ENERGY MEDICINE AND LONGEVITY: Cellular-Electrical Biofeedback Combined with Frequency Specific Healing

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INTRODUCTION

Energy Medicine is a field that is unfamiliar to many physicians, and is often greeted with skepticism. This situation is changing rapidly, and anti-aging medicine is one area where energetic approaches are having a dramatic impact. Patients like energetic therapies because they are easy to understand, are very effective, have few side effects, are generally non-invasive, and often yield results for the patient who has not been helped by other methods. Of interest in the pursuit of longevity is the ability of energetic approaches to catch problems and treat them at an early stage, when they are much easier to take care of; and the ability to address the various so-called "diseases of aging". The outcome: healthier patients with even more respect for their doctors.

The main reason Energy Medicine is not appreciated by the medical community is that the basics are not taught in medical schools. These basics consist of fundamental physics, biophysics, biological electronics and the role the various forms of energy have in physiology and medicine. Here we are not talking about anything mysterious or mystical, but the forces we know about through our senses and through basic science: heat, light, sound, electricity, magnetism, electromagnetism, chemical energy, vibration and gravity. Each of these aspects of our energetic environment, both within and around us, has physiological and clinical significance. The study of energy medicine has become an extremely engaging and fascinating endeavor, and is leading to techniques that will be a significant part of the medicine of the future.

FREQUENCY SPECIFIC HEALING

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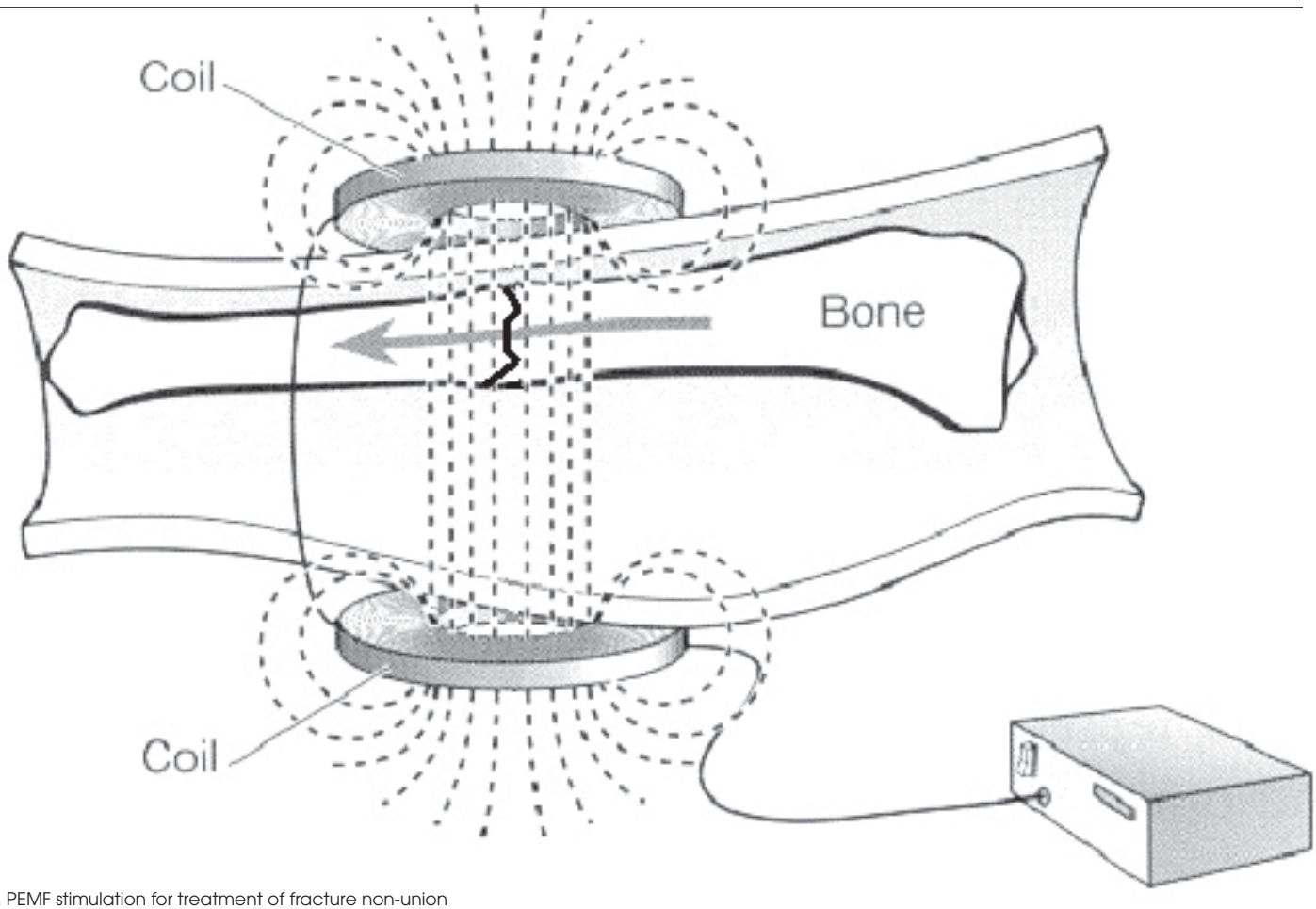

