Chapter 6

Energy Medicine

Christina L. Ross

Additional information is available at the end of the chapter

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1. Introduction

Energy medicine (EM) is medicine based on physics instead of biochemistry. Energy medicine works with subtle forms of energy known as chi or prana that exist in and around the human body. EM treats with the understanding that all illness results from disturbances in this energy known as the human biofield. Physics does not override biochemistry, it drives it. Biology and chemistry behave according to the laws of physics. Physics is the study of energy. The human body is made of energy. It has structure (bones), plumbing (digestive tract), and electricity (nervous systems), all infused with energy. Energy is a property of all matter, therefore cells, molecules, and atoms are all made of energy. Science has begun to measure the subtle but important energy field around the human body and research is showing that when the natural flow of energy is obstructed, disordered, and depleted, the body becomes diseased [1]. Pharmaceuticals affect chemical signals in the body but EM affects electromagnetic signals in the body. EM heals using an integrated system that supervises the interaction of all the body's systems and is not only faster, but more efficient. A continuous, uninterrupted flow of energy through the biofield plays the main role in health and healing.

In 1989 the term *energy medicine* was coined by the International Society for the Study of Subtle Energy and Energy Medicine which studies the science of medical and therapeutic applications of subtle energies. Energy medicine came under government guidelines in 1992 when the National Institutes of Health (NIH) established the National Center for Complementary and Alternative Medicine [2]. According to the NIH, energy medicine is defined as a form of complementary and alternative medicine which has two distinct categories:

Veritable energy medicine, which uses mechanical vibration (sound) and electromagnetic radiation (light) in order to affect health and healing. Veritable EM involves the use of specific, measurable wavelengths and frequencies to treat patients. Many of the human body

electrical systems and electromagnetic fields are well known, and veritable forms of EM are being used in well established models for patients in today's medicine. Examples of veritable forms of EM are the use of lasers and magnetic pulses which have been found to be therapeutic. Commonly used forms of veritable EM such as electrocardiogram (EKG), electroencephalogram (EEG), Computerized Tomography (CT or CAT) Scan, Magnetic Resonance Imaging (MRI) and ultrasound equipment are currently being used in traditional medical applications.

For many years it was thought that electromagnetic field (EMF) exposure would cause only harmful effects in the body, but it is now understood that the amount of energy (field strength or amplitude), and the frequency of the field is what determines whether it is harmful, therapeutic or benign [3]. In particular, ionizing radiation has been shown to cause harmful effects by breaking the electron bonds that hold molecules like DNA together[4, 5]. Ionizing radiation includes alternating current (AC) that is produced by power lines, electrical wiring, and electrical equipment. Some epidemiological studies have suggested there is an increased risk of cancer associated with magnetic field exposure near electrical power lines [3, 6, 7]. The energy in non-ionizing radiation, however, is not strong enough to break ion bonds in atoms and molecules [8, 9]. Depending on the frequency and amplitude, the beneficial effect of non-ionizing EMF has been reported to affect natural killer cells fighting cancer and viruses [10-16], traumatic brain injury, post-operative infections, as well as bacterial and viral related inflammatory responses that are major complications in today's medicine [17-19]. Extra low frequency electromagnetic field (ELF-EMF) in the 50 Hz range has been reported to prohibit bacterial growth and improve immune response against bacterial infection [20].

Veritable EM treatments also include pulsed electromagnetic field (PEMF) therapy. A Pulsed Electromagnetic Field device has been approved by the US Food and Drug Administration (FDA) for bone repair, although it remains widely unused due to physician misunderstanding and lack of knowledge concerning the treatment [21]. PEMF therapeutic devices can be applied in two different ways - either by capacitive or inductive coupling. In capacitive coupling there is no contact with the body, whereas direct coupling requires the placement of opposing electrodes in direct contact with the surface of the skin of the targeted tissue [22]. Inductive coupling does not require electrodes to be in direct contact with the skin because it produces a field (see Faraday's Law of Induction) that emanates in all directions. Research shows that therapeutic applications of PEMF at extra low frequency (ELF) levels (3-300 Hz) are beneficial to the immune system by suppressing inflammatory responses at the cell membrane level [23]. PEMF can pass through the skin and into the body's conductive tissue [24-26], resulting in reduced pain and the onset of edema shortly after trauma. Where edema is already present, treatment exhibits significant anti-inflammatory effects [27]. In a study of the effect of PEMF therapy on arthritis, three hours of exposure to a 50-Hz magnetic field revealed that experimentally-induced inflammation in rats was significantly inhibited as a result [28]. Strong beneficial effects have also occurred using 75 Hz frequency MF treatment in patients suffering from fractures of the ankle joints [29]. PEMF treatments also promote cell activation and endothelial cell proliferation through the cell membrane. ELF levels can increase the rate of formation of epithelial cells in partially healed wounds

