WARNING!
This book contains provocative material not for children or the sexually immature.
Introduction

“The National Institute of Health states that ‘Bio-Electro-Magnetic essentially underlies biochemistry, in that chemical reactions of biological importance are all mediated by the electromagnetic force.’ Bio-Energetic Medicine offers the possibility of more economical and more effective diagnosis and noninvasive therapies for medical problems, including those considered intractable or recalcitrant to conventional treatments.”

Electromagnetic Applications in Medicine NIH-OAM Panel Report
By Beverly Rubik, Ph.D. and Robert G. Flower;
National Institutes of Health,
Office of Alternative Medicine,
January 14, 1993

In the fifth grade we learned that our bodies are made of atoms. And atoms are made mostly of protons, neutrons and electrons. There are great spaces between these electrons and protons and other atoms. Here is a Hydrogen Atom.

In Hydrogen if the protons are like marbles, the electron is over a kilometer away the next atom’s electron is over 2 kilometers away, the next proton is over 4 kilometers away. The electrons never touch each other they repel. The outer electrons in my left hand cannot touch the outer electrons in my right hand. Nothing ever touches anything. So there is more than 99.9999999999999999% empty space. This space is filled with interwoven entwined energetic fields. What we are is a complex fractal interaction of electro-magnetic fields. Health has a particular set of fields and disease states another differing set.

The electrons and atoms of our complex Fractal body obey quantum, QED, photonic, electro-magnetic-static laws. This is a mouthful so we abbreviate and since these are all energy let’s just say ENERGETIC or BIO-ENERGETIC if we quote from above the US National Institute of Health officers.

In China the word for sport is TU it means education of the muscles. The SCIO was registered with the FDA in 1989 in America for the main purpose of reeducation of the muscles. Now its
registration has been expanded in America and around the world. But its sport aspects seem to be its finest aspect. The Deep Rich History of the SCIO in Sports is in this journal and the future is yet to be written. China is just our most recent exciting venture into sport. China has just recently gone into sport and with the help of the SCIO dominated the 2008 Olympics as you will see in this journal.

**Reports from China keep coming in from SCIO techs. A recent one was this:**

“Dear Desiré: well you will be happy to know that I just had a young athlete come in for his 5th session with a big smile on his face. He is a 400m runner and after just 4 sessions he beat his best time by almost 1 second. THAT IS BIG.” He said he has more energy and a stronger desire than ever before to run thanks to the SCIO. He is now the fastest in this Chinese Province right now and will be heading to the qualifying athletic competition for the Asian Games on Aug.3. His time usually is 47.6 seconds and he just did 46.6 seconds on Saturday. At his age with the SCIO energetic help in a few years maybe the world record. Remarkable!!!”

“Desiré I have met you in person, I heard you speak and know you are the real deal. I used the device on several cancer patients with astounding results. Sports athletes respond so well and so quickly. This is probably because they have such a low SOC index. Please keep doing what you are doing. Don’t give up the fight.”

**In another set of Data streaming in from China, the report reads:**

“Our results clearly show that an athlete is improved 5% or so with the SCIO. Here are Medals won during the recent 2010 National Games:

- 16-Gold from athletes we worked with, 48.5 Gold medals won total for the province
- 12-Silver, 28 total for the province
- 16-Bronze, 28 total for the province

I thoroughly enjoyed working with the professional sports teams and felt much support from the coaches, doctors, and athletes. They worked hard to improve and take into account the recommendations I suggested. As proven by the outcome of the National Games it is evident that we definitely had an advantage over their competitors by utilizing the SCIO/ biofeedback testing, therapies and support. I wish them much success for the future and hope to see them winning many more gold medals at the future Olympic Games!

**Overall Improvement:**

- Athletes felt more mobility and flexibility
- Increased energy and more power
- Sleep improved: deeper and faster to fall asleep
- Injuries repaired and had faster recovery
- Pain stabilized and decreased
- Digestion Improved
- Heart rate stabilized (Jing Shing Jing 80/50) - Emotions more stable
- Felt Less Stressed
- Better oxygenation of the blood
- Hydration improved
- Faster recovery for acute and chronic issues

When asked if athletes wanted to continue therapy, all said they would like to continue.
Healthy membrane potential and adequate body voltage makes all of the functions of the cell work better.

Low Body Voltage leads to weak membrane potential, weak osmosis, trapped toxins, premature aging, and increased susceptibility to virus.

70-90 mV

70-90 mV

Factors that influence the body voltage and membrane potential are fatty acids in the cell membrane, minerals, especially salts, hydration water, oxygenation, stress, toxins and life style.

The SCIO has been proven in tests to increase the electrical potential of the body. Increased cellular membrane potential makes osmosis increase, which increases detoxification, nutrient transfer and absorption, hydration, oxidation, and all cellular functions in general.

Charging the Human Battery

70 Nutrients

H₂O

Oxygen

waste

H₂O

Carbon dioxide

If you need more information on the SCIO and purchase details please get in touch with us.

Maitreya Kft.

tel: +3613036043  | web: www.qxsubspace.com  | e-mail: info@qxsubspace.com
Differences in SCIO versus other Technologies

Most biofeedback units work to send information to the verbal mind and thus allow conscious relaxation to take place. Our device interfaces with the non-verbal mind and it interfaces to the body electric. We measure body voltage, amperage, resistance, hydration, redox potential and charge stability (VARHOPE) at the extremities. We make over 235 virtual calculations of the body electric. Then a stimulus of micro-current transcutaneous electro-nerval stimulation, cranial electrical stimulation, electro-wound healing, and VARHOPE correction are sent into the body to treat the electrical imbalance. This forms an auto-focusing treatment measurement cybernetic loop allowing the body electric t correct itself. There are devices that measure and other devices that treat, but our device is the first to do both in a cybernetic loop operating at biological speeds.

There have been many devices in history claiming to be able to measure reactivity of nosodes, sarcodes, allersode, isodes, nutritional supplements, herbs, enzymes and vitamins. There was the technology of Electro-Dermal Screening. This used only resistance readings at acupuncture points. The first of these were the point probe devices like the Voll devices (BEST system, LISTEN, Acupro, Avatar, Clinic-in-a-Case, VEGA and Biomed) that used electro probes applied to the body with the therapist. Pressure and speed changes however made these Voll system point probe techniques prone to operator control.

To measure the body electric we would need to be able to assay the basic variables of voltage, amperage, resistance, hydration, oxidation and Ph for charge stability. The SCIO was the first device to go past simple resistance. The speed of reactivity warranted a computer to send in signals at body reactivity speeds calibrated to the person. And over the last forty years the SCIO has been an overnight success.

The body reacts to the external environment based on the ionic exchange rate of the body. In the human this is approximately one hundredth of a second. These electro-dermal systems used only resistance at speeds of one a second and thus were easily manipulated by the operator. Studies have shown the electro-dermal screening to be completely under control of the operator.

Muscle testing for medications was also found to be inaccurate. The operator’s mind consciously and unconsciously completely controlled the results rendering the test invalid. Russian devices like the Physiospect, Introspect, Oberon devices were found and proven completely fraudulent and measured nothing.

These substances in question (nosodes, sarcodes, allersode, isodes, nutritional supplements, herbs, enzymes and vitamins) have individual electrical fields that make up a complex electrical signature of each item. It has been a major problem in the past by reductionist people reducing these electrical patterns to a single frequency when actually they are rather complex sets of many frequencies. These Voltammetric fields can be detected with the patented QQC Voltammetric device. Our SCIO device uses Transcutaneous Voltammetric Evoked Potential (TVEP) to challenge the body with an amplified QQC Voltammetric signature pulse of a substance and measure the electro-reactivity of the patient. Our device differs from others in the field because it more accurately detects TVEP reactions with much less operator interference.
Watch these 2 video to understand more

http://video.google.com/videoplay?docid=-3943318454841262491#

http://video.google.com/videoplay?docid=-3943318454841262491#docid=-4449802586589468951

When I lectured at the Nobel Prize hospital in 2000, I encountered the
work of Dr. Nordenstrom, the institute tried to ban my lecture but we
won the battle and I gave my historic lecture there.

Bjorn Nordenstrom has found a heretofore unknown universe of
electrical activity in the human body.
Chairman of the Nobel Prize Committee Nordenstrom used electrodes to
administer an electrical current into cancerous tumors in order to
dissolve them in a miraculous fashion. He was also featured on the cover
of Discover Magazine in 1986. He lost his job as the head of the
Karolinska Institute and was ostracized by his colleagues but traveled to
China to work with scientists and doctors there who were more open to
his theories.

Monthly rental fees can be as low as 350 Euro a month.
Contact your SCIO therapist for information...

Maitreya Kft.
tel: +3613036843 | web: www.qxsubspace.com | e-mail: info@qxsubspace.com
Definitions

Electrical stimulation is defined as the use of an electrical current to transfer energy to a wound. The type of electricity that is transferred is controlled by the electrical source. (AHCPR 94). Capacitatively coupled electrical stimulation involves the transfer of electric current through an applied surface electrode pad that is in wet (electrolytic) contact (capacitatively coupled) with the external skin surface and/or wound bed. When capacitatively coupled electrical stimulation is used, two electrodes are required to complete the electric circuit. Electrodes are usually placed over wet conductive medium, in the wound bed and on the skin a distance away from the wound.

When discussing electrical stimulation, it is important to distinguish the waveform used for the protocol. Although there are many waveforms available on electrotherapy equipment, the one that has the most thorough and consistent evaluation in vitro, in animal studies and in controlled clinical trials is monophasic twin peaked high voltage pulsed current (HVPC). The pulse width varies with a range from 20-200 microseconds. The HVPC devices also allow for selection of polarity and variation in pulse rates both of which seem to be important in wound healing. It is a very safe current because it’s very short pulse duration prevents significant changes in both tissue pH and temperature. Therefore, the most tested and safe type of stimulation is the one recommended.

Other types of waveforms and have been tested in clinical trials but will not be discussed here due to limited space. They are discussed in the full chapter.

Theory and science of the therapy

Acceptance of electrical stimulation for wound healing by the medical community has been a long and complex task. In 1994, the Agency for Health Care Policy and Research (AHCPR) panel issued Treatment of Pressure Ulcers, Clinical Practice Guideline, Number 15. The panel of pressure ulcer care experts used an explicit science-based methodology and expert clinical judgment to develop statements regarding pressure ulcer treatment. Extensive literature searches, critical review and synthesis were used followed by peer and field review to evaluate the validity, reliability and utility of the guideline in clinical practice. AHCPR panel issued a statement about use of electrical stimulation as an adjunctive therapy for pressure ulcers: “Consider a course of treatment with electrotherapy for Stage III and IV pressure ulcers that have proved unresponsive to conventional therapy. Electrical stimulation may also be useful for recalcitrant Stage II ulcers. Strength of
Evidence = B. The panel found that data from 5 clinical trials involving 147 patients to support the effectiveness of this therapy for pressure ulcers.

(Note: The complete chapter contains a review of some of the significant areas and observations of research used to develop protocols and support treatment of non-conforming wound healing with electrical stimulation. This is an excerpt of that section.)

Bioelectric System

The body has its own bioelectric system. This system influences wound healing by attracting the cells of repair, changing cell membrane permeability, enhancing cellular secretion through cell membranes and orientating cell structures. A current termed the "current of injury" is generated between the skin and inner tissues when there is a break in the skin. The current will continue until the skin defect is repaired. Healing of the injured tissue is arrested or will be incomplete if these currents no longer flow while the wound is open. A moist wound environment is required for the bioelectric system to function. A rationale for applying electrical stimulation is that it mimics the natural current of injury and will jump start or accelerate the wound healing process.

Research Wisdom:

Keeping a wound moist with normal (0.9%) saline (sodium chloride) maintains the optimal bioelectric charge because it is like the electrolytic concentration of wound fluid. Dressings such as amorphous hydrogels and occlusive dressings help promote the body's "current of injury" by keeping the wound moist.

Bioelectric System

Research Wisdom: Moist wounds promote the "current of injury."

Debridement and Thrombosis

Debridement is helped if the tissue is solubilized such as with enzymatic debriding agents. ES using negative current has been shown to solubilize clotted blood. Necrotic tissue is made up of coalesced blood elements. The negative pole has been used to begin treatment in all controlled clinical studies and most of the wounds have necrotic tissue. This research would lend support to that part of protocol. The positive electrode has been found to induce clumping of leukocytes and forming of thrombosis in the small vassals this was reversed with the negative electrode. (Gentzkow 91)

This may explain a clinical observation that hematoma or hemorrhaging at the wound margin or on granulation tissue are dissolved and reabsorbed following application of HVPC with the negative pole. Hemorrhagic material goes on to necrosis if not dissolved and reabsorbed quickly.

Clinical Wisdom:

Clinical experience has repeatedly shown that treatment with the inflammation protocol, using negative polarity, promotes rapid absorption of hemorrhagic material, usually within 48 hours. (Sussman)

Clinical Wisdom: Absorption of Hemorrhagic Material
Clinical Wound Healing Studies

Early studies using direct current stimulation reported long treatment times of 20-40 hours per week. Four controlled clinical studies and three uncontrolled studies with HVPC report a mean healing time of 9.5 weeks with 45-60 minute treatment 5-7x/wk.

Summary of Scientific Rationale for Application

Electrical stimulation affects the biological phases of wound healing in the following ways:

**Inflammation phase**
- Initiates the wound repair process by its effect on the current of injury
- Increases blood flow
- Promotes phagocytosis
- Enhances tissue oxygenation
- Reduces edema perhaps from reduced microvascular leakage
- Attracts and stimulates fibroblasts and epithelial cells
- Stimulates DNA synthesis
- Controls infection (Note: HVPC proven bacteriocidal at higher intensities than use in clinic and may not be tolerated by patient)
- Solubilizes blood products including necrotic tissue

**Proliferation phase**
- Stimulates fibroblasts and epithelial cells
- Stimulates DNA and protein synthesis
- Increases ATP generation
- Improves membrane transport
- Produces better collagen matrix organization
- Stimulates wound contraction

**Epithelialization phase**
- Stimulates epidermal cell reproduction and migration
- Produces a smoother, thinner scar

**Indications for the therapy**

Use and application of the modality is not pathology dependent.

Types of wounds for which there is indication to use HVPC include:
- Pressure Ulcers Stage I through IV
- Diabetic ulcers due to pressure, insensitivity and dysvascularity
The two body problem is easily solvable. This has been used by science for hundreds of years. A ball falls to earth, and we can calculate the two forces and get a good result. But when there are three bodies (ball, earth, moon) it gets very difficult, but still solvable, and when there are more bodies there is an unsolvable result. Science has struggled to reduce everything to the two body problem. This is called reductionism. So to test a drug they reduce the human to just one variable like blood pressure, give a drug and measure the change in blood pressure. Advanced science has learned that complex systems such as the human body are fractal in nature and reductionism fails, so they have developed CHAOS theory. When more and more variables are measured we observe that there is complex results. Things never repeat, and some small stimulus can have large effects. This is called the butterfly effect. The EPFX device uses fractal chaos theory and was called the butterfly device in a English medical journal in 1990. Reductionism is an useless exercise of the small mind. All of science has not developed more non-linear analytical systems, all except medicine, which depends on reductionism to sell patent S/Nthetic drugs.

There are over one hundred trillion cells in the human body. Each cell is doing fantastic incomprehensible mathematical procedures. There is an innate intelligence beyond our comprehension to which we must be humble. So ten to the sixteenth bits of data are being transported to the brain, and the reticular formation filters them so that less than a million can go to the verbal brain. So the verbal brain is only aware of one percent of the happenings in the body. The non-verbal body electric is aware of the total. And there is a non-verbal unconscious that directs us. It is electrically reactive and it is the heart of our lives. It takes us places and our verbal minds make up reason to explain why we are there. Many people are completely unaware of their unconscious and they struggle with every action. Others are more in tune and understand most of their actions. Only a small few are really in tune and live harmonious lives.

The Verbal Mind must learn Humility & Respect and learn to restrain its arrogance.

But the unconscious body electric is a very complex fractal and it is not a machine. What it will react to is sometimes not understood. A woman inhales a piece of a potato chip, she gets a cough, takes a cough suppressant, the body develops a cyst around the chip in the lungs, the chip is exposed to smoke toxins and or viruses and the cyst goes cancerous as the body last attempt to remove the toxic chip. The unconscious might see the problem in the chip not the cancer. The body electric might see the cancer as a helpful mechanism of detox. The EPFX allows a insight to the non-verbal body electric.

There is Adaptation response to the EPR and there is a variety of fractal reasons why the Xrroid results are not 99% accurate. The best results are 85%, and this is not enough to establish a confident status. So the Xrroid scores are disclaimed as not being diagnostic, but they are interesting. So the EPFX device is only sold to professionals, with the training to know that the Xrroid results are interesting and need to be more traditionally explored.

**Procedure**

The protocols change as the wound healing phase changes. Assessment and diagnosis of the wound healing phase determines the treatment protocol. The set up and protocols used by Sussman are the same regardless of wound pathogenesis.

**Research Wisdom:**

Research compared direct application of HVPC to the wound, using the whirlpool to conduct the current and whirlpool alone. Application of HVPC directly to the wound had best outcomes. Safety is also a concern because electrical leads can become tangled in the turbine of the whirlpool and HVPC stimulators have been known to fall into the water.

**Research Wisdom - Best method for effective and safe HVPC treatment**

**Protocol for treatment**

**Wound Healing Phase Diagnosis: Inflammation phase**

**Expected outcomes:**

- Wound progresses to the Proliferation phase

**Change in Wound Healing Phase Diagnosis: Proliferation phase**

**Stimulator settings:**

- Polarity - negative
- Pulse rate - 100 - 128 pps
- Intensity - 100-150 volts
- Duration - 60 minutes
- Frequency 5-7 x per week, once daily

**Wound Healing Phase Diagnosis: Proliferation phase**

**Expected Outcomes:**

- Wound progresses to Contraction and Epithelization phase
Change in Wound Healing Phase Diagnosis: **Epithelialization phase**

**Stimulator settings:**
- **Polarity** - alternate every three days ie 3 days negative followed by 3 days positive
- **Pulse rate** - 64 PPS
- **Intensity** - 100-150 volts
- **Duration** - 60 minutes
- **Frequency** 5-7 x per week, once daily

**Wound Healing Phase Diagnosis: Epithelialization phase**

**Expected Outcomes:**
- Wound progresses to Remodeling phase

**Research Wisdom:**
A saline based amorphous hydrogel, which has the ability to conduct electric current has been tested and the conductivity is comparable to saline. Whether the healing of the wound is improved when this product is used for conducting current and then left in the wound has not been tested. In the meantime, such a product may have the added advantage of being used as the wound dressing to keep the wound moist after the electrical stimulation treatment is completed.

**Research Wisdom: Use of Amorphous Hydrogel for Conduction**

**Setting Up the Patient**

1. Have supplies ready before undressing the wound.
2. Position patient for ease of access by staff and comfort of both.
3. Remove the dressing and place in an infectious waste bag.
4. Cleanse wound thoroughly to remove slough, exudate and any petrolatum products
5. Sharp debride necrotic tissue, if required, before HVPC treatment
6. Open gauze pads and fluff, then soak in normal saline solution, squeeze out excess liquid. An alternative is to use an amorphous hydrogel impregnated gauze. Hydrogel sheets can also be used to conduct current under the electrodes
7. Fill the wound cavity with gauze including any undermined/tunneled spaces. Pack gently.
8. Place an electrode over the gauze packing cover with dry gauze pad and hold in place with bandage tape.
9. Connect an alligator clip to the foil.
10. Connect to stimulator lead
11. Dispersive electrode placement:
There are no Rods and no Balls!!!

Just energy fields

The Angel discovered that Quantum Electrodynamics ability to describe the photon and electron interaction, means that the energy state of a natural made substance is different from the petrochemical Synthetic Chemistry of the Drug Co.

Dispersive pad should be larger than the sum of the areas of the active electrodes and wound packing.

The greater the separation between the active and dispersive electrode the deeper the current path. Use for deep and undermined wounds.

Dispersive and active electrodes can be close together but should not touch. Current flow will be shallow. Use for shallow, partial thickness wounds.

Clinical wisdom:

All petrolatum products including enzymatic debriding agents such as collagenase, Santyl, and fibrinolysin, Elase, which are petrolatum-based products, must be removed before treatment or current will not be conducted into the wound tissues.

Clinical Wisdom: Remove Petrolatum Before Stimulation

Aftercare

After the electrical stimulation treatment is complete, slip the electrode out from between the wet and dry gauze. The wound can be left undisturbed. If saline soaked gauze is the conductive medium, it should be changed before it dries or be covered with an occlusive dressing. If hydrogel impregnated gauze is the conductor, change BID. If additional topical treatments are required such as enzymatic debriding agents or antibiotics, then the packing will need to be removed, topical agent applied and redressed.

Research wisdom:

Frequent dressing changes are being discouraged because it disturbs the wound healing environment by removing important substances in wound exudate and cooling the wound. It takes three hours for a chilled wound to re-warm and slows leukocytic and mitotic activity.

Research Wisdom: Avoid Wound Chilling

Precautions

Signs of adverse effects were evaluated in the various clinical trials and none were found except some skin irritation or tingling under the electrodes in a few cases. Patients with severe peripheral vascular occlusive disease (PVD), may experience some increased pain, usually described as throbbing, in the leg after electrical stimulation.

Research Wisdom:

An alternative protocol with reported healing, by Kaada, calls for placing the active electrode on
Research Wisdom:
An Alternative protocol with reported healing of lower extremity ulcers, by Kaada, calls for placing the active electrode on the web space between the thumb and first finger instead of over or around the ulcer. This may be more comfortable for the patient with PVD.

Research Wisdom: Kaada Protocol for Wound Healing

Contraindications
Contraindications for treatment with electrical stimulation include:
1. Placement of electrodes tangential to the heart
2. Presence of a cardiac pacemaker
3. Placement of electrodes along regions of the phrenic nerve
4. Presence of malignancy
5. Placement of electrodes over the carotid sinus
6. Placement of electrodes over the laryngeal musculature
7. Placement of electrodes over topical substances containing metal ions
8. E.I. povidone iodine and mercuriochrome, unless thoroughly cleaned.
9. Placement of electrodes over osteomyelitis

Note: This paper on electrical stimulation for wound healing has been excerpted from: Chapter 16, Sussman, C and Byl, N, Electrical Stimulation for Wound Healing, Wound Care Collaborative Practice Manual for Physical Therapists and Nurses, Sussman, C. And Bates-Jensen, BM, Aspen Publishers 1998.

Medicare Reimbursement
Medicare has been enjoined by the court to pay for electrical stimulation for wound healing if the treatment is medically necessary and appropriate and if it is effective. Individual Medicare carriers and contractors have the option to cover this service based on policies for reimbursement prior to July 14, 1997. Contact the American Physical Therapy Association, Government Affairs office at 1-800-999-APTA for more details about this coverage policy.

Reference sources:
Wound Healing: Alternatives in Management, Kloth, McCulloch., Feedar 2nd Ed. 1994
Biofisica(TM) Receives European Clearance to Market First Bio-Electric Wound Care Dressing

New POSiFECT(R) RD Bio-Electric Stimulation Therapy helps regenerate the body's tissue growth and to heal chronic wounds. Biofisica LLC, an Atlanta, Georgia-based high tech wound care company, announced today that the company has received clearance to market POSiFECT(R) RD Bio-Electric Stimulation Therapy, its ground-breaking wound care product. Biofisica worked with the British Standards Institute (BSI) throughout the conformity assessment process and has received clearance to affix the European CE Mark to its product.

The company now plans to launch POSiFECT RD in the UK within the next 90 days, followed by staged rollouts in France, Germany and the Nordic region. POSiFECT RD (RD refers to the dressing's round shape) is the first device available that combines two technologies -- moist wound-care dressing and electrical stimulation -- in a disposable, easy to use, sterile dressing that facilitates the normal healing process. Early clinical research has shown that POSiFECT demonstrates healing in many difficult to heal or non-healing wounds.

"We are delighted to have received marketing authorization for POSiFECT, and can now begin to provide this pioneering therapeutic option to tissue viability nurses (TVNs) throughout the UK for the care of their patients," said Rafael Andino, president of Biofisica. "It is intensely satisfying -- at both personal and professional levels -- to develop a technology that has such a positive impact on patients’ lives and has the potential to help heal non-healing chronic wounds instead of simply 'managing the wound' as other products do."

Background on Wound Healing Physiology

The process of tissue repair is dynamic and complicated. All living tissue in the human body possesses endogenous bio-electric circuits that contribute to healing once a wound is created. For example, when an individual receives even a simple laceration or cut on the skin, the body's own physiology normally begins to produce a 'natural voltage' or 'skin battery' that creates a low level current to start the healing process. However, with long-term chronic wounds, the body's natural ability to create these "currents of healing" is compromised. Biofisica's breakthrough bio-electric technology associated with POSiFECT(R), dovetails with normal tissue repair by stimulating the wound bed as would the body's own "current of healing."

About POSiFECT(R) RD Bio-Electric Stimulation Therapy

POSiFECT(R) RD Bio-Electric Stimulation Therapy is indicated for the management of chronic wounds where conventional therapies have failed. It is designed for use on chronic ulcerated wounds; including venous leg ulcers, pressure ulcers and diabetic foot ulcers. Patient groups especially prone to these conditions are the elderly, immobile patients and individuals suffering from diabetes. The dressing contains a miniature electrical circuit that delivers a microcurrent to the wound bed. This microcurrent is derived from non-rechargeable coin cell batteries. The dressing remains on the wound for 48 hours and is then replaced with a new dressing. Clinical studies have shown that when using POSiFECT on difficult to heal chronic wounds, tissue regeneration at the wound bed site occurs within a few weeks.
Biofisica (http://www.biofisica.com) is a high tech wound care company that was founded in Atlanta, Georgia (USA) in 2000 to develop new solutions within the tissue engineering market to specifically address chronic wound healing. The company also has offices in the United Kingdom. Biofisica was named as one of Georgia’s top 40 technology companies in 2006 by the Technology Association of Georgia.

Biofisica’s wound care technology is uniquely positioned to provide chronic wound solutions to the wound care market -- a global market that is estimated in excess of US$12 billion. In addition to launching POSiFECT(R) RD Bio-Electric Stimulation Therapy in the UK this year, and to other EU countries/regions in subsequent periods, Biofisica will be working with the U.S. FDA to receive proper clearance to market its products in the United States. Currently the product is not approved for marketing or sale in the U.S.

**Ophthalmic Research Lecture**

The Spark of Life: The Role of Electric Fields in Regulating Cell Behaviour Using the Eye as a Model System

John V. Forrester, Noemi Lois, Min Zhao, Colin McCaig

Department of Ophthalmology and Department of Biomedical Sciences, Institute of Medical Sciences, University of Aberdeen, Aberdeen, UK

**Abstract**

Endogenous electric fields (EF) have long been known to influence cell behaviour during development, neural cell tropism, wound healing and cell behaviour generally. The effect is based on short circuiting of electrical potential differences across cell and tissue boundaries generated by ionic segregation. Recent in vitro and in vivo studies have shown that EF regulate not only cell movement but orientation of cells during mitosis, an effect which may underlie shaping of tissues and organs. The molecular basis of this effect is founded on receptor-mediated cell signalling events and alterations in cytoskeletal function as revealed in studies of gene deficient cells. Remarkably, not all cells respond directionally to EF in the same way and this has consequences, for instance, for lens development and vascular remodelling. The physical basis of EF effect may be related to changes induced in ‘bound water’ at the cell surface, whose organisation in association with trans-membrane proteins (e.g. receptors) is disrupted when EF are generated.

**Electrical Stimulation for Wound Healing: A Review of Evidence From In Vitro Studies, Animal Experiments, and Clinical Trials**

Luther C. Kloth, PT, MS, CWS, FAPTA

This article reviews theories linked to endogenous bioelectric currents and the role they may play in wound repair with further appraisal of in vitro and in vivo research related to the effects of clinically applicable electrical currents on protein synthesis, cell migration, and antibacterial activities.
Electric Healing

"A Mildly Shocking Discovery by Jonathan Kolber November 14, 2007 Scientists are now confirming that electrical fields can promote wound healing. As long as 150 years ago, the German physiologist Emil Du Bois-Reymond reported that small electric currents could speed healing. New Scientist reports that Dr. Josef Penninger of the Austrian Institute of Molecular Biotechnology and Dr. Min Zhao of the University of Aberdeen, U.K., have shown that electric fields in tissue play a vital role in the wound-healing process. They attract cells to damaged areas responsible for repair. According to Penninger, "It’s not homeopathy, it’s biophysics." They have identified the responsible genes. All cells and tissues function as chemical batteries, based on positively charged potassium ions and negatively charged chloride ions. When tissue is wounded, this is a kind of short-circuit. This unusual condition attracts and guides repair cells to the damaged area. Using mouse cells and larger tissues such as corneas, Penninger and Zhao found they could speed up or stop the healing process by modifying electrical fields. Essentially, they confirmed that the electric fields could control the healing process at the cellular level. They identified specific genes involved in the process. Interfering with migration “promoter” genes slowed the healing process. On the other hand, when the migration “blocker” gene received electrical interference, then healing became faster. Subsequent research will focus on optimizing the phenomenon to accelerate healing. According to Mark Ferguson, a wound expert at the University of Manchester, “For many years there have been anecdotal reports of the effects of electrical currents on wound healing. This paper not only demonstrates the effects of electrical currents on cellular migration to wound defects, it also provides a mechanistic understanding of how such signals alter cell behavior.” Others are doing some interesting work in bioelectric healing. I am currently exploring several devices, including the Perkl-Lite and a device based on the Archimedean spiral. A device patented by the Albert Einstein College of Medicine removes blood from the body. It then passes a 50 microvolt current through the blood and returns the blood to the body. According to the researchers, a variety of pathogens — including viruses — were killed by the current without harming the blood itself."

Skinwound Healing By Rectangular Pulse Electric Stimulation(RPES) + Vigilon Dressing

Cheng, K. Cazzaniga, A.L. Mertz, P.M., University of Miami;
Publication Date: 31 Oct-3 Nov 1991

outcomes. In addition, studies on the effects of electrical stimulation (ES) on skin grafts, donor sites, and musculocutaneous flaps in animals are evaluated, as well as assessments of numerous clinical reports that examined the effects of ES on angiogenesis, perfusion, PtcO2, and epithelialization. Finally, a plethora of clinical trials related to the responses of chronic lower extremity wounds to ES therapy are reviewed, with emphasis on wounds caused by venous insufficiency, diabetic neuropathy, and ischemia in patients with and without diabetes mellitus. A glossary that addresses ES terminology is also included.
Abstract

The wound-healing process has previously been modeled with exponential or with linear curves. In the present study, we proposed a new model called the delayed exponential model, and compared all three models. Assessment of the models was based on healing data for two large groups of pressure ulcers in spinal-cord-injured (SCI) patients. The first group consisted of conventionally treated wounds and the second group of wounds additionally treated with biphasic electric-current-pulse stimulation, which was applied locally to the wound. Linear, exponential, and delayed exponential curves were fitted to experimental data (weekly measurements of the wound surface area). Numerical criteria, in the form of the least sum of squares of errors and goodness-of-fit, were calculated for each wound and model. Both numerical criteria showed that the delayed exponential model offers the best fit of the three models tested.

What is it and why does it work? Micro-current is a sub current that dives right in to repair and stimulate or provide a charge at the cellular level. Application is through the use of probes or wands, brass plates, and or in combination with acupuncture needles or rollers using various currents, voltages, intensities, polarities and waveforms. This instrument and its application heal by picking up where the body’s own electrical current has failed.

To understand the breadth of this treatment and its potential for healing many, many issues, we must start and understand ourselves at the cellular level. The Nobel Prize was earned by two Germans in 1991 for discovering that the cell membrane wall is the actual intelligence of the whole being. To be truly healthy the 18-44 gates or pathways through this membrane wall in each cell of each organ system of our body need to be working effectively. The number or openings or gates depends upon the specialty of that cell allowing specific nutrients to enter and certain waste products to exit.

Following a trauma, (which interestingly, can be emotional or physical such as surgery, injury or the evolvement of aging), ingestion of life-giving oxygen, minerals and nutrients malfunctions or drops considerably. Our cells tend to become more or less paralyzed and do not functional normally to ingest nutrients and subsequently expel waste products. The powerhouse or mitochondrial function of the cell declines significantly. It is known that the more efficiently your cells function to transport essential nutrients through the cell wall into the mitochondria (our cellular powerhouse) and quickly remove toxic wastes out of the cell, the quicker your cells can receive vital nutrients to promote health and prevent aging. Studies from Universities in Germany have shown that the most important event in alleviating long term chronic pain is to restore the normal cellular electrical potential to the cell’s membrane (thus restoring normal functionality).

The major factor that nearly all researchers are missing in anti-aging programs is this factor of fuel burning. By repairing and increasing the function of these cellular walls by as little as 1% we may increase life span by as much as 10 years.

The major reasons for aging are oxidative stress and free radical damage from environmental factors such as pollution, radiation, cigarette smoke and herbicides, all contributing to our building load of free radicals which only accelerates with the aging process.

We don’t exactly think of ourselves as electrical beings but we very much are. Throughout our bodies all communication is electrical and moves by positively and negatively charged ions. Remember that electrical currents like to take the path of least resistance. Now what happens with injury, surgery, trauma and aging when these paths are disrupted or even disconnected?
Essentially, that area we have traumatized no longer functions properly. Current now moves around the injury or defect rather than through it. The cells making up the traumatized area no longer are sufficiently charged and do not function either effectively or efficiently. The person gets “better” but the body has reached a lesser functioning point by compensation and does not truly become repaired in that place of injury. Later on, in many cases that “old injury resurfaces” to our surprise and frustration. We never healed it in the first place and usually due to some “stress” in our mid-lives, it returns to offer us that opportunity to do the real healing we need to do. We have to repair the cell.

Other than acupuncture, some type of electrical healing, faith healing, rife frequencies, hands-on, or just plain voodoo, electro micro-current in my experience is the most effective of all. Why?

How does it work to heal wounds? Many studies have been conducted on wound healing. In reviewing the evidence and in comparison to other means of wound care healing, it has been demonstrated that electro micro current healing out-performs all others. The “out-performance” is most dramatically experienced in the realm of accelerated healing. One of the best scientific papers is from a Dr. Mark Biedebach, of the University of California at Irvine entitled, “ACCELERATED HEALING OF ISCHEMIC SKIN ULCERS THROUGH USAGE OF MICRO CURRENT ELECTRICAL STIMULATION AND THE INTRACELLULAR MECHANISMS INVOLVED.”

In looking at the various types of electrical current: the waveforms, the output characteristics (Voltage and Amperage), the frequencies, duration of treatments and many other variables, the Electro-Tech Micro Current systems combines the best of the micro-current waveforms, frequencies and other output characteristics with the treatment modalities to produce the latest and best results in the current marketplace and seems to outperform other systems. Wound care results have provided results well above any expectations.

In looking at the actual mechanisms of wound care healing (which are entirely observable with this technique) there is an orderly sequence of mechanisms that takes place. First, a connective tissue sheath forms. This is observable from beginning to end and the formation of the sheath is very often observed during the very first treatment. Once the sheath or fascial layer begins to regenerate the skin will continue to heal at a high rate of speed. We know that new collagen and protein are being formed by the body to affect this change.

Micro-Current increases production of new skin cells at the germinative layer. As a teen we produce new skin very cells quickly and these rise to the surface and are exfoliated in around 7 days. With aging, at around 50, this same process may take 7 weeks leaving those cells to dehydrate and degenerate. Studies at the University of Washington show that with 10 consecutive days of Micro-Current therapy collagen can increase by 37%.

We know with wound care patients, if this collagen is reformulating, then this should also apply to Micro-Current facial treatments. Facial rejuvenation has blossomed using micro-current technology. Though change can be seen with just one treatment, over a series of sessions - wrinkles fade, skin tightens, one can experience a "lifted" look to the facial features and contours, and the skin becomes re-hydrated to that of more youthful times.

What is really happening here?

- Product is being penetrated to the deeper layers of the skin surface
• Skin is becoming more hydrated
• Collagen is being formed and becoming re-hydrated
• Elastin is being formed
• A new connective tissue layer is re-forming, particularly that between the skin and the underlying muscle
• The muscle cells and skin cells in the targeted areas are receiving more nutrients across the cell membrane
• Waste products from normal cellular activity are being released at an accelerated rate
• New skin cells are being formed at an accelerated rate down at the germinative layer
• The neuro-muscular re-education aspects of treatment are causing a lifted appearance to facial features
• The balancing techniques are creating more facial symmetry from right-to-left sides of the face
• Beneficial Neurotransmitters (helpful brain chemicals) are being released, causing overall relaxation and central nervous system stimulation which has positive effects on one’s overall health and well-being, way beyond that of a simple face treatment”.

With micro-current treatments cell activity is repaired, and tissue hydration and detoxification are accomplished. What will be the effect of treatments before and after surgery? Will the difference and effort pay off? Wound healing time will be reduced by more than half, scaring will be all but prevented, pain will be reduced dramatically, swelling reduced, and bruise-time reduced significantly. Micro-current therapy is perhaps the most NATURAL form of therapy available today as it is simply putting back what was once there. Through this return of electrical activity to an area that has lost it, we can foster a real and rapid healing.

Who uses micro-current electrical therapy? Many versions of it have been around for the last hundred years. Machines have been developed for proprietary use; others have been steadily improved for a more broad adaptable use dependent upon the therapist’s training and the desired use.

Physical therapists have used micro-current for all neck, back, knee pain issues, for strains, tendinitis, sciatica, TMJ, joint issues, shoulders, plantar fasciitis, whiplash, chronic and acute pain, neuropathies, disc disease, soft tissue injuries, arthritis and even stroke rehabilitation.

