GET THE FACTS

NATIONAL CENTER FOR COMPLEMENTARY AND ALTERNATIVE MEDICINE

The Use of Magnets for Pain

Magnets have been used for health purposes for centuries. Static, or permanent, magnets are widely marketed for pain control and are considered part of complementary and alternative medicine (CAM). This fact sheet provides an overview of static magnets and summarizes current scientific knowledge about their effects on pain.

Key Points

- Magnets in products such as magnetic patches and disks, shoe insoles, bracelets, and mattress pads are used for pain in the foot, wrist, back, and other parts of the body.
- Preliminary scientific studies of magnets for pain have produced mixed results. Overall, there is no convincing scientific evidence to support claims that magnets can relieve pain of any type. Some studies, including a recent National Institutes of Health (NIH) clinical trial for back pain, suggest the possibility of a small benefit from using magnets for pain. However, the majority of rigorous studies have found no effect on pain. More research on magnets for pain is needed before reaching any firm conclusion.
- Magnets are generally considered safe when applied to the skin, but they may not be safe for some people, such as those who use medical devices like pacemakers or defibrillators, as magnets may interfere with the device.
- Tell your health care providers about any complementary and alternative practices you use. Give them a full picture of what you do to manage your health. This will help ensure coordinated and safe care.

About Magnets

A magnet produces a measurable force called a magnetic field. Static magnets have magnetic fields that do not change (unlike another type called electromagnets, which generate magnetic fields only when electrical current flows through them). Magnets are usually made from metals (such as iron) or alloys (mixtures of metals, or of a metal and a nonmetal).

NCCAM

Magnets come in different strengths, often measured in units called gauss (G) or, alternatively, units called tesla (1 tesla = 10,000 G). Magnets marketed for pain usually claim strengths of 300 to 5,000 G—many times stronger than the

Earth's magnetic field (about 0.5 G) and much weaker than the magnets used for MRI machines (approximately 15,000 G or higher).

Various products with magnets in them are marketed for health purposes, including shoe insoles, bracelets and other jewelry, mattress pads, bandages, headbands, and belts. These products are often placed in contact with painful areas of the body with the goal of providing relief.

History of Magnets for Health Uses

Magnets have been used for many centuries for a variety of health purposes. By various accounts, magnets were discovered when people first noticed the presence of naturally magnetized stones, also called lodestones. By the third century A.D., Greek physicians were using magnetic rings to treat arthritis and magnetized pills made of amber to stop bleeding. In the Middle Ages, doctors used magnets to treat gout, arthritis, poisoning, and baldness; to clean wounds; and to retrieve arrowheads and other iron-containing objects from the body.

In the United States, magnetic devices (such as hairbrushes and insoles), magnetic ointments, and clothes with magnets attached came into wide use after the Civil War, especially in some rural areas where few doctors were available. Healers claimed that magnetic fields existed in the blood, and that people became ill when their magnetic fields were depleted. Thus, healers marketed magnets as a means of replenishing these magnetic fields. Magnets were promoted as cures for a wide range of health conditions, including paralysis, headache, backache, sleeplessness, upset stomach, and liver and kidney problems.

The use of magnets to treat medical problems remained popular well into the 20th century. Today, magnets are used for many different types of pain, including foot pain and back pain from conditions such as arthritis and fibromyalgia.

What the Science Says

What Studies Have Shown

Overall, the scientific evidence does not support the use of magnets for pain relief. Preliminary studies looking at different types of pain—such as knee, hip, wrist, foot, back, and pelvic pain—have had mixed results. Some of these studies, including a recent NIH-sponsored clinical trial that looked at back pain in a small group of people, have suggested a benefit from using magnets. The majority of rigorous trials, however, have found no effect on pain.

Some research results suggest that effects may depend on the type of pain treated. For example, results from a few studies suggest that magnets might provide some relief specifically from osteoarthritis pain. Effects may also depend on the type and strength of the magnets used, the frequency of use, and the length of time the magnet was applied during the study.

Many studies were not high-quality because they included a small number of participants, were too short, and/or were poorly designed. More rigorous research is needed before reaching any firm conclusions about the effectiveness of magnets for pain.

Challenges Facing Researchers

Researchers face challenges when studying magnets in clinical trials:

- Something other than the magnet may relieve a study participant's pain. For example, relief could come from a placebo effect or from a warm bandage or cushioned insole that holds the magnet in place.