FIGURE 1. PEMF stimulation for treatment of fracture non-union

Every physician has taken an electrocardiogram, and therefore knows the basics of electrophysiology. The heart generates a large electrical field that is conducted throughout the body because the vascular system contains electrolytes that carry electrical charge, and because the body is formed of an all-pervasive semiconducting living matrix.[3] The electrocardiogram can be detected anywhere on the skin, even in the feet. Similarly, the brain, muscles, glands and other tissues generate electrical signals that can be detected at the skin surface. Clinical tools such as electroencephalography and electromyography are based on these phenomena. In each of these diagnostic tools, the strength and frequency and shape of the electrical pulses have clinical significance and lead to successful treatment decisions. Indeed, most physiological processes have measurable bioelectrical correlates.

Of growing interest are methods involving the application of electrical fields of particular characteristics to stimulate healing in specific tissues. One of the first methods of this kind was the use of electric fields and pulsing electromagnetic fields (PEMF) to treat fracture non-unions and delayed union, both of which are costly and debilitating conditions that can lead to amputation. Pulsing electromagnetic fields can be applied to the outside of the body, and induce small but measurable microcurrents within tissues. Two firmly established 19th century laws of electromagnetism are involved: Ampere's Law states that the flow of electric currents as in a wire or coil must produce magnetic fields in the surrounding space; and Faraday's Law of Induction states that oscillating magnetic fields as produced by a coil will give rise to oscillating electric currents in nearby conductors, including in living tissues. In the 1980's, PEMF was introduced to the orthopedic community and became widely used to stimu-

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TABLE 1.
Processes responding to pulsing electromagnetic fields, from the peer-reviewed literature

Melatonin secretion
Nerve regeneration
Neurite outgrowth
Osteogenesis
Cartilage growth
Ligament healing
Cell growth
Collagen production
DNA synthesis
Decreased skin necrosis
Angiogenesis
Fibroblast proliferation
Lymphocyte activation

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late bone healing (Figure 1).[4] Extensive basic research revealed the underlying mechanisms, and multi-center clinical trials led to FDA approval.

Success with bone healing led to testing of PEMF's on other tissues, and it was soon found that each tissue responds to a particular frequency. Signals were discovered that could stimulate healing in skin, ligament, tendon, muscle and nerve.[5] The peer-reviewed literature now contains references to a wide range of tissues that respond favorably to low level signals of particular frequencies. Clinically significant frequencies range from 0.1 Hz to millions of Hz. Some of the tissues and physiological processes affected are shown in Table 1, which is based on the peer-reviewed biomedical literature. Some of the processes and their corresponding frequencies involved are shown in Table 2.[6] A variety of PEMF devices have proven safe and effective and have been given FDA approval and are marketed for treatment of a wide range of clinical issues.

Biophysical studies have shown that cells and tissues can respond to electrical signals that are far weaker than those needed to depolarize neurons, produce heating or cause ionization.[7] For example, stimulation of bone repair requires low intensity signals, measured in nano-Watts or nano-Amperes. Such signals do not produce significant tissue heating. The magnetic fields required to induce such currents are only slightly stronger than the magnetic field of the earth.[8] Moreover, magnetic fields can cause dipolar molecules (molecules that do not have a net electrical charge but that have an uneven distribution of charges) to bend or rotate or change their configuration. In other words, enzymatic processes and cell behavior are both field-sensitive.[9] In general these microcurrents are at about the same strength as the signals generated naturally during normal cellular and tissue processes and physiological regulations.