Athletic trainers have used micro-current for: injury rehabilitation, for strength training, pain, inflammation, neuromuscular disorder, pulled muscle, tennis elbow, ten ligament, and rotator cuff. Estheticians are currently using micro-current for facial rejuvenation, for wrinkle removal, skin toning, acne, lymph drainage, spider veins, varicose veins and dermatitis.

Other uses: Wound care, bond healing, osteoporosis, swelling reduction, bruising, scar tissue, burn victims, esophageal sphincter repair, Bell’s Palsy, surgical incisions, abdominal cramps, macular degeneration, facelifts, post surgical repair.

Cell atrophy, and possibly cell death can possibly be reversed using electro micro-current therapy. I believe this treatment technique is one of the most profound in the arena of anti-aging and should be considered by all who are entering the baby boom years.
Research Article

The effect of pulsed electromagnetic fields on secondary skin wound healing: An experimental study

Abstract

A variety of pulsed electromagnetic fields (PEMFs) have already been experimentally used, in an effort to promote wound healing. The aim of the present study was to investigate the effects of short duration PEMF on secondary healing of full thickness skin wounds in a rat model. Full thickness skin wounds, 2 by 2 cm, were surgically inflicted in two groups of male Wistar rats, 24 animals each. In the first group (experimental group - EG), the animals were placed and immobilized in a special constructed cage. Then the animals were exposed to a short duration PEMF for 20 min daily. In the second group (control group - CG), the animals were also placed and immobilized in the same cage for the same time, but not exposed to PEMF. On days 3, 6, 9, 12, 18, and 22, following the infliction of skin wounds, the size and healing progress of each wound were recorded and evaluated by means of planimetry and

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Introduction to Electro-Medicine

In addition to circulatory systems for blood and lymph, some researchers suggest that the human body has an additional circulatory system for electricity. Acupuncture uses metal needles inserted at key points to influence the flow of electricity along meridians. The research of Dr. Robert Becker found that many tissues in the body are semiconductors and that there is an electrical "current of injury" that must be present for healing to take place. Dr. Becker also discovered the remarkable healing effect of silver ions in the human body. Edgar Cayce recommended treatment of certain diseases with mild electrical current. TENS (Transcutaneous Electrical Nerve Stimulation) units are used to treat sports injuries and pain. Dr. Hulda Clark's Zapper uses electrical frequency to kill parasites. Dr. Bob Beck's four part protocol uses electrical current to disable viruses, bacteria, fungi, parasites and mycotoxins in the body. Dr. Lakhovsky's multi-frequency generator promotes health by stimulating all cells in the body. Dr. Lakhovsky's research was continued by Dr. Ed Skilling. Most of these electrical devices are not expensive to purchase. Once you have them, the operating costs are minimal. The devices can be used by your entire family and your friends. Compared to the cost over time of repeated purchases of herbs, vitamins and drugs, electro-medicine is a bargain.

This is why the writings of these researchers contain many references to harassment and suppression on behalf of pharmaceutical companies. From the point of view of pharmaceutical companies, a patient cured is a patient lost. It is bad business to cure a disease. The highly successful business model of pharmaceutical companies is based on treatments, not cures, plus suppression of alternatives. Johnson & Johnson lost a $130 million dollar lawsuit when it tried to suppress TENS units as a treatment for pain. Johnson & Johnson manufactures Tylenol and earns billions of dollars annually from pain killing medicine.

As a result, researchers such as Dr. Hulda Clark and Dr. Bob Beck refused to patent their discoveries. Instead they widely published the schematics for their devices and encouraged anyone with the necessary skill to manufacture them. Once in the public domain it is very difficult for pharmaceutical companies to suppress them. The public domain electro-medicine devices are affordable and have the intent of giving self-sufficiency to individuals who are prepared to take responsibility for their own health. If the electro-medicine devices can kill all known pathogenic bacteria, viruses, and fungi then vaccines and antibiotics become largely unnecessary. Biological warfare becomes much less fearsome. At last, here may be the cure for the common cold.

Many diseases are now found to involve bacteria, viruses, or fungi. These diseases include: Alzheimer’s disease, arthritis, cervical cancer, Crohn’s disease, Epstein-Barr (chronic fatigue syndrome), gallstones, 80% of heart disease, hepatitis, irritable bowel syndrome, Kaposi’s sarcoma, kidney stones, leukemia, liver cancer, lupus, multiple sclerosis, obsessive compulsive disorder, schizophrenia, and ulcers.

FDA approval of these devices is not required if they are used for research purposes only. Therefore, consider yourself a researcher. The electro-medicine devices generally have no side effects other than a cleansing reaction caused by the die off of pathogenic organisms. They seem to work against ALL pathogenic organisms so accurate diagnosis is not required. Plus, these devices are easy to use by the average person. They are safe enough to be used on children.
The courage...

to be yourself

The courage...

to fight convention

The courage...

to fight against false beliefs

The Athenian Lawmaker Solon decreed that is should be a law against anyone shrinking from controversy.
In America most have shrunken away and are fearful of controversy. They fear the law, the rich, and humiliation. They are told lies by the government and the puppet media, misled by their educators, and manipulated by the Ultra Rich.
It takes massive courage to oppose and explore controversy and exercise freedom of thought and speech.
Solon would be saddened at today’s America. It is time for a change and time for COURAGE.
"The doctor of the future will give no medicine, but will interest his patients in the care of the human frame, in diet and in the cause and prevention of disease." - Thomas Edison

"There is only one health, but diseases are many. Likewise, there appears to be one fundamental force that heals; although the myriad schools of medicine all have their favorite ways of coaxing it into action." - Dr. Robert Becker

Dr. Bob Beck’s Brain Tuner helps restore the body’s ability to produce neurotransmitters.

Four thousand years ago, estimates show, the strength of Earth’s magnetic field was 2.5 gauss. Today it is only 0.5 gauss, which is effectively an 80 percent decrease. - Japanese Med J 75:No.2745

You can induce tiny electric currents inside your body by strapping a permanent magnet to the skin. “I have seen dramatic results when the north magnetic pole is applied to a cancer or an area of inflammation.” - Dr Michael Schachter (Editor’s note: the south magnetic pole of a magnet can cause cancer to grow, so make sure you get it right. The north seeking needle of a compass points to the north magnetic pole of a magnet.)

If you are a do-it-yourself kind of person, it may be possible to make economical electro-medicine devices at home for personal use. This 165 page ebook explains how. The book assumes the reader has no background in technology or electronics and explains everything in very simple terms. Learn how to make:

- electrical current devices
- magnetic pulser devices
- radiant plasma devices
- colloidal silver generator

### Pregnant Women and Cancer Patients

Pregnant women and people with cancer need to be very cautious with these devices, because electrical currents that stimulate healing may also stimulate fetal and malignant tissues as well.

Becker mentions research with electrical currents that caused cancer tumors to disappear. However, he notes that these studies used silver electrodes implanted directly into the tumor, and silver particles migrating from the electrodes into the tumor were the most likely reason for the anti-cancer effect. Becker’s research indicates that electrodes made from other materials do not have the same effect. This is one of the reasons why cancer patients might consider drinking some colloidal silver each day.

Some electro-medical devices are based on current, others are based on frequency. The devices for cancer are always based on frequency, and involve much lower levels of current.

<table>
<thead>
<tr>
<th>Device</th>
<th>Current</th>
<th>Frequency</th>
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<tbody>
<tr>
<td>Dr. Rife’s Frequency Generator</td>
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<tr>
<td>Dr. Lakhovsky’s Multiwave Oscillator</td>
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<tr>
<td>Dr. Hulda Clark Zapper</td>
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<td>x</td>
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<tr>
<td>Dr. Bob Beck Blood Electrifier</td>
<td>x</td>
<td>x</td>
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<tr>
<td>Dr. Bob Beck Magnetic Pulse Generator</td>
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<td>Dr. Bob Beck Brain Tuner</td>
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<tr>
<td>TENS</td>
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</tr>
<tr>
<td>Paul Becker’s EarthPulse &quot;geomagnetic supplementation&quot;</td>
<td>x</td>
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</tbody>
</table>

Some cancer patients have used Dr. Bob Beck’s 4 point protocol (blood electrifier, colloidal silver, magnetic pulse generator, water ozonator) with good results. It has been suggested that by removing the bacterial / viral / fungal load from the body, the immune system was strengthened to the point where it could deal effectively with cancer. Also, some cancers are directly caused by pathogens, and the Beck protocol may remove the pathogens.

If you have cancer and decide to use the Beck protocol, keep the devices away from your tumor. Instead, use the north pole of a magnet on the tumor. (The south magnetic pole of a magnet can cause cancer to grow, so make sure you get it right. The north seeking needle of a compass points to the north magnetic pole of a magnet.)
Blood electrification is not compatible with the use of drugs. Blood electrification results in a state called electroporation which means that cells much more readily absorb substances in the blood. This greatly magnifies the effect of drugs. Even substances such as alcohol, tobacco and coffee have their effects magnified. It would be interesting if researchers investigated electroporation as a possible means to increase the effectiveness of chemotherapy, thereby reducing the dosage required. However, there already exists a way to accomplish this called Insulin Potentiation Therapy (IPT). IPT has the advantage of selectively targeting cancer cells.

Here is a brief description of some common electro-medical devices:

Dr. Hulda Clark’s Zapper works on the basis of electrical frequency. According to Dr. Clark, the range of human frequencies is 1,520 to 9,460 kHz. The pathogen range of frequencies is a lower 77 to 900 kHz. Pathogens can be zapped at their frequencies without affecting the human host. Dr. Clark’s zapper is claimed to work against bacteria, viruses, fungi and parasites. A lab study demonstrated that the Zapper selectively destroyed leukemia cells. According to Dr. Bob Beck, the amount of electrical current created in the body by the Zapper is so small it is unmeasurable.

Dr. Bob Beck’s Blood Electrifier was inspired by suppressed research done at the Albert Einstein College of Medicine finding that mild electrical current deactivated the AIDS virus by disrupting its protein coat. Inspired by this, Dr. Beck created a device whereby two electrodes are strapped over the radial artery and ulna artery pulse points on the wrist and the appropriate electrical current passes into the blood. The electrical current is reported to not only deactivate the AIDS virus, but also other bacteria, viruses, fungi, parasites and mycotoxins. Start with daily 20 minute sessions
and work up to two hour sessions. Use two hours daily for four to twelve weeks. As a bonus, Dr. Beck designed the instrument to also make colloidal silver. Drinking a sufficient quantity of colloidal silver daily is another very effective way to deactivate bacteria and viruses, and with this device you can make your own colloidal silver very economically at home.

Dr. Bob Beck’s Magnetic Pulse Generator is designed to induce electrical current at a distance. When placed over part of the body, the magnetic pulse penetrates nine inches deep, reaching into the lymph system and various internal tissues to deactivate bacteria, viruses and fungi wherever they may be. This device is intended to complement the blood electriifer. Do several pulses at each site daily over several weeks.

Paul Becker’s EarthPulse device generates a pulsed one half gauss electromagnetic field. The device is intended to supplement the earth’s declining magnetic field, i.e. “geomagnetic supplementation”. Dr. David Williams writes favorably of this device in his March 2004 issue of Alternatives.

They were showing about a 7.83 hertz, almost pure coherent maybe 20 microvolt signal frontal to occipital midline. That’s between F1 and F2 in the standard nomenclature system to halfway between 01 and 02 if you’re an encephalographer. In other words the third eye...which shows whole brain alpha. Over and over again we found these frequencies in people with remarkable talents - healers, radionics operators, dousers, shamans, witch doctors, mystics, golden dawn, priests and priestesses - if they were authentic...We found that there was phase-lock...frequency, amplitude, etc. between that person’s EEG signature and the earth’s brainwave itself.

Dr. Robert Beck, The Beck Protocol

**Increased coherence in brain activity during Transcendental Meditation (TM)**

There are changes in brain frequencies such as increased slow alpha activity during practice of TM, but more important is the increased coherence at all frequencies between the activity of all areas of the brain. The following two pictures show a series of six charts illustrating the growth of brain coherence ranging from an individual who has been practicing TM for two weeks, to another practicing TM for fifteen years. Also shown is the low coherence seen during sleep, and at the other extreme the maximum coherence seen during “yogic flying”. Click on the pictures to enlarge them.

There is a high correlation between EEG coherence, neurological efficiency, creativity, and experience of higher states of consciousness. For scientific references regarding TM and changes in brain activity see [http://www.mum.edu/tm_research/tm_biblio/physio_b.html](http://www.mum.edu/tm_research/tm_biblio/physio_b.html)

**New research studies the EEG of Cosmic Consciousness.**

“The heart is not a solo player in the quantum jazz of life [3, 4]. Instead, it is in symphony with all other players, intermeshing and syncopating with their varied rhythms, reflecting the correlations and couplings in a system that is quantum coherent in the ideal. It is the rhythm of the organism dancing life into being, in which every single player is freely improvising and yet keeping in tune and in step with the whole.”

Four thousand years ago, estimates show, the strength of Earth’s magnetic field was 2.5 gauss. Today it is only 0.5 gauss, which is effectively an 80 percent decrease. (Japanese Med J 75;No.2745) To make matters worse, our environment is flooded with man-made electromagnetic fields that override the frequencies that resonate in the brain and other body tissues. Some of the more common sources include computers, cell phones, fluorescent lights, televisions, hair dryers, digital alarm clocks, high power transmission lines, and electrical appliances.

**Dr. David Williams, Alternatives, March 2004.**

**Editor’s note:** With the weakening of the earth’s magnetic field and the maddening deluge of man-made electromagnetic fields, it is essential that we learn a technique such as Transcendental Meditation to reestablish and maintain a coherent style of functioning in the brain. Your choice is to do nothing and experience degenerating physical and mental health, or learn how to increase your coherence and enjoy improving health and growth of higher states of consciousness. For more information see:

- [www.drc Clark.com](http://www.drc Clark.com) Dr. Clark Research Association. The website for products designed by Dr. Hulda Clark.
- [www.diapulse.com](http://www.diapulse.com) The “Diapulse” electromagnetic pulse device has a long history of medical use for accelerating wound healing.
- [www.sharinghealth.com](http://www.sharinghealth.com) Information web site regarding electricity and health.

- **Skin is piezoelectric** (turns pressure into electricity) and **pyroelectric** (turns heat into electricity).
- Nearly all tissues have been shown to produce or transmit various kinds of electrical charge. (pages 184-185)
- The cells surrounding nerve cells (perineural cells) are semi conductive and polarized - positive at the dendrite and negative at the axon. These perineural cells surrounding every nerve cell like a sheath compose 90% of the brain. The perineural cell electrical direct current flows from the direction of the axon toward the dendrite. The result of this is, for example, that current flows along motor nerves from the spine to the periphery, and along sensory nerves from the periphery back to the spine. There are also direct currents in the spinal column and in the
brain due to the presence of these semi-conductive cells. (pages 106, 183)

- This direct current system is influenced by external electromagnetic fields. The system is so sensitive as to be impacted by the annual cycle in the earth’s magnetic field strength. The earth’s magnetic field is only one half gauss. (page 107)

- The back to front direct current in the brain changes with state of consciousness. The current is stronger with heightened activity (physical or mental), declines during rest, and is reversed during sleep and anesthesia. (page 116)

- Experiments with salamanders indicates that placing the brain between the poles of a 3,000 gauss electromagnet results in a state of anesthesia, from which the animal regains consciousness within seconds when the current is switched off. Passing a mild electrical current through the brain, equal in strength and opposite in polarity to the brain’s innate electrical direct current also produces immediate loss of consciousness and a state of anesthesia that continues as long as the electrical current continues, though the animals remained unresponsive for up to half an hour after the current was turned off, much the same as with chemical anesthesia. (pages 100-117)

- EEG recordings of magnetic and chemical anesthesia are identical. (page 238)

- All brain wave frequencies are in the same range as the earth’s low frequency (one to 25 Hz) electromagnetic pulsations. (page 115)

- Pulsed electromagnetic fields do induce currents of a type never normally found in the body. Each pulse produces millions of tiny eddy currents briefly flowing in circles. As the magnetic field expands at the beginning of a pulse, the currents circle in one direction; as it collapses, they reverse. (page 177)


Rosch, Paul J., Bioelectromagnetic Medicine, Dekker, 2004. The 86 internationally recognized contributors to Bioelectromagnetic Medicine have strived to insure that this book will remain the gold standard in the field for many years. Its 50 chapters and thousands of references dealing with every aspect of this topic make it an essential guide for physicians and all health care professionals, biophysicists, physiologists, biochemists and other basic scientists, as well as students and anyone interested in non-invasive and authoritative alternative medicine approaches.

Valone, Thomas, Bioelectromagnetic Healing: A Rationale For Its Use, Integrity Research Inst., 2000. Dr. Thomas Valone was for many years a U.S. Patent Engineer investigating the many electromedicine devices that he describes in this highly technical book.

Big Pharma Fears Electricity...

Opinion by Consumer Advocate Tim Bolen; September 11th, 2003

There’s an interesting situation going on in the war between “health” and “medicine” in the United States. Big Pharma is in a panic over electricity.

Yup. Electricity.

Not the kind of electricity that caused the big NorthEast power blackout this year. But the kind that gets applied to the human body, either as an investigative tool or as a immune system stimulator, as an electronic acupuncture, or as an energy field, or whatever.

For sure, big pharma can’t stand the idea that engineers have figured out how to kill viruses, bacteria, and biological warfare agents electronically. We’re looking, here, at ultra-cheap ways to deal with problems big pharma has only offered ultra-expensive, ultra-profitable, ways to solve. Electricity can do, at a mini-fraction of the cost, what any pharmaceutical can do.

Yes, you heard me. I said - “Electricity can do, at a mini-fraction of the cost, what any pharmaceutical can do.”

How do I know this? I do my homework. I actually know, and talk to, experts.

There are two upcoming conferences, both on the same days (September 26, 27, 28, 2003) which will open your eyes WIDE in amazement. One’s in Seattle, Washington, and the other is in Budapest, Hungary by Desire’ Dubounet. I’m going to the one in Seattle. Actually, I’m a speaker there Saturday night, during the politics of health portion.

No wonder big pharma is in a maxi-panic, and has pulled out all the stops in their efforts, to keep electricity out of the hands of the people of North America. How do I know big pharma is in panic mode and has pulled out the stops? Keep reading.

Background...

We all know that North American health care’s massive reliance on the concept of “drugs as treatment” for conditions and diseases is coming to end. It’s an experiment that failed. The Pharmaceutical industry, as a whole, is going the way of buggy whips, and horse carriages. It’s inevitable. Invest your money elsewhere.

Drug “treatments” are a scam. Americans want to be “cured.” Period. Drugs can’t do that. Americans want to be healthy, not medicated.

Big Pharma doesn’t want to die gracefully. They’re fighting reality tooth and nail. One of the ways they’re fighting off their own end is, of course, their so-called “quackbuster” operation - labeling competitors to endless drugs as “quacks,” and using their influence at our government agencies to damage their natural enemies. To a certain extent this has been working - for they’ve poured a fortune into the project - and they set up the structure years ago. But even with all those dollars spent, they’re still losing ground. Reality is catching up.

New enemies to big Parma’s interests are popping up everywhere like weeds in a cornfield, after the farm bureau stopped them from spraying chemicals anymore. THREE VERY BIG new enemies of big pharma are just now awakening - American corporations, The United States Military, and the combined Executive/Legislative branches of the US government.

What? Did I just say that “American corporations, The United States Military, and the combined Executive/Legislative branches of the US government” are new enemies of big Pharma? Yes. That’s what I said.

American corporations have begun to realize that a huge chunk of the North America’s Gross National Product (GNP) is being funneled to FOREIGN DRUG companies - multinational drug
syndicates based in France, Germany, etc. through the grossly inflated price of pharmaceuticals in the United States. North America is being bled. And, big American corporations are picking up a big part of the tab in increased health costs for their employees. That means that US companies have to raise the price of their manufactured goods - which means they can’t compete in world markets with the countries that host big pharma. “Big pharma” is NOT an American business - not at all. The only thing “American” about big pharma is it’s being being half of the word “Anti-American.”

The United States Military is looking for solutions, not drugs. A few months ago I attended, in San Antonio, Texas, a conference called “ElectroMed 2003.” It was put on by the United States Air Force - who is looking for electrical and electronic solutions to health problems. To accomplish those ends it is FUNDING studies, at Universities, of electronic devices that kill pathogens, etc.... I took Hulda Regher Clark, PhD, Naturopath, and eight other “electric/electronic health care” friends with me. Everybody I took with me was probably 25 years ahead, in electromed research, than what the Air Force was currently buying from contractors.

The combined Executive/Legislative branches of the US government are majorly concerned with the low quality, and high cost, of health care in the United States. It is, if not the BIGGEST issue, one of the top five social issues in America. Frankly, it’s all a simple problem (big pharma anti-American greed) with a simple answer - Shut down big pharma. The key words here are “quackbusters, drug lords, indictment, shutdowns, federal prison.” I believe that big pharma’s overt attack on the US economy is a hostile act by foreign interests. Period. How much big pharma stock is owned by those that hate the very essence of America?

**Big Pharma Fears Electricity?...**

There’s no money for big pharma in Americans being healthy. That’s why the “quackbuster” operation, the one run out of a New York ad agency, has been attacking supplements, oxygen therapies, natural antibiotics, etc., for all these years.

Big pharma’s newest, and BIGGEST fear, is electricity - the use of electricity in health care. There are so many people working on electrical solutions to health problems that big pharma is in a screaming panic. Universities, the US military, independent scientists, electrical and electronic engineers, hobbyists, what-have-you, in North America are coming up with major answers to health issues - with electricity. In the rest of the world, I’m told, major work is being done. Russia, China, Switzerland, Germany, Hungary, and even Turkey are churning out electronic devices that far surpass ANYTHING and EVERYTHING big pharma has to offer.

In San Antonio a few months ago I spoke to members of the US Air Force team putting on ElectroMed 2003. They told me that their original function was to find out what harmful effects current electronic military hardware might be having on their crew members - if any. Their research eventually led to the understanding that there were BENEFICIAL affects of electricity introduced into the human body. This was their third conference - and the grants they had let out a few years ago were now reporting their findings at the conference.

One of the problems the Air Force was looking at, to solve electronically, was the potential for a biological attack on an Air Force base and the logistics of a biological cleanup in the aftermath. No one, I can bet, is ever going to be allowed to spray down a 300 million dollar aircraft with a fire hose full of bleach - not going to happen. The Air Force wants to do it with an electronic device they can tune to kill selected biologicals...

And yes, they know about the work of Tesla, Royal Raymond Rife, Hulda Clark, Bob Beck, etc., etc. They know much more about those peoples’ work, and others, since I took nine of my friends to the conference.

Did I tell you that there is an electronic cure for malaria being successfully tested in Africa? Well, there is...

Yup. Big pharma is not sleeping well.

**So, What’s Big Pharma Doing?**

They’ve pulled out the stops. They’re calling in their markers. They’ve put the pedal to the metal in trying to stop “electricity.” All that money drain from the US economy could stop overnight.

Big pharma has significant influence at our US Food & Drug Administration, and consequently, at the Federal Trade Commission (FTC), which merely uses FDA policies and guidelines to determine what, and whom, to prosecute. Both of these organizations are compromised.

When Dwight David Eisenhower was leaving office as President of the United States years ago he brought to America’s attention that the revolving-door relationship between the US Military and the Defense contractors and suppliers “was not a good thing for America.” Legislation was put into place separating the two entities. It is still in place. We need to break up the incestuous relationship between our FDA and the foreign drug cartel - right now.

It’s simple. Big pharma is using it’s contacts at FDA to arrange all sorts of harassment of the fledgling ElectroMed industry. Their contacts at FTC are eager to participate, also. Their organizational point is the combined FDA/FTC project labeled “Operation Cure-All,” a bureau who’s mission should force it to more correctly name itself “Operation Cure-Nothing.”

**“Operation Cure-Nothing”...**

Big pharma’s attack squad is “Operation Cure-All.” They own it outright. They’ve staffed it, they’ve outfitted it, they’ve trained the employees, they’ve set the operational guidelines, they’ve got their own “consultants” in place to advise on issues, and I wouldn’t doubt that there’s a speed-dialer, in both directions, to that New York ad agency that runs the real quackbuster operation.

Operation Cure-All’s job is to hunt down, and set up for the kill, any person or company on the internet who dares to suggest that there is anything other than “treatment” available in health care. All that money, and the Defense contractors and suppliers “was not a good thing for America.” Legislation was put into place separating the two entities. It is still in place. They’ve pulled out the stops. They’re calling in their markers. They’ve put the pedal to the metal in trying to stop “electricity.” They’ve set the operational guidelines, they’ve got their own “consultants” in place to advise on issues, and I wouldn’t doubt that there’s a speed-dialer, in both directions, to that New York ad agency that runs the real quackbuster operation.

Operation Cure-All’s job is to hunt down, and set up for the kill, any person or company on the internet who dares to suggest that there is anything other than “treatment” available in health care. They have a software program they run constantly that searches websites for words that offer reality in health care. When the word “cure” is found on a website, the alarms go off, and an assault begins. Words like “prevention, cause, immune system, etc.” will get you similar attention.

Their job is to make a “cure” for anything illegal, and to terrify Americans who try to find, or promote the reality of “cure vs... treatment.”

And “we the people” are funding this...

**The Attack On Electricity...**
I'm just now beginning to trace back how the attack on the ElectroMed industry occurred, so bear with me on some educated supposition. What I'm actually looking at, and what has actually happened so far, is that FDA coordinated raids have been made against several ElectroMed companies, with seizure of their inventories, etc. Also, subpoenas for a Federal Grand Jury in San Diego have been issued alleging fraud. There are no dates on the subpoenas.

All of the FDA raid warrants have a court order suppressing the “probable cause” of the warrant. I suspect that the “probable cause” information is probably Legal Declarations from the usual “testifying whores” we’ve come to expect will show up - and the prosecutor in the case, issuing the warrants, is too embarrassed to show the low quality of the testimony, and the evidence in the case, for obvious reasons. Be realistic, if YOU were the prosecutor would YOU want to let the opposition know that your “probable cause” declarations, for instance, were the wild-eyed statements of a hair removal expert from Braintree, Massachusetts, that court documents show could never hold a job?

The FDA warrants, I believe, were strictly a fishing expedition.

Judging from former campaigns begun in a New York ad agency, I think we can safely assume, as a working hypothesis, that some, if not all, of the usual tactics were employed against ElectroMed. It was the usual “quackbuster operation.”

The quackbuster operation is being run out of an advertising agency in New York City. The ad agency designs, implements, and runs campaigns against competitors to drugs. Twenty six pharmaceutical companies banded together, originally, and funded the operation against market competitors to drugs. The first plan has been expanded as big pharma panics over North America’s shift in their buying habits to “alternatives.”

Let me refresh your memory on how they do it...

They decide who they’re going to hit. The advertising agency writes up the stories that are going to be distributed to their “letter writing brigade,” the “testifying whores.” The letter writers, following the guidelines, then write to the FTC, the FDA, and Operation Cure-All, to set a basis for the complaint. Then the ad agency writes stories, getting quotes from the likes of Barrett, Baratz, etc., on the victim. The stories are sent out to the media in which the advertising agency’s drug clients advertise. The stories are printed in the media as though they were true.

Once the stories hit the press, a second wave of letters goes out to the FTC, the FDA, and Operation Cure-All, to put pressure on upper management to act. Then more media is generated, this time with quotes from the quackbuster insider FTC employees to make it sound official that the FTC is interested. Once this happens, letters and phone calls go out from supposedly “irate consumers (quackbusters),” once again to the FTC, the FDA, and Operation Cure-All upper management, demanding to know why they aren’t doing something.

Then, letters and phone calls go out from supposedly “irate consumers (quackbusters)” to certain members of Congress demanding to know why the FTC, the FDA, and Operation Cure-All, aren’t doing something.

Within days, upper management of the FTC, the FDA, and Operation Cure-All, are deluged with questions from more media, and Congress. They see the issue as important, and act against the victim - even if their is little or no evidence.
So, What’s ElectroMed’s Response?

Not good. Not bad, but not good. The industry is so new, it’s naive. Too many people in it, just can’t believe that their own government could do this to them. These are in stupid denial. Others say “Well, I’ll just stay below the radar.” These are like a mouse living in a house with four cats.

Some others are stunned, waiting for someone to lead them to safety. They can’t figure out, when they have the best of intentions for humanity in their work and invention, why their own government could act so stupidly, and so brutally.

Sometimes it takes horror to move a fledgling into the adult world. Mom and Dad eagle have no problem pushing Junior off the ledge, so he’ll go get his own breakfast, and find his own mountain range. When Junior begins his plummet over the edge he’s got two choices; either spread those wings and take flight, or hit the rocks a thousand feet below. ElectroMed is plummeting, and the choices need to be made right this minute.

Some parts of it are already awake, others are awakening, and there’s major effort to move the industry into it’s next growth step. Phones are ringing everywhere. Conference calls are happening. Strategy meetings are occurring. Industry conferences are devoting time to strategy and tactic meetings designed to determine exactly what the problem is and how to solve it.

Hence, in the US, Seattle is where the allies are gathering for a war council September 26, 27, 28, 2003. It’ll be the first of several gatherings. The newest and the best will be there. Hulda Clark will open the convention at 9:00am on Saturday. You really need to hear what Hulda Clark has to say. That’s what I think...

Tim Bolen - Consumer Advocate

Research Abstracts

RESEARCH ARTICLES

Microcurrent Electro-Physiology, Research Abstracts: 1985 - 1999


Summary: These researchers applied microcurrent stimulation ranging from 200-800 uA to a wide variety of wounds, using negative polarity over the lesions in the initial phase, and then alternating positive and negative electrodes every three days. The treated group showed 200-350% faster healing rates than control, with stronger tensile strength of scar tissue and antibacterial effects in infected wounds in the treated group.

KEYWORDS: ulcers, polarity, stimulation, quadriplegia, healing


Summary: These researchers applied microcurrent stimulation ranging from 200-800 uA to a wide variety of wounds, using negative polarity over the lesions in the initial phase, and then alternating positive and negative electrodes every three days. The treated group showed 200-350% faster healing rates than control, with stronger tensile strength of scar tissue and antibacterial effects in infected wounds in the treated group.

KEYWORDS: ulcers, polarity, stimulation, quadriplegia, healing


Summary: 100 patients with skin ulcers were treated with microcurrent stimulation; six of them had bacterial ulcers with one side used as controls. Stimulation of 200-800 uA was applied, with negative polarity used until infection cleared, and then polarity reversed. Patients had diagnosis ranging from quadriplegia, CVA, brain tumor, peripheral vascular disease, burns, diabetes, fracture, and amputation. The lesions with patients treated with currents showed approximately twice as fast a healing rate.

KEYWORDS: accelerated, wound healing, current, ATP, amino acids, b


Summary: These researchers used in vitro slices of rat skin to determine some of the biochemical explanations for accelerated wound healing demonstrated in the above studies. By applying various levels of current to the samples, and then chemically analyzing them, they determined that skin treated at currents below 1000 uA showed up to 75% higher amino acids and up to 400% more available ATP than controls, and that skin treated at levels above 1000 uA showed depressed levels of these substances. Often less than non-treated controls.


Summary: This article is an overview of theory and research into the titled field.

KEYWORDS: microcurrents, bone, healing, remodeling

6) Tomoya Ohno (Japanese): Experimental Studies of Influences on Healing Process of Mandibular Defect Stimulated by Microcurrent Shikwa Gakuho, #82 1982

Summary: 50 uA microcurrents were applied to one side of the jaws of a group of dogs with lesions in their jaws. The other side was untreated. The dogs were examined at periods of 3, 7, 14, 21, 28, 42 and 56 days. Results: "It seems likely that direct microcurrent promotes normal bone formation within the defective area and accelerates the osseous healing process. Prolonged
application of electrical stimulus promotes a remarkable bone remodeling mechanism."

**KEYWORDS:** post traumatic, microcurrent, modulated

7) Sinitsyn, Razvozova (Russian): Effects of Electrical Microcurrents on Regeneration Processes in Skin Wounds Ortop Travmatol Protez, Feb. 1986

**Summary:** 68 patients with post burn and post traumatic wounds underwent treatment constant and modulated microcurrent of negative polarity of 1-10 uA/cm2 over a period of 2-20 days. Although both groups showed accelerated regeneration, the modulated electric current group showed more prolonged and marked effect. Better survival of skin grafts was demonstrated compared with untreated patients.


**KEYWORDS:** tendons, stimulated, stimulation, proline

9) Nessler and Mass: Direct-Current Electrical Stimulation of Tendon Healing in Vitro Clinical Orthopedics and Related Research, April 1987

**Summary:** 80 tendons from white rabbits were surgically transected and removed from the animals after being surgically repaired. They were divided into 4 groups of 20, and cultured with 10 of each group being electrically stimulated, and half not. A 1.4 volt direct current connected through a 150 kOhm resistor was used for stimulation, at a current of about 7 uA. It was found that currents any higher than this caused discoloration of the tendons. Healing was measured by proline uptake and bridging of the repair site by the epitenon. Results: "a continuous direct current causes increased tendon cell activity within seven days and the increased activity may persist as long as 42 days." The researchers suggested that externally applied microcurrents may be preferable in future studies.


**Summary:** This article is a summary of research into tendon healing acceleration, including human injuries of the anterior cruciate ligament and the Achilles tendons: "While the results are subjective, the individuals in both groups appear to have returned to usual activities more quickly, and have greater mobility, than people treated more conventionally." "This study confirmed that electrical activity is not limited to nerve and muscle tissue, as previously thought, but is intrinsic to 'all kinds of other cells'".


**KEYWORDS:** Achilles, tendon, anodal, cathodal, microamps, load


**Summary:** 60 rats were divided into three groups of 20. One was unstimulated, one group had their Achilles tendons stimulated with positive (anodal) current, and the third group's tendons were stimulated with negative (cathodal) currents. A current of 75 microamps, at 10 Hz was used. Results: "The group treated with anodal current withstood significantly greater loads (p<0.001) than did either the group which healed normally (i.e. without stimulation) or the group treated with cathodal currents".

**KEYWORDS:** wheatstone, conductance, acupuncture, points, conduc

13) Reichmanis, Marino, and Becker: Electrical Correlates of Acupuncture Points IEEE Transactions on Biomedical Engineering, November, 1975

**Abstract:** Employing a wheatstone bridge, skin conductance was measured over those putative acupuncture points on the large intestine and pericardium meridians lying between the metacarpophalangeal joints and the elbow. Results were compared to those from anatomically similar locations devoid of acupuncture points. "At most acupuncture points on most subjects, there were greater electrical conductance maxims than at control sites".

**KEYWORDS:** patch clamp, currents, membranes, diabetes, ion chann

14) reported by Lawrence Altman: Cell Channel Finding Earns Nobel Prize New York Times Medical Science section, October, 9, 1991

**Summary:** Two German scientists, Dr. Erwin Neher and Dr. Bert Sakmann, will share the $1 million dollar Nobel prize for their development of the patch-clamp technique that allows the detection of minute electrical currents in cell membranes. This discovery, which "revolutionized modern biology" may shed light on the causes of several diseases, like diabetes and cystic fibrosis. This method allowed the detection of 20 to 40 types of ion channels that allow positive or negatively charged ions into and out of the cells. "This study confirmed that electrical activity is not limited to nerve and muscle tissue, as previously thought, but is intrinsic to 'all kinds of other cells'".


**Summary:** 26 rabbits had platinum electrodes surgically implanted into the medullary cavities of their humerus bones. Microcurrent stimulation was applied at 50 and 250 uA, allowing pause periods of one second between one second treatment bursts. The scientists found that osteogenesis (bone growth) happened more around the cathode (negative polarity), and that slight tissue necrosis occurred around the anode. The tissues stimulated acted as capacitors, discharging 75% of the current absorbed during the rest periods. They concluded that pulsed
current is superior to direct current for bone healing acceleration.

KEYWORDS: silver, staphylococcus, infection, anodal


Summary: Percutaneous silver wire implants were placed in rats, and the wounds inoculated with Staphylococcus aureus to test how much infection would spread. Microcurrent stimulation was passed through the wires, with + anodal current placed into implanted silver wire, and the - cathodal electrode placed on the rat’s belly as a ground. It was found that significant inhibition of infection occurred, with the most marked results at 20uA current level. “Metallic silver can be effectively and efficiently activated to elicit its anti-microbial activity by the application of micromepere electrical current.”

KEYWORDS: pulsed, Yucatan pigs


Summary: This study failed to confirm the superiority of microcurrent-stimulated wounds in test pigs over controls. A good review of previous studies is given as well as a discussion of which research variables could account for the inconclusive results, which vary from other studies that found microcurrent to be efficacious for wound healing.

KEYWORDS: microcurrent, TMJ, laser, placebo

18) Bertolucci and Grey: Clinical Comparative Study of Microcurrent Electrical Stimulation to Mid-Laser and Placebo Treatment in Degenerative Joint Disease of the Temporomandibular Joint, Journal of Craniomandibular Practice, 1995

Summary: 48 patients were divided into three groups, some receiving placebo, some microcurrent and some laser to treat pain of TMJ syndrome. Both microcurrent and laser were found to be significantly more effective than placebo, with laser slightly more effective than microcurrent. The author acknowledges that lasers are not legally sold in the United States for this purpose, and that these protocols are not necessarily the best ones, but work well for his practice. 2) Vanable, Joseph: The Role of Endogenous Electrical Fields in Limb Regeneration Limb Development and Regeneration, Part A, pg. 587-596, Alan Liss Publishing, N.Y., 1983 2) Vanable, Joseph: The Role of Endogenous Electrical Fields in Limb Regeneration Limb Development and Regeneration, Part A, pg. 587-596, Alan Liss Publishing, N.Y., 1983

This “Millions of Health Freedom Fighters - Newsletter” is about the battle between “Health and Medicine” on Planet Earth. Tim Bolen is an op/ed writer with extensive knowledge of the activities of a subversive organization calling itself the “quackbusters,” and that organization’s attempts to suppress, and discredit, any, and all health modalities that compete with the allopathic (MD) paradigm for consumer health dollars. The focus of the newsletter is on the ongoing activities, battles, politics, and the victories won by members of the “Health Freedom Movement” against the “quackbusters” It details “who the quackbusters are, what they are, where they are operating, the “quackbusters” It details “who the quackbusters are, what they are, where they are operating, when they appear, and how they operate - and how easy it is to beat them...”

