark on the line, with severe indicating the worse imaginable pain. The McGill Pain Questionnaire was used to measure the affective component of pain. The pain Rating Index (PRI) of the McGill Pain Questionnaire was the sole measure analysed rather than the subscales. Lacking a reliable measure of the physical response to pain, formal measurements of the range of motion (ROM) of the lumbosacral spine were obtained for all subjects by the same investigator.

The mean (SD) cumulative baseline VAS score for all participants was 4.8 (2.2). The mean (SD) cumulative baseline for the sham treatment was 5.0 (2.4) and for the magnet

treatment, 4.7 (2.9). Change in VAS scores after treatment for sham was -0.44 (1.44) and for magnet -0.49 (0.96). The p value was not significant at the .05 level.

Baseline and change after 1 day of treatment in ROM and PRI were also not significant ($p=0.87$ for ROM and $p=0.30$ for PRI). The mean ROM (SD) cumulative baseline for the sham treatment was 37° (19°) and for the magnet treatment, 34° (19°). Changes in ROM after treatment was -0.25° (14°) and for magnet 0.40° (12°). The mean PRI (SD) cumulative baseline for the sham treatment was 12 and for the magnet treatment, 11. Changes in PRI for the sham treatment was -2.5 and for magnet -1.5.

Cumulative changes from baseline (day 1 vs. post-treatment day 3) for VAS, ROM and PRI are as follows: VAS changes for sham treatment was -0.40 (1.8) and for magnet, -0.49 (1.6), $p=0.86$; ROM changes for sham treatment was 0.85° (11°) and for magnet, 2.8° (11°), $p=0.66$; PRI changes for sham treatment was -2 and for magnet, -0.5, $p=0.55$. No statistically significant differences between magnet and sham treatment were found with any outcome measure. No adverse effects were reported by any of the participants.

Methodology

Randomisation

A valid clinical trial requires a method for assigning patients to a test or control treatment that is free of selection bias. The best method for ensuring a bias free selection is through a veritable randomisation technique. Collacott et al (2000) acknowledged utilising a computer-generated list of random numbers for allocation sequence but failed to report on allocation concealment and blinding.

Similar Groups

Since the test group acted as their own controls, baseline characteristic comparisons were irrelevant. Baseline characteristic measures were described as a means to understand the study population. Since the authors recruited from the Veteran's Affairs clinic population there were too few women. Thus, it is difficult to generalise these results to the population at large with chronic low back pain.

Complete follow up of study subjects

A total of 24 individuals met the study criteria. Two individuals did not wish to participate and 2 of the remaining 22 failed to complete the protocol because of time conflicts, leaving 20 subjects who completed the study.

Equal treatment of study subjects

The nature of the study – a crossover design – allowed for equal treatment of the study subjects. All 20 subjects were exposed to a total of 18 hours of magnet treatment for both real and sham devices.

Sample size

Although the study population was small, 20 patients were determined to provide 80% power in the study at $P < .05$ to detect a difference of 2 points (the difference believed to be clinically significant) on a visual analog scale (VAS).

ARTICLES CRITICALLY APPRAISED FOR THIS REPORT

Collacott, E.A., Zimmerman, J.T., White, D.W. and Rindone, J.P. Bipolar permanent magnets for the treatment of chronic low back pain. *Journal of the American Medical Association* 2000; 283 (10): 1322-1325.

ARTICLES NOT CRITICALLY APPRAISED

The following articles were not critically appraised because it was felt that it did not pertain to chronic muscular pain.

Vallbona, C, Hazelwood, C.F. and Jurida, G. Response of pain to static magnetic fields in postpolio patients: a double blind pilot study. *Arch Phys Med Rehabil.* 1997;78:1200-1203.

Weintraub, M. Magnetic biostimulation in painful diabetic peripheral neuropathy: a novel intervention –a randomized, double placebo crossover study. *Am J Pain Manage.* 1999;9:8-17.

APPENDIX

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Levels Of Evidence

As Defined By "A Guide To The Development, Implementation And Evaluation Of Clinical Practice Guidelines" (National Health & Medical Research Council, Canberra, 1998):

Level I

Evidence obtained from a systematic review or meta-analysis of all relevant randomised controlled trials.

Level II

Evidence obtained from at least one properly designed randomised controlled trials.

Level III

- 1) Evidence obtained from well-designed pseudo-randomised controlled trials (alternate allocation or some other method).
- 2) Evidence obtained from comparative studies with concurrent controls and allocation not randomised (cohort studies), case control studies or interrupted time series with a control group.
- 3) Evidence obtained from comparative studies with historical control, two or more single-arm studies or interrupted time series without a parallel control group.

Level IV

Evidence obtained from case series (either post-test or pre-test and post-test), opinions of respected authorities (narrative reviews), descriptive studies, reports of expert (i.e. consensus) committees, case studies.