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[30] and also quicken the healing time of skin wounds [31]. Fields at 15 Hz were used to significantly accelerate wound healing in diabetic mice [32]. Skin wounds have electrical potentials that can be stimulated by ELF-EMF to aid in the healing process by dedifferentiating cells near the wound, thereby accelerating cell proliferation [23]. In a study examining the effects of whole body magnetic fields (50-165 Hz) on patients suffering from different forms of cancer, results showed the MF therapy had overall beneficial effects, particularly with respect to improved immune status and postoperative recovery [33]. Treatment consisted of 15 cycles, each 1-20 minutes in duration coupled with more traditional cancer therapies. PEMF has also been reported to reduce pain and inflammation after traumatic brain injury [34], decrease osteoarthritic inflammation [35], and reduce neuropathic pain [36], as well as control the growth of lymphocytes [37].

EMF treatments appear to improve certain psychological conditions as well. A study of twelve patients with posttraumatic stress disorder (PTSD) and major depression underwent PEMF treatment of either 1 Hz or 5 Hz as an adjunct to antidepressant medications. Seventy-five percent of the patients had a clinically significant antidepressant response after treatment, and 50 percent had sustained that response at 2-month follow-up as compared with controls. Comparable improvements were seen in anxiety, hostility, and insomnia [38]. Low-frequency PEMF therapy at 0.1 – 64 Hz has been shown to improve mobility function, pain, and fatigue in fibromyalgia patients [39] as well. It has been firmly established that tissues such as blood, muscle, ligaments, bone and cartilage respond to biophysical input, including electrical and electromagnetic fields. Research shows that certain field strengths and frequencies of PEMF appear to be disease-modifying [Table 1].

Condition	B or Freq *	Treatment Duration	Treatment Number	Key Finding
Alzheimer's [40]	5-8 Hz	30 min	2x	Significantly improves cognitive function
Arthritis [41]	50 Hz	60 min	3x	Reduction of pain and inflammation
Back Pain [42]	64 Hz	16 min	until pain stops	Statistically significant potential for reducing pain
Bacterial Infection [20]	50 Hz	4 – 6 h	1x	Increased immune response against bacteria
Cancer(breast, colon and prostate tumors) [43]	0.1 Hz to 114 kHz	4 months	2x/week	Tumor specific frequencies showed significant decrease in size
Carpal Tunnel Syndrome [44]	20 Hz	4 h	daily	Statistically significant short- and long- term pain reduction

Condition	B or Freq *	Treatment Duration	Treatment Number	Key Finding
Chronic Bronchitis [45]	30 mT	15- 20 min	15x	Proved effective in patients suffering from chronic bronchitis when coupled with standard drug therapies
Edema [27]	70 mT	15 - 30 min	6x	Significantly reduces acute edema
Fibromyalgia [39]	0.1-64 Hz	30 min	2x day/3 weeks	Improved function, pain, fatigue, and global status in FM patients
Gastroduodenitis [46]	100 Hz	6-10 min	8-10x	77 % of treatment patients experienced elimination of gastro-esophageal and duodenogastral refluxes compared to 29 % of controls
Mastitis [47, 48]	10-25 Hz	60 min	1x/2-3 mos	Significantly reduced post-op inflammation
Multiple Sclerosis [49]	1-25 Hz	2-24h/day	Up to 5 weeks	PEMF device significantly alleviated symptoms
Migraine Headache [50]	27.12 Hz	1 h/day	5days/wk/2 wks	Effective, short-term intervention for migraine, but not tension headaches
Nerve Regeneration [51]	2 Hz/0.3mT	1 h/day	10 days	Pre and post injury exposure suggests that PEMF influences regeneration indirectly
Neuritis [51]	10-100 Hz	6 min	10-12x	Produced beneficial effects in 93% of patients suffering from nerve problems
Oral Surgery [52]	5mT/30Hz	30 min	3-5 days prior to	Significantly reduce inflammation in clinical trials