- It can be difficult to design a sham magnet that participants cannot distinguish from an active magnet. If participants know whether they are using an active magnet, study findings may be less reliable.

- It is possible that the magnetic properties of low-strength magnets, which are sometimes used as shams, can actually have a therapeutic effect.

- Opinions differ about how to administer magnet therapy, including what strength magnet to use, where to place the magnets on the body, and how long to use them. These factors have not been fully studied in humans. Clinical trials that look at these factors are needed.

How Magnets Might Work

No scientific theory or manufacturer claim about how magnets might work has been conclusively proven. Although some preliminary research has been conducted in animals and in small clinical trials, the mechanisms by which magnets might affect the human body are not yet known.

Scientific researchers and magnet manufacturers have proposed that magnets might work by:

- Changing how nerve cells function and blocking pain signals to the brain
- Restoring the balance between cell death and growth
- Increasing the flow of blood and the delivery of oxygen and nutrients to tissues
- Increasing the temperature of the area of the body being treated.

Findings from preliminary studies in healthy people—including one study funded by NIH—suggest that magnets may not affect blood flow or nerve function.

Side Effects and Risks

Magnets may not be safe for some people to use, including those who:

- Use a medical device such as a pacemaker, defibrillator, or insulin pump, because magnets may interfere with the functioning of the medical device
- Have a wound that has not healed.

Otherwise, magnets are generally considered safe when applied to the skin. Reports of side effects or complications have been rare.

It is important not to use magnets in place of proven treatments for serious medical conditions. Tell your health care providers about any complementary and alternative practices you use. Give them a full picture of what you do to manage your health. This will help ensure coordinated and safe care.

NCCAM-Funded Research

Projects on magnets supported by the National Center for Complementary and Alternative Medicine (NCCAM) include the following:

- Carpal tunnel syndrome
- Fibromyalgia
- Knee osteoarthritis
- Low-back pain
- Networks of blood vessels involved in healing.

References

Alfano AP, Taylor AG, Foresman PA, et al. Static magnetic fields for treatment of fibromyalgia: a randomized controlled trial. *Journal of Alternative and Complementary Medicine*. 2001;7(1):53-64.

Basford JR. A historical perspective of the popular use of electric and magnetic therapy. *Archives of Physical Medicine and Rehabilitation*. 2001;82(9):1261-1269.

Brown CS, Ling FW, Wan JY, et al. Efficacy of static magnetic field therapy in chronic pelvic pain: a double-blind pilot study. *American Journal of Obstetrics and Gynecology*. 2002;187(6):1581-1587.

Carter R, Aspy CB, Mold J. The effectiveness of magnet therapy for treatment of wrist pain attributed to carpal tunnel syndrome. *Journal of Family Practice*. 2002;51(1):38-40.

Caselli MA, Clark N, Lazarus S, et al. Evaluation of magnetic foil and PPT insoles in the treatment of heel pain. *Journal of the American Podiatric Medical Association*. 1997;87(1):11-16.

Cepeda MS, Carr DB, Sarquis T, et al. Static magnetic therapy does not decrease pain or opioid requirements: a randomized double-blind trial. *Anesthesia and Analgesia*. 2007;104(2):290-294.

Collacott EA, Zimmerman JT, White DW, et al. Bipolar permanent magnets for the treatment of chronic low back pain: a pilot study. *Journal of the American Medical Association*. 2000;283(10):1322-1325.

Fanelli C, Coppola S, Barone R, et al. Magnetic fields increase cell survival by inhibiting apoptosis via modulation of Ca2+ influx. *The FASEB Journal*. 1999;13(1):95-102.

Harlow T, Greaves C, White A, et al. Randomised controlled trial of magnetic bracelets for relieving pain in osteoarthritis of the hip and knee. *British Medical Journal*. 2004;329(7480):1450-1454.

Hinman MR, Ford J, Heyl H. Effects of static magnets on chronic knee pain and physical function: a double-blind study. *Alternative Therapies in Health and Medicine*. 2002;8(4):50-55.

Khoromi S, Blackman MR, Kingman A, et al. Low intensity permanent magnets in the treatment of chronic lumbar radicular pain. *Journal of Pain and Symptom Management*. 2007;34(4):434-445.