Abstract

PURPOSE. To investigate the effects of hepatocyte growth factor (HGF) and a small applied electric field (EF) on corneal epithelial cell (CEC) migration.

METHODS. Primary cultures of bovine CECs were exposed to an EF (25–250 mV/mm) in the presence or absence of HGF (100 ng/mL). The rate and directionality of CEC migration were quantified. The expression of HGF receptors (HGF-Rs), p42/44 mitogen-activated protein kinase (MAPK) and the time-course of activation of p42/44 MAPK were investigated by confocal microscopy and Western blot analysis.

RESULTS. CECs migrated significantly faster in the presence of an EF, HGF, or HGF and an EF combined. The distribution of HGF-Rs was intracellular and in the presence of an EF was concentrated in the cathode-facing side. This EF-induced asymmetrical accumulation of HGF-Rs correlated with the...
The application of HGF or an EF led to the activation of the MAPK signaling pathway and in the presence of an EF, activation of MAPK was greater in the cathode-facing half of the CECs. Inhibition of the MAPK signaling pathway by PD98059 (100 µM) reduced the ability of HGF and an EF to enhance the rate of CEC migration, but did not alter EF-induced cathodal directionality.

**CONCLUSIONS.** These data suggest that both HGF and an EF augment the rate of CEC migration through activation of p42/44 MAPK. Moreover, EF-induced redistribution of HGFRs and asymmetry of MAPK signaling, although not instrumental in directing CEC migration cathodally, may be important for the signaling and maintenance of migration.

Wounding the cornea generates steady DC electric fields (EFs) directed toward the wound's edge and initiates the expression of hepatocyte growth factor (HGF). Both biologically generated EFs and endogenous growth factors (GFs) are significant during wound healing. Wound healing involves cell adhesion, migration, and proliferation, which are modulated by factors such as extracellular matrix (ECM) proteins.

The vibrating probe technique and traditional glass microelectrodes placed in varying locations have enabled the measurement of physiological, self-generating EFs at the wound site and with progressive closure of a wound, the endogenously produced EFs gradually diminish. In vitro, a variety of cells respond to EFs with directed migration (galvanotaxis) or directed growth (galvanotropism). These include neural crest cells, fibroblasts, neurons, and corneal epithelial cells (CECs). Applying an EF to cultured CECs imposes a cathodal directionality and perpendicular orientation on cell migration. The mechanisms underlying this behavior are unclear but may involve redistribution of charged plasma membrane glycoproteins such as GF receptors.

HGF is structurally distinct from other GFs and elicits a pleiotropy of behavior. In vitro HGF acts as a motogen, mitogen, and morphogen on a variety of epithelial cells. Therefore, in vivo HGF may stimulate migration of CECs to cover the denuded area of a wound and stimulate proliferation of CECs to restore corneal integrity. The signal transduction pathways involved in HGF-stimulated cell migration, proliferation, and differentiation are well studied and involve an extended repertoire of cytoplasmic transducers.

We sought to investigate the MAPK signaling pathway as a potential common downstream target of HGF and an EF in CEC migration. We also investigated the expression of HGFR and p42/44 MAPK in EF-treated CEC cultures. The results show that both HGF and an EF enhanced the rate of CEC migration and that both activated MAPK signaling. Inhibition of MAPK signaling reduced the ability of HGF and an EF to augment CEC migration. These data strongly suggest that HGF and an EF use the MAPK signaling pathway to augment the rate of CEC migration. An applied EF also induced an asymmetric accumulation of HGFRs and of p42/44 MAPK activation in the cathode-facing half of the CEC body. Although this may not be instrumental in directing CEC migration cathodally, it may be important in signaling and maintaining directed cell movement.
Materials and Methods

Cell Culture

CECs were isolated as described previously,17 but with the following modifications. Dispase II (2 U/ml) was diluted in Ca2+ and Mg2+ Hanks’ balanced salt solution containing penicillin-streptomycin (1000 U/ml-1000 µg/ml), amphotericin B (12.5 µg/mL), and kanamycin (200 µg/ml). The medium was used for all the experiments was buffered for room air and consisted of minimal essential medium (MEM) containing L-glutamine (2 mM), 10% fetal bovine serum (-irradiated), amino acid supplement (7.5–14.7 g/L), amphotericin B (2.5 µg/mL), penicillin (100 U/mL), and streptomycin (100 µg/mL). The CECs were seeded and incubated for 24 hours at 37°C before experimentation. For immunofluorescence experiments, the base of the chamber was an acid-washed glass microscope slide (BDH, Poole, UK).

EF Stimulation

EFs were applied as described previously.17 Briefly, two chambers were constructed in 100 x 20-mm tissue culture dishes (Falcon; BD Biosciences, Plymouth, UK) using glass coverslips (No. 1) fixed to the base with silicon rubber (BDH). A coverglass roof was applied to give final chamber dimensions of 22 x 11 x 0.1 mm. Agar salt bridges 15 cm long were used to connect Ag/AgCl electrodes to beakers of Steinberg solution (sodium chloride, 58 mM; potassium chloride, 0.67 mM; calcium nitrate, 0.44 mM; magnesium sulfate: 1.3 mM; and a buffer base. 4.6 mM [Trizma; Sigma-Aldrich, Poole, UK]), to pools of excess medium at either side of the chamber. This prevented diffusion of electrode products into the culture medium. Field strengths were measured directly throughout the experiment. Medium, with or without HGF (100 ng/ml) or PD98059 (100 µM), was applied with a Pasteur pipette and a push–pull technique. HGF concentrations of 25, 50, and 100 ng/mL were tested initially, and 25 ng/mL did not affect migration rates, but both 50 and 100 ng/mL increased control migration rates. All subsequent experiments were performed using HGF at a concentration of 100 ng/mL.

Quantification of Cell Behavior

Cells were monitored and analyzed using an image analyzer (Q500mc; Leica, Heidelberg, Germany).17 Mean migration rates and directedness were quantified hourly. The rate of cell migration was measured using the distances from a fixed point (a scratch on the chamber base) and the angle between the two cell positions.17 The method of Gruler and Nuccitelli was used to quantify directionality and, in short, used the cosine angle () that each cell moved in relation to the angle between the two cell positions.17 The individual z-series were viewed three dimensionally (3-D) on computer (2.1a Lasersharp; Bio-Rad) to give a collapsed image of total cell fluorescence. The freehand polygon function was used to measure the mean FI in the cathodal and anodal half of each CEC body. The corresponding area of each half was measured to ensure equality. A background mean FI for each cell was also obtained and subtracted from each measurement. The asymmetry index (AI) was calculated for each CEC as: (Cfi – Afi)/(Cfi + Afi) where Cfi indicates mean cathodal FI, and Afi indicates mean anodal FI. A value of 1 indicates fluorescence asymmetry entirely localized to the cathode-facing side, -1 indicates fluorescence asymmetry entirely localized to the anode-facing side, and 0 indicates no fluorescence asymmetry.

The extent of correlation between the location of cell body HGFRs and the direction of CEC migration was determined in CEC displaying prominent leading edge lamellipodia (i.e., migratory morphology). The individual z-series were viewed three dimensionally (3-D) on computer (2.1a Lasersharp; Bio-Rad). The number of HGFR stacks with staining located toward the leading edge was used as an indication of whether the location of HGFR and the direction of CEC migration were correlated. Each cell was designated as having no correlation, a little correlation, some correlation, and a strong correlation. Quantification of pERK 1/2 staining was performed by using the line intensity profile (LIP) tool in the image-processing software (2.1a Lasersharp; Bio-Rad). The average LIP measured across the midline of 10 CECs gave the mean FI for each experiment, and the data were normalized by dividing the mean treated FI by the mean control FI. To quantify the AI for p-ERK 1/2 staining in to nitrocellulose membrane (ECL; Amersham International, PLC, Little Chalfont, UK) and the membranes blocked for 2 hours with 5% nonfat milk in TBS-T (TBS with 0.1% Tween-20). The membranes were incubated with mouse monoclonal anti-pERK 1/2 or rabbit polyclonal total ERK 1/2 (Santa Cruz Biotechnology, Inc.) at a 1:1000 dilution for 1 hour and then biotinylated anti-mouse secondary or anti-rabbit secondary antibodies (SAHU, Carluke, Scotland, UK) at a 1:10,000 dilution for 1 hour. Streptavidin conjugated to horseradish peroxidase (SAHU) was added last at a 1:10,000 dilution. The blots were developed using o-dianisidine stain, and the dried membranes were scanned into a computer (Photoshop 5.02; Adobe, San Jose, CA) to prevent photobleaching.

Confocal Microscopy

Cultured cells were exposed to an EF (150 mV/mm) or HGF (100 ng/mL) for 15 minutes, washed with PBS, fixed in formaldehyde (4% vol/vol in PBS-T) for 1 hour, and washed again with PBS-T before blocking in BSA (10 mg/ml in PBS-T) for 1 hour. All antibodies were prepared in 1 mg/ml BSA in PBS-T and used at the following concentrations: m-Met rabbit primary, 1:100; p-ERK1/2 mouse primary, 1:100 (Santa Cruz Biotechnology, Inc.), FITC anti-rabbit secondary, 1:50 (Jackson Immunoresearch, West Grove, PA), and FITC anti-mouse secondary 1:100 (SAHU). For negative control staining, only the secondary antibodies were incubated with the cells. No positive staining was observed with secondary antibodies alone. Cells were mounted in antifade medium (Vectorshield; Vector Laboratories, Peterborough, UK) and viewed with a confocal microscope (MRC 1024; BioRad, Hercules, CA).

For quantification of asymmetric distribution of HGFRs, the fluorescence intensity (FI) of FITC-labeled cell body HGFR was measured in the cathode- and anode-facing halves. Ten CECs were selected randomly by using the rhodamine-phallolidin fluorescence (i.e., F-actin) to ensure that there was a mix of cell morphologies. A z-series (1-µm horizontal sections through an entire CEC), was obtained and then projected vertically using an image-processing package (2.1a Lasersharp; Bio-Rad) to give a collapsed image of total cell fluorescence. The freehand polygon function was used to measure the mean FI in the cathodal and anodal half of each CEC body. The corresponding area of each half was measured to ensure equality. A background mean FI for each cell was also obtained and subtracted from each measurement. The asymmetry index (AI) was calculated for each CEC as: (Cfi – Afi)/(Cfi + Afi) where Cfi indicates mean cathodal FI, and Afi indicates mean anodal FI. A value of 1 indicates fluorescence asymmetry entirely localized to the cathode-facing side, -1 indicates fluorescence asymmetry entirely localized to the anode-facing side, and 0 indicates no fluorescence asymmetry.

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the CEC body, the Fl in the first and last 2 µm (i.e., the cathode- and anode-facing sides) of each mean LIP was measured, and the corresponding Ai calculated.

Statistical Analysis

All experiments were repeated at least three times on separate primary cell cultures. Data are expressed as the mean of total results in all experiments ± SEM. Student’s t-test or the Welch t-test, when the standard deviations were significantly different, were used, and the level of significance expressed as P < 0.01, P < 0.001, or P < 0.0001.

Results

HGF- and EF-Enhanced Migration

The effect of HGF and an EF on rate of migration (Fig. 1A) and directionality (Fig. 1B) in CECs was determined. HGF (100 ng/mL) or an EF (150 mV/mm) significantly enhanced the rate of CEC migration by 37% compared with control (P < 0.001; Fig. 1A). Coapplication of HGF with an EF further enhanced the rate of CEC migration by 62% compared with the control (P < 0.0001, Fig. 1A).

FIGURE 1. Effect of HGF (100 ng/mL) and an EF (25 and 250 mV/mm) on CEC migration rate and directionality. (A) Application of an EF, HGF, and HGF plus an EF significantly enhanced the rate of CEC migration compared with the control. (B) An EF also stimulated CEC migration toward the cathode (positive values) in the absence and presence of HGF (100 ng/mL). Data are presented as the mean ± SEM of results for each condition with approximately 100 CECs from three separate cultures. **P < 0.001 compared with the control.

To quantify these observations, the mean Fls of the anode- and cathode-facing half of each CEC body (20 per variable) was measured, and the Ai calculated. An EF of 250 mV/mm resulted in a significant accumulation of HGF-associated fluorescence in the cathode-facing half of the CECs (P < 0.001; Fig. 2C). The accumulation of HGFs in the presence of an EF was striking and appeared as stacks of receptors viewed in 3-D (not shown). We also determined whether there was any correlation between the cell body distribution of HGFs and the direction of CEC migration (see the Materials and Methods section). Most of the control CECs did not display any such correlation toward the cathode, with a mean directionality close to 1 (P < 0.0001, Fig. 1B). Simultaneous exposure to HGF (100 ng/mL) and an EF did not further enhance directed migration. The directionality of HGF-treated CECs without application of an EF was random (Fig. 1B).

HGFR Distribution and Correlation with Directed CEC Migration

The epidermal growth factor receptors (EGFRs) accumulate at the leading edge of cathodally migrating CECs. The distribution of HGFRs in both control and EF-treated CECs was intracellular and in the presence of an EF (250 mV/mm), HGFRs accumulated asymmetrically in the cathode-facing half of the cell body (Figs. 2A-2B).

FIGURE 2. HGFR distribution and directed migration of CECs. (A) FITC-labeled HGFR fluorescence (grayscale) in an EF-treated (250 mV/mm) CECs imaged with a confocal microscope. Darker shades: more intense staining; dotted line: an LIP; arrows: accumulation of HGFRs. Scale bar, 10 µm. (B) Mean HGFR fluorescence LIP for EF-treated CECs (n = 5; SEM range 0.19–2.19; 25 and 250 mV/mm). The direction of the applied EF is indicated under the image and the LIP. (C) Mean cell body HGFR Ai for control and EF-treated (25 and 250 mV/mm) CECs. Positive Ais indicate cathodal asymmetry. Application of an EF-induced significant cathodal asymmetry in the cell body. Data presented as the mean Ai for 20 CECs per condition; ***P < 0.0001, compared with the control. (D) Correlation of HGFR and the direction of CEC migration were determined by the number of HGFR stacks located in the direction of CEC migration. Ten CECs were examined for each condition. *, little correlation; **, some correlation; and ***, striking correlation. CECs exposed to an EF (25 and 250 mV/mm) displayed a greater correlation between accumulation of HGFRs and the direction of migration (25% of control CECs with 67% of EF-treated CECs).
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The proportion of EF-treated CECs displaying any correlation (little, some, or striking), however, was 67% (Fig. 2D), three times greater than the control.

**Activation of p42/44 MAPK by HGF and an EF**

To begin to elucidate the mechanisms by which an EF and HGF stimulate the migration of CECs, we investigated whether the MAPK signaling pathway was involved. Previous studies have shown that the activation of p42/44 MAPK is essential for cell proliferation and migration and that HGF can stimulate MAPK in several cell types. 

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**FIGURE 3. p42/44 MAPK activation with HGF and an EF.** (A) Mean normalized phospho-p42/44 MAPK LIP FIs for control CECs and those treated with HGF (100 ng/mL) and an EF (150 mV/mm). CECs were cultured, treated, fixed, stained, and imaged and the image subjected to computer-assisted analysis. Mean FIs were obtained from the LIP for each CEC, and then the data from individual experiments normalized. Application of either HGF or an EF significantly increased activation of p42/44 MAPK, compared with the control. Data are expressed as normalized values; n = 20 per condition; ***P < 0.001, **P < 0.01, compared with the control. (B) Time course of phospho-p42/44 MAPK activation in CECs after application of HGF (100 ng/mL) and EF (150 mV/mm). Anti-phospho-p42/44 MAPK and total p42/44 MAPK were detected by Western blot analysis (10 mg soluble protein extract for each treatment was loaded). HGF-treated CECs demonstrated p42 MAPK phosphorylation within 5 minutes (lane 2), which peaked at 30 minutes (lane 4) and remained activated at 60 minutes (lane 5). EF-treated CECs, in contrast, only displayed p42 phosphorylation after 60 minutes of EF exposure (lane 5). Lane 1: baseline; lane 3: 15 minutes. The experiment was repeated with identical results.

**FIGURE 4. p42/44 MAPK distribution in HGF- and EF-treated CECs.** (A) Confocal image of an EF-treated (150 mV/mm) CEC stained with FITC-labeled phospho-p42/44 MAPK (gray scale). Dotted line: the LIP; arrow: accumulation of ERK 1/2 on the cathode-facing side. Scale bar, 10 µm. (B) Mean phospho-p42/44 MAPK fluorescence LIP for EF-treated CECs. The LIP is expressed as distance for 20 cells; arrow: peak of p42/44 MAPK fluorescence in the cathode-facing side of the EF-treated CEC body. The direction of the applied EF is indicated under the image and LIP. (C) Mean fluorescence Ais for control, HGF-treated (100 ng/mL), and EF-treated (150 mV/mm) CECs. Positive Ais indicate cathodal asymmetry. Application of an EF, but not HGF, induced significant cathodal asymmetry of p42/44 MAPK activation in the CEC body. n = 20 cells per condition; ***P < 0.0001.

**Inhibition of HGF- and EF-Induced p42/44 MAPK Activity**

PD98059, a selective inhibitor of MEK 1/2, significantly reduced the mean migration rate of control CEC by 28% (P < 0.01; Fig. 5A) The methanol vehicle had no effect (not shown).
An exogenous EF enhances migration rates of several cell types—for example, Xenopus neural crest cells,12 avian fibroblasts,13 keratocytes,44 and Xenopus neurites45—and stimulates the rate of reepithelialization during wound healing in vivo.7 45 46 However, the EF-enhanced migration rate of 37% (Fig. 1A) reported herein was greater than found previously in CECs16 17 and keratinocytes,48 perhaps due to differences in the serum used. EF-directed migration cathodally has been demonstrated in CECs16 17 and keratinocytes48 and is similar to that reported in the current study (Fig. 1B).

GFs regulate migration, mitosis, and differentiation. EGF enhances the rate of migration of cultured bovine CECs,17 human keratinocytes,48 and cells from a human corneal epithelial cell (HCEC) line.6 The level of expression of HGF and HGFR mRNAs are low in the unwounded cornea; however, a marked upregulation occurs after wounding.2 Applying HGF in culture, significantly stimulated bovine CEC migration (Fig. 1A). HGF also stimulates migration in MDCK cells33 and in HCECs.6 Coapplication of HGF with an EF, as occurs at a wound, enhanced the rate of CEC migration over that seen with GF or EF alone (Fig. 1A). The enhancement was not fully additive, suggesting that HGF and an EF may operate through common downstream pathways capable of saturation.

HGF did not affect the extent of EF-induced cathodal directionality (Fig. 1B). Coapplication of EGF plus an EF enhances cathode-directed migration.17 EGF partially restores EF-induced cathode-directed migration in CECs and keratinocytes in the absence of serum.17 48 Activation of EGFR may be crucial in EF-induced cathode-directed migration of CECs and keratinocytes, but HGF, although present in serum, was not involved in initiating cathode-directed migration.

**HGFR and CEC Behavior**

EGFRs accumulate at the leading edge of the cathode-facing side of cells in an EF and may be instrumental in directing migration.4 19 42 HGF staining was mostly intracellular in control and field-treated CECs (Fig. 2A). The absence of HGFR staining in the leading lamellae of field-treated CECs also indicates that redistribution of HGFRs to the leading edge of the cathodal lamellae was not instrumental in directed migration. In EF-treated CECs, HGFRs accumulated asymmetrically within 15 minutes, but in the cathode-facing half of the CEC bodies rather than in the leading lamellae (Fig. 1). This observation raises three questions. Where was this asymmetric accumulation of HGFRs located? How did the HGFRs accumulate there? What was the purpose of this asymmetric location of HGFRs? The stacks of HGFRs spanning the cell body of the CEC may indicate that the HGFRs had been internalized into the endosomal compartments. Both EGF and EGFRs have been detected in the early endosomal compartment within 2 to 5 minutes after receptor-mediated internalization at 37°C.49 A recent report of a colocalization study noted that a non-Golgi compartment, termed the subapical compartment (SAC), was involved in redirecting apical and basolateral membrane components in polarized and semipolarized cells.50 There was a striking similarity between the location of their IgA and sphingolipid accumulation in the SAC50 and the HGFR staining observed in the CECs in the current study. This may indicate that HGFRs are internalized after ligand binding and are located in the endosomal compartments or the SAC. Asymmetric accumulation of cytosolic proteins would be unlikely to result directly from exposure to an EF, due to the high resistivity of the plasma membrane. However, the asymmetric accumulation of HGFRs may have resulted from asymmetric internalization cathodally caused by an initial plasma membrane asymmetry.

In field-treated CECs, the asymmetric accumulation of HGFRs was correlated with the direction of migration.
Both An EF also induced activation of p42/44 MAPK in CECs, MAPK is a substrate of p42/44 MAPK after the activation of integrins and EGFRs. Second, EGF-stimulated p42/44 MAPK activates cPLA2, which in turn increases release of arachidonic acid, the rate of CEC migration. Two downstream signaling cascades are involved in the enhancement of cell migration, especially if the EF indirectly activates p42/44 MAPK through GF and/or integrin receptor clustering that indirectly activated p42/44 MAPK. Asymmetric HGFR signaling, PD980509, the MEK 1/2 inhibitor, significantly reduced both the EF- and HGF-enhanced rate of CEC migration (Fig. 5A), but neither was inhibited completely. Other second-messenger cascades may be involved in cell migration. For example, ligand binding to the HGFR also phosphorylates P3-K and PLC, both of which are involved in HGF's enhancement of cell migration.31 34 HGF also directly phosphorylates components of the cytoskeletal signaling complexes—for example, focal adhesion kinase (FAK)61 and the small GTPase proteins Rho and Rac.33 In addition, ezrin, a protein that acts as a membrane–cytoskeleton linker, is activated after activation of HGFR.35 These represent alternate pathways for HGF-enhancement of CEC migration besides activation of MAPK. Similar to HGF, the EF may stimulate other second-messenger pathways capable of enhancing CEC migration, especially if the EF indirectly activates p42/44 MAPK through GF and/or integrin receptor clustering. PD98059, however, did not affect EF-induced cathodal directional fiber migration (Fig. 5B), suggesting that the upstream asymmetric activation of EGFR for example, engages pathways other than the MAPK pathway to effect directed migration.

**Proposed Mechanisms for HGF- and EF-Enhanced CEC Migration**

The application of an EF and HGF may converge at the level of p42/44 MAPK activation to enhance the rate of CEC migration. Two downstream signaling cascades are involved in the enhancement of the cell migration rate after EGF- and extracellular matrix (ECM)-stimulated activation of p42/44 MAPK. First, myosin light chain kinase (MLCK), a key regulator in cell motility and contraction,62 63 is a substrate of p42/44 MAPK after the activation of integrins and EGFRs.56 Second, EGF-stimulated p42/44 MAPK activates cPLA2, which in turn increases release of arachidonic acid from phospholipids, with consequent production of leukotrienes.64 65 Both of these signaling cascades converge at the level of the actin cytoskeleton, where the leukotrienes stimulate actin polymerization and phosphorylation of MLCK results in actin contraction.62 63 64 Therefore EF- and HGF-stimulated activation of p42/44 MAPK may also converge on these signaling cascades.

In conclusion, corneal wound healing may involve a temporal and spatial interplay of GFs and EGFs as well as ECM proteins. A wound-induced EF may directly and stimulate cell migration, while GFs such as HGF further enhance activated migration. These observations indicate potential therapeutic strategies that combine treatment with an EF and GFs.

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An Introduction to Quantum Biofeedback and its use for Sport Performance Enhancement

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ABSTRACT

Quantum Biofeedback offers a state-of-the-art methodology for identifying and reducing the impact of stressors and stress responses exhibited by the body electromagnetically and informatically, which has applications in medicine and sport performance enhancement. Specific low-dose micro-currents are fed into the body via extremity and head electrodes, and responses are measured via a process of non-invasive automated biofeedback referred to as Electro-Physiological Feedback Xroid® (EPFX). A review of conventional biofeedback literature shows strong scientific support for the general benefits of biofeedback training and technologies for a broad range of symptoms, disorders and performance enhancement. Advancements in computer technology and bioelectromagnetics (BEM) research have provided the foundation for Quantum Biofeedback, an evolved form of biofeedback training, which offers similar mind-body benefits combined with additional medical possibilities not seen before; such as, digital-human cybernetic interface, double-blind electro-physiological response measurement, instantaneous feedback, sub-clinical wellness forecasting, and auto-focusing corrections. The EPFX device—a culmination of over 30 years of research, development, and application—is introduced, along with case evidence demonstrating EPFX use and efficacy with athlete performance and recovery.

INTRODUCTION

Nearly a century ago, quantum research overturned the 17th century mechanistic paradigm of “world as a machine,” within which phenomena are to be understood by reducing them to their parts. Instead, a world of radical interconnectedness was revealed where parts and wholes are deeply embedded within each other in dynamic and unfolding relationships. Reductionism has failed as a way of understanding the universe and understanding complex problems. The vast incredible complexity of the human body makes it fractal and quantic not reductionistic. Medicine has clung to a 17th century mechanistic reduction perspective. Medicine has been unable to embody science advances such as electricity and the body electric, non-linear systems, fractals, quantum theory. Medicine has used them in making devices such as the MRI, but has not used these new science advancements to understand the workings of the human body. There is no good medical theory of the human body use of electricity to accomplish to actions of life. Medicine has a chemical, synthetic chemical 17th century view, and use antiquated 17th century reductionistic before and after statistics that do not have enough variables or fractal sophistication to guarantee safety. The pharmaceutical companies are running scared when their drugs all show side effects, but one by one they are all showing unpredictable excess side effects. When we view the human body with today’s science, a body electric jumps out at us. A view of the body rejected by the chemical companies that control the schools and the chemical companies fear loss of profit. Basic 5th grade science tells us. We are made of atoms and atoms are made almost exclusively of electrons, protons and neutrons. None of us can in any way perceive this simple truth presented to
It was Genius to take Behavior Medicine, Life Style, Electro-Acupuncture, Homeopathy, Herbal Medicine, Homotoxicology, Blood Analysis, and all of Natural Medicine and combine it all in one Energetic Medicine device. Theorize it, Research it, Build it, Register it and do clinical evaluation of it for the last 30 years. True Genius, perseverance and enthusiasm.

Leonardo Divinci was a cross dresser with man and woman characteristics of beauty, grace, science and art. He is an example of eccentricities in Genius. The male and female mind when combined and set free can see truth and see reality where more rigid minds are blind.

All designed to detect + reduce Electro-stress and Balance the Body Electric Automatically.
injured

The 1968 Olympics were known for several reasons, one of them the protest of the black panthers

us in 5th grade. We live in the false belief that there is solid flesh in our bodies, when we know that it is not true. The outer area of any atom or molecule is made of the electrons. The electrons have a very strong electric charge. So strong that two electrons can almost never touch, the energetic charge will repel them. No atom ever touches another atom. No molecule ever touches another molecule. Everything is held together with energetic, quantum, electro-static-magnetic, or other subatomic forces. All of life is mostly electrons and protons that never touch but only interact through electro-magnetic fields. These are the basic forces of electricity. All of the interactions of life are energetic and electrical at some level, 5th grade fact.

Chemistry has been taught with the analogy of rods and balls. Every chemistry student has been shown molecules with balls for atoms and rods for the bonds. This implies there is a solid nature. There is not. The atoms are energy fields, the bonds are also fields not much different than two magnets that repel on the table. There is no rod or ball, but this analogy is used by the pharmaceutical companies to sell their wares. It is a false belief.

The field of voltammetry tells us this simple fact. We appear solid because these forces are strong. But we cannot touch anything but just interact with energy fields. This is basic 5th grade science but our society has decided that since this interferes with the sale of pharmaceuticals, we will ignore this simple truth in medicine. People such as me, who try to reposition medicine to this truth are attacked and persecuted.

The molecular structure hypothesis - that a molecule is a collection of atoms linked by a network of energetic bonds - was developed in the nineteenth century experimental chemistry. It has served as the principal means of ordering and classifying the observations of chemistry. But the advent of Quantum Physics allowed us to better understand and clarify this field of knowledge.

When it was developed in the 1920’s, quantum mechanics was viewed primarily as a way of making sense of the host of anomalous observations at the level of molecules, atoms, and subatomic particles that could not be explained in terms of older mechanical models. Now, in the 21st century, most physicists are confident that quantum mechanics is a fundamental and general description of the physical world. Indeed, quantum ideas are now being applied to understand the workings of chemistry, consciousness, environment, electromagnetic field interactions, low-dose healing effects, non-local phenomena, and many other observable phenomena that are unexplainable with an outdated mechanistic worldview.

During the last century, traditional medical and philosophical practices, such as Traditional Chinese Medicine, acupuncture, Qi Gong, Tai Chi, meditation, homeopathy, naturopathy, and mind-body techniques considered “esoteric” by the scientific establishment, have been largely ignored while the Western world’s attention was focused solely on drugs, surgery, radiation, genetics, and other invasive and reductionistic approaches.

With massive public pressure to support research of safer and progressive Complementary and Alternative Medicines (CAM), and with athletic communities seeking effective drugless performance advantages, significant funds are moving in those directions. Quantum physics and non-linear mathematics are providing scientists with better models for understanding complex systems and subtle interactions, like mental, emotional, environmental, and electro-physiological interactions in the human body. With new ways of measuring and verifying energetic and quantum events and their effects on health, disease, and performance, scientists are re-igniting interest in traditional healing techniques, and the field of subtle-energy medicine is explosively emerging.
One of the most exciting and promising fields of CAM involves bioelectromagnetics (BEM)—the study of electromagnetic fields (EMF’s) and their biological effects. Based largely on biofeedback principles, BEM diagnostic and healing devices are well entrenched in mainstream medicine already, but scientists are really only beginning to realize the practically limitless potentials that this field offers. Interest in these techniques has grown exponentially since the early 1970’s. Currently, in the United States, the National Institutes of Health (NIH) officially recognizes and encourages research and exploration in the field of Energetic Medicine, including biofield and BEM-based therapies.

The purpose of this article is to introduce modern advanced biofeedback, one of the fastest growing areas within the field of BEM, and provide supportive evidence for its use for stress, pain, and general preventive health management of Olympic-level athletes. Focus is given to one of the most advanced biofeedback technologies, the EPFX (Electro-Physiological Feedback Xrroid®), which combines mind-body training with a methodology of applying micro-currents and informational signals to the body, measuring feedback, and utilizing the resultant information for stress reduction, education, behavioral modification, and self-adjusting cybernetic correction (an historic innovation exclusive to the EPFX).

“Conventional” biofeedback, the use of devices to monitor physiological processes and enhance mind-body interactions, has been one of the most researched branches of CAM for over 60 years, and it provides the basis for this study and for claims made in athletic sport performance. “Quantum” biofeedback is the term adopted to describe advanced Quantum Electro-Dynamic Biofeedback capabilities performed with the EPFX system, which combines the benefits of both conventional and advanced methods.
BIOFEEDBACK AND ATHLETIC PERFORMANCE

Biofeedback is a heavily researched technique and a technology that trains subjects to alter brain activity, blood pressure, muscle tension, heart rate, and other bodily functions that are not normally controlled voluntarily. Devices are used to monitor electrical responses on skin and muscles and translate them into auditory or visual stimuli that serve as rewards as a subject practices relaxation techniques and subtle muscle control. Various other devices monitor skin temperature, heart rate, sweat gland activity or brain wave activity.

Techniques involving mind-body control; such as, meditation, yoga, and martial arts go back millennia and have helped people to accomplish uncanny feats. Surprisingly, one of the secrets of achieving the necessary focus and mind-body control that translates into extreme performance is deep relaxation. Though this ability can be taught without technology, the use of biofeedback devices has been proven to accelerate learning (Norris, 1986; Pulvermüller et al, 2000).

Biofeedback evolved out of early laboratory research in the 1940's. In the 1950's and 1960's researchers from different fields independently studied various applications of feedback mechanisms to modify physiological functions in animals and humans. Since the 1970's, biofeedback has been used in clinical settings, and today, it is used widely by physicians, nurses, psychologists, physical therapists, addiction counselors, dentists and other professionals to treat an array of disorders.

At this point, according to The Association for Applied Psychophysiology & Biofeedback, the world's largest research society for biofeedback, there is solid scientific evidence that biofeedback benefits the following disorders:

<table>
<thead>
<tr>
<th>Disorder</th>
<th>Description</th>
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<td>Alcoholism</td>
<td>Incontinence</td>
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<tr>
<td>Anxiety</td>
<td>Insomnia</td>
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<tr>
<td>Arthritis</td>
<td>Irritable Bowel Syndrome</td>
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<tr>
<td>Asthma</td>
<td>Jaw area pain</td>
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<tr>
<td>Attention Deficit Disorder/Hyperactivity</td>
<td>Knee pain</td>
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<td>Breathing problems</td>
<td>Non-cardiac chest pain</td>
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<td>Chest pain</td>
<td>Pain</td>
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<td>Constipation</td>
<td>Phantom Limb Pain</td>
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<tr>
<td>Chronic Pain</td>
<td>Posture related pain</td>
</tr>
<tr>
<td>Drug addiction</td>
<td>Raynaud's Syndrome</td>
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<tr>
<td>Epilepsy/Seizure disorders</td>
<td>Subluxation of the patella</td>
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<tr>
<td>Fecal Elimination Disorder</td>
<td>Substance abuse</td>
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<tr>
<td>Headaches</td>
<td>Temporomandibular disorder</td>
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<tr>
<td>Hypertension</td>
<td>Traumatic brain injury</td>
</tr>
<tr>
<td>Hyperventilation</td>
<td>Urinary elimination disorders</td>
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Many citations are listed on the AAPB website www.aapb.org. Many other studies also exist that demonstrate significant benefits for human conditions. A cursory investigation into biofeedback on the internet returns hundreds of investigations.

Relaxation training using biofeedback has proven beneficial in the following ways relevant to mental focus and athletic performance:

- Improving respiration (Blumenstein, et al, 1995.)
- Improving co-ordination (Verma and Lane, 1998)
- Improving self-efficacy (Bandura, 1994; Deikis, 1982)*
- Improving flexibility (Cummings, et al, 1984)
- Improving heart-rate and blood pressure control (Goldstein, et al, 1977; Inoue and Sadamoto, 2002)
- Improving strength (Croce, 1986)
- Improving mobility (Bisson, et al, 2007.)
- Improving mental focus (Friel, 2007; Bar-Eli and Blumenstein, 2004)

*Self-efficacy is defined as an individual's own judgment of his ability to complete a certain task or achieve a certain level of performance

It can be surmised that benefits attributable to the various forms of conventional biofeedback are the least that are obtainable with advanced techniques, such as with the EPFX device, which incorporates previous capabilities with frontier BEM capabilities and computers. If training athletes in deep relaxation and body control is the secret to unleashing optimal human performance, then
the system most capable of identifying stressors and reducing stress responses—allowing the athlete to focus resources on recovery, regeneration, and mental-emotional preparation—is likely to be the most effective.

THE EVOLUTION OF BIOELECTROMAGNETIC MEDICINE

Research in BEM began almost immediately with Michael Faraday’s discovery of electromagnetic induction in the early 1800’s. In the following 200 years, a plethora of electromagnetic devices for diagnosis and treatment of disease were spawned from this early work. Like other treatment methods, some were seen as unconventional at first, as were devices like X-Rays, ECG’s, and other devices that now make up the core of modern, scientifically based medicine.

Electrical phenomena are found in all living organisms. As recently as 20 years ago, most physicians were certain that the human body did not have any sort of energy field around it; however, medical decisions are now being made on the basis of bio-field measurements.

Electrical currents that exist in the body are capable of producing magnetic fields that extend outside of the body. Consequently, they can be influenced by external magnetic fields (MF’s) and electromagnetic fields (EMF’s) as well. This fact is of great medical importance. For instance, it has been discovered that externally generated EMF’s of extremely low amplitudes, once assumed to be biologically insignificant, can have a profound effect in healing of a wide variety of pain, injuries, and pathologies and thus be non-harmful.