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Condition	B or Freq *	Treatment Duration	Treatment Number	Key Finding
Osteoarthritis [53]	25 G/5-24 Hz	25 G/5-24 Hz	18x	Rapid improvements of immuno-logical indices & alleviates symptoms
Pain and edema [54]	1mT or 5 mT	6 h/day	90 days	Significantly aids in clinical recovery
Post Traumatic Stress Disorder [38]	1Hz or 5Hz	40 sec or 8 sec/1 hr	20-30 days	Seventy-five percent of patients had a clinically significant antidepressant response
Rheumatoid Arthritis [55]	30 mT	30 min	15 – 20x	Reduces pain in chronic pain populations
Septic Shock [56]	50 Hz/2mT	6 h	1x	*E. coli* became more sensitive to antibiotics
Skin Ulcers [57]	75 Hz/2.7 mT	4 hr/day	for 3 months	Positive effects but only in small lesions
Tendonitis [58]	30 mT	60 min	10 – 20x	Significant beneficial effects
Whiplash [59]	64 Hz	8 min	4x	Considerable and statistically significant pain reduction
Wound Healing in diabetic mice [60]	15 Hz	8 h/day	24 days	Postoperative pain was significantly reduced for a decrease in the need for analgesic resolve

Table 1. Veritable EM therapies applied to various conditions. * B=magnetic field; G=Gauss; T=Tesla; Hz=Hertz; 1 mT=10 Gauss

How do veritable EMF therapies work?

The mechanism for action of EMF on cells and tissues is based on how cells can detect and generate electromagnetic fields in general. Biological systems such as cells communicate not only with each other but also interact with their environment [61, 62]. This is done through several mechanisms at many levels depending on the type of cell tissue and nature of the information being communicated. Most known mechanisms in the literature address cell-cell interaction as chemical or electrical signaling, but intercellular interaction can also be attributed to electromagnetic fields (EMFs) [63]. Burr *et al* published a report on stable voltage gradients in various biological systems back in 1935 [64]. Since then researchers have discovered that these stable gradients can be altered when the whole organism undergoes biologi-

cal processes such as growth, localized injury and microbial invasion. Because EMFs radiate, they behave in a wave-like manner (Figure 1).

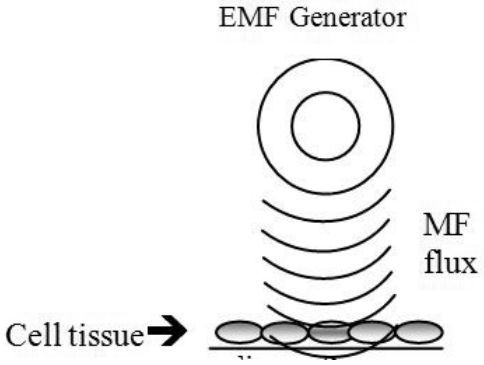

Figure 1.

The biological effects of low-frequency magnetic fields have been the subject of extensive studies since they can penetrate deep into tissues [65-72]. It has been shown that low-frequency EMF can act at the cellular level affecting various cell functions, including cell proliferation and differentiation [73-76], apoptosis [77-79], DNA synthesis [80, 81], RNA transcription [82], protein expression [83], protein phosphorylation [84], re-dox mediated rises in NFkB and cell damage [85, 86], microvesicle motility [87], ATP synthesis [88], hormone production [89], antioxidant enzyme activity [90], metabolic activity [91], and the inhibition of adherence [92]. It has been proposed that the initial interaction occurs outside the plasma membrane, but could also involve interactions with transmembrane proteins [93, 94]. For example, NIH3T3 cells exposed to a 50 Hz PEMF for over 2 h significantly increased the clustering of intermembrane proteins compared with controls [95]. Investigators concluded that the signal was likely being propagated and amplified through the intracellular signal transduction pathways [96]. An example of this is when the calcium stored in the intracellular compartment prompting mitochondria to produce free radicals (which increase DNA response) [97] can be controlled by PEMF[98], providing a first order effect in preventing the onset of inflammatory responses. The impact of EMF on calcium channel protein has been reported many times [99-102]. The genes that encode ion channels are important because they produce the gradients that determine downstream cell behavior. Future advances in this work will fully integrate bioelectric cascades. Increased understanding of how these mechanisms work will lead directly to devices that stimulate cell treatment directly to the damaged region producing the bioelectromagnetic changes needed to repair and regenerate tissues.