Kuipers NT, Sauder CL, Ray CA. Influence of static magnetic fields on pain perception and sympathetic nerve activity in humans. *Journal of Applied Physiology*. 2007;102(4):1410-1415.

Macklis RM. Magnetic healing, quackery, and the debate about the health effects of electromagnetic fields. *Annals of Internal Medicine*. 1993;118(5):376-383.

Magnet therapy. Natural Standard Database Web site. Accessed at http://www.naturalstandard.com on March 2, 2008.

Martel GF, Andrews SC, Roseboom CG. Comparison of static and placebo magnets on resting forearm blood flow in young, healthy men. *Journal of Orthopaedic and Sports Physical Therapy*. 2002;32(10):518-524.

Mayrovitz HN, Groseclose EE. Effects of a static magnetic field of either polarity on skin microcirculation. *Microvascular Research*. 2005;69(1-2):24-27.

McLean M, Engström S, Holcomb R. Static magnetic fields for the treatment of pain. *Epilepsy & Behavior*. 2001;2:S74-S80.

Pittler MH, Brown EM, Ernst E. Static magnets for reducing pain: a systematic review and meta-analysis of randomized trials. *Canadian Medical Association Journal*. 2007;177(7):736-742.

Reeser JC, Smith DT, Fischer V, et al. Static magnetic fields neither prevent nor diminish symptoms and signs of delayed onset muscle soreness. *Archives of Physical Medicine and Rehabilitation*. 2005;86(3):565-570.

Vallbona C, Richards T. Evolution of magnetic therapy from alternative to traditional medicine. *Physical Medicine and Rehabilitation Clinics of North America*. 1999;10(3):729-754.

Weintraub MI, Wolfe GI, Barohn RA, et al. Static magnetic field therapy for symptomatic diabetic neuropathy: a randomized, double-blind, placebo-controlled trial. *Archives of Physical Medicine and Rehabilitation*. 2003;84(5):736-746.

Winemiller MH, Billow RG, Laskowski ER, et al. Effect of magnetic vs sham-magnetic insoles on nonspecific foot pain in the workplace: a randomized, double-blind, placebo-controlled trial. *Mayo Clinic Proceedings*. 2005;80(9):1138-1145.

Winemiller MH, Billow RG, Laskowski ER, et al. Effect of magnetic vs sham-magnetic insoles on plantar heel pain: a randomized controlled trial. *Journal of the American Medical Association*. 2003;290(11):1474-1478.

Wolsko PM, Eisenberg DM, Simon LS, et al. Double-blind placebo-controlled trial of static magnets for the treatment of osteoarthritis of the knee: results of a pilot study. *Alternative Therapies in Health and Medicine*. 2004;10(2):36-43.

For More Information

NCCAM Clearinghouse

The NCCAM Clearinghouse provides information on CAM and NCCAM, including publications and searches of Federal databases of scientific and medical literature. The Clearinghouse does not provide medical advice, treatment recommendations, or referrals to practitioners.

Toll-free in the U.S.: 1-888-644-6226
TTY (for deaf and hard-of-hearing callers): 1-866-464-3615
Web site: nccam.nih.gov
E-mail: info@nccam.nih.gov

PubMed®

A service of the National Library of Medicine (NLM), PubMed contains publication information and (in most cases) brief summaries of articles from scientific and medical journals. CAM on PubMed, developed jointly by NCCAM and NLM, is a subset of the PubMed system and focuses on the topic of CAM.

Web site: www.ncbi.nlm.nih.gov/sites/entrez
CAM on PubMed: nccam.nih.gov/camonpubmed/

ClinicalTrials.gov

ClinicalTrials.gov is a database of information on federally and privately supported clinical trials (research studies in people) for a wide range of diseases and conditions. It is sponsored by the National Institutes of Health and the U.S. Food and Drug Administration.

Web site: www.clinicaltrials.gov

Acknowledgments

NCCAM thanks the following people for their technical expertise and review of this publication: Agatha Colbert, M.D., Helfgott Research Institute, National College of Natural Medicine; Max Pittler, M.D., Ph.D., Peninsula Medical School, Universities of Exeter and Plymouth; and Partap Khalsa, D.C., Ph.D., NCCAM.

National Institutes of Health
♦♦♦
U.S. Department of Health and Human Services

D408
Created March 2008