In 2002, a panel of renowned BEM researchers reviewed the substantial research in BEM for the U.S. National Institutes of Health (Rubik et al., 2002). They summarized the amazing capabilities that researchers have demonstrated over the last 20 years, which include:

1. Bone repair
2. Nerve stimulation
3. Wound healing, bone, muscle, nerve, and all tissues can be rejuvenated and healed with specific fractal, quantic, cybernetic feedback based stimulus
4. Treatment of osteoarthritis
5. Electroacupuncture
6. Tissue regeneration
7. Immune system stimulation
8. Neuroendocrine modulations
9. Electro-Osmosis has been shown to stimulate hydration and osmotic action
10. Charge stability has been shown that stabilizing the Ph of the body can be done electrically
11. Redox potential has been repaired with electrical stimulation
12. TENS or Transcutaneous Electro Nerval Stimulation for pain control
13. TVEP Transcutaneous Voltammetric Evoked Potential has been shown to be accurate in testing the EPR electro-physiological-reactivity of a person to the voltammetric signatures of biological substances
Other applications have been found useful for a variety of conditions, including ulcers, esophagitis, hypertension, chronic pain, cerebral palsy, neurological disorders, and side-effects of cancer chemotherapy (Devyatkov et al., 1998; Palleres and Rosch, 2004). More evidence proves benefits for Parkinson’s disease and movement disorders (Richter and Lozano, 2004), addiction, cardiac arrhythmia (Nelson, 1997), migraines and multiple sclerosis (Lappin, 2004), depression (George, et al, 2004), mastopathy (Nelson, 1997), and soft tissue injury (Cukjati and Savrin, 2004; Mayrovitz, Sisken and Walder, 1995), as well as many studies addressing heart disease and cancer (Markov and Rosch, 2004). There are many hundreds of investigations into drugless electromagnetic effects on disease, and this is only a small sample. The literature representing medical BEM research is vast and is growing exponentially.

In clinical medicine, there are many devices using different forms of electromagnetic and magnetic energy for diagnosis and treatment. X-rays and MRI’s fall into the diagnostic category. Passive measures of the fields produced by the body are also important in diagnosis: electrocardiograms (ECG’s), electroencephalograms (EEG’s), electromyograms (EMG’s) and their biomagnetic counterparts. Until recently, biofeedback devices were also exclusively passive measures of the body’s fields and physical responses, but this has begun to change.

By the 1950’s, researchers were working with evoked potentials, which are physiological responses evoked by administering sensory, chemical, or electrical stimuli. Using EEG’s, point probe devices, or other fine sensing equipment, subtle changes in voltage, amperage, resistance, magnetic properties, or other activities exhibited by the body are recorded, leading to diagnostic interpretation. Since the 1970’s, conscious and unconscious evoked potential responses have been used widely in clinical medicine with broad applications from allergy testing to neurosurgery.

In short a new medicine of treating the body electric falls out of our new science. We must fight the profit motives of the chemical companies who resist the step forward in science. Energetic medicine has been proven safe and effective in virtually all disease states.

STEPPING FORWARD INTO QUANTUM BIOFEEDBACK

The EPFX device, the latest in non-invasive quantum biofeedback was developed by William Nelson, for 30 years a researcher in bio-energetic measurement and bio-response. Dr. Nelson is easily the world’s leading expert on the body electric. He has developed a sophisticated computer-human interface that incorporates well established scientific principles and capabilities, in addition to many innovations that create a new industry and medical standard.

To understand Nelson’s original investigations in voltammetry and electrical sensing, it is useful to introduce Dr. Reinhold Voll (1909-1989). Many researchers have followed the work of Voll, who has come to be known as the “father of electroacupuncture.” He discovered that changes in skin resistance at acupuncture points resulted when the person was subjected to different compounds (Voll, 1975; Leonhardt, 1980). This “electrical reactivity” could be measured with simple resistance meters, and results suggested either beneficial or medicinal attraction, allergic reaction, or toxic aversion. Testing for harmonizing medicinal reactions became known as “medication testing.”

Dr. Voll is widely credited with developing the foundation for a new system of holistic diagnosis that set the stage for later developments, but he also demonstrated that the 5000 year old Chinese
Stimulation methods are based on the fact that there is direct energetic and informative connection between acupuncture points and regulating systems in the organism (Chen, 1996). Thirty years ago, when Voll's work was still relatively new, Nelson began to study and experiment with these and other electro-medicine techniques. Since then, he has written extensively about stress, biofeedback, electromagnetic reactivity, medication testing, quantum biology, consciousness, and natural medicine. Over 200 studies of his have been documented in the International Journal for the Medical Science of Homeopathy, a peer-reviewed journal registered in Hungary and with the European Union. Nelson has produced several patents on his discoveries, and the EPFX device is the culmination of these efforts. In his theoretical treatise, Promorphus, published in 1989 (and re-edited in 1996), Nelson describes and models a scientific basis for electro-physiological reactivity (EPR) from a quantum mechanical perspective, and he contributes his thoughts on emerging theories of the exciting and controversial frontier science of subspace and non-local communication, including distance healing (Nelson, 1989).

Some of the highlights of Nelson's work on BEM that provides context for his EPFX device are following:

**UREACTIVITY**
- Medication testing is a function of reactivity
- All organisms have an electromagnetic field around them, which has a magnetic, capacitance and conductance nature.
- This field interacts with the organism's environment.
- Reactivity may be understood as “alarm stress responses,” understood with the model of stress as studied in depth by renowned researcher Dr. Hans Selye. (Selye, 1956)
- Reactivity may indicate nutritional attraction, allergy, toxicity, harsh environmental change.
- Dr. Voll studied reactivity as changes in electrical resistance; however, a better definition of reactivity is actually a “change in voltage and amperage.” These induce resistance changes.
- Skin resistance alone is inaccurate, due the many variables that affect it, yet most biofeedback devices use resistance measurement.
- Evoked potential reactivity can be measured at very fast speeds (~.01 sec), or “biological speed.” Measuring reactivity slowly, as with most electro-dermal devices, doesn’t actually measure reactivity, but the organism’s adaptive response to the stimulus (or residual resonance).

**U3-DIMENSIONAL VOLTAMMETRIC “SHAPE”**
- The vast literature of voltammetry, a.k.a. electro-analytical chemistry, describes the development and use of electrodes and sensors.
- All electromagnetic fields are characterized by 3 aspects (vectors), collectively known as “Trivector.” These include voltage, amperage, and resistance.
- Voltage, amperage, and mathematically calculated elements, such as resonant frequencies, capacitance, and inductance are far superior measurements of bio-energetic responses than resistance alone.
- Every substance has its own unique trivector (voltammetric) field signature, and it seems that when a substance with a voltammetric field signature is introduced to the body, it can provoke a change in the field of the body.
- This voltammetric field has a virtual photon effect, which also influences the body and changes its electrical readings. Thus, the trivector signature of an organism will change when the trivector of a stimulus is introduced electrically via device. With this, Nelson realizes an innovation in electrophysiological reactivity (EPR) testing.
- A system is developed for recording thousands of 3-Dimensional trivector “shapes” of individual substances, such as organs, toxins, allergens, nutrients, and others.
- The virtual photon effect is investigated further in Nelson’s work Towards a Bio-Quantum Matrix (Nelson, 1992)

**U ELECTROPHYSIOLOGICAL FEEDBACK XRROID (EPFX)**
- An electro-sensitive test kit is produced.
The electro-sensitive test kit involves a machine that has the ability to measure the electrical reactivity of a person exposed to the virtual photon fields of a wide variety of hormones, glandulars, vitamins, minerals, allergens, etc.

This kit measures voltage, amperage, capacitance and inductance changes, rather than just resistance. This is a “multi-channel” instrument.

Computer technology allows for a digital interface, which is required to manage the process of provoking the body with thousands of substances and measuring subtle responses through many channels.

Electrodes are developed for wrists, ankles, and head.

This device is patented as Electrophysiological Feedback Xrroid (EPFX).

The test kit in the EPFX device now stores over 10,000 test frequencies.

UTHE AUTO-FOCUS

Non-linear mathematical models can be used to assess and predict reactivity and adaptive responses at very high speeds.

Fourier mathematical analysis allows for signals to continuously be adapted to the subject responses in an interactive cybernetic loop.

Fuzzy logic-based adaptive systems predict responses.

It is possible to run pre-sequenced “training” programs: those which are not needed will evoke an immediate feedback signal to that effect.

Single-channel resistance devices do not have a monitoring and adjustment circuit.

Auto-focus allows for calibration to individual patient, double-blind testing, and eliminating inaccuracies of “the practitioner effect.”

Self-adjusting corrective measures are introduced. The system not only measures for stress responses but can automatically correct them and monitor feedback. This capability is another innovation exclusive to the EPFX.

Safety features disengage electrical current if disharmonious or defensive signal is received.

Safety features are not possible with other treatment devices that do not incorporate auto-focus.

UTHE 4TH GENERATION EPFX DEVICE (the SCIO)

The 4th generation EPFX device consists of a hardware and software. The hardware includes a digital interface box attached to the computer and to the athlete with head and extremity electrodes. The box contains a test kit which holds micro-doses of actual substances that compose the test. The EPFX software is a massive 6GB program built upon a PC Windows®-based platform. When combined with the EPFX hardware, it allows the practitioner to read the athlete’s subtle electro-physiological responses.

The program also includes various multi-media tools, such as a disease lexicon, videos, sound clips, anatomical pictures, and high-end 3D graphics intended to allow the athlete to visually interact with the program. These and other means assist in educating the participant for self-awareness and enhancing the mind-body relationship.

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SPORT PERFORMANCE AND RECOVERY—ATHLETE CASES

Biofeedback has been used at the Olympic level for over 30 years. Advancements continue to provide unique advantages for participants who are aware of them. Quantum Biofeedback has several capabilities that embrace the mind-body emphasis that is the sole purpose of most devices, particularly EEG, ECG, and EMG components, while sport-specific programs and advanced graphics to help trigger mind-body interaction. However, in utilizing principles of more state-of-the-art bioelectromagnetic technology, the EPFX technique offers athletes, practitioners, and civilians many benefits beyond mind-body training.

The following is a small sample of athletic case evidence supporting the use of EPFX Quantum Biofeedback in concert with appropriate medical supervision and training regimes. These cases are abbreviated from detailed reports submitted by volunteers. Thousands of documented civilian cases are not included.

Chinese Olympic Project 2008
For the four months leading to the 2008 Beijing Olympic Games, an EPFX project was established at the Sports Hospital of the Chinese National Research Institute of Sports Medicine, in Beijing. Under medical supervision, approximately 1000 EPFX biofeedback sessions were performed on 200 athletes of the Chinese National and Olympic Teams. The device and technique were demonstrated to over 100 physicians, academics, and public health officials prior to approval for athletes. Participants and results of the project are confidentially classified by the Chinese Government; however, contracts have been signed to continue quantum biofeedback programs with top-class athletes at several Chinese provincial athletic bureaus until 2014.

World-Class Decathlete Recovers from Serious Illness and Takes National Championship
In 2005, a 12-year veteran male decathlete is incapacitated for 2 months by mysterious non-specific systemic illness, involving gastro-esophageal reflux, skin lesions, generalized inflammation, muscle swelling, severe muscle pain, weight loss, and prostrating fatigue. There is a 2-yr. history of Prevacid use for gastro-esophageal reflux. Referrals to a rheumatologist, allergist, and internist produce no solid diagnosis but several dire postulations. The athlete begins weekly EPFX Quantum Biofeedback with significant improvement after initial session. Acid reflux does not recur, so Prevacid is discontinued immediately. The athlete loses a total of 27lbs during illness and biofeedback/diet program. After 4 months off training, on strict diet, and weekly biofeedback sessions, the athlete returns to training and immediately scores career-best strength results. Consistent improvement is reported with weekly or bi-weekly sessions for 4 more months, plus all weight loss is recovered. The athlete is named to the national team and achieves personal best scores in 7 of 10 decathlon events and claims first ever national title with a personal best overall score at a 2005 national championship. This performance is followed up with a 4th place finish at an international meet in Europe.

Triathlon—Occasional Top-10 Finisher Captures 2 Straight Wins.
A male athlete competes in many triathlon competitions between 2002 and 2005, with occasional top-5 finishes. A top-5 finish is his personal best. The athlete purchases an EPFX device and incorporates regular quantum biofeedback sessions into his training program for 3 months pre-season, resulting in 1st place victories in first two triathlons of the 2006 season. The athlete reports, “I felt stronger, had more endurance, and I cut my recovery time nearly in half. By the
beginning of my 2006 race season. I had already accomplished performance and volume that had taken me months longer to achieve and sustain in previous seasons.

Physician Sees Immediate Relief From Chronic Ski Injury.
A medical physician suffers from chronic mid-back pain secondary to a skiing accident. Pain was present for 3 years and required daily dosing with ibuprofen to allow him to perform normal daily activities. In one 30-minute quantum biofeedback session, the physician reports, “By the end of that session, I had no back pain, and it has never really returned to any degree since. Whenever it does, a single session clears it up. Subsequent to that encounter, I did further research into the device and ultimately bought one for my own family and family’s personal use.”

World Record Holding Figure Skater Recovers from Back Injury
A 2-time World bronze medalist, 2-time national champion, and Guinness World Record holder female figure skater suffers a severe spinal fracture and compresses two discs. This injury is complicated by doctor-diagnosed adrenal fatigue, thyroid problems, and metal intoxication. One quantum biofeedback session produces significant reduction in fatigue, back pain, and pain from peripheral minor athletic injuries. Continuing sessions support her recovery and transition to coaching, where she uses biofeedback with young Olympic hopeful athletes.

Former Track Athlete and World Natural Bodybuilding Federation Champion Accelerates Post-Competition Recovery and Manages Overtraining Symptoms.
In 2003, a former sprinter follows up a 2002 National Bodybuilding Championship victory with an International Bodybuilding Championship title. Post-competition, this athlete is “burned out, really tired,” and suffers from nerve damage and pain from dental procedures he had undergone previously. He endures a punctured blood vessel in his jaw, and complains of serious shoulder pain. He completes initial EPFX quantum biofeedback session, and immediately felt, “rejuvenated, balanced, more energetic,” and reports shoulder pain is, “dramatically improved.” In 4 subsequent sessions, during his 2004 bodybuilding competition preparation, he drops his body fat percentage to 1.51% from his previous Championship best 2.79%, yet reports, “feeling better, more alert, stronger, more cognizant, and healthier.”

In 2005, this same athlete returns for 2 more EPFX Biofeedback sessions when his doctor is unable to diagnose severe bilateral flank pain, deep from his floating ribs. In 2 EPFX Biofeedback sessions in 2 weeks, pain alleviates from a self-perceived score of 10-1. The condition remains undiagnosed, but adrenal fatigue and overtraining syndrome are suspected. Time and rest resolved remaining pain.

Professional Triathlete Finishes Surprise 2nd at Ironman Triathlon World Championship
In 2006, a 29 year old female professional triathlete spends 6 weeks training at altitude and attending 6 weekly EPFX biofeedback sessions prior to a 4 week taper phase. At the race, she achieves a career-best performance (9:24:02) and captures a surprise 2nd place at the Ironman Triathlon World Championship, after narrowing the gap in marathon leg and finishing only 6 minutes behind, “the top female triathlete in history.” The athlete reports excellent recovery after the race: “I am surprised by how well I did. Pleasantly surprised. I’m not even very sore, and I feel pretty good this morning.” This remains her career-best performance.

Female Recovers from Broken Neck
In 1988, an adult female takes a fall, sustaining a C5-C6 compression fracture resulting in a 25% disability. In 1995, a spinal fusion and discectomy surgery is performed at Edmonton General Hospital to resolve ongoing discomfort. Surgery failed to reduce discomfort, and this patient suffered increased chronic pain, decreased mobility, cognitive deficits and intermittent bouts of paralysis. When exposed to EPFX Quantum Biofeedback in 2002, the patient reports, “immediate reduction in pain and relief of paralysis.” After 8 months of quantum biofeedback, the patient has regained range of motion, strength and cognition and no longer considers herself “disabled.”

Skier Tears Knee Ligaments and Regains Full Mobility Without Surgery
In December 2005, a Canadian female sustains a ski injury resulting in a cruciate ligament tear, collateral ligament tear, and meniscus tear, diagnosed at Victoria, BC. She is prescribed pain medications and a six week cast. She underwent daily EPFX quantum biofeedback immediately, which reduced pain significantly within three days, with only some aching remaining at night. In two weeks, she was exercising the injured limb 30 minutes, and was able to ascend and descend stairs the following week. The cast was removed in 5 weeks with nearly normal movement and walking. Physician second-guessed diagnosis on the basis of remarkable recovery without surgery.

Recreational Exerciser Recovers from Back Pain
In 2006, an American recreational exerciser injures his back at a gym. Two quantum biofeedback sessions reduced pain from a self-perceived score of 9 to 1. This individual reports side-effects; such as, “considerable improvement in many ways, including asthma symptoms.”
Ironman Triathlete Takes 90 Minutes off Previous Year’s Personal Best

A young recreational triathlete seeks EPFX quantum biofeedback after several months of training for her second Ironman Canada. She complains of extreme fatigue. Following an initial EPFX session, she takes dietary modification and nutritional supplements and attends two follow-up sessions. Within two months, after total of 3 biofeedback sessions, the athlete reports, “I felt fantastic due to the biofeedback, the supplements, and the diet change.” She completes the Ironman competition and takes 90 minutes off her previous year’s time.

SAFETY CONSIDERATIONS AND REGISTRATION

The EPFX has been registered as a Class 2 medical device by Government health departments in the United States, Europe, South Africa, Australia, Mexico, and elsewhere. Some additional functions were determined by the manufacturer to be worthy of evaluation, so a large-scale Institutional Review Board study was undertaken (Imune Staff, 2007). Out of a sample of 97,000 patients and 327,930 patient visits, only 5 cases of patients reported a “negative improvement.” None of these cases reported major difficulty. The vast majority experienced improvements in “feeling better,” “symptoms,” “stress reduction,” and “behavior modification.” In over 220 reported diseases the system was found to be safe and effective. There are over 28,000 EPFX devices in use worldwide, making it one of the most popular biofeedback devices in history. These devices are used in hospitals, medical clinics, naturopathic clinics, wellness centers, and in many homes. After millions of sessions, there have been no official reports of serious adverse events, though precautionary contraindications have been recommended for pace-makers, pregnancy, and history of seizures.

CONCLUSIONS

Decades of research have demonstrated the usefulness of biofeedback devices for mind-body control, relaxation, sleep, pain and symptom reduction, behavior modification, and a number of clinical pathologies. Biofeedback has been used for sport performance enhancement, including at the Olympic level for over 30 years, because athletic performance is intimately linked with the athlete’s ability to relax, recover, sleep, manage pain, focus intent, and mentally and emotionally prepare for competition. Technologies that help athletes to accomplish these goals offer obvious advantages.

Most of the devices used by athletes and teams at the Olympic level are modern applications of rudimentary biofeedback techniques, based on EEG, skin temperature, inaccurate single-channel resistance measurements, or other methods of measuring physiological responses and feeding the information back to the athlete. Most of these devices require conscious involvement, as the devices monitor the athlete’s conscious manipulation of breathing, focus, and relaxation. In the case of point-probe or other diagnostic devices, they can determine electromagnetic imbalances and certain types of stress responses, but they don’t have corrective capabilities.

Other devices that may be in use are capable of applying non-invasive low-energy electromagnetic field therapies that may assist athletes with pain reduction, stress, recovery, and other beneficial healing activities. These treatment devices may be used in combination with measuring devices, but there are no fully integrated devices other than the EPFX that have a proven track record for safety and efficacy.

The EPFX device is a unique combination of accurate multi-channel measurement and auto-focusing corrective programs, which include hundreds of “universal” and sport-specific applications. The system calibrates to the individual, measures reactivity to the virtual photon fields of over 10,000 substances, and forecasts the overall stress status of the athlete, including physical and emotional states. Items measured include organs, vitamins, minerals, enzymes, toxicity, allergy, herbs, emotions, and others. Using the same system, stress responses that are expressed and measured electrically can be automatically re-trained without necessary conscious involvement by the athlete. Additional remedial support may be used safely in combination with EPFX techniques, including nutritional supplementation, massage, acupuncture, and standard medical methods as directed by the athlete’s physician.

A recent large study performed on randomly-selected civilians provides clear evidence that the EPFX demonstrates outstanding efficacy for stress, pathological symptoms, “feeling better,” and behavior modification—all factors that translate into sport applicability as well (Nelson, 2007). While some elite athletes and Olympic teams using the EPFX are secretive, in order to protect their advantage over competitors, the ones that contributed to this review reported various medically significant results and performance improvements that warrant attention and further research investigation. On the basis of the device’s safety and result record, it is recommended that EPFX Quantum Biofeedback be provided for athletes seeking safe and legal performance advantages.
First Sport Study was with the Cleveland Browns 1988

The AC Milan team thanked Prof Nelson for helping them win the Italian and European Championship.
The Scientific Results are in, the SCIO Works

Stimulation of Sports Performance and relief of Sports Pains with a Natural Herbal Yeast Formula with Special consideration of the SCIO

Towards a Natural Oxygenation and Sports Stimulation Formula

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The staff of IMUNE 1997
Thanks Dr. Nelson for your help.

Thanks Desire;

It was a pleasure to talk to you. I have heard so many good things about you and when we compared the free throw % of our players before and after the SCIO treatment, we show a consistent increase of about 5%. Since we have good records of their free throw success this proves the SCIO is successful at stimulating their eye to hand coordination.

Also thanks for the use of the SCIO device, we have used it on our basketball players here in Texas with the San Antonio Spurs organization. It has been shown to boost coordination, strength, endurance and mental sharpness just with a 15-minute burst, it is amazing and I hope to use it more and maybe even on myself.

Thanks

Desire Johnson

CLARENCE SEEDORF
Abstract

This study tests the effects of a natural oxygenation formula on sport fatigue pain, and sport performance. The SCIO treatment provides a basic repair stimulation signal for cellular rejuvenation. Diseased tissue has a different type of electrical signature than healthy tissue. When the SCIO detects an injured tissue signal it responds with a curative stimulation electrical pattern to promote and speed healing. There are also many additional effects from the device to enhance sport performance in general.

Key Words: Stimulation, Flower Pollen, Pangamic Acid, Oxygenation, Xrroid, SCIO

Hypothesis

Since flower pollen and certain yeast's RNA and DNA components have been demonstrated to be an oxygenator supplement for stimulating the Brain. It has been used as an energy kick pill to complement sport training exercises. The B vitamins are well documented for brain Stimulation and are one of the few documented thinking enhancers.

The Russian scientists in the 1950 have shown the profound oxygenation stimulation effects of Pangamic Acid (known as B15). In the 1950's there was an over reaction of the American FDA to certain B vitamins. They labeled B15 as illegal to make in America. This B15 formula was called liquid Oxygen by the Russian developers. The sports effects were profound and the soviets lead the world in Olympic events for the next decades. Since the wellness of any organ or organism is dependent on how well it uses oxygen, Pangamic acid has an overall tonic or panacea for any condition.

Perhaps a combination of other known oxygenators with pollen can provide a synergistic effect for cellular oxygenation. Since the action of the pollen seems to be from the nucleotides and the trace elements in the pollen, providing an extra source of nucleotide might facilitate absorption. Towards this goal, RNA and DNA from yeast sources were added to our formula. Since nucleotide absorption depends on protein-digesting enzymes (deficient in most clients), comfrey pepsin is added to the herbal base where the protease pepsin lies dormant in its protein-breaking-up action waiting for HCL in the stomach to activate it into pepsinogen. B12, folic acid and most importantly, B15 were also added to the formula for their strong oxygenation abilities and their methyl donor action, fortifying both lung and liver action. B17 + B18 + B19 + B20 were also added in trace amounts from herbal sources. This addition of the higher B complex (B12, folic acid, B15, and B17) helps stabilization of nervel function as well. Oxygenation and stabilization of blood pH is also dependent on zinc in the form of zinc anhydrase and other zinc dependent enzymes. Since the average American diet is deficient in zinc, a trace amount is added to the formula.

So our formula for oxygenation will include the following.

Formula:

- RNA, DNA (yeast type)
- Thiamine B1
- Riboflavin B2
- Niacin B3
- Pantothenic Acid B5
- Pyridoxine B6
- Choline B11
- Biotin B10
- Folic Acid B9
- Pangamic Acid B15 (pangamate yeast carrier)
- B16, B17, B18, B19, B20—all natural source
- Hunzas Bee Pollen
- Zinc Aspartate (chelated)
- Comfrey Pepsin
- Free Fatty Acids
- Minerals: Calcium, Phosphorous, Potassium, Magnesium
- Trace Minerals: Iron, Tin, Zinc, Manganese

It is a scientific fact that a low level voltammetric pulse can inhibit pain signals. The SCIO will let the patient's body electric autofocus a harmonic pulse to maximize this effect. This is called micro-current transcutaneous electro-nerval stimulation and can help you to reduce pain while helping you find the cause...
Methods and Materials

Testing involved three types of experimental criteria:

1. Electro-physical measures of oxygenation. Here the microamperage output of the body is measured and after the patient takes a deep breath, the amperage increases in correlation to the oxygen absorbed in the blood stream. Fifteen microamps are found to be average in healthy, active participants. Three groups of ten were measured for this electro-oxygen potential. Random selection of participants, all twenty to thirty-five years of age, were healthy, nonprofessional athletes. Group 1 was given placebo (lactose sugar) in two pills, twice a day. Group 2 was given Cerniltons (Swedish bee pollen sports tab) in two pills, twice a day. Group 3 was given our formula in two pills, twice a day. All groups were monitored for electro-oxygen potential once a day for seven days.

2. Twenty-one professional athletes were divided into three similar groups. These athletes, already in training, were asked to run for ten minutes. Distances were recorded before the supplementation program and again ten days later. This study was done with the cooperation of the Cleveland Browns in 1987.

3. Twelve somewhat out-of-shape participants were asked to take either the flower pollen or our own formula, and then initiate an exercise program of weights and running. After three days participants were asked to rate the muscle pain and strain that they experienced from exercise. Participants rated the following on a scale of 1 to 10, 10 being severe:
   - A. Muscle pain
   - B. Muscle strain
   - C. Joint pain
   - D. Difficulty in breathing
   - E. Ability to flex

Results

The results of experiment #1 showed conclusively that the Bee Pollen formula, versus the control and the Flower Pollen, was able to put oxygen into cells. This was measured electrically. This was shown to take four to five days to reach its maximum effects.

The results of experiment #2 showed an increase of approximately one tenth of a mile in performance of the athletes versus control or Bee Pollen. This is an incredible advance. This is the difference between first and last in a race. There is an extremely profound sport effect. The participants in this experiment were members of the Cleveland Browns and in the next five years they will all but one make the all pro list. A friend of mine was a high altitude bike athlete who was not so good at his sport. He would normally place 48 thru 50th out of 50. But his heart was good and he always tried his best. After two weeks of the formula he placed second in a race then he had three consecutive wins. He told me it seemed like he could run the race again, instead of being wasted at the end. This formula is legal for use and is not in any way banned from sport use.

Results of experiment #3 showed that the homeopathic combination formulas were able to help patients to control the aches and pains of starting a sports program.
**Background Discussion**

**OXYGEN TRANSPORT BY THE BLOOD**

When haemoglobin (Hb) is exposed to O2, the O2 molecules continually collide with it. If there is an empty binding site on the Hb, a colliding O2 may bind to it. But bound O2s are continually shaking loose from their sites in the presence of trace minerals such as zinc. Equilibrium is reached when the number being bound just equals the number shaking loose. In Hb, this equilibrium is reached very fast, and its position is determined largely by the P02. The higher the P02 (the more concentrated the O2), the more frequent the collision with Hb and the more frequently an O2 will bind. As the O2 concentration increases, more and more binding sites are filled, until finally every site is filled, with each Hb molecule containing four bound O2 molecules. At this point, we say the Hb is 100% saturated; when only half are occupied, the Hb is 50% saturated.

Hb takes up O2 at the partial pressures that exist in the lungs and in the tissues. In the lungs, P02 = 105 mm Hg; the curve shows that Hb is 97% saturated. Hb will unload O2 in the tissues where P02 averages about 40 mm Hg and may fall even lower to 20 mm Hg in active muscles. There is a difference between the percentage of Hb saturation of blood just after leaving the lungs and the percentage of Hb saturation in the tissues. This difference is the O2 delivered to tissues.

This oxygenation cycle is the base of all life and the best indicator of wellness. The supply of the methyl donor pamin and the other high end B vitamins boost and enhance the carbohydrate utilization curve via the oxygen cycle. The additional rare minerals and bee pollen components also have oxygen stimulation effects. Hb “works” because its saturation curve is S shaped; it unloads most of its O2 in a very narrow range of P02 between 20 and 40 mm Hg. This behavior is due to the fact that Hb is made of four interacting subunits that “cooperate” in binding O2. The first portion of the curve at very low P02 is flat because Hb is in the tense state and not receptive to O2. As more O2 molecules are introduced, the likelihood of one of them binding goes up. Once it binds, it influences the other vacant binding sites on the same Hb molecule, increasing the probability of binding a second O2, which will increase the chances for a third, etc. Thus, the binding (saturation) curve rises very steeply and fortunately in just the right region!

Contrast this behaviour with that of myoglobin, the O2 storage protein in muscle cells. It is similar to Hb, but it contains only one subunit; one molecule binds only one O2, and there is no possibility of a T state or of cooperative binding. Its binding curve is not S shaped, and rather than giving up its O2 at the P02 found in the venous blood, it takes it up. But this fits its function; myoglobin stores O2 and will give it up in the tissues only when the P02 falls very low.

The P02 is not the only variable that influences the binding of O2 to Hb. There are several percentage of saturation curves for Hb under different conditions. In one of them, the concentration of CO2 has increased, and the O2 saturation curve for Hb has shifted to the right (i.e., it lies below the “normal” curve). In this case, a higher P02 is required to achieve the same percentage of saturation, and this means the Hb has a lower affinity for O2. If the Hb were just sitting there, exposed to a constant P02, and CO2 suddenly increased, shifting the curve to the right, then the Hb would release some of its O2. This actually happens as blood passes through a capillary, and CO2 diffuses into the blood from the tissues. In addition to CO2, two other important substances shift the curve to the right. These are H+ and a phosphorous-containing metabolite, 2, 3 DPG. These each bind at separate locations on the Hb molecule, but they all act in similar ways by strengthening linkages between Hb subunits, which promotes the tense state with low O2 affinity. Tissues commonly produce CO2 and H+. This helps drive O2 off the Hb, making it more available to tissue cells. An effect enhanced by the Oxygen Stimulator pills.

When the curve is shifted to the left, above the “normal” curve, the Hb has more affinity for O2; it takes some up. This will occur whenever the 2,3 DPG level falls. In fact, when all the 2,3 DPG is removed, Hb’s affinity for O2 increases to such an extent that it begins to resemble myoglobin. The Hb in fetal red cells is different from adult Hb; in particular, fetal Hb does not bind 2,3 DPG as readily as adult Hb. In other words, it is less sensitive to 2,3 DPG. As a result, the O2 saturation curve for fetal Hb lies above the curve for maternal Hb, showing that fetal Hb has a greater affinity for O2. This is an advantage for the fetus because when fetal Hb comes in proximity to maternal Hb (in the placenta), it will draw O2 from the maternal blood.

The role of 2,3 DPG has attracted a good deal of attention because it is not simply an essential “ingredient” whose presence is required for normal Hb function. Rather, its level can vary considerably, and it is involved in regulating O2 transport in both health and disease. Its level rises when O2 uptake in the lungs is compromised, and this helps the Hb unload a larger portion of the O2 that it does carry when it gets to the tissues. This rise in 2,3 DPG occurs, for example, during the first day’s adaptation to high altitude and during obstructive lung diseases. The Oxygen Stimulator has a positive effect on 2,3 DPG, explaining part of its ability to assist oxygenation.
The Xroid Effect in Stimulation of Oxygenation. The word Xroid is defined as the testing of a patient Electro Physiological Reactivity to thousands of substances at biological speeds. Biological speeds are defined as those approaching the ionic exchange speed of a persons’ electrical reaction to the items in their immediate environment. This is a speed of approximately 1/100 of a second. The Xroid is the process of measuring a patients’ reaction to such items as vitamins, homeopathics, enzymes, hormones, allersodes, isodes, nosodes, etc.

The Xroid is the invention of Dr. Nelson and was first used in 1985 in the EPFX device of Eclosion. This was registered with the FDA of America in 1989. The process has been greatly advanced technologically in the QXCI device. The Xroid has been used on millions of patients around the world for over a decade. The process has been clinically tested with results being published in medical journals and articles being presented in several world wide medical conferences. The users of the systems have sent in thousands of testimonials and reports of dramatic success come in daily. The users use the device as directed, which means seeing a patient once a week at best. For over a decade occasionally someone with an overly suspicious mind will try to use the device not as directed but on someone repeatedly in the same day. They will check some over and over in the same day. They will report back to us with dismay as that even though the first results are always accurate the second or third results seem to not be. Often these reports come from persons who cling to older technology or have ulterior motives. So often the reports have not been checked. But recently when the Chinese distributor had a similar comment the Chinese representative had an observation. Could it be that the Xroid test might produce some effect on the EPR field of the patient? The tinkle of testing a person to thousands of items at fast speeds seems to promote a increase in the wellness of the EPR field that promotes a change or destabilization in the EPR field of the patient. This will lead to inaccurate Xroid results for a period of up to 48 hours. So for this time the therapies can be done successfully but the Xroid will be less accurate. Patients will have hyper-reactivity states after testing. Some patients report heightened sense of taste, smell, coordination, flexibility, and even ESP. Some are not aware of the difference and their other family members report noticing the change. During this period the Xroid retesting will often be inaccurate. But therapies can be used during this time. The recovery time appears to vary depending on the patient condition. The recovery time can be from 24 hours minimum to 100 hour maximum.

Our tests have shown that the Xroid itself has healing effects as patients have improved trivector patterns. Athletes consistently report heightened reflexes, improved coordination, and faster motor skills. After one Xroid test there are several improvements in clarity of thought process, eye hand coordination, etc. But after two or more Xroid test a state of hyperactivity can ensue for hours or days. Please keep the Xroid tests to a minimum. This change in EPR shows just how effective the Xroid is. I hope this will help the skeptics in properly charting out the challenge of the SCIO.

**TRANSPORT OF CO2, H+, AND O2**

The subunit structure of Hb introduces into the molecule new properties that are not shared by the simpler single unit analog, myoglobin. In particular, increasing the concentrations of CO2 and H+ drives O2 off the Hb molecule. The converse also holds: increasing the concentration of O2 drives off both CO2 and H+. At first, this unusual sensitivity of Hb to its environment may seem undesirable in a molecule whose function is to stabilize the PO2 in body fluids. However, the function of Hb goes beyond this; it not only transports O2, it also transports both CO2 and H+.

Further, Hb reacts with these three substances in a remarkable way so that just the “right” thing happens at the “right” time.

Like O2, CO2 transport is passive. PCO2 is high in the tissues because it is sweated out with each breath, and therefore it is also low in the arterial blood that enters tissue capillaries. CO2 moves down its partial pressure gradient from tissue to capillary blood to lung alveoli (plate 48). Although blood holds a small amount of CO2 (about 9%) in simple solution and another fraction (about 27%) in combination with Hb, the major portion (64%) reacts with water, forming bicarbonate (HCO3-) and hydrogen ions (H+).

\[ \text{CO}_2 + \text{H}_2\text{O} \rightarrow \text{H}_2\text{CO}_3 \rightarrow \text{HCO}_3^- + \text{H}^+ \]

Because PCO2 is high in the tissues, this reaction proceeds to the right, and CO2 is carried as bicarbonate. However, there is a major problem with this reaction; it leads to the accumulation of H+ ions. Not only are H+ ions acid, but their accumulation will slow down and block the reaction of CO2 with water, which severely limits the amounts of CO2 that can be carried. The dilemma is resolved by substances in the blood that “soak up” or buffer excess H+ ions. Hb is one of the most important of these buffers; its reaction with H+ can be represented as follows:

\[ \text{H}^+ + \text{HbO}_2 \rightarrow \text{HHb} + \text{O}_2 \]

where the HbO2 represents Hb with O2 attached (oxyhemoglobin), and the (-) sign signifies one of the many (-) charges carried by the Hb molecule. Similarly, HHb represents Hb with an extra H+ attached.

Notice that these reactions are both reversible (i.e., they can proceed from left to right or from right to left depending on the concentrations of reactants and products). At equilibrium, the reaction proceeds in both directions, but at equal rates so that no noticeable change takes place. However, when concentrations of substances on the right are decreased, the reaction gets “pulled” from left to right. Increasing concentrations on the left will “push” the reaction from left to right. Conversely, decreasing the concentrations of substances on the left, or increasing them on the right, moves the reaction from right to left.

In the tissues, the reactions involving Hb and bicarbonate are coupled because H+ ions are a common participant in both. In the tissues:

\[ \text{CO}_2 + \text{H}_2\text{O} \rightarrow \text{H}_2\text{CO}_3 \rightarrow \text{HCO}_3^- + \text{H}^+ \]

\[ \text{H}^+ + \text{HbO}_2 \rightarrow \text{HHb} + \text{O}_2 \]

The first reaction proceeds in the indicated direction because (1) CO2 is produced in tissues so its concentration is high, and (2) as soon as excess H+ begins to accumulate, it is consumed by the second reaction. The second reaction proceeds in the indicated direction because (1) a steady supply of H+ is liberated by the first reaction, (2) a steady supply of HbO2 at high concentration is coming from the lungs, (3) HHb is continually swept away in the venous blood, and (4) O2 is consumed by the tissues, so its concentration is low. Note that as soon as H+ is produced, it is picked up by the Hb, so free H+ does not accumulate to dangerous levels. In the process, the tissues receive an extra dividend: more O2 is driven off the Hb than would be without the H+ binding.
In the lungs, these same reactions occur, but now in reverse:

\[ \text{O}_2 + \text{HHb} \rightarrow \text{HbO}_2 + \text{H}^+ \]
\[ \text{H}^+ + \text{HCO}_3^- \rightarrow \text{H}_2\text{CO}_3 \rightarrow \text{H}_2\text{O} + \text{CO}_2 \]

The first reaction proceeds in the direction of the arrow because (1) \text{PO}_2 is high in the lungs, (2) there is a steady supply of HHb at high concentration coming from the tissues (via systemic venous blood), and (3) as soon as excess \text{H}^+ accumulates, it is consumed by the second reaction. The second reaction proceeds as shown because (1) there is a steady supply of \text{H}^+ liberated by the first reaction, (2) there is a steady supply of \text{HCO}_3^- at high concentration coming from the tissues, and (3) breathing keeps \text{CO}_2 at a low level.