Effect of EMF on cytokine production

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It is now well established that exogenous applied EMFs affect cell signaling and cytokine production. PEMF treatment appears to be disease-modifying in a model studying osteoarthritis [103]. Since transforming growth factor beta (TGF-β) is understood to upregulate gene expression for aggrecan (a cartilage-specific core protein), downregulate matrix metalloprotease and IL-1 activity, and upregulate inhibitors of matrix metalloprotease, the stimulation of TGF-β could be considered a mechanism by which PEMF favorably affects cartilage homeostasis.

Application of PEMF does not appear to alter the cell immunophenotype of fibroblast-like cell populations, but does appear to decrease the production of inflammatory cytokines IL-1β and TNF-α. PEMF also appears to increase anti-inflammatory cytokine IL-10 [104]. Both IL-1 and TNF-α concentration in the synovial fluid were significantly lowered while TGF-β was significantly higher compared with controls. Large bone formation was also observed one month after osteochondral graft implantation using PEMF treated grafts which favor early graft stabilation [105]. PEMF exposure at 75 Hz, 45 mT limited bone resorption in the subchondral bone while cytokine assessment in the synovial fluid indicated a more favorable articular environment for the graft.

EMF and Inflammation

EMF has many well documented physiological effects on cells and tissues including anti-inflammatory effects. MF therapies can provide noninvasive, safe and easy to apply methods to directly treat the source of pain, injury, inflammation and dysfunction [106]. Low-frequency EMF has a long term record of safety, backed by tissue culture, animal and clinical studies which have been conducted for over two decades [107]. Although the exact mechanism of anti-inflammatory effect is unclear, the cell membrane is most often considered the main target for EMF signals [106]. It has been reported that EMF affects membrane mediated signal transduction processes, especially the Ca^{2+} transport system [108]. Early events in signal transduction play a critical role in calcium influx in the lymphocyte. Because calcium is an important second messenger for a wide variety of important cellular processes such as RNA, DNA and protein synthesis; modulation of calcium signaling by electromagnetic fields has the potential to influence these cell functions [108]. Studies have demonstrated that EMF can stabilize the cell membrane by restoring membrane protein activity (Ca^{2+} -ATPase) and maintain intracellular Ca^{2+} levels [109, 110]. Biological systems in transition have been shown to be more sensitive to EMF exposure than in stationary systems. In one study immune compromised animals constituting systems in transition state were shown to be more sensitive to EMF exposure; whereas healthy animals, considered to be in relatively stable systems, exhibiting no sensitivity to the same field parameters [111]. Low-frequency, low-intensity EMF was reported to be beneficial in reducing inflammation without potential side effects indicating its value as a viable alternative for treating inflammatory responses. In living systems, from planarian flatworms to humans, mechanisms involved strongly suggest that therapeutic EMF applications stop inflammation first, then initiate healing [98].

2. Veritable EM Devices

PEMF Knee Device

The PEMF knee device is an FDA-approved device consisting of a cuff that surrounds the knee. It has a coil and heating pads that send magnetic pulses and heat through injured tissue. This device combines PEMF energy and thermal therapy to increase circulation, reduce swelling, relieve chronic pain and arthritis, as well as improve range of motion. It has been reported to benefit patients with osteoarthritis [112].

Transcutaneous Electrical Nerve Stimulation (TENS)

Transcutaneous electrical nerve stimulation (TENS) uses electric current to stimulate nerves to induce therapeutic treatment. These devices are usually connected to the skin using electrodes. A typical TENS device is able to modulate pulse width, frequency, and intensity of the electrical field it uses. TENS applied at frequencies above 50 Hz uses intensity below motor contraction (sensory intensity). TENS applied at frequencies below 10 Hz, use an intensity that produces motor contractions [113]. Studies show that TENS stimulates nerves in order to reduce both acute and chronic pain [114, 115].

PEMF Mats

PEMF mats produce a therapeutic pulsed electromagnetic field (PEMF) that surrounds the entire body. PEMF whole-body mats are promoted in many countries for a wide range of therapeutic applications. Randomized, sham-controlled, double-blind trials focusing on osteoarthritis of the knee (3 trials) or the cervical spine (1 trial), fibromyalgia (1 trial), pain perception (2 trials), skin ulcer healing (1 trial), multiple sclerosis-related fatigue (2 trials), or heart rate variability and well-being (1 trial) have been performed, with outcomes varying between improvement and ineffective [116]. PEMF mats are primarily advertised and distributed over the internet, and are often used without medical supervision. More research is needed to repeat outcomes. As of 2012 they have not been approved by the US Food and Drug Administration (FDA).

The second type of energy medicine is known as putative energy medicine.