The reason cells are sensitive to such tiny signals has been determined in great detail. Researchers have defined a cascade of events that take place across the cell surface, through the cytoplasm, and to the nucleus, where the genetic material is activated. In essence, cells amplify tiny signals. The calcium channel is involved: single photon of energy can trigger the entry of thousands of calcium into the cell, where they activate particular activities or cellular behaviors.[10]

As with any clinical procedure, methods employing PEMF are not effective on 100% of the patient population. For example, multi-center clinical trials of PEMF in treating fracture non-unions showed that the method was effective in approximately 85% of cases. We can ask why all patients did not respond.

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TABLE 2. Frequencies affecting particular tissues

2.0 Hz	Nerve repair	326 Hz	Herniated disc	835 Hz	Immune System
5.9 Hz	Scars	326-328	Back Pain	1335 Hz	Adrenals
7.0 Hz	Bone	337 Hz	Circulation	1342 Hz	Pituitary
9.7 Hz	Ligaments	443 Hz	Chemical Sensitivity	1351 Hz	Hypothalamus
13.5 Hz	Muscle	480 Hz	Pineal	1413 Hz	Hypothalamus
15 Hz	Blood pressure	528 Hz	DNA Integrity	1434 Hz	White Cell Production
15 Hz	Lymphatic circulation	625 Hz	Kidney	1443 Hz	Progesterone
15 Hz	Emotional stability	635 Hz	Pituitary Function	1446 Hz	Progesterone
15 Hz	Emotional Trauma	635 Hz	Colon	1524 Hz	Red Blood Cell Production
15 Hz	Herniated disc	637 Hz	RNA Integrity	1534 Hz	Hypothalamus
15 Hz	Fluid Retention in Joints	645 Hz	Pituitary	1537 Hz	Endocrine System
	& Tissues,	657 Hz	Nerve repair	1351 Hz	Estrogen
15.2 Hz	Capillaries	751 Hz	Liver	1444 Hz	Testosterone-male
17 Hz	Blood Flow / Circulation	657 Hz	Electrical Sensitivity	1445 Hz	Testosterone-female
24.3 Hz	Fluid Retention in Joints	676 Hz	Lymphatics	1565 Hz	Spiritual Well-Being
	& Tissues	696 Hz	Heart	1725 Hz	Pituitary
25.4 Hz	Herniated Disc	763 Hz	Thyroid	2452 Hz	Hemoglobin Production
35 Hz	Mental clarity	763 Hz	Progesterone	2642 Hz	Stroke
326 Hz	Calcium Metabolism	764 Hz	Nervous System		

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FIGURE 2. Radial artery pulse cellular-electrical biofeedback

The answer to this question emerged from studies of Peters and colleagues, who showed that the optimal therapeutic frequencies must be determined on an individual basis.[11] This raises another question: how do we determine the optimal frequency for the individual patient.

Cellular-electrical biofeedback provides an effective answer to this question.

CELLULAR-ELECTRICAL BIOFEEDBACK

The fundamental discovery providing the basis for cellular-electrical biofeedback is that most physiological processes previously thought to be regulated automatically (autonomic nervous system) can be regulated consciously if the processes can be brought to awareness via appropriate measurements. Since most physiological events in the body have electrical correlates, many cellular-electrical biofeedback technologies involve measurements of electrical events as the feedback signal. Such measures include

- Galvanic skin response (skin resistance)
- Muscle tension (electromyography)
- Brain activity (electroencephalography)
- Heart activity (electrocardiogram, heart rate variability)
- Arterial pulse (vascular autonomic signal)
- Skin temperature

As with PEMF, there is an extensive peer reviewed literature on the safety and clinical effectiveness of cellular-electrical biofeedback for the treatment of a variety of conditions, some of which are difficult to resolve by other methods. Table III lists some of the conditions in which sound is used as the cellular-electrical biofeedback signal. Other ways of providing cellular-electrical biofeedback include light, electrical stimulation and even wave-forms viewed on an oscilloscope. Again, like PEMF techniques, cellular-electrical biofeedback has proven non-invasive, safe and effective for a wide variety of conditions and most cellular-electrical biofeedback technologies have FDA approval. Moreover, cellular-electrical biofeedback has the advantage that it is patient-specific. In other words,