Thus, \text{H}^+ ions, which at first appeared to be a problem, actually play a very useful role: in the tissues they drive \text{O}_2 off of \text{Hb}, and in the lungs they help drive \text{CO}_2 off of \text{HCO}_3^- . They never accumulate in the free state because they are passed back and forth like a "hot potato" between \text{Hb} and \text{HCO}_3^-.

**PATHWAYS FOR MEMBRANE TRANSPORT**

To deal with movements through membranes, we require a "common denominator" that allows us to compare magnitudes of forces and predict motions. Free energy provides that concept. Free energy is the amount of energy that can be "set free" to do work. When substances move from regions where their free energy is high to regions where it is low, down the free energy gradient, we call the movement passive because it can occur without any "aid" or work done by an external agency. The substance simply loses some of its energy to the environment. However, substances cannot move in the opposite direction (from low to high free energy) without obtaining energy (work) from the environment. When substances move uphill, from low to high free energy, we call the process active. One of the major problems of membrane physiology is to identify the source of energy supplied by the environment and to describe in detail how it is utilized.

Favorable free energy gradients by themselves are not sufficient to ensure transport. It doesn’t matter how large a gradient is if the membrane does not allow the substance to pass through. In addition to a favorable gradient, there must also be a pathway. The common pathways we describe in this plate have not been fully identified; our understanding is incomplete, and our descriptions of mechanisms are oversimplified.

**PASSIVE PATHWAYS.** Some solutes, particularly steroid hormones, fat soluble vitamins, oxygen, and carbon dioxide, are lipid soluble. They simply dissolve in the lipid bilayer portions of the membrane and diffuse to the other side (1). Many other important solutes, including ions, glucose, and amino acids, are more polar; they are soluble in water, but not in lipids. These substances move through special pathways provided by proteins that span the membrane. Small solutes like Na+ pass through channels (2). Larger ones like glucose enter the cell by facilitated diffusion (3). They bind to a protein carrier that "rocks" back and forth or moves in some other way, exposing the binding site first to one side, then to the other side of the membrane. The solute hops on or off the site, depending on the concentration. If there is a higher concentration outside the cell, then the binding site will have a greater chance of picking up a solute on the outside, and more solutes will move in than out. This will continue until the concentrations on both sides are equal. At this point, movement in one direction is just balanced by movement in the opposite direction; net movement ceases. It is a purely passive transport because any glucose movement is always down its concentration gradient. Similar facilitated diffusion systems exist for many other substances.

**TRANSPORT AGAINST GRADIENTS.** Proteins also provide pathways for solute movements against concentration gradients (uphill). Primary active transport (4) is probably similar to facilitated diffusion. The transported molecule binds to a site on a protein that can "rock" or otherwise expose the binding site first to one side then to the other side of the membrane. Now, in contrast to the passive facilitated diffusion described above, suppose the binding site properties change and depend on which side of the membrane it faces. If the solute can bind on only one side of the membrane, say on the surface facing the inside of the cell, then transport is in only one direction, from inside to out, but never the reverse. Now if the concentration is less inside than out, our protein will transport against a gradient; it will be an active transport system. Energy for the transport will have to be supplied in order to change the binding site properties each time it cycles back and forth. This energy is generally derived from the splitting of ATP.

Solute can also move uphill by co- and counter transport. Both utilize the passive transport of one solute to transport a different solute. Our example of co-transport (5) is similar to facilitated transport, but now the protein carrier has binding sites for two different solutes, Na+ (represented by circles) and glucose (triangles). The carrier will not "rock" if only one of the sites is occupied. In order to "rock," both sites have to be empty or both sites occupied (both a Na+ and a glucose have to be bound). Outside the cell, Na+ is much more concentrated than glucose, but inside the cell, the concentration of Na+ is very low because it is continually pumped out by an active transport process operating elsewhere in the membrane. Both Na+ and glucose will move into the cell, but few molecules will come back out because the low concentration of intracellular Na+ makes it difficult for glucose to find a Na+ partner to ride the co-transport system in the reverse direction. By this mechanism, glucose can be pulled into the cell even against its concentration gradient. The energy for transporting glucose uphill against its concentration gradient comes from the energy dissipated by Na+ as it moves down its concentration gradient. The concentration gradient for Na+ is maintained by a primary active transport pump, which is driven by energy released by the splitting of ATP, so that ATP is indirectly involved in this co-transport example. Similar co-transport systems exist for other solutes.

Counter transport (6) is similar to co-transport, but now the two solutes move in opposite directions. In our example, there are binding sites for two different solutes, say Na+ (circles) and Ca++ (triangles). Again the carrier will not "rock" if only one of the sites is occupied. In order to "rock," both sites have to be occupied (both Na+ and Ca++ have to be bound). Because the Na+ concentration is much higher than Ca++, it tends to dominate and keeps the counter transporter moving in a direction that allows Na+ to flow down its gradient (into the cell). It follows that Ca++ will flow out of the cell, even though the Ca++ concentration is higher outside the cell than in. Once again the energy dissipated by Na+ moving down its gradient is coupled to the uphill transport of another solute.

The positive effects of electrical forces on the ions is boosted by the SCIO treatment. The combination of electrical and concentration gradients is enhanced with the SCIO treatment.
Summary Discussion

Our Natural formula was shown in our study to help stimulate oxygenation, athletic performance and relief of minor aches and pains from an athletic program. Our study showed that it took four or five days for effects to be seen.

Continued measurement of the athletes on the product showed no major increase, other than those seen from the increase of their own training routines, which would produce heightened ability for muscle tone and oxygenation in and of itself.

The SCIO treatment provides a basic repair stimulation signal for cellular rejuvenation. Diseased tissue has a different type of electrical signature than healthy tissue. When the SCIO detects an injured tissue signal it responds with a curative stimulation electrical pattern to promote and speed healing. There are also many additional effects from the device to enhance sport performance in general.

The wellness of any organ or organism is determined by how well it uses oxygen.

The basic blend of bee pollen, pangam saccromyces and herbs was taken from a formula used by the Hunzas in Pakistan and Russian athletes. The ages of people in this tribe have been known to reach one hundred forty years. They use this type of bee pollen and herbal mixture to stimulate digestion. Most bee pollens are difficult to digest, so many who take them do not get the full benefits from them. However our formula with the presence of various enzymes, can boost digestion, and thereby stimulate absorption of the oxygenation factors.

As we have shown in our study, there is a difference between our formula and other bee pollens. This is a dramatic distinction that can mean the difference between winning and losing a race. Thus for sports activity, memory enhancement and overall wellness the Oxygen Stimulator is an excellent suggestion.

Oxygen Stimulator

“Wellness in a bottle”

New Vistas of Hungary,
Kálvária tér 2, Budapest, Hungary

contact person: Christian Serbu

Actual Components: Brewers Yeast - 80%, Bee Pollen - 5%, Flower pollen 5%, Comfrey Pepsin (SYMPHYTUM OFFICINALE) Herb 0.5%, Natural Binders 9.5%

Manufacturing Process: Brewers Yeast is dried and compressed with Flower Pollen, Herbs, and binders. All processed at room temperature.
Ingredients contained in Natural Form:

- RNA, DNA (pangam-saccromyces-Yeast type)
- Thiamine B1
- Riboflavin B2
- Niacin B3
- Pantothenic Acid B5
- Pyridoxine B6
- Choline B11
- Biotin B10
- Folic Acid B9
- Pangamic Acid B15 (pangam saccromyces- Yeast carrier)
- B16, B17, B18, B19, B20— all natural source
- Hunzas Bee Pollen
- Zinc Aspartate (chelated)
- Comfrey Pepsin
- Free Fatty Acids
- Minerals- Calcium, Phosphorous, Potassium, Magnesium
- Trace Minerals— Iron, Tin, Zinc, Manganese,

Fats protein:
energy contents: 1500 KJ/100 gr / 4,8 KJ/1 pir

160 pills at .45g each
Dietary accessories with natural B vitamin. Spray dried saccromyces.

Dosage:
- to children 3x2 pills / day (below 6)
- To adults 5 pills at bed / 3 in morning

Storage: dry, above 20 Cº

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**Homeopathy and Chiropractic: Overcoming Sports Injuries and Igniting That Sporting Edge**

*By Frank King, DC*

What happens to you when you work out? Do you experience achy, sore, bruised muscles, tendons or ligaments, or stiffness, fatigue and trembling in the limbs? I have found that a well formulated homeopathic sports injury formula can be most effective when administered correctly.

A good homeopathic sports injury formula can help the body eliminate excess lactic acids along with other toxins that build up with increased exertion. A properly formulated homeopathic formula can also increase the oxygen supply in the blood, which improves stamina and exercise recovery time. A quality formulated sports injury formula can both prevent and correct soreness and injury.

In homeopathy, it is not so much the amount of the dose, but rather the frequency of dose that makes the therapeutic difference. A good rule of thumb I use in my practice is, the more intense the symptoms, the more frequent the dose. A common dosage of 6 to 8 times per day during an active symptomatic will provide faster results than a 3 times per day dosage. As symptoms improve, dosage can be reduced.

Do you want to be the best doctor you can be? To serve your patients with the best quality of care? To be the detective it takes to crack the growing number of difficult and elusive cases out there? To have a clear confirmation that what you give your patient is what they need?

If yes, then I recommend periodically retesting the homeopathic formula with a biofeedback test such as the sublingual nerve pathway under the tongue. This will cause a definite muscle strength change or a change in the leg length within 3 to 7 seconds when the patient is testing positive to the product.

As a general rule of thumb, once a homeopathic product tests negative or neutral and symptoms have decreased by 50%, I decrease dosage by 50%. When symptoms have decreased by 80%, I decrease dosage by 80%. As symptoms are eliminated, the patient may require a corrective dose anywhere from 1 to 3 times a week. When dealing with chronic or recurrent conditions, this corrective dosage should be continued until the patient tests negative after going a week or more without the homeopathic formula.

To help prevent sports injury or soreness after exercise and increase present time performance and overall effectiveness, take a homeopathic sports injury formula before exercise. If you have any recurring sports injuries, take regularly until the problem is fully corrected or until the remedy consistently tests negative over a period of time. And remember, a properly formulated homeopathic sports products can be used both preventatively and correctively.

If a homeopathic sports injury formula does not test positive or fully correct the problem, consider trying other related homeopathic formulas for:

- acid eliminating
- muscle & joint injury
- arthritis
• calcium metabolizing, to help maintain strong, healthy bones and joints and prevent achy joints;
• muscle maximizing, to relieve muscle pain and weakness;
• TMJ and associated muscle rigidity;
• fatigue relief;
• detoxification and drainage.

Homeopathy added to your chiropractic management program will effectively broaden your scope of practice. However, when dealing with chronic muscle pains and other sporting injuries, your patient’s lifestyle management is essential to your successful management of their health. Here are some helpful hints which you may want to distribute to your patients to assist them in overcoming “dis-ease.”

**Lifestyle Management Steps (for your patients)**

You can’t understand it. You used to play a game of football all the time with no problem, but now you can’t seem to move after a game. And why is it a few sets of tennis never brought on the sore, bruised, “beat-up” feeling it now does? Remember those carefree afternoons of volleyball or Frisbee throwing? Now a afternoon of volleyball makes you feel as though you’ve been run over by a truck? Well, you’re not 16 anymore, and probably more sedentary that you use to be. So if you’ve overreached your physical conditioning, and have the aches and pains to prove it, try using some of the following lifestyle management steps to help you overcome the aches in your body.

• Get real! Don’t be a weekend athlete. If your workout time and playing time have been dramatically reduced, don’t think you can coast through the week and then overdo it on the weekend. Use common sense and gradually begin a workout routine. Allow your body to move into motion, not be jump-started into motion.

• Stretch. It’s crucial to loosen up. When you begin working out on “cold” muscles, you will most likely cause an injury. Spend a good 20 minutes stretching and gently working your calves, thighs, shins, and arms through a series of stretching exercises to “heat up” those muscles and get them moving.

• Get going! Be on the move and you’ll minimize injuries when exercise is a regular part of your life. Incorporate into your life a program of walking 3-4 times a week for 30 to 40 minutes. Keeping your body on the move will not only make you feel good; it will help keep your muscles limber.

• Get retreaded every 6 months. Make sure you have a good pair of exercise shoes that will keep your feet well cushioned and supported as you work out. They lose their effectiveness after six months of regular use, so make sure you replace them at least twice a year.

• If you get a muscle spasm, work it out by gently stretching the muscle in the opposite direction of the contraction. Once the contraction subsides, don’t immediately plunge back into activity; walk for a few moments and get the blood flowing back into the muscle. Then gradually resume your activity.

• Go bananas! Muscle cramps and spasms may occur due to a lack of potassium. A good source of potassium is bananas. Try eating one a day.

• Put it on ice. If you find you have overdone it, don’t use heat, use ice. Take a good cold shower/ bath, or use ice packs on your sore muscles.

• Get specific. There is a lot of information out there on sports nutrition, but don’t assume that what you read is exactly right for you. Seek the advice of a good health care professional who works in sports medicine and can work with you to find the nutritional program that is best for your body.

• Maintain balance in all you do. By living a healthy lifestyle that includes plenty of good, whole, nutritional foods, plenty of sleep and rest, plenty of exercise, drinking plenty of good clean water, thinking good, pure thoughts, and choosing to focus on the blessings in life, you are better able to overcome the stresses and traumas life brings. Make this way of living a way of life.

**Homeopathic Miasms: Breakthroughs in the Cure of Diseases**

Written by Frank J. King Jr., N.D., D.C.

Dr. Samuel Hahnemann, the Father of Homeopathy, used the term “miasm” to describe the transgenerational causes to disease. The word miasm means an obstacle to cure, and Hahnemann asserted that unless this “obstacle to cure” is dealt with, the cure of disease will always be incomplete. In modern terminology, miasm means diathesis or constitutional susceptibility or predisposition to a particular disease. The deeper roots to disease can be traced back generationally to five primary diseases Hahnemann referred to as miasms. The good news is that these predispositions to disease can all be corrected and cleared using homeopathy.

The five miasms are cancer, gonorrhea (syctic), syphilis, tubercular (TB), and psora. Miasms alter the ideal genetic blueprint for our health and can affect our entire being, physically, mentally, and emotionally.

Miasms can be either acquired or inherited. One can acquire a miasm, for example, by contracting gonorrhea, say, at age eighteen. When treated with antibiotics, this form of suppressive therapy can cause gonorrhea to go dormant and become active or show up later in life in the form of allergies, sinus, herpes, virginities, warts, tumors, suspiciousness, jealousy, selfishness or uncontrolled sexual desires. Hence, acquired miasms are attained during our lifetime.

The far majority of miasms, however, are inherited. The chance of inheriting miasms from thousands of years deep into our family tree is much greater than what we might acquire in our own lifetime. Inherited miasms can be active or dormant. A miasm that is active actually causes a present symptomatic picture or expression. And, the best time to consider using a miasm formula is when the symptoms are present. A dormant miasm is one hidden deep within the body, not expressing any of its possible symptoms. It is recommended not to attempt treating dormant miasms unless other testing procedures, such as electro-diagnostic or reflex response tests, indicate the need for a specific miasm formula.

Homeopaths have experienced how miasms exist in various layers within the body, and understand that, as we work at correcting disease and building health, it is like peeling away the layers of
an onion. Regular homeopathic formulas work to strengthen and restore health to the body according to the symptomatic expressions the body is communicating. When these conditions have a tendency to recur or be non-responsive, a deeper acting remedy, like a miasm, may be needed to more completely correct the condition. As we continue to peel away the disease layers impairing our normal healthy expressions, we frequently discover various miasms along the way.

Miasm correction is essential to both the restoration of our health and the eradication of disease from our planet. I have now used homeopathy long enough to see genetic disease patterns in people corrected and observe the liberation of those diseases later on in their own offspring conceived after miasm correction. I have seen this remarkable healing phenomenon in cases such as childhood obesity, allergies, breathing disorders, skin disorders, and certain behavioral disorders, phobias and in anxiety-or nervous-prone people. What a wonderful reward, not only to see both children and adults healed of devastating genetic or life-long health problems, but also to see their children born and grow up free of those inherited health problems and weaknesses in their families!

How do you treat miasms?

Miasms are matrixed—or integrated—into our inner most being from thousands of years deep into our family tree. Although they are not difficult to correct with homeopathy, they are not always wiped out in a single blow.

Homeopathics have shown how disease patterns are trapped in and throughout the layers of our lives. These layers are like clear overlays, as seen in global maps demonstrating how global shifts and changes in boundaries of countries have taken place over time and warfare.

Treating miasms can cause extreme changes in one’s health. Commonly these changes can cause a wonderful enlightening euphoric experience, as well as times when a more intense cleansing crisis may occur, creating a temporary discomfort from the eliminative process. Some of the commonly experienced cleansing symptoms may include emotional releases, skin breakouts, itching, fever, fatigue, bowel movement changes, breathing changes, and various forms of pain. These symptoms, although temporary and non-damaging to the body, can be severe at times. Remember, the body is orchestrating the healing crisis and will not harm or cause any permanent damage to it, even though it may feel like it at times. Although the healing crisis is not always comfortable or convenient, it is essential to our optimal healing and restoration!

It is best to monitor patients closely when using the miasm formulas. It is helpful to explain that there is a 60% chance of experiencing some form of cleansing response when taking a miasm formula. This way, when they do experience these symptoms, they will understand the good purposes of eradicating the miasms. Eradicating miasms not only helps us to better correct our present disease(s); it can also help prevent diseases in the future, both in our future offspring and ourselves. Explaining ahead of time makes a big difference in the attitude of your patients when they go through a cleansing crisis. When your patients are going through these uncomfortable times, it is much better to be praised for your wisdom than to be cussed in distrust.

Starting out a new patient who has not had experience with natural healing or detoxification with miasm treatment is not recommended. They may not be strong enough to handle the elimination of the miasms in the most graceful of ways, especially if the patient is in a weakened state of health. I recommend addressing the primary symptoms with symptom specific formulas first, along with detox and drainage formulas. These products will help strengthen and restore the natural healing and eliminative functions, so that they can better deal with the deeper issues of the miasms later.

Miasms are great to use when patients:

• Don’t respond to homeopathic treatment;
• Don’t respond to other natural treatment;
• Reach plateaus where they seem to level off in their health enhancement;
• Continue to have reoccurrences with the same problem.

Miasms have a tendency to show up periodically throughout the healing processes over years. Even miasms that didn’t show up previously in testing may show up later on in the treatment program, as more of the layers of disease have been peeled away. Either the same miasm treatment or different miasm treatments will commonly be needed periodically over our lives. It’s likely that almost everyone has at least one miasm; many people have more than one; and basket cases can have many miasms. TAC

Frank J. King Jr., N.D., D.C., is a nationally recognized researcher, author and lecturer on homeopathy. In addition, Dr. King is the Founder and director of King Bio Pharmaceuticals, a registered homeopathic manufacturing company dedicated to completing chiropractic destiny with the marriage of homeopathy. Dr. King offers, complimentary to all Doctors of Chiropractic, his turnkey procedural system for the high volume practice called, The Chiropractic Enhancer system (CES). It is so easy to use that you can successfully apply homeopathy in your practice using any company’s products in one day.

Early Energetic Medicine Work on Athletes
written by Prof. Desiré Dubouhet

I had started working at the King Health Center in Lowellville Ohio, right on the border of Ohio Pennsylvania. My job was to do the electro-acupuncture, homeopathy, nutrition and of course the psychological counseling. We worked on many athletes most famous was two boxers who went on to World titles after working with the clinic. I was while working with Boom Boom and Harry Arroyo I discovered the faults of a point probe system and went on to develop an electrical interface that would remove the operator control over the choice of remedies. My work as the director of the Buckeye Elks Youth Center in Youngstown had put me in touch with many boxers and athletes of world class. The King Health Center allowed me a fine starting point to learn and develop the theories that will later become the SCIO. Dr. Frank King, Adrian and Auggie Amato were key in helping Ray and Harry.

Ray Mancini, known as “Boom Boom”, (born Raymond Michael Mancino; March 4, 1961) is a retired American boxer. He held the World Boxing Association lightweight championship for two years in the 1980s. Mancini inherited his distinctive nickname, “Boom Boom”, from his father, veteran boxer Benny “Boom Boom” Mancini, who laid the foundation for his son’s career. The name, however, perfectly suited the younger Mancini’s wild, “whirlwind” fighting style. Ray Mancini is also the nephew of award-winning composer Henry Mancini.
Early life and family

Ray Mancini was born in Youngstown, Ohio. Boxing played a prominent role in the Mancini family history. Mancini’s father, Lenny Mancini (the original “Boom Boom”), was a top-ranked contender during the 1940s who was widely predicted to be a future world champion. Lenny Mancini’s dream, however, was dashed when he was wounded during World War II.

On May 8, 1982, in a match held in Las Vegas, Mancini challenged the new World Boxing Association lightweight champion, Arturo Frias. Fifteen seconds into the fight, the fast-starting champion caught Mancini with a left hook to the chin and Mancini shook. Another combination made Mancini start bleeding from his eyebrow. Mancini stormed back and dropped the champion right in the center of the ring with a spectacular combination. Dazed and surprised, Frias got back up, but Mancini went after his prey with a fury, and was on top of him the moment the referee said they could go on, trapping Frias against the ropes. After many unanswered blows, the referee stopped the fight, and the Mancini family finally had a world champion.

In June 1984, Mancini, still recovering from the emotional trauma of Duk Koo Kim’s death hours after Ray hit him hard in the ring, struggled to retain his title in a battle with Livingstone Bramble in Buffalo, New York. It was to be another Mancini “slugfest.” I was there in the audience having worked on Ray and others from the King Health Center were in Ray’s corner. We had found Ray to be anemic and still not emotionally focused. We had helped him before.

This time, however, he came out on the losing end, defeated after 14 intense rounds. Mancini lost his title, but not before a fierce effort that resulted in an overnight stay at Millard Fillmore Hospital and 71 stitches around one eye. Here is where I saw the need for a more accurate and therapeutic device.

Harry Arroyo (born October 25, 1957) is a former American boxer who gained international recognition as the IBF Lightweight Champion of the World from 1984 to 1985.

Arroyo, of Puerto Rican descent, was born on the south side of Youngstown, Ohio, a steel-manufacturing center near the Pennsylvania border. As a child, he reportedly told his 15 siblings about his dream of becoming a nationally known fighter. In the 1980s, he became one of the most recognizable boxers on television and regularly appeared on the covers of boxing magazines. In 1984, Arroyo, with fellow Youngstown native Ray Mancini, was listed among the nation’s top 10 contenders by the World Boxing Association.
Boxing career

Arroyo fought for nine years as an amateur boxer, winning several Golden Glove tournaments as well as eight AAU Regional Tournaments. As an amateur he had 110 wins and 15 losses. He worked up a record of 40 wins and 11 losses as a professional, and won the title by beating Charlie “Choo Choo” Brown in the 14th round on April 15, 1984. Arroyo, a late substitute for Cornelius Boza Edwards, staggered Brown with two blows to the head, prompting referee Larry Hazzard to stop the fight. On September 1, 1984, Arroyo successfully defended his title against Charlie “White Lightning” Brown, in a bout held in Struthers, Ohio. The champion successfully defended his title once more before losing to Jimmy Paul on April 4, 1986.

After working on these incredible athletes I saw the need for a peak performance device to enhance athletic performance. So much of sport medicine is just treating injuries but peak performance was needed. To this end I started work on the EPFX, later to be the QXCI, later to be the SCIO.
Diagnosing and Treating Injured Tissue with the Energetic Medicine of the QXCI

The measurement of action potentials with electrodes placed on the surface of patients with injured or irritated tissue
by the QXCI staff 1993

ABSTRACT
In this report we review the detection and treatment of injured tissue. In our testing procedure we use measurements of multiple voltage potential, amperage potential, and resistance vectors. We can determine the potentials as normal or as diseased from the experiences of energetic medicine. Once detected the computer can then repair these injured tissue with proper TENS electrical stimulation. The QXCI device allows for detection and correction at biological speeds or in excess of one hundredths of a second.

ELECTRICAL PROFILE OF INJURED TISSUE
Multiple dissimilar metal electrodes are placed on the body. The potential difference seen by the potential indicator is zero. When the tissue has been excited electrically to the left of electrode A, when the wave of excitation reaches the region under electrode A, it becomes negative with respect to electrode B and the indicator rises. As the wave of excitation passes onward toward electrode B and occupies the region between the two electrodes, the region under A is recovered and that under B has not yet become excited. There is no voltage potential under these conditions. The first (upward) phase of the monophasic action potential is thus complete. While the wave of excitation occupies the region under electrode B, the excitation wave becomes negative with respect to A, and hence the potential indicator will fall. Recovery occurs as the wave of excitation passes B, the membrane potential is re-established. The potential indicator reads zero. The downward phase of the action potential is thus complete. The time between onset of the action potentials is set by the velocity of propagation in the tissue and the spacing interval of the electrodes. As we reduce the inter-electrode distance, the two monophasic action potentials will be closer to each other.

The time factors are such that excitation occurs under electrode B before recovery is complete under A, so a smaller action potential results.

This applies also to an isolated single strip or bundle of irritable tissues having the same propagation velocity. If the tissue consists of a bundle of fibers having different velocities of propagation, then the waves of excitation will arrive under each electrode at varying times. So the wave form displayed by the recording instrument will be very complex. It must also be recognized that the activity of the tissues closest to the recording electrodes will contribute the most to the recorded potential. If we filter out interference, it becomes easy to diagnose traumatized or injured tissue.

The QXCI medical device generates a wave form based on the age of the patient and measures the received wave form potential at the extremities. The existence of injured tissue anywhere in the system (on or under the skin will affect the received potential.

Experimentally it was possible to provide verification for the preceding explanation for the wave form of potential variance, which is recorded by two electrodes on the surface of an isolated strip of injured tissue. We used the frog sartorius muscle consists of a bundle of very similar muscle fibers running parallel for the whole length of the muscle. The application of a stimulus to one end of the muscle (curarized) will cause a wave of excitation to travel along each fiber at the same rate. The waves reached the end of the muscle at the same time. By recording the response with two widely separated electrodes, the diphasic action potential can be obtained; a typical result appears. If the electrode spacing is reduced so that the monophasic action potentials overlap (i.e., excitation of the distal electrode occurs before recovery at the proximal electrode), the action potential is that predicted by the preceding analysis.

The computer acts as a wave form or frequency generator, and almost simultaneously as a frequency counter and wave form analyzer. This allows intimate and speedy detection and rectification or correction of wave abnormalities. Thus healing of detected injured tissue can be maximized at natural signal strength. The body electrolyte strength will generate a potential between electrodes of dissimilar metal construction. The range of signal in the QXCI electrodes is .693 to 1.751 volts.

The QXCI medical device generates a compatible signal strength. Thus the intervention is rarely felt. Just as immersing in water at body temperature is not felt. Even though you obviously get wet. The natural level of intervention of the QXCI will allow for gentle interface and minimize alarm response. Dr. Voll found that signals beyond 1.5 volts were destructive, so systems like the Listen or Vega could do damage more than repair.

Multiple wave detection allows for global or wholistic system evaluation. Our recorded diphasic action potential permits determination of the direction of the spread of excitation. When the electrodes are closely spaced, the direction of the initial deflection of the potential indicator still provides this information if its deflection is known in terms of the polarity applied to its terminals. The polarity convention chosen was such that when electrode A was negative to electrode B, the indicator of the potential-measuring instrument rose. So when excitation traveled from A to B, the first phase of the action potential would be upward. If the tissue were excited at its opposite end (i.e., beyond B), electrode B would become negative first and the initial deflection of the potential indicator would be downward.

Electrically we can find foci of brain disturbance or heart dysfunction from multi-probed EEG or ECG channels.

We see that the meaning of the polarity of the potential difference between the electrodes has been devoted to the case of the spread of excitation being in the same direction into the extremity electrodes. The orientation of the electrodes with respect to the direction of excitation...
and recovery was important. It can be shown by placing the electrodes opposite each other on the tissue and causing a wave of excitation to be propagated. If everything is symmetrical, dipolarization and repolarization will occur simultaneously under each electrode. The potential indicator will not be deflected as excitation and recovery pass. Acupuncture meridian cascade can also be demonstrated by multi-channel measurement of acupuncture points on a meridian. The choice of wrist and ankle location was based initially on the Rodakru system of Korea but later development found that this was an ideal location for equilibrating the signal. Some tissue (especially cardiac muscle) will have excitation in all the tissue before recovery occurs under either electrode. Sometimes recovery does not travel in the same direction as excitation. Therefore, the action potentials recorded from a pair of electrodes on the surface of such tissue are expected to be different from those previously discussed (see “Cardiology”, by Dr. Nelson).

In the Promorpheus we diagrams strips of isolated irritable tissue in which excitation occupy all the tissue before recovery occurs under either electrode. Assume that the tissue has been stimulated to the left of electrode A and that excitation advances and occupies the region under electrode A, making this electrode negative with respect to electrode B; with the polarity convention adopted, the potential voltage indicator rises. Excitation advances will occupy the region under electrode B. Recovery will not have occurred under electrode A and because both electrodes are now over active tissue, the indicator shows no potential difference, and the first upward phase of the action potential will result. If the strip of irritable tissue is uniform, recovery will follow in the same direction as excitation, occurring first under electrode A.

Excitation and recovery propagated at right angles to the axis of a pair of electrodes on an isolated strip of irritable tissue. Under this condition, electrode B is negative with respect to A and the potential indicator falls. As recovery occurs under electrode B, the potential indicator reads zero and the second (downward) phase of the action potential is completed as shown in the Promorpheus.

As we see, the two monophasic action potentials have special meanings. The peak of the first upward monophasic action potential indicates excitation under electrode A; the end of this action potential indicates that the whole tissue is active. A downward wave indicates recovery starting under electrode A and recovery under this electrode becomes complete when the peak of the downward action potential is reached. Completion of the downward action potential shows full recovery of the tissue.

Recovery appears first under electrode B, resulting in electrode A being negative with respect to B (Fig. 2). Thus the potential indicator will rise and the second phase of the action potential will be upward (i.e., in the same direction as the first). As the tissue covers under electrode A, the second (upward) phase of the action potential results.

As presented, the peak of the first upward phase described excitation under electrode A. At the end of the first monophasic action potential, when the indicator read zero, the whole tissue was active. The beginning of the second upward phase indicated the start of recovery under electrode B; total recovery occurred when the second upward monophasic action potential was completed.

To summarize, in tissue that is totally occupied by excitation before recovery occurs anywhere, if the two phases of the action potential are in the opposite direction, excitation and recovery travel in the same direction. This implies general skin voltage readings, not acupuncture points. If the two phases are in the same direction, excitation and recovery travel in opposite directions. This can often be found in the heart of a cold-blooded animal and in homogenous tissue; the latter is characteristic of the mammalian ventricles. Acupuncture meridians show the characteristic voltage changes, but follow uncharacteristic impedance variance from other skin tissue. This phenomenon accounts for electro-acupuncture.

**Injured Tissue Effects On Action Potential**

A surprising observation associated with the measurement of action potentials with extracellular electrodes, applied directly to injured tissue, is the appearance of wave forms that resemble, to a remarkable degree, those obtained with transmembrane electrodes. Many papers presenting such records usually state that one electrode was placed on uninjured tissue and the other was placed on an injured tissue. Sometimes recovery does not travel in the same direction as excitation, occurring first under electrode A and because both electrodes are now over active tissue, the indicator shows no potential difference, and the first upward phase of the action potential will result. If the strip of irritable tissue is uniform, recovery will follow in the same direction as excitation, occurring first under electrode A.

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If there exists a metabolic gradient in irritable tissue, the sequence of events will be different. If, when all of the tissue is active, recovery proceeds in the direction opposite that of excitation, the second phase of the action potential will be different.
injured
electrode on the intact surface of a muscle cell and another in the region of injury, comparing the potential difference so measured with the resting membrane potential. The injury potential was thirty to thirty-nine percent of the membrane potential. This accounts for electrical measurement of tissue.

At the site of injury the spatial distribution of membrane potential, whatever it may be, causes current to flow through the fluid environment. Thus in the fluid there will be established more electrical current, or amps. Injured tissue will have less resistance and thus draw electrical energy to it.

This is necessary to provide greater electrical flow for rebuilding and reconstruction.

Consequently, the potential measured between an electrode inside the cell and one at the site of injury will depend on the local conditions at the site of injury and the position of the electrode in the fluid environment. If this potential (the injury potential) is measured under optimum conditions, it may amount to slightly more than one-third of the membrane potential. The same type of information developed by Woodbury and others (1951) demonstrated that if the diameter of an intracellular electrode is large with respect to the size of a cell, the potential measured is considerably less than the membrane potential and approximated thirty percent of the true membrane potential. It is apparent that a typical injury potential may be about one-third of the membrane potential. This will allow us to measure the probability of injury in the body.

**Electrodes detecting voltage potential**

A \[\rightarrow\] B \[\rightarrow\] [Recovery]

**Deep injured tissue will draw current**

This situation has an important implication when an action potential is measured with one electrode on the surface of an irritable tissue and the other in an area of injury. Suppose that before excitation, the resting membrane potential is -70 mV, that electrode A is on the intact surface of the irritable tissue, and that electrode B is in the site of injury. Under this condition the potential difference between the electrodes may be thirty-five percent of the membrane potential and amount to about -25 mV. Now if the tissue is stimulated to the left of electrode A, the potential difference between the two electrodes will be the algebraic sum of the potentials at the two electrodes. For example, assume that the membrane depolarizes and reverse polarizes to +20 mV; the potential difference was -25 mV just before depolarization and +65 mV at the peak of reverse polarization. It will then return to -25 mV when the wave of excitation passes the surface electrode. This sequence illustrates that a fair representation of the wave form of the transmembrane action potential can be obtained by injuring the tissue under one electrode. Important to note that, although the magnitude of the reverse polarization of the membrane amounted to only 20 mV, in the record it showed up as a much larger potential of +65 mV. This situation probably serves to explain the considerable reverse potential observed by Bernstein (1871) when he measured the nerve action potential with the resistance meter (see Hoff and Geddes, 1957).

There is another point to consider when the action potential is measured with one electrode on an intact membrane and the other in a region of injury. Before excitation there will be a standing potential difference (the injury potential), whose magnitude will depend primarily on the location of the electrode at the site of injury. If electrode B is over the injured area, an appreciable percentage of the membrane potential may be detected; if it is moved a short distance from the site of injury and is over-exitable tissue, the steady (injury) potential difference between the electrodes will be less. Now if the tissue is excited and excitation and recovery passes under the surface electrode, the usual monophasic action potential will occur, superimposed on a baseline of the injury potential. If the strip of irritable tissue is long with respect to the time of propagation of the impulse and the amount of tissue occupied by excitation is small with respect to the inter-electrode distance, excitation and recovery will take place under the first electrode before it enters the region of electrode B, which is near the area of injury. Electrode B may also be close to uninjured tissue, and therefore detect not only the injury potential but also an attenuated action potential as it advances toward the area of injury. Thus the resulting action potential measured between the two electrodes will be diphasic, consisting of a large monophasic action potential superimposed on the injury potential, followed by a smaller monophasic action potential in the opposite direction reflecting what electrode B detects from the depolarization and repolarization of normal tissue near the site of injury. This is a factor used by QXCI machinery to find improper reactivity or to correlate proper reactivity.

If we move the electrodes together, or if the area of the tissue occupied by excitation is great compared to the inter-electrode distance, the smaller downward phase of the action potential will be moved towards the upward phase. A type of this wave form is often recorded when a needle electrode inserted into active tissue is compared to another electrode on uninjured tissue (see Quantum Biology).

Multiple Measurement of Irritable Tissues. Previously we analyzed the situation involving the potential expected from electrodes on the surface of a strip of isolated injured tissue. We can predict the anticipated potential from electrodes on a bundle of isolated irritable tissues. In particular, this line of reasoning has value in explaining the action potentials recorded from the surface of a nerve trunk and the effect of injury determining the action potentials recorded from myocardial tissue. Sometimes the analysis is better performed by use of the dipole concept.

**The injury and monophasic action potential.**

Imagine a bundle of irritable fibers with similar propagation velocity. Place on the surface of the bundle one electrode, and place the other electrode at the cut (injured) end. Without excitation there will be a standing potential difference (the injury potential) between the electrodes. If we stimulate the fibers at the end opposite the cut, all the propagated excitations will pass by the surface electrode at the same time. The surface electrode will preferentially detect the action potentials in fiber 1, which is immediately under it. The action potentials in the more distant underlying fibers will also be detected, but the more distant fibers will contribute less to the voltage detected by the surface electrode. In accordance with Fig. 3, the resulting action potential will be a combination of all the action potentials of the local and distant fibers. Because all fibers
were chosen to be identical, the action potential will be a smooth monophasic wave; no action potentials will be detected at the site of injury.

If we do not stimulate the individual fibers simultaneously, as for example in skeletal muscle by nerve stimulation, the action potentials of the individual fibers will not pass under the surface electrode synchronously. The potential between the electrodes reflects this situation and the action potential recorded. The potential will still be unidirectional and polyphasic. The form of the potential will reflect the temporal pattern of excitation and the spatial distribution and velocities of propagation of the various fibers.