Putative energy medicine is based on the idea that human beings are able to influence subtle forms of energy with their hands, intentions, or meditation. By focusing on these subtle energies, EM practitioners are able to feel vibrational frequencies with their hands and align the biofield through healing treatments [117]. Putative energy medicine is an all-inclusive term used for practices that include, but are not limited to Acupuncture, Alexander Technique, Bowen Technique, Chakra Balancing, Craniosacral Therapy, Eden Energy Medicine, Energy Psychology, Feldenkrais, Healing Touch (HT), Nambudripad's Allergy Elimination Techniques (NAET), Polarity Therapy (PT), Reiki, Rolfing, Therapeutic Touch (TT), Traditional Chinese Medicine (TCM), Trager Approach and yoga.

Putative EM is based on the understanding that a therapist instead of a device is able to facilitate healing by balancing disturbances in a patients' energy field. Practitioners are able to

generate sub extremely low frequency (sub ELF) fields (0.3-30 Hz) from their hands through meditation and intention [118, 119]. This subtle energy entrains the biofield of the patient and initiates a healing effect. Instruction on body movement is also used to shift energy imbalances. Treatments are carried out in an integrative and holistic manner. The concept of holism in medicine dates back to 460 B.C. with Hippocrates, the father of medicine, positing the idea that every aspect of our body and mind are interrelated to every other aspect of our being [120]. Manipulation of the holistic field allows for healing throughout the entire being – body, mind and spirit.

How Putative EM Techniques work

The hands of EM practitioners produce coherent electromagnetic fields that affect the human biofield in many ways. A measuring device called the Superconducting Quantum Interference Device (SQUID) is a magnetometer used to detect very weak biomagnetic fields. SQUID has detected frequencies coming from the hands of practitioners in the sub extra low frequency electromagnetic field (sub ELF-EMF) range of 0.3 to 30 Hz [121]. The signal emitted by a practitioner is not steady or constant, but moves through the range of sub ELF-EMFs with an average range around 7 – 8 Hz. EM techniques are capable of producing healing results because they directly affect mechanical vibrations in the membrane and the cytoskeleton of human cells as well as the biofield in general. Many research studies have detected the frequency limit of cell oscillations to be only 30 Hz [122-126], which is the same frequency range coming from the hands of EM practitioners. This suggests a subtle resonance involved in the healing process. An interesting characteristic of energy emission from any living organism is that it stays somewhat organized in its fields. It has a tendency to remain stable and does not randomly dissipate [127]. Biofield vibrations are like tuning forks, acting as both transmitters and receivers of vibration coming from their environment. They resonate at specific harmonic pitches when we are healthy. When we are not healthy a non-coherent type noise vibrates from our cells and our biofield. Valerie Hunt, PhD, Professor Emeritus in the UCLA Department of Physiological Sciences has been conducting research in this field for over 40 years. She was the first to research the relationship between changes in bioenergy fields and human health. In mapping bioenergy fields, Hunt has found that each individual has a unique resting pattern she calls the *Signature Field*. "The Signature Field of a healthy human being is composed of balanced, coherent energy patterns running the full spectrum of frequencies (4 – 20 microns in wavelength [128]). This coherency shows up on a graph as smooth, gentle, shallow waves evenly distributed throughout the frequency spectrum". There are two types of patterns in the Signature Fields of people who have (or are soon going to develop) disease: deficiency patterns, and hyperactive patterns. They appear in graphs as thick, jagged waves concentrated in the high- or low-frequency bands (Figure 2).

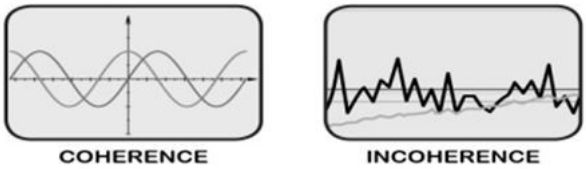

Figure 2.

Deficiency diseases like cancer and chronic fatigue syndrome have what Hunt calls "anti-coherent" patterns in the high frequency ranges, with almost no energy at all in the lower frequencies. Hyperactive conditions like colitis, hypertension, and skin problems show anti-coherent patterns in the low frequencies, with absent vibrations in the high frequencies [129]. The sub ELF-EMF frequency emitted from the hands of EM practitioners is capable of retraining the incoherent frequencies back to a healthy state. Gentle changes in body movement exhibited in EM therapies such as Alexander Technique, Feldenkrais and yoga retrain the cells and biofield back to a healthy vibrational state as well. The application of energy medicine, whether from a medical device or from the hands of a practitioner, is a viable alternative or complement to conventional medicine. Free flowing energy throughout the body eliminates physical health problems attributed to pain, disease and structural dysfunction [130]. EM significantly increases energy levels even if no specific problem exists [131]. It is used as both a preventative as well as a healing treatment.