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TABLE 3.
Medical applications of cellular-electrical biofeedback documented by peer-reviewed literature

acute pain management
fibromyalgia
childhood migraine
ADHD
sensorimotor learning
stutter and dysfluency
tinnitus
velopharyngeal dysfunction
in cleft palate
balance improvement
gait in spina bifida.
handwriting disabilities
chronic asthma
parkinsonian dysarthria
post-stroke movement disorders
incontinentence
speech rehabilitation in dysarthria
brain damage after trauma
irritable bowel syndrome
Raynaud's phenomenon
motor aprosodia
velopharyngeal dysfunction
motor aprosodia
brain injury
ocular vergence
sensorimotor learning and stuttering
nocturnal bruxism
spastic dysphonia
hyperfunctional voice disorder

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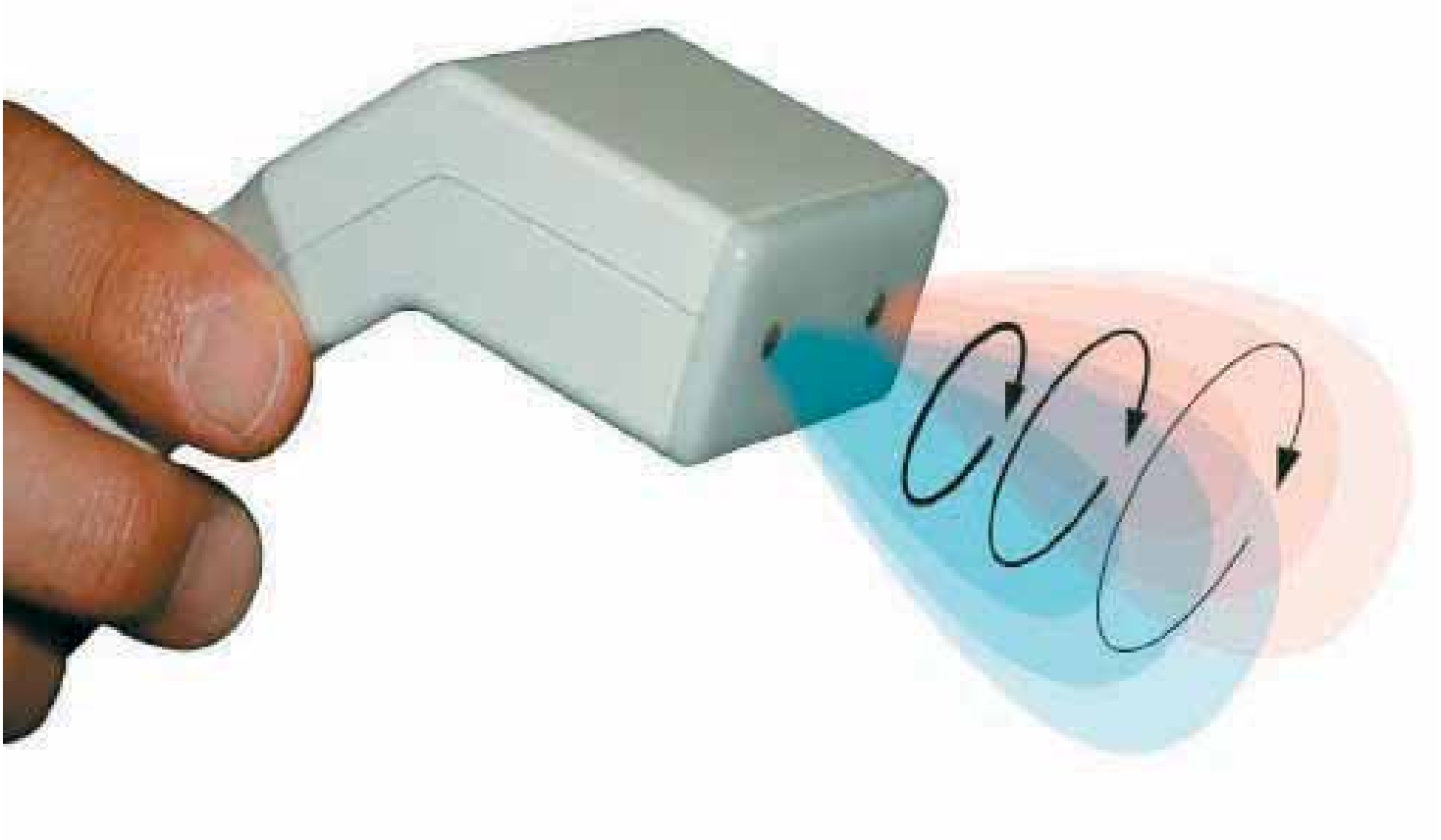