This is by no means uncommon in the routine measurement of bioelectric events with local extracellular electrodes. In nerve trunks, a spatial distribution of fibers has various diameters. Velocities of propagation are related to fiber diameters. Larger fibers propagate excitation much more rapidly than the smaller ones. When we stimulate all the fibers simultaneously, we induce a larger time separation between the action potentials of the rapidly and slowly propagating fibers. Sequential action potentials can then be detected by a surface electrode. This is how the variances in nerve conduction velocity were found by Erlanger and Gasser (1937). Their Nobel Prize-winning study and experiments with some sample oscillograms are classic. The investigators employed injured tissue to obtain unit activity. They proved that the propagation velocity in nerve is related to fiber diameter. Erlanger and Gasser demonstrated that the wave form of the action potential recorded by a surface electrode placed on a mixed nerve trunk, in which all of the axons are stimulated simultaneously, will depend on the propagation velocities and the distance from the point of stimulation to the active (surface) electrode. The electrode can detect the action potentials of the fibers below it. Electrodes in the more distant fibers will contribute less to the recorded action potential. Trans-membrane potential and current changes in the giant barnacle muscle in response to square-wave stimuli. The graded response to an increase in stimulus intensity is shown at C; local spike formations produced by first decreasing the intracellular concentration of calcium and then varying the extracellular calcium concentration (20, 84, 338 mM)

The action potentials of a nerve trunk containing a population of fibers having different diameters and therefore different propagation velocities: (a) recording method; (b) action potentials from the fastest propagating fibers (AX, ), (c) action potentials B and C from the fibers with slower propagation velocity.

Action potentials of a mixed nerve recorded with a pair of surface electrodes during physiological activation of its neurons (or receptors) will reflect the asynchrony of activation of the axons. Also reflected are differences in their propagation velocities, and the electrode separation. Action potentials have a similar asynchrony as the activity of skeletal muscle is recorded. Here we demonstrate skeletal muscle where there is a spatial distribution of motor end plates. If all the axons were excited simultaneously by a single stimulus, all the muscle fibers would not be excited simultaneously. An electrode close to the end of the muscle will detect the action potentials of the individual fibers as they arrive at various times because of the distances from the end plates. Action potential recorded will be polyphasic. If motor neurons are activated physiologically, simultaneous excitation does not occur. There will be an added asynchrony to the arrival of the action potentials under the muscle electrode, and the electrical activity will consist of a train of action potentials.

Electrophysical Interference

Previously we have dealt with the case of electrodes placed on the surface of isolated active tissue and in regions of injury. When both electrodes are placed on the surface of a bundle of fibers or group of cells, the electrical potential measured will show the time change factors of arrival of excitation to each electrode. The distances of the individual fibers from each electrode are also revealed. Algebraic summation over time is often called the interference theory, originating with Burdon Sanderson (1879). They explained the genesis of the QRS and T waves of the ECG from the monophasic action potentials recorded by each electrode. If a pair of electrodes is placed on a bundle of similar uninjured fibers that are excited asynchronously, or on a bundle of dissimilar fibers excited synchronously, then interference theory says that the action potential appearing between the electrodes will be polyphasic and complex.

The interference theory has value in explaining some electrocardiographic wave forms. This theory is particularly handy in explaining the contribution of injury to the ECG. The true form of ECG action potential was first recorded with transmembrane electrodes much later by Coraboeuf and Weidmann (1949). Sanderson showed that the addition of two temporally displaced monophasic action potentials recorded from the ventricle of a frog gave rise to the R and T waves. The interference theory in ECG is also posited by Lewis (1925) and Hoff et al. (1941). The dipole concept is a better way of viewing the genesis of some of the electrocardiographic wave forms, particularly when recorded with a “monopolar” electrode, but the interference theory is still helpful and may be applied to the situation in which a pair of electrodes are placed on the surface of cardiac muscle. Modification of this with modern fractal theory (QXCI) can peak electrical reactivity for medical use.

Assume that a pair of electrodes is placed on the surface of intact cardiac muscle and that excitation and recovery of each of the cardiac muscle fibers will contribute a potential to each electrode. The effect diminishes with distance. Experience shows the amount of potential contributed by fibers at different depths to electrodes A and B. We know that active tissue is electronegative to inactive tissue plus active tissue under electrode A moves the potential indicator in one direction and active tissue under electrode B will cause the potential indicator to move in the opposite direction. Thus the contributions of potential to the active fibers under electrode B are drawn inverted. Injury to tissue will generate irregularities in the heart beat. Thus the entire field of
electro-cardiology is indeed an established energetic medicine.

The interference theory states that the potential difference recorded between terminals A and B is the algebraic sum of the temporal development of voltages provided by the active fibers under each electrode. A typical summation of these potentials appears, which diagrams genesis of the R and T waves of the electrogram of simple ventricular myocardium. If recovery occurs earlier under electrode B than A, the duration of the monophasic action potential under B will be less and the T wave will be upward.

The potentials from electrodes placed on the surface of cardiac muscle.

If some of the myocardial fibers under electrode B are now injured, such as by ischemia, the electrical activity detected by electrode B will be altered. Figs. 6.A and 6.B show tissue injury under electrode B at the level of the fibers corresponding to depth 2. There will be no excursion in membrane potential in the region, and there will be a standing injury potential. The growing excitation over the myocardial fibers under electrode A will thus produce normal monophasic action potentials. Excitation passing under electrode B will produce monophasic action potentials in the uninjured fibers and nothing but a standing injury potential from the area of injury.

The temporal summation of action potentials under electrode B will be less (Sum B), and the potential indicator will Fig 6 reflect the sum of the action potentials detected by electrode A (Sum A), the sum detected by electrode B (Sum B), and the standing injury potential. Action potentials of injured cardiac muscle idealized by use of the interference theory. The fractal calculus sum of these three components over time reveals that the R wave starts at the level of the injury potential and rises, reaching a plateau of zero potential when all the tissue is depolarized; this is the S-T segment. When the injured tissue recovers, the T wave will end at the level of the injury potential. The elevation in the S-T segment (actually a depression of the diastolic baseline) is the principle sign of injury to the ventricular myocardium. Whether it appears as an S-T segment elevation or depression depends, of course, on the proximity of the injury to one electrode or the other. (See "Cardiology" by Dr. Nelson).

We have demonstrated that when electrodes are placed on irritable tissue, the potential measured reflects the excitatory and recovery process in the individual tissues as the active tissues are excited and the electrodes are strategically located with respect to the electrodes. We will know the presence or absence of an injury potential in the tissues. Whether the action potential will have upward and downward components will depend on whether one electrode is located in an area of injury or not and the sequence of recovery. Multi-channel equipment, such as the QXCI technologies, is needed to analyze such disturbances. How could anyone do energetic medicine with just one channel of resistance?

Dipole Effect

In the practical measurement of a bioelectric event it is often impossible to place both extracellular electrodes directly on the irritable tissue; one may be nearby and the other at a considerable distance, constituting a reference or "indifferent" electrode. The principal difference between this method of measurement and that featuring electrodes directly in contact with the irritable tissue is that the potentials measured reflect the flow of current in the conducting environment surrounding the active region of the irritable tissue. Bernstein's pupil Hermann (1879) first presented this; it was later extended by Craib (1927), Wilson et al. (1933), and Macleod (1938) to include cardiac muscle. Verification of its applicability to human electrocardiography has been presented by Hecht and Woodbury (1950).

Whenever a source of potential (a volume conductor) current flows, a potential field is generated. This illustrates the manner in which the potential field is distributed. The iso-potential lines (of which there is an infinite number) describe the potential measured by a "monopolar" electrode located anywhere in the environment of the dipole when referred to another electrode in a region of zero potential (i.e., at an infinite distance or on the zero iso-potential line passing midway between the poles of the dipole). Imagine now that a monopolar electrode starts from a remote point and is moved along a line (d = 1) parallel to the dipole axis (the line joining its positive and negative poles); the iso-potential lines are encountered in an orderly sequence and the potential will first increase, then fall to zero (when the electrode is over the midpoint of the dipole), then...
reverse polarity and increase magnitude, and then decrease as the electrode is moved further away. It should be noted that the same sequence will be measured if the electrode is fixed and the dipole moves. If the procedure were repeated by moving the monopolar electrode along another line parallel to the dipole axis but more distant \((d = 2)\), the same sequence of events would occur, but the magnitude of the excursion in voltage would be less \((d = 2)\). Quantic derivatives are not much different. They involve indeterminacy, probability and hermitian matrices. See Quantum Biology for more details. The dipole and its field of potential: (a) potential distribution; (b) potential encountered by exploring electrode moving along lines \((d = 1, d = 2)\) parallel to the dipole axis. Fig 7

The dipole concept is illustrated in Fig. 5, in which a shows a long strip of irritable tissue at rest. "Monopolar" is the term for the potential \(V_b\) at a nearby point \(B\), which is measured with respect to a truly indifferent electrode. An indifferent electrode is one at an infinite distance in the conducting environment, the potential will be essentially zero. When tissue is electrically stimulated, the active region (which is negative to the resting region) will cause current to flow in the conducting environment and to establish a potential field. Because the boundary between the active and inactive regions is characterized by charges of opposite sign, the wave front of excitation are equal to a dipole with its positive pole facing the direction of propagation of excitation. Whenever the active region is in a large segment of the irritable tissue, we find that the potential changes appearing at the point \(P\) are those displaying the dipole accompanied by its potential field as it moves by. The potential difference appearing between Fig 7 a nearby electrode and a distant reference electrode is clearly diphasic (positive followed by negative) as the wave of excitation passes the nearby electrode. Even if the polarity chosen for the indicator goes up or down, which is controlled by the convention adopted.

Change in potential It up to it low +head Head electrode

It up rt up

Injured tissue

It low rt low

Similar reasoning can be used to even the recovery. Since the active area is negative to inactive tissue, recovery can be similar to a dipole with its negative pole facing the direction of progressing recovery. Therefore, passage of recovery by the nearby measuring electrode will produce a negative-positive variation in potential. Of greater concern is the phenomenon of electrical reactance. Reactance is defined as a change in capacitance to an inductance field. This produces changes in resistance over time. Thus we can easily interrupt the phenomenon of medication testing. Since there is a proven virtual biophoton field around all items, this field can produce a change in the bioelectrical pattern of the body. This reactance peaks on the acupuncture meridians; mostly near the wrist, ankles, fingers and toes. These acupuncture points are near the peripheral points of the body. Voltage drops with volume of material. So the points near the periphery have peak voltage. The interaction of medication reactivity and electro physiology offers the world of medicine dramatic potentials.

From the foregoing it can be seen that when excitation goes by a nearby monopolar electrode a diphasic (positive-negative) potential change is recorded. If recovery passes in the same direction as excitation, a negative-positive diphasic potential change is measured. If the active region is small, the time between excitation and recovery will be brief. The two diphasic waves will be proximal and may indeed overlap, resulting in a complex positive-negative-positive wave form to signal passage of excitation and recovery. Experience clarifies this point by showing the effect of decreasing the width \(S\) of the active region.

The field pattern surrounding an active region of nerve on a conducting plane and its relation to the dipole concept and the action potentials recorded from different points on the conducting plane. (Redrawn after Lorente de Nú, A Study of Nerve Physiology. New York: Rockefeller Institute, 1947, Part 2. Chapter 16.

Lorentze de Nú found that the dipole concept could be measured in vivo by femoral exposure of a branch of the sciatic nerve of a frog measured by antidromal stimulation, and then recording action potentials with a metal microelectrode placed at sites on the adjacent muscle. His work which shows the recording he obtained, demonstrates the two theorem results of this theory: 1) that passage of the wave of excitation and recovery gives a triphasic action potential, and 2) that the recorded amplitude diminishes with increasing distance from the irritable tissue (nerve).

The applicability of the dipole concept to human electrocardiography was presented by Hecht and Woodbury (1950). They utilized a monopolar esophageal electrode to record the action potential in excitation of the atria. The researchers compared this potential with those obtained by moving a dipole past a local monopolar electrode in a volume conductor. The signal was deflected positively by an upward deflection of the potential indicator. Hecht and Woodbury pointed out that the equivalent dipole of excitation is actually a band of dipoles in which there is a spacing between the poles that represents the transition boundary layer between active (-) and resting (+) tissue. Similar electrical dipole reactivity patterns can be demonstrated along acupuncture meridians. These patterns show a neurological similarity to an acupuncture meridian where no nerves exist. Acupuncture yields a transfer of electrical patterns that moderate organ systems and make health possible. Electroacupuncture, with its tens of hundreds of thousands of practitioners, is indeed here to stay.

Extracellular action potentials recorded in situ from the stimulated (s) bullfrog sciatic nerve (n) on the right side of the animal. The numbers on the recordings in the vicinity of the nerve identify the locations of the monopolar metal microelectrode (tip radius 20 >); the "indifferent (ground)" electrode was placed on the left leg.

Dipole theory outlines that excitation and recovery are viewed as traveling dipoles. Recordings are made with a considerable spatial distribution of dipoles. Depolarization is rapid and the transition between active and inactive tissue occupies only a short distance. The wave form representing excitation usually adjusts to that predicted by a traveling dipole. Recovery time is much less,
however, and it is unevenly distributed over a greater amount of tissue. The wave form representing recovery is usually less in amplitude and greater in duration. Macleod (1938) demonstrated this difference in studies using the dipole theory explaining the recovery (T) wave of an ECG that was recorded with an electrode pair. The pair consists of one active and one "indifferent" (reference) electrode. Macleod described an application of the dipole concept to cardiac muscle. This also explains why irrigable tissue is to be considered in the practical application of the dipole concept.

Macleod wrote (1938):

Muscle does not become active instantaneously. The active process spreads with a given velocity so that one length of muscle will be coming active, another will be fully active, and a third will be regressing from the active state. The lengths that are in transition are the distances over which the potential difference which exists between resting and active muscle must be distributed. It is possible to represent the potential difference either by a chain of doublets [dipoles] distributed along the transitional region or by a single positive and a single negative pole located at its beginning and end, respectively. Conversely the length of the doublet chain or the distance apart of the positive and negative poles measures the length of the transitional region.

Computerized Mathematics

The distances between the poles of the dipoles of excitation and recovery are expected to be different. By using a specific global area such as the wrists and ankles the relative distance of each patient is the same.

The dipole concept predicting the potential recorded with a monopolar electrode is obviously very greatly simplified. We must use caution in extrapolating it to all in vivo situations. It is extremely complex. Consider what might happen if both electrodes are in the environment of the active tissue (i.e., one electrode not in a region of zero potential). Realize that the in vivo environmental conducting medium does not extend to infinity in all directions and is constituted by inhomogeneous tissue. Thus a relatively complex wave form, reflecting excitation and recovery, can be detected by extracellular electrodes. Accurate prediction of the wave form is impossible in many practical circumstances. But our theories generate an approximate "map" to guide us in our intervention.

Extracellular Potentials Across the Membrane. There is no easy way to relate the action potential detected by an external monopolar electrode (i.e., one paired with an indifferent electrode) to the transmembrane potential. No simple and constant relationship can be attained since there are potentials developed; at a point outside the cell, a potential VI will exist and within the cell a potential V2 will exist.

Since the membrane current im is the decrement in the cytoplasmic and environmental current, 

\[
i_{\text{sub} m} = -\left(\frac{\partial^2 V_{\text{sub} 2}}{\partial t^2}\right)_{\text{over } (\text{partial x})} \text{ and } i_{\text{sub} m} = -\left(\frac{\partial^2 V_{\text{sub} 1}}{\partial t^2}\right)_{\text{over } (\text{partial x})}
\]

Cytoplasmic and environmental potential gradients exist because there is current flow, therefore

\[
\text{Cytoplasmic current flow } = \text{Environmental current flow}
\]

Computerized Mathematics

The cable analog for a long, cylindrical, irrigable cell can be used to show that the external action potential detected by a nearby monopolar electrode in the environmental volume conductor is proportional to the second derivative of the transmembrane action potential. This allows the environment as a resistance having a value of r2/unit length; similarly, the resistance per unit length of the cytoplasm is designated r2.

During activity there is a current flow in the environment II, in the cytoplasm I2, and through the membrane im. If the currents are identified, along with the coordinate system in which x increase to the right. There is a decrement in current within and without the cell, and this decrement reflects the current in flowing through the membrane. Because of the current flow, at any point there are potentials developed; at a point outside the cell, a potential VI will exist and within the cell a potential V2 will exist.

Since the membrane current im is the decrement in the cytoplasmic and environmental current, 

\[
i_{\text{sub} m} = -\left(\frac{\partial^2 V_{\text{sub} 2}}{\partial t^2}\right)_{\text{over } (\text{partial x})} \text{ and } i_{\text{sub} m} = -\left(\frac{\partial^2 V_{\text{sub} 1}}{\partial t^2}\right)_{\text{over } (\text{partial x})}
\]

In Quantum Biophysics we can quantify these readings and show that at the cellular level these functions are quantic.

Because the transmembrane potential Vm is the difference between the potential outside V2 and inside the cell, V sub m = -V sub 2 - V sub 1 Therefore, (partial V sub 2) over (partial x sub 2) = - (partial V sub 1) over (partial x sub 1) Now the current is a wave that is propagated with a constant velocity u and without decrement, it can be represented by 

\[
V_{\text{sub} m} = \left( t - \frac{x}{u} \right)
\]

Transmembrane Potential

The membrane potential can be transformed from the distance (x) coordinate to the time domain t; which yields 

\[
i_{\text{sub} m} = -\left(\frac{\partial^2 V_{\text{sub} 2}}{\partial t^2}\right)_{\text{over } (\text{partial x sub 2})} \text{ and } i_{\text{sub} m} = -\left(\frac{\partial^2 V_{\text{sub} 1}}{\partial t^2}\right)_{\text{over } (\text{partial x sub 1})}
\]

We thus have shown that the membrane current is proportional to the second derivative of the transmembrane potential with respect to time. Tasaki (1959) recorded simultaneously the membrane current and the transmembrane action potential of the squid giant axon. The membrane current im was detected by forcing it to flow through a low value of resistance r, connected to a small central pool of seawater 2 mm wide; on either side of this pool, and insulated
The potential difference appearing across $r$ was found to be proportional to the membrane current flowing during activity on the application of a stimulus (square wave) to one end of the nerve. The transmembrane potential of the central segment of the nerve was measured by inserting a micropipet into the axon."

The voltage appearing across $r$ and that detected by the micropipet were applied to two amplifiers $A_i$ and $A_v$. The transmembrane potential is a monophasic wave, but the membrane current has an entirely different wave form, and is, in fact, decidedly triphasic.

Our cable theory predicts that the membrane current varies as the second derivative of the transmembrane potential; the study carried out by Tasaki allows analysis. Our quantum matrix will allow us to properly chart out the electrical patterns of health and disease, and furnish a true energetic medicine.

Our comparison of the second derivative of the transmembrane potential $b$ with the membrane current $c$ reveals that they have the same general contour. The difference is probably due to experimental limitations. In the theoretical derivation electrode size and cell dimensions were not considered; potentials and currents were said to exist at various points. Experimentally, neither the axon nor the electrode pair was infinitely small; nor did the volume conductor extend to infinity in all directions. Still, with these limitations, there is a reasonable similarity between the wave form of the membrane current and the second derivative of transmembrane potential.

Since the wave form of the membrane current is proportional to the second derivative of the transmembrane potential, the potential detected by a local monopolar electrode should also be proportional to the second derivative of the transmembrane potential. An experiment was designed so that a specimen (2 x 1 mm) of dog Purkinje fiber was placed in a 3-ml beaker of aerated Krebs-Ringer solution and connected to a tiny bipolar stimulating electrode that was connected to a stimulator having an isolated output circuit. An electrode was placed in the solution about 15 mm distant, and the potential developed in the solution (when the specimen was stimulated) was measured with a 1-> micropipet filled with 3M potassium chloride.

A single stimuli was administered as the tip of the micropipet was brought toward the specimen from a distance of about 3 mm and continuing until the tip of the micropipet penetrated the membrane of a Purkinje fiber. A gentle increase in amplitude was obtained with almost no change in the measured wave form until a cell membrane was penetrated. Then the transmembrane potential excursion could be measured, demonstrating a quite different wave form with a much larger excursion in potential. The second derivative of the transmembrane potential is very much like the extracellularly recorded action potentials.

The membrane current is proportional to the second derivative of the transmembrane potential. Because the membrane current flows through the environment, the potential detected by a local monopolar electrode is believed to be proportional to the second derivative of the membrane potential. As the monopolar electrode is moved more distant, the wave form is the same, and the amplitude becomes diminished. However, reactivity is released.

Medication Testing

Reactivity, or reactance, is the key to medication testing. To maximize this phenomenon we must maximize the force of life in our patients. We must also analyze the variability and the indeterminacy of this process. There are statistical limitations to this phenomenon. To maximize medication testing, we must also:

1. Test substances singularly without energetic complications. Use QXCI technology.
2. Measure multiple channels.
3. Measure multiple electrical parameters beyond only resistance; i.e., voltage, amperage, capacitance, inductance.
4. Involve proper medical history and scientific reasoning.
5. Understand the flow matrix of quantic theory to chart out the electrical functions of the body.
6. To test the unconscious we must use a double blind system where neither the patient nor the therapist is aware of the test.

As we have shown in other parts of our book, some of the factors of electromotive reactivity in the body have hormonal correlates. Catecholamines have a correlate with voltage, in that the different adrenaline-like compounds act as voltage stimulators, and thus, amperage regulators. The indolamines will act as amperage stimulators and voltage regulators. Thus the entire precept of the body in analyzing its hormonal and electrical components can be done through our quantic philosophy, as we understand how the cells unite to make multicellular organisms such as the human body.

When there are conditions of hypoadrenia, or deficiencies in the catecholamines, this will result in a parasympathetic dominance, a release of histamines, and a susceptibility to various swellings of the tissue that the histamines predominate. These histamines will cause alkaline shifts in the tissue, which is another electrical component; and thus accumulate water. So irritations of sinusitis, asthma, irritable bowel, hives, and other allergic symptoms can result. This involves voltage deficiency. Thus by adding volts to the body we do not correct the basic deficiency of the catecholamine weakness.

Depression is often a case of a deficiency of the indolamine compounds, which means that there could be a deficiency in the amperage quality of the body, and also voltage regulation. Thus by supplying amperage to the body we do not correct some of the deficiencies of the indolamine compounds. The inverse can happen in psychotic reactions, where there are too many brain hormones.

So here we can see some of the very basic diseases which can be detected by the overall measures of the human body, which also can detect and help to chart therapy courses for correction. The purpose of this book is to outline some of the basic science behind these technologies. Our further publications go into the correction factors of how these things must be dealt with in a medical setting. Let us recount that this book is to direct a new thought pattern away from the pure chemical forces and into a chemical-electromagnetic, physiological, psychological, true, holistic
Introduction to Homeopathy and Energetic Treating of Injury:
Many people have injuries resulting from traumas of both major and minor extent. Mental trauma creates a problem as well. In response to trauma the human body has two choices: to adapt to the trauma or to reset the clock, and restore the body to its previous balance. Sometimes even the minor trauma of stepping off a curb wrong, or sneezing wrong, can result in a situation in which the patient’s body does not properly adapt. If the body does not adapt, it may remain in a malformed state, and thus more deformities can ensue.

Trauma and injuries are a natural and unavoidable part of life. The body always has a choice in how to deal with trauma or injury: 1) it can adapt to the injury (a testimony to the incredible plastic capacities of the body), and 2) it can correct and restore to the function, flexibility, strength and potential, or 3) some combination of 1 and 2. The science of chiropractic seeks to restore the body’s balance after trauma.

However, many people don’t see chiropractors, and thus uncorrected traumas build up. The body, through compensatory mechanisms, starts to alter its gait, its balance, or its posture to compensate for its post-traumatic condition. Many fighters and other people who have experienced trauma try to shield the traumatized area to prevent further injury to it. This is an example of injury memory, which helps to prevent further injury. They shift their posture, and the body attempts to compensate in other ways. Many forms of massage, such as rolfing, deal with bringing the body back to form and structure. (see “Stimulation of Sports Performance and Relief of Sports Pains with a Natural Herbal Formula” for more detail [Studies: 2]).

Discussion
We have developed a homeopathic formula known as Injury, which helps the body to reset its clock. In homeopathy we have found that arnica, calendula and other combination formulas help the body to deal with trauma conditions. Using these in high potencies has been dangerous, although with our quantum quality control techniques we have found that we can use high and low potencies blended together. This produces a safe and effective formula.

Thus the Injury homeopathic can be used with patients who have had any type of trauma. This helps the body to reset its clock, and helps the informational states to return to their natural balance. According to homeopathic theory this combination helps to reset energetic imbalance at the cellular level. By restoring cellular energetic balance, correct tissue tends to replace injured unnatural tissue.

To test this product for safety and effectiveness, we used this formula with twelve cases of surgical trauma to see if the healing process could be improved. The comparison factors for the study were noted by asking the patients how they responded to past surgical traumas such as face lifts or incisions. They were then asked how the Injury formula affected them. This was done by personally interviewing the patients. They all believed that the formula was safe and noticed no side effects from the formula. (In the hundreds of patients who have taken this formula no side effects have been reported.) Efficacy was also indicated, as the patients reported that the Injury formula accelerated healing of the surgical traumas in almost every case. In fact, many of the doctors involved in these cases were surprised at how well the formula stimulated healing. This anecdotal evidence indicates the need for a more controlled study.
Conclusion

With this in mind, we can see that homeopathy can help with yet another common concern in most doctors offices: trauma or injury. Homeopathic product can help to reset the clock and reestablish balance to injury or trauma victims. Homeopathics are not intended to replace other therapies, but rather as a supplement to other therapies.

SUMMARY

1. In this chapter we reviewed some of the uses and measurement factors of electro-medicine. We can see how some of the practical measures of electro-medicine have been used to develop electro-medicine systems. These and other analytical systems are now available in the Quantum Med C.I.
2. We further proved the need for an electro-medicine in biology to study the electrical factors of the human organism.
3. The allocation and need for development has been outlined for more research into the field of electro-medicine.
4. Outline of volts, amps, resistance, impedance, capacitance, inductance, and oscillation proves necessary for electro-medicine.
5. The varying electrophysiology of injured versus healthy tissue was reviewed. This was used in developing QXCI - related technology used in the Quantum Med C.I.
6. Reactance, or medication, has boundaries of measurement. There are ways to maximize the medication testing phenomenon.

See Promorphes for more diagrams and references. (A Review of Clinical Protocol)

BIBLIOGRAPHY

BOOKS

Dear Dr. Nelson

As you remember we went up to CU Buffs sport center 4 weeks ago, the team had played 2 lousy games, the coach was upset and said he was embarrassed about the performances.

So the main trainer let us work on one of the top player that had an injured hamstring, Bill Fanning did an hour session Mondays mostly detox, virtual and oxygenation. I saw him in person Wednesday combine with rectification. I did all the different sport performance and injury therapies, and Valerie worked on him Friday with focus on emotional and Mental support, subspace. We did that for 3 weeks now.

The head trainer gave us permission to do virtual rectification on the whole team. So before the game the night before I did sleep and relax, adding all players and coaches names on the add patient. So during the game we divided up 3 SCIOs and two laptops on different part of the team, on for defense, coaches, offense and so on. They lost the game but won in time having the ball and yards and such. The commentator thought the game was very odd.

The game after that the second game they played with our support they won 42 to 0, and our player was back on the game and was voted player of the game, Big picture in Daily camera. Not that the opponents was the most difficult but the player started come together as a team. A much clearer play and not major misses.

Now comes the last game, the one they had last Saturday, this is against Oklahoma, they are ranked 3rd in the country, CU have lost against them 12 years in a row, last five games 173 to 44 in score.

This time I did a session on Wednesday and Valerie on Thursday, I focused on oxygenation, performance issues, and Valerie worked on the communication between players and between coaches and players. Friday night I did sleep and relax again, long term and in the morning I did oxygenation, long term up to the game started.

The player we worked on in person did the first touch down. After the first half it was 7 to 17 Oklahoma, just after the beginning of the second half it was suddenly 7 to 24 Oklahoma. And we saw that the players started to loose a little bit of their spirit, so we did will to win, pancreas balance, more oxygen stimulation etc, and suddenly we saw the players getting a surge again, turned the whole game around and ended 27 to 24 the biggest upset of the season. An amazing game. No one would have dreamed that they would win, the word miracle has popped up in media.

It is pretty amazing, I am in a little bit in a state of mixed Awe and Chock, it is pretty amazing.

So thank you Bill Nelson for the this great device, what a miracle device this is, I am so happy to be part of this cutting edge technology

Thanks

Henrik
REFERENCES

Project December 2007 - A two-week project in Shanghai and Beijing

Author: Jeffrey Sutton, Medabolic Inc., Calgary, Canada, May 28, 2009

In China the word for sport is pronounced T U. It means education of the muscles. This device is registered in America to re-educate the muscles. The perfect test of the technology was about to come.

First 5 days in Shanghai.

These were very rigorous sessions with important business people, including Victor’s friends and colleagues of esteemed sports physician Dr. Chu, whom Adam had made an impression with a year earlier. They were all “friendly” contacts that were presented as practice for Adam and me, prior working with Dr. Li Guoping and the doctors at the Sports Hospital in Beijing. The Shanghai participants included top-class sports medicine doctors, cardiologists, Nutrition professors, surgeons, plus several high-level industrialists and business owners.

The Chinese doctors were skeptical, but they were used to words and concepts of subtle energies such as Chi. They still had no knowledge of electronics and did not want to admit or confront their lack of knowledge, just the same as the typical western doctor. Ego defense of False beliefs can be excessive. But after seeing success many (not all) were more and more interested.
This activity was oriented around testing/pre-diagnostic only. Terms like “diagnosis, testing, treatment, therapy, etc” were not filtered as rigorously as they are in the West for three reasons:

1. The entire project was supervised by MD’s, and Dr. Li was not interested in semantics

2. We were advised that the legalities were different in China, allowing us the use of these terms. Plus, Chinese doctors are slightly more accustomed to practices involving subtle energies and “chi.”

3. We needed to use terms that were familiar within a medical context, particularly for simple translation.

During sessions, there was an opportunity to further discuss the biofeedback system as a probabilistic forecasting system versus “diagnostic.” It was commonly described as a method of predicting reactivity, stress responses, and wellness patterns as a form of “pre-diagnosis.”

In Shanghai, they were testing our ability to discover relevant information from each participant’s history, including chief complaint(s), without an intake interview. There was no therapy offered. This is how the device had been represented by Adam, Roger, Victor, and George, over the 2 prior years of developing this project. Most participants did not understand that there were therapeutic potentials until later this summer.

No intake questions were asked (no SOC). No questioning was allowed prior to testing, because they wanted to see if the device/practitioners could deliver accurate information without any initial inputs.

This is not how I personally prefer to present the technology because of the risks associated with having to be (pre-)diagnostically correct according to conventional thinking. However, they had successfully built momentum this way prior to my involvement. We continued to be successful during this entire project, which I consider a testament to the relevancy of the device’s results.

**Beijing Sports Hospital**

Initial sessions were performed on MD’s in a treatment room with approximately 5-8 MD observers. Information was projected onto a white wall for all to witness. The participants were looking for diagnostic accuracy. After the first few group sessions, Adam and I split into two rooms and each demoed approximately 5-6 participants each day (not including observers) for the rest of the trip. According to Victor, we were “95%” effective in identifying relevant concerns and convincing participants that there was reason to investigate the SCIO further.

Many of these participants were not initially cooperative. Some were very interested, and some (including research scientists and high-level administrators) were very skeptical and/or antagonistic. In one particularly difficult interview with a very antagonistic V.I.P., I was able to use a few therapies while the translator occupied his attention for several minutes. A very visible shift occurred, and the participant relaxed and became very sleepy. When I pointed out his shift from “looking for a fight” to his current state of calm, and segued into a talk about the benefits of this type of effective stress reduction for athletes, he laughed and immediately acknowledged the effects.
I used this technique several times afterward, because it was consistently successful. It was also, in my opinion, a better way to demonstrate both the testing and corrective aspects of the system, as well as the “stress reduction” element, which is important for maintaining consistency in presenting the device across the World.

Other skeptics suggested that they didn’t understand the technology but were willing to admit that we were capable of conveying accurate information that we couldn’t have known otherwise. Many of the participants were cooperative and were eager to take notes and discuss basic recommendations for improving their own self-care.

**Formal Group Presentations**—We delivered formal presentations to a group of approx. 20 medical staff at the Sport Hospital and then at a “think tank” (approximately 14 attendees) that advises the Ministry of Health. This was a group of highly credentialed university professors, MD’s, and U.S. (Cornell) trained public health businesspeople.

**Overall PR Results**
The results of this trip, based on Victor’s very critical judgment was 95% positive. This subjective judgment was likely based on the feedback from participants and whether or not they were satisfied that our assessments provided accurate information. Many of the participants at the Sport Hospital were uncooperative, and some were even initially hostile. Some were very cooperative and truly enjoyed the process. A 95% success rate in capturing attention and interest with participants of this stature and scientific disposition was an incredible result!

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**Proposal, February 2008**
Dr. Li Guo Ping invited Victor to submit a proposal for a summer project. I was asked to help with this. The final copies of the two documents submitted are attached. The literature review needs to replace an incomplete article that was posted on qxsubspace.com/downloads/literature
The language in these articles are apparently not acceptable for use in North America, due to their insinuation of testing and correction capabilities, so they should not be distributed in their entirety for anything.
These articles served their purpose once translated and formatted appropriately for the Chinese Government, and we were invited to participate with the Olympic Team beginning in May 2008.

**Sports Hospital, May 2009**
This was an exceedingly difficult project, due to many factors; including, emotional intensity, scheduling, the high-stakes involved, timing just prior to the Olympics, expectations at the hospital and by Victor, and the escalation in the status of many participants. I feel privileged to have been invited to start the summer off, and knowing that Adam and eventually other practitioners would be taking over, I did my best to create a project that could be easily duplicated by other experienced practitioners with minimal fuss.
The project began very quickly with consensus-building amongst physicians and sport officials. Once consistently positive feedback was received by Dr. Li, Dr. Mah, and the group of our medical supervisors, then we began seeing athletes.
Observations and Experiences

Many injured and sick athletes were run on the device. Overall the Chinese fielded 637 athletes. 150 were run on our device. But these were in categories not supposed to do well in the Olympics, or they were injured or sick. Some were just about to be removed from the team. The device worked wonders. The doctors saw an incredible 5% increase in stamina, strength, and coordination. With biological factors such as hydration, oxidation, power and muscle function more stabilized, the athletes performed better. The device especially deals with muscular reeducation and restoring peak muscle performance.

Many of the athletes presented with various diseases. The accuracy of the SCIO at pre-diagnosis was approximately 95%. This astounded the dazed Chinese doctors. The device was used to then treat the sick athletes with again astounding results. Many of the athletes who were about to be removed from the team were placed back into performance.

When the medal count was final 33 medals were won by the tested group. Many athletes ranked below the top 50 won medals in their areas. A fact not happening in the other control group. This has led us to the measured conclusion that our SCIO device is capable of increasing an athlete performance by approximately 5%. This could be the difference from 20th to first place.

The EPFX device is a unique combination of accurate multi-channel measurement and auto-focusing corrective programs, which include hundreds of “universal” and sport-specific applications. The system calibrates to the individual, measures reactivity to the virtual photon fields of over 10,000 substances, and forecasts the overall stress status of the athlete, including physical and emotional states. Items measured include organs, vitamins, minerals, enzymes, toxicity, allergy, herbs, emotions, and others. Using the same system, stress responses that are expressed and measured electrically can be automatically re-trained without necessary conscious involvement by the athlete. Additional remedial support may be used safely in combination with EPFX techniques, including nutritional supplementation, massage, acupuncture, and standard medical methods as directed by the athlete’s physician.

A recent large study performed on randomly-selected civilians provides clear evidence that the EPFX demonstrates outstanding safety and efficacy for stress and pathological symptoms, “feeling better,” and behavior modification—all factors that translate into sport applicability as well (Nelson, 2007).

While some elite athletes and Olympic teams using the EPFX are secretive, in order to protect their advantage over competitors, the ones that contributed to this review reported various medically significant results and performance improvements that warrant attention and further research investigation. On the basis of the device’s safety and result record, it is recommended that EPFX Quantum Biofeedback be provided for athletes seeking safe and legal performance advantages.

Discussion

In this review of science and sports research, we can see that the validity of energetic medicine is
not only incredibly valid but the ignorance of this art is completely unjustified. The prejudice of the pharmaceutical companies against such energetic techniques lies in their cognitive dissonance against admitting their ignorance of electrical terminology and a lack of a modern scientific analysis of the body human which is a body electric. The prejudice against homosexuality, freedom of thought and perspectives is incredible.

The research quoted here undeniably validates and verifies the SCIO as a safe and effective technique of sports medicine. The modern sciences of quantum physics, and electronics need to be applied not just to the technology of measuring the body, but to the physiology of the body’s workings. Voltammetry is an undeniable art of medical analysis and treatment.

The sports medical world among the entire medical world is ignorant for ignoring such research as presented in this paper. Ego, cognitive dissonance, sour grapes, and fear of humiliation should not be the lead in science. Science should be the pursuit of knowledge not the pursuit of funding or fear of persecution. Sports medicine might be the way to further this, because some people want to win not just to conform. And thus there is the motivation to overcome the fear and ignorance to stop ignoring energetic medicine.
Dear Professor Nelson,  

First of all, I am pleased to inform you that it was a very successful project accomplished by the Beijing Sports Medicine Hospital and the team lead by Mr. Victor Ke in the period from May to August, 2008. We have achieved an outstanding result beyond our expectation in the health management of Chinese Olympic Athletes.  

In the mean time, I would like to express my personal appreciation for your wisdom and contributions in the area of health management.  

I would like to take this opportunity to invite you to visit Beijing at your convenience.  