Energy Medicine Therapies

More people are turning to energy medicine because of its holistic approach that includes not just the physiological, but mental, emotional and spiritual aspects of disease. Being diagnosed with a life threatening illness is very emotionally and psychologically disruptive; EM helps the patient find solace despite challenge. It also eases or counteracts the side effects of conventional therapies [131]. When it comes to selecting an EM therapy there are a variety of options. The following EM treatments are substantiated by peer reviewed published research:

Acupuncture uses meridians of Eastern medicine traditions which form a continuous, semi-conducting network. This Chinese medical procedure uses the stimulation of specific points on the body where the insertion of needles through the skin removes blockages in the flow of chi through the body's meridians to reinstate health. Acupuncture needles are metallic, solid, and hair-thin. Experienced differently, most people feel little or minimal pain while the needles are inserted. Some feel energized by treatment, others feel relaxed. Acupuncture has been shown to improve treatment related pain in cancer patients [132], pain management for women in labor [133], treatment of temporomandibular (TMJ) disorders [134], treat infertility, improve symptoms of menopause [135], improve insomnia [136], and improve chances of successful in vitro fertilization [137]. Relatively few complications have been reported from the use of acupuncture; however, acupuncture can cause potentially serious

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side effects if not delivered properly by a qualified practitioner. Make sure the practitioner is a certified Licensed Acupuncturist (L.Ac.).

Alexander Technique improves physical postural habits, particularly those that have become ingrained or are conditioned responses. The technique has been purported to improve athletic performance, self observation and impulse control, as well as relieve chronic stiffness, tension and stress. It changes movement habits in everyday activities, improving ease and freedom of movement, balance, support and coordination, teaching the use of appropriate amount of effort for a particular activity, increasing energy. It is not a series of treatments or exercises, but rather a reeducation of the mind and body. It can be applied to sitting, lying down, standing, walking, lifting, and other daily activities. Strong evidence exists for the effectiveness of Alexander Technique lessons for chronic back pain and moderate evidence in Parkinson's-associated disability [138].

Bowen is a gentle technique involving a series of moves held for several seconds and then released. The therapist gently pulls the skin on the back of the neck, knees, or affected body part away from the muscle or tendon beneath it and applies light pressure following a specific pattern. Bowen relieves both physical and psychosocial problems, including pain, sports injuries [139], shoulder problems [140], postpartum symptoms [141], fatigue, anger and depression [142].

Chakra balancing based on the seven energy centers along the center of the human body starting from the base of the spine to the top of the head. Chakras are responsible for keeping vital energy flowing through the biofield. They create openings for life energy to flow into and out of the aura. Their function is to vitalize the physical body and to bring about the development of our self-consciousness. They are associated with physical, mental and emotional interactions. An energy worker trained in chakra balancing will determine which chakras are functioning poorly and which chakras are over stressed in order to keep the body's energy balanced. When one or two chakras are performing at a reduced level, the remaining chakras have to work harder. Having a non-functioning or closed chakra can cause another chakra to blow, creating havoc in the biofield [143]. Blown chakras cause pain and initiate disease. Chakra balancing reprograms the chakra system to flow as nature intended.

Craniosacral therapy (CST) is a manipulation technique involving light touch to the cranium (skull) and sacrum (tailbone). It is based on the theory that the movement of bones within the skull and the lower back, as well as the rhythmic flow of cerebrospinal fluid (in and around the spinal cord), play a central role in the body's overall function. Obstruction of this flow of spinal fluid contributes to problems in the brain, spine and endocrine system. Research shows statistically significant improvements in the treatment of migraine headache using CST [144].

Eden Energy Medicine activates the body's natural healing ability by restoring weak or disturbed energy. Eden EM utilizes techniques from acupuncture, yoga, kinesiology, and qi gong. Energy is brought back into balance by tapping, massaging, pinching, twisting, or connecting specific energy points (acupoints) on the skin; by tracing or swirling the hand over the skin along specific energy pathways; through exercises or postures designed for specific en-

ergetic effects; by focused use of the mind to move specific energies; and/or by surrounding an area with healing energies. There is qualitative evidence that Eden EM relieves pain; stimulates immune function, relieves headaches, releases stress, improves memory, enhances digestion, relieve arthritis, neck, shoulder, and low back pain [145].