FIGURE 3. Hand-held applicator used with ONDAMED®

the patient's own body regulates the process and determines when the endpoint has been reached.

COMBINING PEMF AND CELLULAR-ELECTRICAL BIOFEEDBACK

Technologies have been developed that have the goal of using PEMF and cellular-electrical biofeedback together for diagnosis and therapy. In practice, these methods continuously inform both patient and practitioner during the diagnostic and treatment procedures. There is a basis for these devices in the Vascular Autonomic Signal (VAS), which is increasingly being utilized for diagnostic purposes. The VAS is a sensitive indicator of the condition of a variety of systems within the body.

A discussion of the VAS begins with the work of French physician, Dr. Paul Nogier, who taught neurology at the medical school in Lyon, France. Nogier also studied Traditional Oriental Medicine, which includes sophisticated methods of analyzing the radial artery pulse (Figure 2). In 1966, Nogier discovered that the Vascular Autonomic Signal was evoked in the radial pulse (termed the RAC in French, for Réflexe Auriculo-Cardiaque or Autonomic Circulatory Reaction) when he touched certain points on the ear of a patient. Subsequently, he discovered that the arterial system responds in a reproducible manner to a variety of changes to key physiological systems in the body. To be specific, the VAS is a rapid change in the tone of the smooth muscles in the walls of the arterial system throughout the body, mediated by sympathetic and parasympathetic neurons.[12, 13] Distinct changes in the amplitude and other characteristics of the pulse take place when specific events take place within the body. This occurs consistently and is both repeatable and measurable by modern equipment. The response that is felt by the practitioner (Figure 2) is a qualitative variation in the perception of the pulse that begins from 1 to 3 cycles after the stimulus begins and continues for about 8 to 15 cardiac cycles.[14] Nogier found that there are four pulse responses to stimuli: no response, the weakening of the pulse signal (negative VAS), increase of the pulse signal (positive VAS), and a sharp pulse spike. These responses occur from colors,