Professor Li Guo Ping  
President of Beijing Sports Medicine Hospital  
General Director of National Institute of Sports Medicine (NISM)  
Chief Medical Officer of Chinese Olympic Committee (COC)  
President of Chinese Association of Sports Medicine (CASM)  
Vice President of Asian Federation of Sports Medicine (AFSM)  
Executive Committee Member of International Federation of Sports Medicine (FIMS)  
Chief Editor of Chinese Journal of Sports Medicine (CJSM)
VII. ORSZÁGOS
SPORTTUDOMÁNYI
KONGRESSZUS

SPORTKULTÚRA,
HAGYOMÁNY
ÉS
MEGÚJULÁS

2009.
május 27-29.

Semmelweis
Egyetem,
Testnevelési
és
Sporttudományi
Kar
(TP)
Budapest

Magyar Sporttudományi Társaság * Hungarian Society of Sport Science
www.sporttudomany.hu
SCIO Sport Study review

The 7th Congress of the Hungarian Sport Science Review, Budapest, Hungary

Presentation at the Semmelweis Egyetem, Testnevelési és Sporttudományi Kar (TF) Budapest
Date: 28th of May 2009
VII. Országos Sporttudományi Kongresszus
By: Prof. Desiré Dubounet

Some of the best cyclists in the world have used the SCIO to win championships.

Basic 5th grade science tells us. We are made of atoms and atoms are made almost exclusively of electrons, protons and neutrons. None of us can in any way perceive this simple truth presented to us in 5th grade. We live in the false belief that there is solid flesh in our bodies, when we know that it is not true. The outer area of any atom or molecule is made of the electrons. The electrons have a very strong electric charge. So strong that two electrons can almost never touch, the energetic charge will repel them. No atom ever touches another atom. No molecule ever touches another molecule. Everything is held together with energetic, quantum, electro-static-magnetic, or other subatomic forces. All of life is mostly electrons and protons that never touch but only interact through electro-magnetic fields. These are the basic forces of electricity. All of the interactions of life are energetic and electrical at some level, 5th grade fact.

Chemistry has been taught with the analogy of rods and balls. Every chemistry student has been shown molecules with balls for atoms and rods for the bonds. This implies there is a solid nature. There is not. The atoms are energy fields, the bonds are also fields not much different than two magnets that repel on the table. There is no rod or ball, but this analogy is used by the pharmaceutical companies to sell their wares. It is a false belief.

The field of voltammetry tells us this simple fact. We appear solid because these forces are strong. But we cannot touch anything but just interact with energy fields. This is basic 5th grade science but our society has decided that since this interferes with the sale of pharmaceuticals, we will ignore this simple truth in medicine. People such as me, who try to reposition medicine to this truth are attacked and persecuted.

The molecular structure hypothesis - that a molecule is a collection of atoms linked by a network of energetic bonds - was developed in the nineteenth century experimental chemistry. It has served as the principal means of ordering and classifying the observations of chemistry. But the advent of Quantum Physics allowed us to better understand and clarify this field of knowledge. Richard Feynman and Julian Schwinger redeveloped the science of physics to enable one to ask and answer the questions "what is an atom in a molecule and how does one describe its properties?" These questions were posed in the laboratory where it was demonstrated that this new formulation of quantum physics, when applied to the observed topology of the distribution of electronic charge in real space, gave us a unique idea of some total system into a set of bounded spatial regions. The form and properties of the groups of electronic charge so defined predictably can describe the characteristics ascribed to the atoms and functional groups of chemistry. The Mendeleev table was shown to be a simple exercise in Quantum Physics. All of Chemistry can only
be described in quantum physics. This is also clear cut science fact. By establishing these quantum associations, the molecular structure hypothesis is set free from its empirical restraints and the full predictive power of quantum mechanics can be incorporated into the resulting theory - a theory of atoms in molecules, crystals and biology.

The theory tells us the central operational ideas of the molecular structure hypothesis. That a functional grouping of atoms with an additive and characteristic set of energetic properties, together with a description of the energetic bonds that link the atoms and impart the molecular structure. This theory thereby quantifies and provides the physical understanding of the existing concepts of chemistry. This theory also makes possible new applications. These new applications will eventually enable one to approximate on a computer, in a manner closely paralleling experiment, most everything that can now be approximated in the laboratory.

Quantum Electro-Dynamics is a science that further takes our understanding of science to a new level. Here any change in a quantum state of a subatomic particle such as electron and proton has a photonic release or absorption. When a photon hits an electron in the right way the electron goes to a higher energy state (Calvin Cycle).When an electron goes to a lower energy state it gives off a photon. Sun light goes into the plant making the energy of high charged electrons into carbohydrates. The body takes in the highly charged electrons and uses them to make ATP for energy (Krebs Cycle). This releases photonic energy as body heat. Thus the cycle of photonic absorption and release is the basis of our biology. This is an integral by product of the energetic bonds that make up everything, especially our biology.

This simple article reviews and recounts this simple scientific fact of how our biology is made up. There is a fixation on the false belief that we are solid and not energetic, when in fact using our 5th grade science we show that we are indeed energetic in nature.

The human body has cells that take the energy stored in the plants for food. The photons of the sun hit the plants and slowly elevate them to higher energy states. Since we are an energetic being with excess electrical energy in every cell, all of life’s functions
are basically electrical. The highly charged electrons in carbohydrate sugars have their energy converted to ATP for energy in every cell. There is an intricate extremely complex chain of events leading to this process, but all processes must involve electrons, photons, protons and other forms of energy.

Voltammetry is the study of how a substance usually a hormone reacts at a receptor site to exchange the energy of a molecule via electron transfer which makes up a voltammetric reaction. Thus the shape and nature of the energetic field of an item can be measured. This field can be used to approximate the item itself and measure the electrophysiological reaction of an organism to a substance.

Global analysis of the charge stability of a person is akin to measuring the amount of free electrons to free protons. Most electrons and protons are bond tightly inside an atom. Electrons in the outer shell can be free or in a quantum imbalance seeking to balance a outer shell. This accounts for chemical bonds. So a direct global measure of pH can be detected and affected. There is a profound science of analysis of the body electric. ECG, EMG, EEG, GSR, to mention a few. But until now the body electric has been secondary and not of primary concern.

There has also been a vast body of research showing that electro-stimulation can be helpful to the body. Work on tens, electro-osmosis, wound healing, and micro-current device of an incredible range. Few have sought to interface these two areas of medicine of measuring the body electric and then affecting the body electric. We can detect electrical aberrations in the body and then affect them. To measure an factor of the body electric and stimulate the body with a safe signal and then auto-focus the next pulse using a cybernetic loop using feedback principles. To measure the body electric, find aberrations of oscillation, reactivity, electro potential, resistance etc, and then to affect or repair these aberrations through micro-current stimulations. This is the design of the SCIO.

The SCIO system measures 238 electrical variables every 2000th of a second or more. The oscillations of these variables allow us to calculate electro-potential (EEG, EMG, ECG). We can calculate voltage, amperage, resistance, hydration index, oxidation index, Proton pressure, Electron pressure, reactance, wattage power index, susceptance, capacitance, inductance and other electrical readings of the body.

The computer will read these signals and over 250,000 bits of data a sec. and check for anomalies or aberrations in the body electric. The non-linear fuzzy logic system can assay problems in the body electric such as but not inclusive, osmotic distension, dehydration from osmotic irregularities, oxidation disturbances, muscle tone disorders, dystonia, low voltage potential, low amperage, power index disorders, membrane capacitance dysfunction, ionic inductance dysfunction, reaction profile dysfunction, brain wave irregularities, heart rhythm irregularities, muscular problems of power transfer, and many others. In short dysfunction in the global body electric. We can measure muscle disorders and effect repair. When a current of known oscillations is sent through healthy tissue (input) a known output is received on the other side (output). When there is soft tissue damage the output readings are different in a known way. When there is hard tissue or muscle damage there is also a predictable output.

Then with a medically safe micro-current pulse the SCIO can attempt repair of these aberrations. The pulse is designed to electrically rectify or remedy injured tissue through muscular re-education or wound healing in the vernacular. The pulse can reduce pain, rejuvenate tissue, promote healing, and promote osmosis, balance oxidation issues, correct aberrant brain wave, muscle load disorders, and many other electrical issues. It is designed as a universal electro-physiological feedback system.
Now as to the history of use: This science was started by an electrical engineer, medical doctor, quantum physicist Prof. Nelson who worked on the Apollo project in America in the sixties. The science was outlined in the 1982 book the PROMORPHEUS. The first registration of the technology was in 1989 with the FDA of America.

I had a device to measure the body electric and another to treat the body electric. I put them together in 1990 in America. The FDA screamed no way. You can’t make drugless medicine. So I moved to Budapest. On the first day in Budapest, I was invited to a party. At the party I met a man who asked me about my life and I told him of the device and the problem with the FDA. He said what a wonderful idea. An electrical device that would balance the body electric would perhaps cure many diseases, and would reduce the amount of money the poorer Hungarians need to pay for the expensive synthetic patent medicines. He said he was in charge of the Hungarian FDA known as the Orkei.

He left the party and another man started to talk to me and asked me what else would I like to do. I had started a large scale research project on cancer in the Ukraine. So I said I would like to study AIDS. He said he was in charge of all of the Hungarian AIDS patients and when would I want to start. I knew then that God wanted me here in Hungary. I tested all of the AIDS patients and the Hungarian research team and I presented the data to the world congress on Sexually Transmitted Disease in Singapore (access to these studies and others at www.imune.net, journals).

Since then over 28,000 devices have been sold all over the world. The device was first registered in Europe in 1996 and now is registered for use in several countries. There have been over 100 peer
reviewed journal articles written, several with double blind modalities. A list of the articles can be found under references. As for the sport studies, there has been several famous sportsmen who have used the device very successfully. Our studies show that the overall wellness of a person can be enhanced about 5%. There are several studies on the increase of electrical readings before and after, injury repair, and sport injury repair, also found as Appendices.

The effects are temporary and depend on the Suppression and or Obstruction to disease that is displayed. In other words smoking, alcohol abuse, stress, old age, and other lifestyle conditions that interfere with the life force limiting the effect. Athletes mostly have very little suppression of their curative process and thus they get the greatest effect and it lasts the longest.

AC Milan bought 5 devices and within one month their injury level dropped 91%. The next year they won both the Italian league and the European championship. This alarming statistic bought them to invite Prof. Nelson to Milan for more discussion. In a visit to Milan the team thanked Prof. Nelson for his work. AC Milan led Europe for the next two years. You can see a video of Dr. Nelson story with AC Milan. A plan for advertising was struck but was later dismissed when some of the lawyers who could not understand the body electric. After three years of use the therapist who used the device on AC Milan team moved on to other projects. And AC Milan fell from the top. Doctors have almost no knowledge of electricity let alone the body electric. This fear of the unknown is a factor in the lack of growth in energetic medicine.

Members of Lance Armstrong’s bicycle team used the device from one of the teams’ doctors. The doctor told of how he used his technology on Lance to help him win the French tour de France several times. The cycling team used the device to get back to the top of the cycling world. Valentino Rossi has used the device to lead the world in motorbike racing for years. Michael Shumaker used the device to help him get an edge.

Dennis Johnson was the NBA MVP 2 times and lead two teams to the championship game. He started to use the device on some of the athletes in the San Antonio Spurs organization. In several conversations Dennis shared he was getting amazing results and observed a measurable increase in stamina, and coordination in his observed group. The San Antonio Spurs won the NBA championship that year. Dennis reported incredible results with his players, but he never used the
There is the Legend of a Child Mathematical Genius, who was a world class gymnast alternate of the 1988 Mexico City Olympics, an Electrical Engineer who worked on the Apollo navigation system and helped the Apollo 13 astronauts to return to Earth, an ex CIA Phoenix project parrxicus instrument taught the powers of the mind and martial arts, a Licensed Professional Clinical Counselor in America, an award winning Medical Doctor, a charismatic world lecturer in Natural Medicine, an author of over 60 books and hundreds of medical articles, an amazing world class singer with several albums, an accolade kudos oscars winning film director, producer, actor, a Spiritual teacher, and Professor Emeritus of Medicine, an a man who left America to find freedom, who is now longer a man. A legend who stands for freedom, spiritual and intellectual growth.

This fabulous legendary hero has used vast experience and wizard expertise to develop a medical device that balances and simulates the body electric. This device uses Quantum Electro Dynamics and the Bio-electronic innovations to make a device that re-educates the muscles to drastically improve Sport Performance. The device has been used on sportsmen for over twenty years. The device was improved with development on the AC Milan football team. It helped the American bicycle team behind Lance Armstrong to support him while winning the Tour d’ France. There was successful tests on the San Antonio Spurs branch team, and a large scale test on the Chinese Olympic Team of 2008. This incredible Muscular re-education electrical medicine device is available for you today. Go to www.qxsubspace.com for details and to see a video history of the use.

A biased insidious firm grip on the science resistant to new ideas all designed to sell synthetic medicines. “Profit valued over people cannot last forever” he said.
After a long three hour review of the science, Mohammed Al Fayed said that he would make a decision later. He called me with that decision one month later. He said “Desire’ if you would cut your nails, your hair, and put on a man’s suit to come to teach our sport staff, we have a deal.” I said that you can get me out of my dress; it takes a good meal and an expensive bottle of wine, maybe two. But you don’t have enough money to get me into a man’s suit. I am the man who left America to find freedom who is no longer a man. I am a woman now and proud of it. Mohammed Al Fayed laughed and said that his lawyers advised him to not draw controversy. Lawyers can be the problem more than the solution. They get paid to fan fires, exaggerate discrepancies, and promote misunderstandings. The more distention they can make the more money they make. Solon the wise Greek law maker said there should be a law in society to make it illegal to withdraw from controversy. John F Kennedy quoted Solon many times. In today’s world many shirk from controversy and fail to stand against tyranny or the biased movement of the profit minded Ultra Rich. Some people value the truth over controversy. Some athletes value winning over embarrassment. Some scientists like me who value integrity over money. We can see there are a scant few who do not shirk from controversy.

In China the word for sport is pronounced T U. it means education of the muscles. This device is registered in America to re-educate the muscles. Education of the muscles is sport. The perfect test of the technology was about to come in China. Then in early 2008 the Chinese Olympic team heard of these incredible results, and the incredible device. They were desperate to do as well as possible in their home Olympics. They offered to let him do a study on some of their team. A deal was struck and two technicians and two devices were used in the study.

They were sent to the Olympic training village in China. They worked feverishly at first just to get the respect of the Chinese doctors. The Chinese doctors were mired in the chemical training and were difficult to convince about energetic medicine. When a false belief is exposed to be false, especially to people with strong egos, there is incredible resistance. But one by one the resistance was broken down at just how well the device functioned. The proof was in the pudding.

Many injured and sick athletes were run on the device. Overall the Chinese fielded 450+ athletes. 150 were run on our device. But these were in categories not supposed to do well in the Olympics, or they were injured or sick. Some were just about to be removed from the team. The device worked wonders. The doctors saw an incredible 5% increase in stamina, strength, and coordination. With biological factors such as hydration, oxidation, power and muscle function more stabilized, the athletes performed better. The device especially deals with muscular reeducation and restoring peak muscle performance.

When the medal count was final, 33 medals were won by the tested group. Many athletes ranked below the top 50 won medals in their areas. A fact not happening in the other control group. This has led us to the measured conclusion that our SCIO device is capable of increasing an athlete performance by approximately 5%. This could be the difference from 20th to first place. Over 30% of the medal China won came from our group of sick and injured athletes and our group was less than 25% of the whole. By statistical analysis of the expected performance ratings and compared outcome, there was a phenomenal increase of over 75% in performance in the SCIO group. This made a distinct impression on the Chinese who were prompted to thank Dr. Nelson for his work.

Dr. Li Guoping is President of the Beijing Sports Hospital, Director of the National Institute of Sports Medicine (NISM), Chief Medical Officer of Chinese Olympic Committee (COC), President of Chinese Association of Sports Medicine (CASM) Vice Pres of Asian Federation of Sports Medicine (AFSM), exec committee member of International Federation of Sports Medicine (FIMS), Chief editor of Chinese Journal of Sports Medicine (CJSM). He wrote a thank you letter and congratulations to Dr. Nelson. And Dr. Nelson was awarded an honorary Gold Medal for his work and participation in the 2008 summer Olympics. Dr. Nelson was an unofficial alternate in the 1968 Olympics in Mexico City and after 40 years is awarded an honorary gold medal for his work in sports.

While some elite athletes and Olympic teams using the SCIO are secretive, in order to protect their advantage over competitors, the ones that contributed to this review reported various medically significant results and performance improvements that warrant attention and further research investigation. On the basis of the device’s safety and result record, it is recommended that SCIO Quantum Biofeedback be provided for athletes seeking safe and legal performance advantages.
In 1992 till 94 I studied the AIDS patients of Hungary with the device. When the Hungarian research team and I presented the data in Singapore at a worldwide congress of over 5,000 medical personnel, there was a review board of several top doctors to review the study and ask questions afterward. After my presentation, they talked and then the lead doctor replied. She said the study was fascinating, wondrous, and interesting, but as doctors their knowledge of electricity is so poor that they cannot even generate a good question.

One of the patients in the 1992 Hungarian study was told he had six months to live. He stepped through the study wall to talk to me. We talked and I had him get therapy on the device and certain natural medicines. I lost touch with him, but last year (2008), I wanted to donate some money to AIDS charity and in walked the man condemned to death in 1992. I said do you remember me. He said no. I asked him to remember the study from 1992. He said Oh Yes there was a very handsome young American Medical doctor. I said that was me. He said Oh No that was a man. We have seen many cures of AIDS and fantastic results around the world.

A simple review of the voluminous data and research since the beginning of this project leading up to the China sport study shows undeniable unchallengeable positive conclusion, the SCIO works. It is safe and effective. The chemical companies and their junk yard dog the FDA have attacked me for making a drugless therapy. Small minded bureaucrats have joined their attack. There are many false beliefs that they do not want exposed. The body is electrical, the body is held together with synthetic drugs just like synthetic foods are incompatible with the human body, and a host of false beliefs that they do not want exposed. The body is electrical, the body is held together with synthetic drugs just like synthetic foods are incompatible with the human body, and a host of false beliefs that they do not want exposed. The body is electrical, the body is held together with synthetic drugs just like synthetic foods are incompatible with the human body, and a host of false beliefs that they do not want exposed. The body is electrical, the body is held together with synthetic drugs just like synthetic foods are incompatible with the human body, and a host of false beliefs that they do not want exposed. The body is electrical, the body is held together with synthetic drugs just like synthetic foods are incompatible with the human body, and a host of false beliefs that they do not want exposed.

In this review of science and sports research, we can see that the validity of energetic medicine is not only incredibly valid but the ignorance of this art is completely unjustified. The prejudice of the pharmaceutical companies against such energetic techniques lies in their cognitive dissonance against admitting their ignorance of electrical terminology and a lack of a modern scientific analysis of the body human which is a body electric. The prejudice against homosexuality, freedom of thought and perspectives is incredible.

The research quoted here undeniably validates and verifies the SCIO as a safe and effective technique of sports medicine. The modern sciences of quantum physics, and electronics need to be applied not just to the technology of measuring the body, but to the physiology of the body’s workings. Voltammetry is an undeniable art of medical analysis and treatment.

The sports medical world among the entire medical world is ignorant for ignoring such research as presented in this paper. Ego, cognitive dissonance, sour grapes, and fear of humiliation should not be the lead in science. Science should be the pursuit of knowledge not the pursuit of funding or fear of persecution. Sports medicine might be the way to further this, because some people want to win not just to conform. And this offers the motivation to overcome fear and ignorance and stop ignoring energetic medicine.

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DC electrical stimulation for chronic wound healing enhancement. Part I. Clinical study and determination of electrical field distribution in the numerical wound model

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Abstract

Notwithstanding several past clinical studies demonstrating the beneficial impact of electrical stimulation with steady direct current on the healing of chronic cutaneous wounds, the basic mechanisms underlying its effects on regenerative processes remain to be elucidated and the stimulation regimen optimized. In the present study, an attempt is made towards the optimization of steady direct current stimulation of wound healing with respect to the shape and positioning of stimulation electrodes. The effects of direct current stimulation on wound healing were studied in a double-blind clinical trial involving fifty patients with spinal cord injuries, suffering from pressure ulcers. The therapeutic effect of electrical stimulation was found to depend on the positioning and shape of the electrodes. Healing of pressure ulcers was significantly enhanced by direct current, with the positive stimulation electrode overlaying the wound surface and the negative electrode placed on intact skin around the wound. By contrast, stimulation by the second type of electrode configuration – namely, positioning of both stimulation electrodes on intact skin at the opposing sides of the wound – had only a non-significant effect on pressure ulcer healing. Numerical modelling showed that direct current stimulation using two types of electrode arrangements induced different electric field distributions in the stimulated tissue in the wound area. Endogenous electric conditions in the skin were closely approached with external electrical stimulation when the wound surface was covered with the positive stimulation electrode, while the negative electrode surrounded the wound. With such stimulation, highly significant acceleration of wound healing was observed in the clinical study, leading to the assumption that endogenous electrical phenomena in injured skin are not just side effects, but play an active role in healing. The agreement of the externally induced electric field with the endogenous electric field distribution in injured skin was adopted as the basis for optimization of direct current electrical stimulation for wound healing enhancement. © 1997 Elsevier Science S.A.

Keywords: Electrical stimulation, Direct current, Wound healing, Numerical modelling, Electric field distribution

1. Introduction

Skin injury represents a menace for the organism’s integrity, in response to which an otherwise healthy organism has an elegant, harmonized cascade of processes is started, leading to healing of the wound. Biological processes such as inflammation, proliferation, angiogenesis, wound contraction, epithelization – lead to the scar formation [1]. Certain systemic diseases, such as injuries of the nervous system, metabolic and aging problems, however, significantly increase the probability of wound formation and disadvantageously influence the healing process. The course of events, which normally lead to healing, is in these cases slower or even does not progress, thus leading to chronic wound formation. Such wounds represent a vast energetic demand for the organism, constant threat of infection, undesired interaction with the patient’s every-day life, hindrance for the normal course of rehabilitation, and also a financial burden for society.

The problem of chronic wound healing therefore has not lost its actuality in spite of centuries-lasting research, the goal of which, on the one hand, is to elucidate the healing process per se, and on the other to find therapeutic methods for enhancement of healing. In this sense, electrical phenomena linked with wound healing can be considered through two approaches:

1. Study of the endogenous electrical properties of the...
injured skin and their significance in the wound healing process, and
application of exogenous sources of electrical cur-
cents for therapeutic purposes, i.e. for chronic wound healing enhancement.

1.1. Endogenous electrical properties of the skin

In normal, uninjured human skin, a difference in ionic concentrations is actively maintained between the upper and lower epidermal layers that can be measured as a difference of electrical potentials, ranging between 10 and 60 mV on different locations on the body surface. The positive terminal of this so-called epidermal battery is located on the inside surface of the living layer of the epidermis [2]. After wounding, when the skin layers are interrupted, the epidermal battery at the wound site is short-circuited, producing a conducting path which allows ionic currents to flow through the superficial epidermal region, a part of the wound and return to the battery by flowing through the region between the stratum corneum and the living layer [3]. The injury current can only flow as long as the wound surface is moist. Drying of the wound leads to appearance of a layer with very high resistivity and thus cessation of the ionic current [2].

The measurements have shown that the injured tissue is characterized by a higher potential compared with the surrounding intact skin [5]. The transmembrane potential is highest at the wound with the distance from the wound, reaching the value which is normal for the uninjured skin at the distance of a few millimeters [2]. The wound edge is thus characterized by a relatively steep lateral voltage gradient which means that the cells on the wound edge are situated in an electric field. Physiological meaning of these lateral fields is not completely known, but they are believed to play a role in the healing process by being responsible for the closure of wounds [2]. It has been shown that electrical fields of such "physiological" intensities can affect orientation, migration and proliferation of cells, which are of key importance for healing, such as fibroblasts and keratinocytes [6,7].

1.2. Application of externally applied electric fields for enhancement of chronic wound healing

Endogenous electrical skin phenomena exert a steady direct character, therefore out of the various types of electrical and electromagnetic stimulation which were examined for their wound healing promotion capacity [8], this article will focus on stimulation with constant direct currents.

The first report on the use of direct electric current for stimulation of wound healing was published in 1908 [9]. It dealt with only three patients with large ulcers, who were stimulated with negative polarity direct current of 0.1 mA. This study was followed by several studies in which the polarity of the stimulation electrode on the wound was changed during the course of healing [10-13]. In these studies, the stimulation program was always started with the application of the negative electrode to the wound due to its assumed anti-inflammatory effects. Therefore, the polarity was reversed and the application of the positive electrode to the wound was supposed to lead to accelerated healing. The amplitude of the stimulation current was up to 1 mA.

The regime of polarity changes was repeated whenever the plateau in healing was observed. The beneficial effects of weak constant direct current stimulation on wound healing were also reported in other studies. In these studies, the effect of the electric current stimulation on wound healing was observed by the above mentioned studies, yet the explanation for the study protocol with electrode polarity changes was not given.

Stimulation with weak direct electric currents does not provoke any easily identifiable reactions in the tissue which could be used as a basis for selection of optimal parameters and regime of stimulation. Ignoring the basic mechanisms of the effects of external electrical signals at the cellular level, however, readers this task still more difficult.

The primary aim of our study was to make a step towards optimization of the constant direct current stimulation regime for wound healing enhancement. The principal questions arising certainly relates to the optimization criteria. Being aware of endogenous electrical properties of the injured skin and assuming that they are beneficial and necessary for the normal course of healing, the possibility is given for using them for determination of therapeutic electrical stimulation parameters of the intact skin surrounding the wound. In our clinical study, which involved a uniform population of spinal cord injured patients with pressure ulcers, electrical stimulation was delivered through surface electrodes. Two different electrode configurations were used, which clearly induced significantly different electric field distributions in the stimulated wound area. We studied the effect of DC electrical stimulation on healing of pressure ulcers and the differences ensuing from different electrode arrangements.

We further built a three-dimensional anatomically-accurate, finite element model of the cutaneous wound, taking into account different tissue types constituting the skin layers. It was used for determination of electric field distribution in the wound area, resulting from DC electrical stimulation, as well as for determination of electric conditions induced by endogenous epidermal battery.

From the comparability of externally induced electric fields with experimental data and clinical results obtained, an attempt was made to define a criterion for optimization of DC electrical stimulation for wound healing enhancement.

2. Materials and methods

2.1. Clinical study

The clinical study was conducted in the double blind manner. Fifty hospitalized patients with spinal cord in-

jury having pressure ulcers participated. All patients received equal conventional treatment of their ulcers (daily cleaning and dry gauze dressing exchanges). Stimulation electrodes were applied for two hours daily in all patients. They were divided into three groups with regard to electrode placement and applied electrical stimulation.

In the first group of patients (DC++/−, N = 16), the positive stimulation electrode overlaid the ulcer. The ulcer surface was covered with sterile gauze, soaked in physiolo-
gical saline. The negative electrode was applied to the intact skin around the wound, representing the ring-shaped negative electrode. The electrical stimulation programme consisted of 2 hours application of constant direct current current of 0.6 mA.

The second group of patients (DC+/−, N = 18) received the same electrical stimulation programme, but the electrode placement was different. Two self-adhesive electrodes were positioned on the healthy skin at the ulcer edge across the wound, one of them being positive and the other negative. This type of electrode arrangement was used in our previous study for the application of pulsed currents, which proved beneficial for wound healing acceleration [14].

In the third group of patients (SHAM, N = 16), the electrodes were positioned on the intact skin sides of the wound for two hours daily and connected to the stimulators, in which, however, the power source was disconnected and they delivered no current.

The double blind study protocol could be conducted since the weak constant direct current of 0.6 mA cannot be felt even on a normally innervated skin, so neither the patient nor the therapist were aware of the used the deception stimulators in the third group of patients.

Healing was evaluated using weekly measurements of the ulcer area. The parameter "relative healing rate" was calculated for each wound after the respective time and described by the equation S0 = S0 exp(−λt), where S0 is the ulcer area at time t = 0, S0 is the initial ulcer area [14].

Students' test was applied to test the hypothesis regarding the equality of average relative healing rate in the SHAM group with average relative healing rates in DC+ and DC− groups.

2.2. The cutaneous wound model

Skin is composed of two layers: epidermis and dermis. Epidermis is the upper, proplasmic layer, while dermis provides strength and elasticity. The epidermal layer is relatively thin (0.06-0.08 mm), while the dermis is approximately seven times thicker. Below the dermal layer lies the subcutis, and deeper down the fat layer, reaching down to the muscle tissue. A three dimensional finite element model of the wound and its surroundings was built using ANSYS/EMS and MSC/NX Electro-Magnetic Analysis System software packages [16-18]. The wound and the surrounding tissue were modelled as a cylinder with the spherically shaped cut-out representing the wound. The model consisted of five layers of homogeneous, isotropic materials representing layers of skin and subcutaneous tissue: epidermis, dermis, subcutis, fat and muscle. A detailed description of the geometry, material definition, tissue characteristics and determination of boundary conditions is given in Part 2 of this paper [20].

The model was first used for the study of endogenous electrical skin phenomena. The electric field was determined, which arises as a result of setting the potential difference of 30 mV between the top and bottom of the epidermal layer. In model 1 in this case the potential difference of 66 mV was set on the surface of unjured skin in the wound surroundings (top of epidermis) and the potential of 30 mV on the boundary between epidermal and dermal layers.

The numerical model was further employed for studying the effects of different arrangements and shapes of surface stimulation electrodes which were used in the clinical study on electric field configuration in the model. The computations were obtained using the same model with different boundary conditions. They are shown in top view in Fig. 1. In the DC− case the potential difference of 66 mV was set between the positive circular electrode (diameter of 30 mm) covering the wound surface and four rectangular negative electrodes (60 mm x 25 mm) on the intact skin in the wound surroundings, in order to obtain the total current of 0.6 mA as used in the clinical study. The DC+/− assumed two rectangular surface electrodes (60 mm x 25 mm) of opposite polarity placed on the intact skin symmetrically on opposite sides of the wound. In this case a total current of 0.6 mA was obtained by setting the

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* Mean ± S.E.
potential difference of 184 mV between the positive and negative electrodes.

3. Results

3.1. Clinical study

In Table 1, the average values of relative healing rate \( \theta \) with standard errors for DC +, DC +/−, and SHAM groups are given. Data concerning the initial average ulcer areas are presented as well.

The criteria for inclusion of treated pressure ulcers into the analysis of the efficacy of the particular treatment were: initial ulcer area of at least 500 mm², ulcer stage 3 or 4, no previous plastic surgery at the same location, no additional illnesses such as diabetes or cancer. The number of ulcers in the groups hence is not large, but with regard to the above requirements and uniform ulcer aetiology, a high level of comparability is provided between groups. The differences in initial ulcer pressure areas between the groups are non-significant.

The hypothesis that the ulcers treated with daruvap equipment (SHAM group) heal with the same average relative healing rate as those treated with direct current applied across the wound (DC +/− group) could not be rejected (Student’s \( t \)-test; \( p = 0.05 \) was considered significant). The average relative healing rates were 4.2% and 4.8% per day, respectively. Much better therapeutic effects than in the DC +/− group, however, were obtained with direct current stimulation applied directly to the wound, i.e. in the DC + group. The difference in average relative healing rates of DC + (\( \theta = 7.4\% \) per day) and SHAM (\( \theta = 4.2\% \) per day) groups was found to be statistically significant (\( p = 0.028 \)).

3.2. The cutaneous wound model

Endogenous electric field distribution due to activity of the epidermal battery is shown in Fig. 2. Represented here is one half of the wound model cross-section, showing electric field intensity (left) and direction (right). The modelled endogenous potential difference of 30 mV across the epidermal layer resulted in a homogeneous electric field of 1 V cm\(^{-1} \) directed from the bottom to the top of the epidermis.

Fig. 3 represents the calculated electric field intensity (left) and direction (right) for external DC electric stimulation with electrode arrangement DC +. A current of 0.6 mA in this case induces in the epidermis at the wound edge an electric field of 0.033 V cm\(^{-1} \), which is much lower than the endogenous field intensity. The direction of the electric field in this skin layer (from the bottom towards the top of the epidermis), on the other hand, closely resembles the endogenous conditions. With electrode arrangement DC +, the electric field is obtained not only in the epidermal layer, but also in tissues below the wound surface, its direction being from the center towards the edge of the wound.

The same electric current applied through electrodes in configuration DC +/− inducethes in the epidermis at the wound edge below the surface stimulation electrodes an electric field of 0.055 V cm\(^{-1} \) (Fig. 4, top). Its direction depends on the polarity of the electrode and is thus opposite on both sides of the wound, as shown in bottom illustration of the Fig. 4. Direction of the electric field in the tissue below the negative and positive stimulation electrodes is shown on the left and right sides, respectively. Comparison with the endogenous situation reveals that distributions of electric fields in endogenous and DC +/− cases are significantly different.

4. Discussion

In the clinical study employing DC electric stimulation for enhancement of pressure ulcer healing, two electrode arrangements were used, which induced different electric field distributions in the stimulated tissue. Significant differences were also observed concerning their clinical value when used for stimulation of pressure ulcer healing. The numerical modelling of electric field distribution in the computer cutaneous wound model revealed that by application of direct current using two rectangular surface stimulation electrodes placed on opposite sides of the wound (DC +/−), the electric field is induced in the tissue, the form and distribution of which strongly deviates from the endogenous field. With this electrode arrangement, the result of pressure ulcer stimulation in the clinical study hardly surpassed the control placebo effect obtained by sham equipment. Significantly better results, i.e. faster healing, however, have been obtained using the electrodes configuration, with the positive stimulation electrode covering the wound and four negative electrodes overlaying the intact skin in the wound surroundings (DC +). At the same time, numerical modeling showed that with this electrode configuration, the endogenous electrical conditions in the epidermal layer at the wound edge are closely approached.

The agreement can be observed as confirmation of the assumption that endogenous electrical phenomena in the skin are not just side effects, but play an active role in healing. The endogenous battery which induces the injury currents in the wound is located in the epidermal layer of the skin. Distribution of the electric field, which is induced in epidermis by the application of external electrical stimulation, or else its accordance with endogenous field distribution, can thus be adopted as a criteria for optimization of DC electrical stimulation for wound healing enhancement.

The active role of endogenous electrical phenomena in wound healing is also indirectly confirmed by the fact that the healing of wounds, the surface of which is kept moist, is more successful than in wounds which are left to dry out. Winter was the first who demonstrated significantly faster wound epithelization in excelled experimental wounds in pigs compared to air-exposed controls [19]. Looking at the phenomena of more successful wound healing in a moist environment from the described endogenous electrical activity point of view, it can be noticed that the injury currents cannot exist when the wound surface is left to dry out due to the existence of a dry top layer representing very high resistivity. Wound surface moisture is thus essential for the existence of injury currents driven by the endogenous epidermal battery.

The endogenous potential difference between the wounded tissue and intact skin in the wound surroundings, which has been measured during the healing of acute and chronic wounds, has not been found to change the polarity. The wound surface was consistently positive (having higher potential) compared with the intact skin [5]. Assuming that externally applied therapeutic electrical stimulation with...
Acknowledgements

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References


MATHEMATICAL MODELING OF CHRONIC WOUND HEALING

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Key words: Electric stimulation; Pressure ulcers; Curve fitting

ABSTRACT

The wound-healing process has previously been modeled with exponential or linear curves. In the present study, we proposed a new model called the delayed exponential model, and compared all three models. Assumption of the models was based on analyzing data for two large groups of pressure ulcers in spinal-cord-injured (SCI) patients. The first group consisted of conventionally treated wounds and the second group of wounds additionally treated with biphasic electric-current-pulse stimulation, which was applied locally to the wound. Linear, exponential, and delayed exponential curves were fitted to the data from experimental data (weekly measurements of the wound surface area). Numerical criteria, in the form of the least sum of squares of errors and goodness-of-fit, were calculated for each model and the model. Both numerical criteria showed that the delayed exponential model offers the best fit of the three models tested.

INTRODUCTION

A majority of the reports in the literature that deal with mathematical description of the wound-healing process assume the healing process to be linear, and accordingly calculate the percentage change over time in the wound surface area or the wound volume (L2). Other authors claim that for most chronic wounds, fitting errors are reduced when exponential fitting is applied, i.e., that the healing process, once triggered, exhibits exponential behavior (3,4). Observing a large group of pressure ulcers, treated either conventionally or with electrical stimulation in a previous study that we had done.
we found the healing process to be delayed for a period from a few days to a few weeks in 50% of wounds after beginning of the particular treatment. We thus suggested a new model, called the delayed exponential model, which encompasses this feature of “delayed” healing.

Wounds of different etiologies, such as vascular wounds, amputation wounds, and pressure ulcers, heal with different dynamics. We therefore assessed the models described above with pressure ulcers in a uniform population of spinal-cord-injured (SCI) patients, treated either conventionally (control group) or additionally with biphasic electric-current-pulse stimulation applied locally to the wound (electric-stimulation group).

MATERIALS AND METHODS

In our study, the wound-healing process was evaluated through weekly measurements of wound surface area. Criteria for inclusion of wound cases in the assessment of healing models were a minimum number of wound area measurements (at least 3) and a minimum initial wound area (1 cm²). Wounds that had previously been treated surgically were excluded from analysis. With the foregoing inclusion criteria, the control (CO) group consisted of 40 patients with 59 wounds, and the electric-stimulation (ES) group consisted of 74 patients with 106 wounds.

