Energy Fields in Conventional and Integrative Medicine

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Magnetic fields in medicine go back to Mesmer, a Parisian glass harmonica-playing eighteenth century rascal who, dressed in bright violet robes, developed a magnificent practice in his parlor, treating hysterical women with bar magnets and iron-laced water. The final measure of his success was his death in 1815 as a pauper, and the somewhat doubtful metamorphosis of his earnest but misguided work, into psychiatry.[1]

Far from this dubious legacy, present legitimate magnetotherapy uses specially generated magnetic fields,[2] while spurious futile commercial applications still exploiting Mesmer's placebo effects, divert five billion dollars yearly from rational medical expenditures.[3]

A few basics:

There are electrostatic fields—witness the sparks when you stroke a dry cat—and there are electro-magnetic fields, produced by current flowing through a wire or a coil—the heart of all electric motors. Only the electromagnetic field, and only if it is moving in relation to tissues, appears to have any measurable clinical effects. These result from induced current, quantified in Faraday's laws.[4]

A stable, essentially motionless field like that of the earth is produced by static magnets—those in the mattresses, discs, bars, horseshoes, earrings, bracelets and other widely marketed configurations, despite their popularity, have no explicable interaction.

Conversely, electromagnets, with their moving fields driven by various current patterns have a successful history of treatment applications, particularly for stimulation of bone repair by inducing a current flow in the bone similar to the specific waveform discovered by Fukada when he physically stressed bone matrix in his piezoelectric studies of crystals.[5-8]

Application of this principle led in 1980 to our trial of a 12 week, 10 hour daily electromagnetic field exposure of the non-dominant forearms of 20 osteomyelitis-prone women, after 108 weeks of serial bone density determinations. A 12% increase in bone density was found in the treated arms.[9]

Comparable effects have been reported in many animal models,[9] as well as in worldwide fracture therapy. Although the exact bone enhancing mechanism is unknown, these consistent results suggest the possible application of scaled-up equipment using a full-field generating bed, for example, for an osteoporotic patient, or in the management of the bone density loss of microgravity.[11]

Although most clinical applications of oscillating magnetic fields have used energy levels well below 10 milliTesla (10 gauss), recent clinical development of concentrated fields of 2-3 Tesla (over 20,000 gauss) has made possible two new clinical uses, one, the 80% successful treatment of major depression without classical electroshock therapy, using induction through the skull,[12] and another, the treatment of urinary incontinence patients by stimulation of pelvic structures (nerves and musculature) by a series of "induced" Kegel exercises at 50 Hz, while they are comfortably seated in the treatment chair. Sixty–five percent of patients report marked improvement or cure after the prescribed treatment course.[13]

In contrast to the quantifiable effects of the relatively high energy time-varying fields long used in conventional medicine, there exists a separate and unrelated world of magnetic "therapy," "aura manipulation," unexplained "body forces," and "energy fields" that have no demonstrable basis in rational chemistry, physics, or physiology other than possible psychosomatic effects. Controlled studies repeatedly debunk the mysticism on which many of these therapeutic "systems" ride—none, better, for example than the work that has punctured the proliferation of Kirlian photography, and Emily Rosa's landmark 4th grade science project published in JAMA.[14]

The astonishing popularity of small static magnets that are worn, walked on in a million shoe soles, slept on, and revered by thousands, delightfully demonstrate the triumph of marketing, as well as hope over reason.

Static magnets contacting the body have no more effect on one's physiology than refrigerator door magnets have on the food inside. Magnetic baubles may satisfy, but only by their presence. By engendering satisfaction, perhaps they earn their keep however; any miniscule electrical energy induced by these magnets by Faraday induction in flowing blood, can have no conceivable biologic effect, lying as it does, in the range of one ten billionth of the normal electrical and thermal energies in tissues.[15,3]

Clearly it is the responsibility of the scientifically literate to continuously clarify, quantify, and document mechanisms and outcomes of all therapeutic interventions, truly separating knowledge from nonsense.

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creation of the NCCAM. JABSOM believes that it can be a leader in the United States, and internationally in the credible scientific study of alternative and complementary therapies. Furthermore, JABSOM believes that it is important to educate medical students about the therapies that their patients are using which may augment or detract from conventional allopathic medicine. For these reasons, we believe it is important to start a Department of Integrative Medicine at the John A. Burns School of Medicine.

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perceived effect. Another withdrawal was for travel. Ten patients completed the study.

Results obtained for the monitored parameters are summarized in Table 1. Thirty days of active magnet use improved pain, perception of function, and the range of motion of the joint, while reducing the duration of morning stiffness in the knee, and increasing the range of motion. No effect was noted on joint swelling, circumference, or time needed to walk 50 feet.

Cartilage, like bone, has piezoelectric properties leading to electrical outputs thought to be capable of stimulating chondrocyte synthesis of matrix components.[5] Similar electrical changes may occur through Faraday induction from applied time-varying electromagnetic fields. Complex chemical responses are detectable within 48 hours of PEMF exposure.[6-8]

Although pain, morning stiffness, and range of motion appear to be beneficially affected by the active field used in this study, further sampling with appropriate statistical evaluation is necessary for valid quantitative conclusions. Extended studies should be designed to histologically determine whether PEMF exposure has true chondroprotective or repair potential in the intact joint, or both.

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