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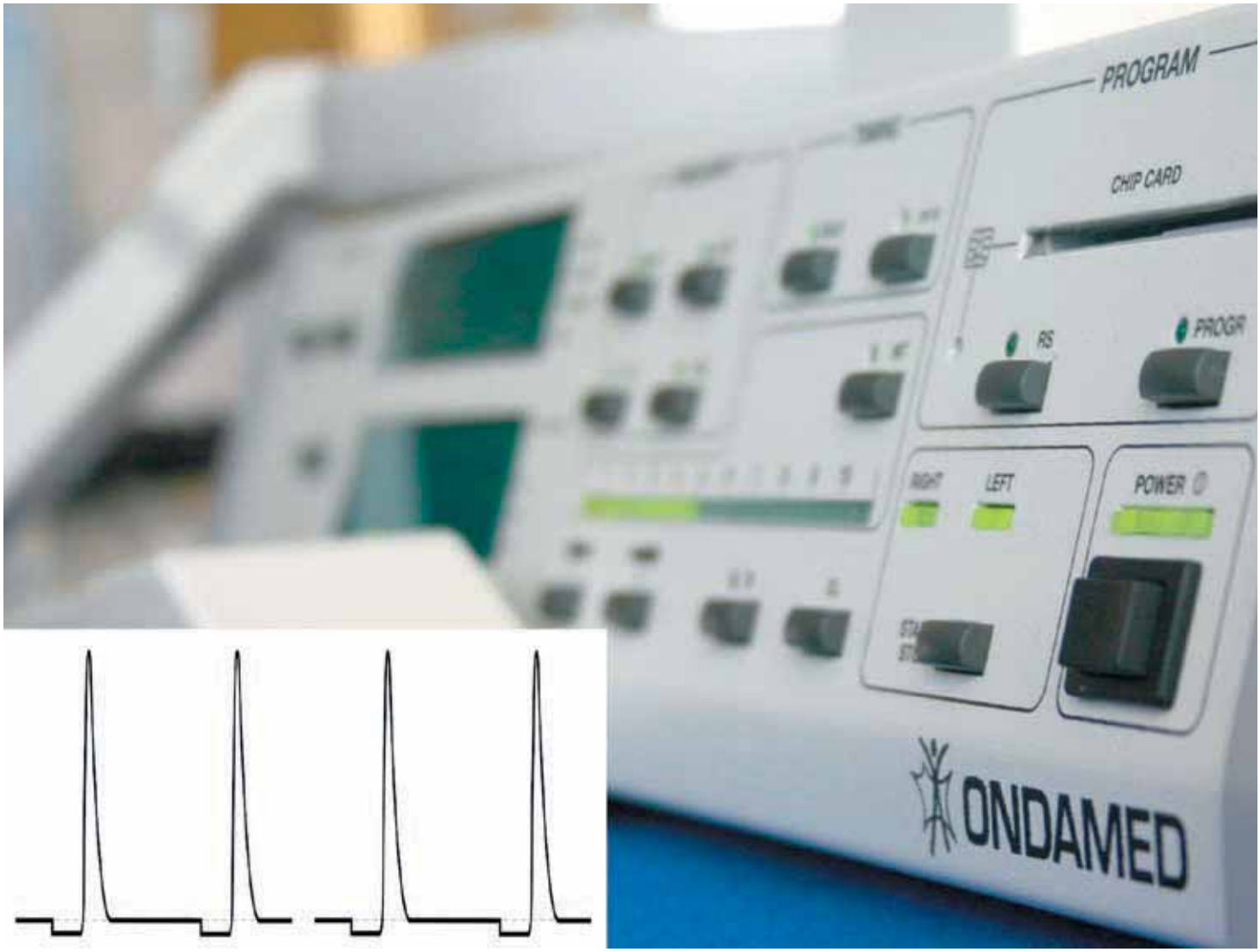

FIGURE 4. The ONDAMED® with the pulse shape it delivers to the body during diagnosis and treatment

magnetically induced currents, sound frequencies, light waves, emotions, touch, substances, and electromagnetic frequencies. There is considerable medical interest in the VAS, as evidenced by five International Symposia, the most recent one held in Lyon, France in 2006. Several United States Patents[15] and both diagnostic and therapeutic tools are based on the phenomenon. The method is sometimes referred to as Peripheral Arterial Tonometry or PAT.

Although the term "signal" as in the "Vascular Autonomic Signal" is widely used, many who use the system consider the term "response" as more accurate. A response is an answer to a question, and the VAS is the body's reaction or answer to a question posed by the introduction of stimulation into the body or into its energy field. For a discussion of the term, "energy field," see Oschman.[3]

The VAS is rapid and extremely sensitive, and can be used to discover both the best treatment for a problem as well as more subtle levels of disturbance or imbalance. These include blockages to the healing response, layers of pathology, appropriate priority for treatments and even subclinical issues. The VAS can be used both before and after a treatment to determine the accuracy of the diagnosis and the success of the treatment. In essence, the VAS is a very sensitive way of "listening" to the body as well as providing feedback to the patient. A wide variety of therapeutic schools around the world train practitioners to read the VAS and use it to define areas of the body under stress, the causes of the stress, chemical intolerances and the degree of success of interventions. The VAS can also provide early warnings of subclinical issues and therefore provide the practitioner with the opportunity to reverse developing conditions at an early stage.[16]

ONDAMED® AS AN EXAMPLE

The most widely tested approach combining PEMF and cellular-electrical biofeedback is the ONDAMED®, which has been used successfully in Europe since 1993 and is beginning to be used by physicians and other health care providers in the USA. Developed by Rolf Binder, the ONDAMED® provides a spectrum of low-level pulsing magnetic fields that induce the flow

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of microcurrents within the tissues of the patient. During a diagnostic phase, radial arterial pulse provides cellular-electrical biofeedback about which frequencies in the range 0.5 to 32,000 Hz affect physiological systems. A subsequent treatment phase introduces the same frequencies into the body via a hand-held applicator (Figure 3) that is moved a few inches over the patient's body. Again, the VAS is used to determine which area of the patient's body is responding to the frequency in question, and both the position of the applicator and the sounds produced by the electromagnet provide feedback to the patient. Cellular-electrical biofeedback raises the patient's awareness and conscious control of physiological activities. Experience shows that the patient is then able to bring their system toward a desired end-point. Experience shows that many conditions resolve quickly, as though the body simply needs a small signal to jump-start the healiing process.