Energy Psychology (EP) addresses the relationship of energy systems to emotion, cognitive behavior and health [146]. Energy psychology uses imagery, narrative, and hyperarousal associated with traumatic memory or threatening situations to resolve traumatic memory [147]. When the brain reprocesses traumatic memory, the new association is retained by reducing it to hyperarousal. This leads to treatment outcomes that involve less time with fewer repetitions and higher impact. These techniques show less chance of retraumatization [147]. During EP treatments, mental/emotional/spiritual problems are healed through the biofield. The biofield is connected through the consciousness, thought processes and spirit, and includes the electrical activity of the nervous system, heart, meridians, biophotons (energy field particles), and chakras.

Feldenkrais Method uses gentle movement and directed attention to improve range of motion and enhance human functioning. Based on principles of physics, biomechanics and an empirical understanding of learning and human development, Feldenkrais exercises have been reported to be an effective way to improve balance and mobility, flexibility and coordination, helping to offset age-related declines in mobility and reduce the risk of falling among community-dwelling older adults [148].

Healing Touch (HT) is an energy medicine practice involving the relationship between the practitioner, the patient, intention, and the power of touch to facilitate healing. Like most EM treatments the patient is lying on a massage-type table, where the practitioner applies different forms of touch in order to assess the patient's biofield imbalances. HT is widely used to help ease pain, stress and anxiety [149]. Patients receiving music, imagery and touch therapy during angiograms or other cardiac procedures were 65 percent less likely to die in the following six months than patients who received no such intervention [150]. Other research shows that HT lowers blood pressure, heart and breathing rates, fatigue, mood disturbances, and pain in patients receiving chemotherapy [151]. HT is endorsed by the American Holistic Nurses' Association.

Nambudripad's Allergy Elimination Techniques (NAET®) is an EM treatment designed to alleviate allergies using a combination of energy balancing, testing and treatment procedures from acupuncture/acupressure, allopathy, chiropractic, nutritional, and kinesiological disciplines of medicine. Research suggests it is effective in treating allergies to milk, sugar, egg whites, pork meat and other foods causing eczema and dyspnea [152].

Polarity Therapy (PT) uses touch, verbal interaction, exercise, and nutrition [153] to balance and restore the natural flow of energy in the biofield. Blocked and stagnant energy is responsible for both emotional and physical pain as well as disease. Energy medicine treatments are patient-practitioner oriented, where both the giver and receiver of the energy treatment work in tandem to facilitate treatment. The practitioner grounds and centers his/her body, meaning all thoughts, emotions and physical sensations are neutralized

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through intention. This mindset begins the healing process for both the practitioner and the client. PT balances the subtle energy of the biofield which can be detected and manipulated by movements of the practitioner's hands. The practitioner provides the resonating template for the patient's biofield to follow. Change occurs on a spiritual or unconscious level, and most people do not feel much other than becoming very relaxed. This mind-body state is optimal for healing and cell regeneration. After effects of the treatment last from hours to days with feelings of calm, focus, peace and serenity. PT bases its philosophy in the traditional system of Ayurvedic medicine, which defines patterns of health as energy moving through the Five Elements of Life – Ether, Air, Fire, Water and Earth. The practice of PT focuses on the balance of these elements as the foundation of good health. It integrates philosophies of Ayurvedic medicine, hermetic or ancient Egyptian medicine, Traditional Chinese Medicine (TCM), chakra balancing and the balance of yin and yang. PT understands that energy flows through the body along five pathways, enabled by positive and negative poles of the body. Five energy centers along the body represent the five elements of Ayurvedic tradition relating to different organs and functions in the body. Practitioners aim to correct disturbances and enable optimal physical, emotional as well as spiritual healing. Along with energy balancing sessions, cleansing diet and energy exercises are part of the therapy. PT has been shown to reduce cancer related fatigue [154], and improve the quality of life for caregivers of dementia and Alzheimer's patients [155] as well as improved stress reduction in burned out oncology professionals [131].

Reiki is an ancient Tibetan Buddhist practice in which practitioners serve as facilitators for life force energy (chi). Reiki is used to reduce stress, improve health and quality of life, and promote mental clarity. Practitioners use 12 – 15 specific hand positions each held for a few minutes on the patient's clothed body. Sessions last 30-90 minutes and the number of treatments may vary. Like other EM therapies, Reiki practitioners assert treatments can be effective over long distances. Formal scientific evidence has shown that Reiki can increase quality of life and reduce pain when used with standard medications [156]. Reiki has also been reported to relieve stress and improve psychological well being in patients with heart rate variability [157], and pain management issues [158].