Figure 4 shows the ONDAMED® and the pulse shape it delivers to the body during diagnosis and treatment phases. Repeated testing of the ONDAMED® in physician's offices, wellness centers, health spas, and anti-aging practices reveals that the system does indeed provide the advantages of both PEMF therapies and cellular-electrical biofeedback by revealing patient-specific information and treatment options in a safe and non-invasive manner. While a variety of PEMF technologies and cellular-electrical biofeedback protocols have been developed to treat a wide range of individual conditions, the ONDAMED® combines all of these possibilities into a single versatile instrument. Moreover, the ONDAMED system has a set of pre-programmed frequencies that are helpful to most patients. These frequencies are based on the medical literature as well as on studies of rhythmic phenomena in nature and rhythms used in traditional healing methods.[17] The outcome: healthier patients with even more respect for their doctors. ◆

REFERENCES

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2 Judy Kosovich, c/o Swankin - Turner, 1400 16th Street NW, Suite 101, Washington, D.C. 20036, judy@swankinturner.com.

3 Oschman JL. Energy Medicine: the scientific basis. Edinburgh; Churchill Livingstone/Harcourt Brace: 2000.

4 Bassett CAL. Bioelectromagnetics in the service of medicine. In: Blank M (ed) Electromagnetic fields: biological interactions and mechanisms. Advances in Chemistry Series 250, American Chemical Society, Washington DC: pp. 261-275: 1995.

5 Sisken BF Walker J. Therapeutic aspects of electromagnetic fields for soft-tissue healing. In: Blank M (ed) Electromagnetic fields: biological interactions and mechanisms. Advances in Chemistry Series 250, American Chemical Society, Washington DC, pp. 277-285: 1995.

6 Table II is based on the peer-reviewed literature as well as on various sites on the World Wide Web.

7 Adey WR. A growing scientific consensus on the cell and molecular biology mediating interactions with environmental electromagnetic fields. In: Ueno S (ed) Biological effects of magnetic and electromagnetic fields. Plenum Press, New York Ch. 4, pp. 45-62: 1996.

8 Rubin, C. T. &. Hausman, M. R. (1988) The cellular basis of Wolff's Law: transduction of physical stimuli to skeletal adaptation. Rheum. Dis. Clin. North Am. 14(3): 503-517.

9 Westerhoff HV Kamp F Tsong TY Astumian RD. In Blank M Findl E (eds) Mechanistic approaches to interactions of electric and electromagnetic fields with living systems. Plenum Press, New York, pp. 203-215: 1987.

10 For references, see the Afterward in Oschman, 2000, reference 3.

11 Peters TK, Koralewski HE, Zerbst EW. The evolution strategy--a search strategy used in individual optimization of electrical parameters for therapeutic carotid sinus nerve stimulation. IEEE Trans Biomed Eng. 1989 Jul;36(7):668-75; Peters TK, Koralewski HE, Zerbst EW. Search for optimal frequencies and amplitudes of therapeutic electrical carotid sinus nerve stimulation by application of the evolution strategy. Artif Organs. 1989 Apr;13(2):133-43.

12 Karita K Izumi H Effect of baseline vascular tone on vasomotor responses in cat lip. J Physiol. 1995 February 1; 482(Pt 3): 679–685: 1995.

13 Anderson LC Martin DJ PhillipsDL Killpack KJ Bone SE Rahimian R. The influence of gender on parasympathetic vasodilatation in the submandibular gland of the rat. Experimental Physiology 91.2 pp 435-444: 2005.

14 http://www.sedatelec.com/english/acupauri.htm

15 United States Patent 6,942,622, issued September 13, 2005, for Method for monitoring autonomic tone.

16 Agnes M. Toward an Integral Energy Medicine Model for Understanding the Vascular Autonomic Signal. Ph.D. Thesis, Greenwich University - Holos University: 2002.

17 Appelt C Klänge des Lebens. Freiburg, pp. 10-41:2000.

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