Rolfing focuses on fascia tissue that connects all internal structures within the human frame. Connective tissue unites the structure of the body and divides it into individual functioning parts. Fascia is constantly changing and adapting in response to demands placed on the body. It reacts to trauma to a joint for instance by producing extra tissue to enhance stability and support; however, it can produce more than is necessary. In time, rather than stabilizing movement it can actually reduce mobility, leading to a changed posture and altered patterns of movement. After completing ten sessions a client can expect greater ease of movement and all over range of motion, along with better posture. Rolfing has been shown to significantly decrease pain and increase range of motion in adults who have cervical spine dysfunction [159].

Therapeutic Touch (TT) is similar to PT and HT, except practitioners usually do not actually touch the patient, but hold their hands 4-8 inches (10-18 cm) from the body in order to detect energy imbalances and correct them. TT has been shown to significantly reduce pain and in-

crease the quality of life in fibromyalgia patients [160], significantly decrease pain and improve function in patients with osteoarthritis [161], produce significant reductions in behavioral symptoms of dementia [162], and chemical dependency in pregnant women who suffer from anxiety [163]. TT is mainly practiced by nurses.

Traditional Chinese Medicine (TCM) suggests that the basis for disease results from the disruption in the flow of subtle energy known as qi or chi. TCM works with imbalance in the forces of yin (feminine principle) and yang (masculine principle). Practices such as Chinese herbs, meditation, massage and acupuncture aid healing by restoring yin-yang and Qi to homeostasis. This same subtle energy is known as ki in the Japanese Kamp system.

Trager Approach is a combination of massage, meditation and movement education. The head, torso, arms and legs are manipulated with rhythmic pull and rotation techniques in order to release tension, increase mobility and clear the mind. Movement awareness is emphasized to promote relaxation and ease neuromuscular pain. The Trager Approach has been shown to reduce symptoms of chronic headache along with reduction of headache medication [164].

Yoga is an ancient Indian practice uniting the spirit, the body and mind accomplished through physical postures, controlled breathing exercises, and meditation, often accompanied by healthy lifestyle and search for higher consciousness. Yoga is not a religion but a philosophy and way of life. Hatha yoga is most commonly practiced in North America and Europe, using a sequence of postures or asanas held statically or moved through dynamically in sequence, using the breath and hand positions for balance. Ashtanga yoga builds strength, stamina and flexibility, more commonly known in the United States as power yoga. Bikram yoga is practiced in rooms heated to 100 °F (39 °C). Profuse sweating loosens muscles and tendons while promoting inner cleansing. This type of yoga should only be practiced after consulting with a physician. Research has shown the practice of yoga can reduce pain, and increase energy, flexibility, and function during physical activity, as well as relieve stress and anxiety in breast cancer survivors[165]. It has also been shown to reduce pain associated disability [166], reduce stress [167], and as a complementary therapy for major psychiatric disorders [168].

As with pharmaceuticals, the effectiveness of these treatments varies with each patient. It is important to speak with a practitioner before scheduling an appointment to discuss your needs and ask questions about what to expect during your visit. Most of these therapies are practiced with the patient fully clothed except for shoes, socks and jewelry. Although human biofields have as yet been proved measurable with conventional scientific equipment, medical journals have published articles suggesting the existence of such fields [169-171]. Please consult with a physician to determine any health issues (recent surgeries or trauma) which may not allow for physical manipulation. Many EM treatments are not recommended for people who have multi-personality disorder or schizophrenia as manipulation of the biofield can sometimes exacerbate delusion, hallucination and bring out multiple personalities at once.

In Summary

The growth and maintenance of correct vibrational patterning of tissues and organs is the hallmark of good health. Current biomedical interventions ultimately attempt to restore the body's optimal vibrational patterns. In order to accomplish this goal it is imperative to understand the key aspects of immune response with respect to cellular communication, as well as biochemical, bioelectrical, and bioelectromagnetic processes; and to develop technologies to facilitate the body's use of this information during the repair and regeneration process.

Author details

Christina L. Ross[1,2*]

Address all correspondence to: chrross@wakehealth.edu

1 Department of Energy Medicine, Akamai University, U. S. A.

2 Research Fellow, Wake Forest Institute for Regenerative Medicine, School of Medicine, Winston-Salem, U. S. A.

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