Patients in the CO group received conventional treatment of their wounds for 1 month. If within this month some healing was observed, the patient remained in this group and data were collected until complete closure of the wound. If within the first month of conventional treatment no healing occurred, or if the wound increased in size, the patient was assigned to the ES group (5). This was done for obvious ethical reasons. No significant difference was observed between exponential and linear models for the CO group, because most of the wounds in the CO group were followed for only about 1 month (33 ± 18 days), whereas the mean observation period for wounds in the ES group was 62 ± 45 days. For short observation times, such as 1 month, exponential and linear fits were of very similar quality.

Linear, exponential, and delayed exponential curves, described by Equations 1, 2, and 3, respectively, were fitted to experimental data, i.e., measurements of wound area.

\[ S_i = S_0 - \Delta S \]  
\[ S_i = S_0 e^{-\alpha i} \]  
\[ S_i = \begin{cases} S_0 & i \leq T \\ S_0 e^{-\alpha i} & i > T \end{cases} \]

where \( S_i \), \( S_0 \), and \( S_T \) represent estimated values of wound surface area at time \( i \), when the time course of the area surface is fitted linearly, exponentially, and delayed-exponentially, respectively; \( S_0 \) represents the fitted initial value of the wound surface area (fitted area of the wound surface at the beginning of the particular treatment); \( \Delta S \) is the linear healing rate; \( \alpha \) is the exponential healing rate; and \( \alpha \) is the delayed exponential healing rate; and \( i \) is time expressed in days.

Figure 1 illustrates the linear, exponential, and delayed-exponential fitting for a typical wound case in the ES group.

![Modeling of Wound Healing](image)

**RESULTS**

After fitting the healing of all wounds with three models, we calculated mean values and standard errors of LSSE and \( r^2 \). The mean values of the least sum of squared errors for linear (LSSE), exponential (LSSE), and delayed-exponential (LSSE) fit of ulcer healing in the study are given in Table 1. The mean values of goodness-of-fit for linear (\( r^2 \)), exponential (\( r^2 \)), and delayed exponential (\( r^2 \)) fit of healing of ulcers included in the study are given in Table 2.
Table 1. The Mean Value of the Least Sum of Squared Errors for Linear, Exponential, and Delayed Exponential Fit

<table>
<thead>
<tr>
<th>CO group</th>
<th>ES group</th>
<th>Both groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of ulcers</td>
<td>59</td>
<td>106</td>
</tr>
<tr>
<td>Mean LSSE</td>
<td>385.2 ± 172.7</td>
<td>1835.9 ± 217.4</td>
</tr>
<tr>
<td>Mean LSSE</td>
<td>506.4 ± 209.8</td>
<td>824.3 ± 312.4</td>
</tr>
<tr>
<td>Mean LSSE + SE</td>
<td>899.9 ± 158.6</td>
<td>783.6 ± 190.3</td>
</tr>
</tbody>
</table>

CO = control; ES = electric stimulation; LSSE = least sum of squared errors for linear model; LSSE = least sum of squared errors for exponential model; LSSE = least sum of squared errors for delayed-exponential model; SE = standard error.

Table 2. Mean Value of Goodness of Fit for Linear, Exponential, and Delayed Exponential Fit

<table>
<thead>
<tr>
<th>CO group</th>
<th>ES group</th>
<th>Both groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of ulcers</td>
<td>59</td>
<td>106</td>
</tr>
<tr>
<td>Mean $r^2$ ± SE</td>
<td>0.7527 ± 0.0166</td>
<td>0.7270 ± 0.0223</td>
</tr>
<tr>
<td>Mean $r^2$ ± SE</td>
<td>0.7601 ± 0.0168</td>
<td>0.8448 ± 0.0235</td>
</tr>
<tr>
<td>Mean $r^2$ ± SE</td>
<td>0.8064 ± 0.0163</td>
<td>0.8586 ± 0.0204</td>
</tr>
</tbody>
</table>

CO = control; ES = electric stimulation; $r$ = goodness of fit for linear model; $r^2$ = goodness of fit for exponential model; $r^2$ = goodness of fit for delayed exponential model; SE = standard error.

For our sample of 165 ulcers, the LSSE of the delayed-exponential model was 38.1% and 51.7% smaller than the LSSEs for the exponential and linear models, respectively. Goodness-of-fit of the delayed-exponential model was 6.7% and 13.1% greater than goodness-of-fit for the exponential and linear models, respectively.

For the CO group of wounds, the LSSE of the delayed-exponential model was 38.4% and 33.5% smaller than the LSSEs for the exponential and linear models, respectively. Goodness-of-fit of the delayed-exponential model in this group of wounds was 10.5% and 10.1% greater than goodness-of-fit for the exponential and linear models, respectively.

For the ES group of wounds, the LSSE of the delayed-exponential model was 38% and 56.7% smaller than the LSSEs for the exponential and linear models, respectively. The delayed-exponential model for wounds on the hand was characterized by a 4.9% and 14.72% better goodness-of-fit than with the exponential and linear models, respectively.

Both numerical criteria show that the delayed-exponential model offers the best fit of the three models tested.

Because of non-normal distribution of data, the non-parametric Wilcoxon's signed rank test was used to determine whether there was a significant difference between the mean values of LSSE and goodness-of-fit for the wound-healing models tested. For our sample of 165 ulcers, the hypothesis for equality of mean LSSE and goodness-of-fit for the linear, exponential, and delayed-exponential models could be rejected at a significance level of $p = .003$ when comparing the fit with the delayed-exponential with that of the exponential, as well as that of the linear model.

For the CO group of wounds, the hypothesis for equality of LSSE and goodness-of-fit could be rejected at a significance level of $p = .001$ when comparing the fit with the delayed-exponential with the fit with the exponential model, and at a significance level of $p = .002$ when comparing the fit with the delayed exponential with the fit with the linear model.

For the ES group, the foregoing hypothesis could be rejected at a significance level of $p = .001$ when comparing fit with the delayed exponential and exponential models, as well as when comparing fit with the delayed exponential and linear models. The obtained results demonstrate that a delayed-exponential curve fits the healing process significantly better than do exponential or linear curves in both the CO and ES groups.

The difference between the exponential and linear models was found to be non-significant for the CO group ($p = .210$), whereas the exponential model was significantly better in the ES group ($p = .001$). This result was obtained by observing both assessment criteria. LSSE and goodness-of-fit.

CONCLUSIONS

The delayed-exponential model was found to offer a better description of the wound-healing process for pressure ulcers in SCI patients than were the exponential and linear models. However, it also has several drawbacks. It introduces an additional parameter "delay" (T), the meaning of which is not easily identifiable in physiological terms. Application of the model with more parameters requires a greater number of experimental data to be trustworthy, which necessarily means longer observation periods. Moreover, and not least, the delayed-exponential model is relatively mathematically complicated, which makes its wider acceptance by other groups questionable. The latter certainly presents an important drawback, making general comparison of wound-treatment efficacies more difficult.

Additionally, it should be pointed out that the wound-healing process is not merely a surface phenomenon. It can be described by wound surface area, but it is also dependent on other parameters, such as wound duration before the beginning of a particular treatment, wound depth, the patient's age, duration of the patient's disability, and the patient's general health status. The progress of healing also strongly depends on the location of the wound (7). Basing the healing rate, 6, only on changes in wound area therefore does not provide a complete description of the healing process; the healing rate should additionally contain at least information about the wound depth. However, owing to problems with the measurement of wound depth, as well as its incorporation into the mathematical description of the healing process, wound area as the only parameter seems to be a reasonably accurate compromise solution.

Our further studies will be devoted to improving the understanding of model parameters (delay, T, and wound healing rate, 6) and their correlation with other parameters of the wound-healing process. The model parameters will be used in combination with other parameters of the wound-healing process in a prediction study in which we will try to build a classifier for prediction, after treatment is applied for a defined time, of the wound-healing rate.
REFERENCES


Pressure ulcers are a common phenomenon in many different health care settings. Over the years several Dutch studies showed indeed that the prevalence of pressure ulcers is high, especially in the intensive care unit (Bours, 2004). There is a need for an effective therapy of managing these ulcers. Pressure ulcers are medically known as decubitus ulcers. A decubitus ulcer is a pressure sore or what is commonly called a bed sore. It can range from a very mild pink coloration of the skin, which disappears in a few hours after pressure is relieved on the area, to a very deep wound extending to and sometimes through a bone into internal organs. There has been a trend in modern health care toward minimal invasive procedures, including reduced reliance on heroic and long term drug therapies (Kenneth, 2006). The trend for managing pressure ulcers has been towards the use of microcurrent living tissue possess direct current electro-potentials that appear to regulate, at least partly, the healing process. Micro-current therapy is the practice of applying low-intensity electric currents, usually at low frequencies that match the body’s natural pulse rate. Micro-currents, or micro-amps, are electric currents with intensity less than one milliamp. Micro-currents are measured in the millihoths of an ampere. However, the evidence that micro-current therapy predictably accelerates dermal (skin) repair remains less convincing (Mohammed, 2004). In view of recent scientific understanding of the wound-healing process, one would expect a beneficial outcome from electro-therapy that decreases tissue size and accelerates healing in patients (Gentlow, 1993) Chronic wounds, of which leg ulcers make up a major share, are a therapeutic problem. It is estimated that 20-25% of leg ulcers are due to venous stasis, affecting 0.6% of men and 2.1% of women in their 60s (Stiller and Dennis, 1992; Niseler and Mass, 1985).

A statistical analysis of data and results from a prospective study, undertaken with the aim to detect the effect of Microcurrent Electrical Therapy (MET) on patients hospitalized for a long time and therefore having decubitus wounds

### MATERIALS AND METHODS

The data was collected from patients hospitalised for a long time and therefore suffering from decubitus wounds in Bogotá. A total of 60 male and female patients aged between 60 and 80, got enrolled into the study. These were from 6 different hospitals and got randomised into 2 different groups. The randomization was important so that bias is removed and the two groups are comparable. Patients from one group, MET group, were receiving micro-electrotherapy while those in the other

### RESULTS AND DISCUSSION

Overall, healing rate ranged from 0.7340 to 1.0838, with mean 0.9240 and standard deviation 0.0807. In the CON group, the healing rate ranged from 0.8551 to 1.0838, with mean 0.9455 and standard deviation 0.0767, while it ranged from 0.7340 to 1.0511 in the MET group, with mean 0.9455 and standard deviation 0.0760 (Table 2).

Overall, the age ranged from 60 to 79 years in the CON group, with mean 69.33 and standard deviation 6.23. In the CON group, age ranged from 60 to 79 years, with mean 69.6 and standard deviation 5.93, while it ranged from 61 to 78 in the MET group, with mean 69.07 and standard deviation 6.72 (Table 2).

In general, 40.39% of wounds were from female and 59.61% from male patients. In the CON group the distribution of wounds by sex was about 23.38% from male and 76.62% from female, while in the MET group it was about 39.38% from male and 60.62% from female patients (Table 5).

Overall patients hospital 2 had the most wounds (33%). Most of the wounds in the CON group were at hospital 2 (33%), while most of the wounds in the MET group were at hospital 6 (30%) (Table 6).

About two-thirds (67%) of the patients had more than one wound on their bodies (Table 5). It can be seen that the surface-base ratio is generally decreasing in both groups, but is decreasing at a faster rate in the MET group (Fig. 1), suggesting that healing rate in this group is better than in control group.

The wounds for patients in hospital 4 and 5 are reducing in surface-base ratio faster than other hospitals (Fig. 2). There is no much difference in the surface change of wounds for patients in Hospital 1, 2, 3, and 6. This led us to conclude that the healing rate was different among the hospitals.

Treatments are significantly related with sex and slightly related with hospital. Sex and hospital also significantly associated (Table 6).

The model explained approximately 46% of the total variation by the regressors (Table 7). Individually every variable has significant effect on healing rate except hospital 1. Here we also seen that average rate of change in surface area of wound decreases approximately 8% more using micro-current electrical therapy than control when all other variables hold constant. That is Micro-current Electrical Therapy (MET) significantly contribute for reducing the rate of change in surface area of wound.
Table 5: Summary statistics for the rate of change of surface area of wound and age

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate of change in surface area of wound (mm square per week)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>0.9485</td>
<td>0.6760</td>
<td>0.8815</td>
<td>1.0888</td>
</tr>
<tr>
<td>MIT</td>
<td>0.9482</td>
<td>0.8080</td>
<td>0.7840</td>
<td>1.0513</td>
</tr>
<tr>
<td>Total</td>
<td>1.0410</td>
<td>0.9517</td>
<td>0.7340</td>
<td>1.0888</td>
</tr>
<tr>
<td>Age (in years)</td>
<td>40</td>
<td>40.33</td>
<td>23.33</td>
<td>70</td>
</tr>
</tbody>
</table>

Table 6: Frequency distributions of sex in the control and the MET groups

<table>
<thead>
<tr>
<th>Sex</th>
<th>Control</th>
<th>MET</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>14</td>
<td>12</td>
<td>26</td>
</tr>
<tr>
<td>Male</td>
<td>46</td>
<td>44</td>
<td>90</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>56</td>
<td>116</td>
</tr>
</tbody>
</table>

Table 7: Frequency distributions of sex and hospital in the control and the MET groups

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Control</th>
<th>MET</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>10</td>
<td>6</td>
<td>16</td>
</tr>
<tr>
<td>3</td>
<td>12</td>
<td>9</td>
<td>21</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>30</td>
<td>70</td>
</tr>
</tbody>
</table>

Table 8: Frequency of wounds per patient

<table>
<thead>
<tr>
<th>No. of wounds per patient</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>22</td>
<td>36.67</td>
</tr>
<tr>
<td>2</td>
<td>12</td>
<td>19.05</td>
</tr>
<tr>
<td>3</td>
<td>6</td>
<td>9.43</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Table 9: Cross-tabulation

<table>
<thead>
<tr>
<th>Variable</th>
<th>Treatment versus age</th>
<th>Treatment versus hospital</th>
<th>Sex versus hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment</td>
<td>Age</td>
<td>Hospital</td>
<td>Sex</td>
</tr>
<tr>
<td>Male</td>
<td>0.051</td>
<td>0.058</td>
<td>0.123</td>
</tr>
<tr>
<td>Female</td>
<td>0.182</td>
<td>0.153</td>
<td>0.183</td>
</tr>
</tbody>
</table>

Table 10: Multiple linear regression analysis of rate of change in surface area of wound

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficient</th>
<th>SE</th>
<th>t</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>(constant)</td>
<td>6.831</td>
<td>0.088</td>
<td>77.217</td>
<td>0.000</td>
</tr>
<tr>
<td>Treatment</td>
<td>4.010</td>
<td>0.013</td>
<td>31.85</td>
<td>0.000</td>
</tr>
<tr>
<td>Sex</td>
<td>-4.010</td>
<td>0.013</td>
<td>-31.85</td>
<td>0.000</td>
</tr>
<tr>
<td>Age</td>
<td>0.005</td>
<td>0.013</td>
<td>0.3185</td>
<td>0.750</td>
</tr>
<tr>
<td>Hospital 1</td>
<td>0.005</td>
<td>0.012</td>
<td>0.3185</td>
<td>0.750</td>
</tr>
<tr>
<td>Hospital 2</td>
<td>-0.046</td>
<td>0.012</td>
<td>-3.78</td>
<td>0.000</td>
</tr>
<tr>
<td>Hospital 3</td>
<td>-0.062</td>
<td>0.012</td>
<td>-5.11</td>
<td>0.000</td>
</tr>
<tr>
<td>Hospital 4</td>
<td>0.175</td>
<td>0.012</td>
<td>14.58</td>
<td>0.000</td>
</tr>
<tr>
<td>Hospital 5</td>
<td>-0.126</td>
<td>0.012</td>
<td>-10.30</td>
<td>0.000</td>
</tr>
</tbody>
</table>

R² = 0.062, F(6,49) = 3.408, p < 0.001

Fig. 1: Weekly surface-base ratios for the control and MET groups (Comparison of MET and control group).

Fig. 2: Comparison of weekly surface base ratios at the hospitals.

The Effect of Pulsed Electromagnetic Fields on Secondary Skin Wound Healing: An Experimental Study

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A variety of pulsed electromagnetic fields (PEMF) have already been experimentally used, in an effort to promote wound healing. The aim of the present study was to investigate the effects of short duration PEMF on secondary healing of full-thickness skin wounds (in a rat model). Full-thickness skin wounds, 2 cm in diameter, were surgically inflicted in two groups of male Wistar rats, 24 animals each. In the first group (experimental group - EG), the wounds were healed in a specially designed cage. In the second group (control group - CG), the rats were also placed and immobilized in the same cage for the same time, but not exposed to PEMF. On days 3, 6, 9, 12, 14, and 16, following the infliction of the skin wounds, the size and healing progress of each wound were recorded and evaluated by means of planimetry and histological examination. According to our findings with the planimetry, there was a statistically significant acceleration of the healing rate for the first 14 days in EG, whereas a qualitative improvement of healing progress was identified by histological examination at all time points, compared to the control group.

Key words: PEMF; secondary healing; skin wounds; rate; magnetic pulse

INTRODUCTION

In the last three decades, a large number of studies have proved that EMFs have multiple effects on living organisms [Aaron and Cimbron, 1993; Walker et al., 1994; Tao and Henderson, 1999; Tofani et al., 2002]. These effects mainly refer to alterations of the cell proliferation rate, changes in the levels of mRNAs and protein synthesis, alteration of cellular membrane’s permeability, and Cu++, Na+, K+ ion transfer. All the above lead to alterations of both the electrical and metabolic behavior of cells, influence the differentiation of primitive stem cells, and alter the rates of apoptosis in both normal and neoplastic cells [Walker et al., 1994; Han et al., 1998; Tao et al., 1999; Isakov et al., 2002; Tofani et al., 2001]. Additionally, it seems that EMFs have a direct or indirect action, on the production of melanin by epidermis cells (pincal gland), resulting in the emergence of disorders in the organism's circadian and hormone production rhythms [Reiter, 1993]. Furthermore, it is obvious that EMFs of certain frequencies and intensities alter the behavior of T-lymphocytes, as far as their cytotoxicity is concerned [Albemeci et al., 2003a,b; Murabayashi et al., 2004]. At a molecular level, fields influence the expression of early-induced genes such as IL-1 and COX-2. They affect synthesis of various proteins, among them, the tumor suppressor protein p53 [Tofani et al., 2002]. There are certain studies indicating that EMFs can operate as carcinogenesis-promoting factors, after pre-administration of benzo[a]pyrene [Simko et al., 2001].

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while other studies show that EMFs have the ability to significantly inhibit the tumor growth in athymic nude and other neoplastic diseases models [Tofani et al., 2001, 2002]. The biological actions of EMFs on the organisms seem to be due to their ability to induce changes both in cells (temperature increase and expression of heat shock proteins) and in other signal transduction systems of the cells, especially focused on the intermediates that bear the characteristics of free radicals [Schiano et al., 1994; Wallaceczk, 1995; Lander, 1997].

There are different theories that may explain the effects of EMFs on the biological targets and especially on the procedure of tissue regeneration and cell proliferation. These theories seem to merge to the following common theoretical framework. Pulsed electromagnetic fields (PEMFs) are capable of altering the structure of the cell membrane and thus diversifying the permeability of different ion channels and the potential of the cellular membranes. Both phenomena are important at cellular functions [Blackman et al., 1980; Wallaceczk and Liburdy, 1993; Rehara et al., 2002], such as the production of chemical energy in the form of adenosine triphosphate (ATP) and the variance of intracellular free calcium levels, which is a second type universal intermediate ion [Carafolı, 2004]. They may also conserve the normal electrochemical gradient of cells, a necessary condition for ATP production, which may be lowered by ischemia or trauma. Thus, they might ensure a high performance and elevated protein synthesis (anabolic reactions) of cells [Westerhof et al., 1983]. Other theories suggest that the primary actions of EMFs are correlated with the production of small quantities of free radicals within cells. These radicals can function as mediator molecules on the systems of intracellular communication [Scianto et al., 1994; Lander, 1997].

In the current study, a powerful short duration PEMF, produced by a specialized device, was used, in order to evaluate its effects on the healing process of surgically created skin wounds in a rat model. The main advantage of the field produced is that it is short duration electromagnetic pulses protect the biological targets from the development of increased temperatures.

MATERIALS AND METHODS

Forty-eight male Wistar rats, 4 months old and weighing 200 ± 30 g, were used. All experimental procedures were approved by the animal care committee of the local veterinary direction for, according to the Greek and European guidelines, regulating animal research. The rats were acclimated for a period of 3 days prior to experimentation, during which they were examined for any signs of disease. Throughout the entire study period, the animals were kept under stable conditions (temperature 22°C, humidity 30–70%, light cycles on 12/12 h light/dark schedule), and nourished with dried pellets and tap water.

All animals, following intraperitoneal anesthesia (Ketamine 3.5 mg/kg B.W. and Midazolamin 7 mg/kg B.W.), underwent en bloc excision of the skin and underlying panniculus carnosus of a square shaped area, measuring 2 cm by 2 cm from their back (day 0) (Fig. 1). Post-surgically, the rats were returned to their caging and housed individually, in order to avoid cannibalistic behavior. Dressings were not used and antibiotics were not administered.

From day 0 and on a daily basis, all rats were placed and immobilized for 20 min in a specially constructed wooden box of size 32 × 16 cm, and divided into four chambers. The dimensions of each chamber (16 × 8 cm) were small enough to keep the animals restrained. No metallic components were used, in order to avoid any interference with the electromagnetic field. The antenna loop (30 × 15 cm, one winding with two turns) of a device, producing a short duration bipolar PEMF producing was horizontally centered over the cage, at a distance of 5 cm from the wound surface (PAPIMI model 600, Pulse Dynamics, Athens, Greece. Manufacturer characteristics: 35–80 J/pulse energy, 1 × 103 s wave duration, 35–80 × 103 W wave power, amplitude on the order of 12.5 mT, rise time 0.1 μs, fall time 10 μs, repetitive frequency of 3 Hz.). The position of the animals in the chambers was symmetric and equidistant from the perimeter of the loop.

The rats were randomized in two groups of 24 each. In the first group (experimental - EG), the
animals were exposed to the PEMF, while in the second group (control - CG), although the animals were caged for the same time, the device was not activated.

On days 3, 6, 9, 12, 18, and 22 after wound creation, four rats of each group were sacrificed, in order to evaluate the healing process. The wounds were photographed with a digital camera (SONY P-10, Japan). Also, the size of each wound, including the crust, was measured with the use of a high precision (1 mm²) polar planimeter (HAFF planimeters, model N° 317 E, W, West Germany, Germany) after tracing the borders on plastic film. Finally, tissue specimens were harvested for histological examination. All specimens were fixed in 10% formalin solution, paraffin-embedded, cut in 4 μm thick sections perpendicularly to the skin surface, including the whole thickness of the skin wound and the surrounding healthy tissue, and stained with hematoxylin-eosin.

Given that in both groups, wound healing was anticipated by the end of the experiment, the following parameters were qualitatively evaluated as a sequence of events, starting from Stage 1 (blood clot) and ending with Stage 6 (scar formation with complete re-epithelialization). The intermediate stages were considered as Stage 2 (immature granulation tissue), Stage 3 (granulation tissue), Stage 4 (fibroblasts and collagen fibrils, but not complete re-epithelialization), Stage 5 (abundant fibroblasts, dense collagen deposition, almost complete re-epithelialization).

Statistical Analysis

The Mann–Whitney statistical analysis test was used to evaluate the significance of differences between groups, accepting 5% (P < 0.05) as the level of significance (Table 1). The significance of the results obtained is supported by histopathological evaluations.

RESULTS

Throughout the entire experiment, all rats in both groups remained healthy. All wound sites went through the normal wound healing process, with no signs of infection or purulent discharge. The results obtained from the planimetric evaluation of the total wound area, including the crust, on days 3, 6, 9, 12, 18, and 22 after surgery, are listed in Table 1. Statistically significant acceleration of wound healing was noticed in the experimental group compared to the control, on days 3, 6, and 9 (P < 0.02). For the rest of the assessment period, although wound healing was faster in EG, there was no statistically significant difference compared to the CG. The difference between those rates is clearly represented in Figure 2.

As for histology evaluation the following findings were recorded:

Day 3: In the control group, the area of the wound was completely covered by blood clot with numerous inflammatory cells. No remarkable granulation tissue was observed (Stage 1). In contrast, in the experimental group, underneath the superficial blood clot, a loose connective tissue with edema, polymorphonuclear neutrophils granulocytes, newly formed capillaries, and immature fibroblasts were noted (Stage 2) (Fig. 3a).

Day 6: The histological findings in the control group were comparable to those of the experimental group in Day 3, that is, prominent infiltration by polymorphonuclear neutrophils, loose connective tissue with few capillaries, and stimulated fibroblasts (Stage 2). In the experimental group, there was a significant decrease in the number of acute inflammatory cells. In addition, a denser connective tissue with a clearly developed capillary network and several fibroblasts were noted (Stage 3).

Day 9: Inflammatory cells were no longer observed in the specimens derived from the experimental group. A significant population of mature, flattened, fibroblasts was noted and the capillary network appeared to be denser and more mature. The collagen fibers were increased and formed thick bundles, oriented parallel to the epidermis (Stage 4).

In the control group, the histological findings were the same with the ones from the treatment group on day 6 (Stage 3) (Fig. 3b).

Day 12: In the experimental group, scar tissue with almost complete re-epithelialization was observed. In the dermis, a few flattened fibroblasts as well as abundant bundles of collagen, oriented parallel to the surface, were noted (Stage 3). In the control group, there were increased numbers of mature fibroblasts and blood capillaries and the bundles of collagen were notably thinner. Here also, there was significant re-epithelialization (Stage 4).

Day 18: In the experimental group, an advanced stage of healing was evident. There was almost a complete covering of the wound by keratinocytes forming the epidermis. Underneath, a fibrous connective tissue was noted (Stage 6). In the control group, the squamous epithelial cell layer was noted; however, it consisted of only a few layers of immature keratinocytes (Stage 5) (Fig. 3c).

Day 22: In the experimental group, a complete wound healing was noticed. In the control group, the histological findings were similar to those from the experimental group on day 18.

DISCUSSION

In the current study, the biological effects of short duration PEMF on secondary wound healing were investigated in a full thickness, surgically created skin defect rat model.

Regarding the effects of electromagnetic fields on tissue repair, there is a great variety of reports in the literature, referring to bone formation, tendon healing, and axonal regeneration, wound healing etc. (Bassett, 1993; Agren et al., 1994; Walker et al., 1994; Ryaby, 1998; Robotti et al., 1999; Macas et al., 2000; Aaron et al., 2004). As for the effect of PEMF on full-thickness skin wound healing, there are fewer reports with controversial findings: (a) Milgram et al. [2004] reported on the use of short duration PEMF for secondary healing of skin wounds in rats. According to their findings, an increase of epithelialization was noticed in the treated group during early stages of wound repair, but there was no statistically significant difference when compared to the control group. (b) In Ottani et al. [1988], an extremely low-frequency magnetic field was used and a significant increase in the ratio of wound contraction was found in the treated animals. (c) Patino et al. [1996] investigated the effect of PEMF and their results suggested a significant beneficial stimulation in the wound healing process of treated rats.

In our study, the same device as the one by Milgram et al. [2004], was used. The basic differences between the two studies were the rate of pulses per second and the time of exposure to the electromagnetic field. The rate of pulses was 3s (1.7) in our study compared to 5s (1.0) in the previous study. The times of exposure were 20 and 5 min, respectively. The total number of pulses per treatment was 3600 in our study compared to 1500 in the other one, thus providing more energy on the surface of the exposed wound.
Initial acceleration of wound healing with a non-invasive method, such as PEMF, may be important in reducing bacteria accumulation, stimulating growth factors, and reducing early inflammation, thus creating an appropriate environment to facilitate tissue regeneration [Vodovrine and Karba, 1992; Aaron and Clomorrow, 1993; Aaron et al., 2004].

In conclusion, according to our findings, short duration PEMF seem to facilitate and improve the quality of skin wound healing in our rat model. Nevertheless, further studies are needed to define the optimal characteristics of the PEMFs, in order to ensure a faster and more effective wound healing process.

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REFERENCES


According to our findings, a statistically significant acceleration of wound healing was noticed for the first 9 days in the animals exposed to PEMF. This was verified by planimetry and histology examination. The main histological evidences indicating increased healing rate in the PEMF treatment group, during this time period are the appearance from day 3 of a loose connective tissue, newly formed capillaries, increased re-epithelization, and better structure of collagen fibers. Our data also suggest that in the time period from day 12 to 22 (complete healing of all the animals), although no statistically significant acceleration of wound healing was noticed between the two groups, histopathology verified that healing process still predominated significantly in the PEMF group at every day of estimation (Fig. 3). Furthermore, the majority of EG had completed the healing process by day 18 in comparison to the CG, which was completed by day 22 (Table 1). Although the total time needed for complete re-epithelization was less in the experimental group, no statistically significant difference was noticed from 12th to 22nd day (Table 1).

FLEXIBILITY

Restricted Range of Motion

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This study was performed in the field by practicing Biofeedback technicians. Data was collected and the study supervised by the Ethics International Institutional Review Board of Romania. The Data analysis and study presentation is done By the The Centro Ricerche, University of Venice + Padova, Italy


Abstract
This study demonstrates the safety and effective qualities of the SCIO device used in a large scale study. A large scale study of over 97,000 patients with over 275,000 patient visits reported their diseases. Many of them reported this disease. And the results of their therapy is reported in this study.

Introduction
Overview:
This Large scale research was designed to produce a extensive study of people with a wide variety of diseases to see who gets or feels better while using the SCIO for stress reduction and patient monitoring. The SCIO is a evoked potential Universal ElectroPhysiological Medical apparatus that gauges how a individual reacts to miscellaneous homeopathic substances. The device is registered in Europe, America, Canada, S Africa, Australia, S. America, Mexico and elsewhere. The traditional software is fully registered. Some additional functions where determined by the manufacturer to be worthy of evaluation. Thus a study was necessary to determine safety and efficacy. (As a result of these studies these additional functions are now registered within the EC)

An European ethics committee was officially registered and governmental permission attained to do the insignificant risk study. Qualified registered and or licensed Biofeedback therapists where enlisted to perform the study. Therapists were enrolled from all over the world including N. America, Europe, Africa, Australia, Asia, and S. America. They were trained in the aspects of the study and how to attain informed consent and transmit the results to the ethics committee or IRB (Institutional Review Board).

2,569 therapists enlisted in the study. There were 98,760 patients. 69% had more than one visit. 43% had over two visits. There were over 275,000 patient visits recorded. The therapists were trained and supervised by medical staff. They were to perform the SCIO therapy and analysis. They were to report any medical suspected or confirmed diagnosis. Therapists personnel are not to diagnose outside of the realm of their scope of practice. Then the therapist is to inquire on any reported changes during the meeting and on follow-ups any measured variations. It must be pointed out that the Therapists were free to do any additional therapies they wish such as homeopathy, nutrition, exercise, etc. Therapists were told not to recommend synthetic drugs. Thus the evaluation was not reduced to just the device but to the total effect of seeing a SCIO therapist.

• Part 1. The emphasis was on substantiating safety followed by efficacy of the SCIO.
• Part 2. Proving the efficacy of the SCIO on diseases (emphasis on degenerative disease)
• Part 3. Proving the efficacy of the SCIO on the avant garde therapies of Complementary Med
• Part 4. QQC standardization
Methods and Materials

**SCIO Device**
The SCIO is an evoked potential Universal Electro-Physiological Medical device that measures how a person reacts to items. It is designed to measure reactions for allergy, homeopathy, nutrition, sarcodes, nosodes, vitamins, minerals, enzymes and many more items. Biofeedback is used for pre-diagnostic work and therapy.
The QXCI software will allow the unconscious of the patient to guide to repair electrical and vibrational aberrations in your body. For complete functional details and pictures, see appendix.

**Subspace Software**
The QXCI software is designed for electro-physiological connection to the patient to allow reactivity testing and rectification of subtle abnormalities of the body electric. If a patient is not available a subspace or distance healing link has been designed for subspace therapeutics. Many reports of the success of the subspace have been reported and thus the effectiveness and the safety of the subspace link is part of this test. Many companies have tried to copy the subspace of Prof. N. Nelson and their counterfeit attempts have ended in failure.

**SOC Index**
The SCIO interview opens with a behavioral medicine interview. This is called the SOC Index. Named after the work of Samuel Hahneman the father of homeopathy, he said that the body heals itself with it’s innate knowledge. But the patient can suppress or obstruct the healing process with some behavior. Hahneman said that the worst way to interfere with the healing natural process was allopathy or synthetic drugs. Theses upset the natural healing process by unnatural intervention and regulation disturbance. Other ways to Suppress or Obstruct the Cure are smoking, mercury amalgams, stress, lack of water, exercise and many others. This behavioral survey then gives an index of SOC.
The scores relate to the risk of Suppression and Obstruction to the natural Cure. The higher the scores the more the Suppression and or Obstruction. The scores of 100 or lower are ideal. A copy of the SOC index questions appear in the appendix.

**Study Technicians**
The study technicians were educated and supervised by medical officers. The study technicians were to execute the SCIO therapy and analysis. All were trained to the standards of the International Medical University of Natural Education. Therapists from all over the world including N. America, Europe, Africa, Australia, Asia, S. America and elsewhere were enlisted to perform the study according to the Helsinki study ethics regulations.
They were to chronicle any medical suspected or confirmed diagnosis. Therapists personnel are not to diagnose outside of the realm of their scope of practice. Then the study technician is to inquire on any disclosed observations during the test and on follow-ups report any measured changes.
To test the device as subspace against the placebo effect, two of the 2,500+ therapists were given placebo SCIO devices that were totally outwardly the same but were not functional. These two blind therapists were then assigned 35 patients each (only 63 showed). This was to assess the double blind factor of the placebo effect as compared to the device. Thus the studied groups were A. placebo group, B. subspace group, and C. attached harness group.
Cross placebo group manipulation was used to further evaluate the effect.

**Important Questions**: these are the key questions of the study
1. Define Diseases or Patient Concerns
2. Percentage of Improvement in Symptoms
3. Percentage of Improvement in Feeling Better
4. Percentage of Improvement Measured
5. Percentage of Improvement in Stress Reduction
6. Percentage of Improvement in SOC Behavior
7. What Measured+How (relevant measures to the patient’s health situation)
8. If Patient worsened please describe in detail involving SOC_

After the patient visit is was complete the data was e-mailed to the Ethics Committee or IRB for storage and then analysis. This maneuver minimized the risk of data loss or tampering. Case studies were reported separately in the disease analysis.

**MEDICAL DETAILS**

**Results**:
Before we review the direct disease improvement profiles, we need to review the overall results. The first most basic of question in the results is the basic feedback of the generic patient conditions.
1. Percentage of Improvement in Symptoms
2. Percentage of Improvement in Feeling Better
3. Percentage of Improvement Measured
4. Percentage of Improvement in Stress Reduction
5. Percentage of Improvement in SOC Behavior

The SOC index gives us great insight to this study. Each disease has a different cut off where the ability of the SCIO to help was compromised. As a general index scores of 200 + where much less successful.

This groups significant SOC cut off was 130.
The Large scale study had over 98,000 patients and 275,000 patient visits we have direct evidence of the safety and efficacy. A placebo group was used for the large scale test to help validate the results.

This disease group total number of patients was 9,345

Subspace Treatment 2,941 patients, 6,404 SCIO Harness Patients
OVERALL ASSESSMENT

A. Subspace Treatment 8,504 patient visits

There were ---- cases of patients who reported a negative Improvement.

None of these cases reported any major difficulty.

There were

• 29 cases reporting no improvement of Symptoms, .001 % of Subgroup
• 23 cases reporting no improvement in feeling better, .001% of Subgroup
• 21 cases reporting no improvement in stress reduction, .001% of Subgroup
• 25%--- Percentage of Improvement in Symptoms
• 21%--- Percentage of Improvement in Feeling Better
• 33%--- Percentage of Improvement Measured
• 34%-- Percentage of Improvement in Stress Reduction
• 15%---- Percentage of Improvement in SOC Behavior

B. SCIO Harness Treatment 11,897 patient visits

There were ---- cases of patients who reported a negative Improvement.

None of these cases reported any major difficulty.

There were

• 7 cases reporting no improvement of Symptoms, .001 % of Subgroup
• 10 cases reporting no improvement in feeling better, .001 % of Subgroup
• 11 cases reporting no improvement in stress reduction, .001% of Subgroup
• 47%--- Percentage of Improvement in Symptoms
• 54%--- Percentage of Improvement in Feeling Better
• 62%--- Percentage of Improvement Measured
• 65%-- Percentage of Improvement in Stress Reduction
• 45%---- Percentage of Improvement in SOC Behavior

Discussion:
The results show significant improvement in symptoms and feeling better. The Collective results show a dramatic benefit to the SCIO therapist visit.

FRACTURES

Part of the Following:

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**This group significant SOC cut off was 175.**

The large scale study had over 98,000 patients and 275,000 patient visits we have direct evidence
of the safety and efficacy. A placebo group was used for the large scale test to help validate the
results.

This disease group total number of patients was 125

**Subspace Treatment 32 patients, 93 SCIO Harness Patients**

**OVERALL ASSESSMENT**

**A. Subspace Treatment 87 patient visits**

There were 0 cases of patients who reported a negative improvement.
None of these cases reported any major difficulty.

There were:

- 0 cases reporting no improvement of Symptoms, 0% of Subgroup
- 0 cases reporting no improvement in feeling better, 0% of Subgroup
- 0 cases reporting no improvement in stress reduction, 0% of Subgroup
- 32%—Percentage of Improvement in Symptoms
- 21%—Percentage of Improvement in Feeling Better
- 2%—Percentage of Improvement Measured
- 43%—Percentage of Improvement in Stress Reduction
- 2%—Percentage of Improvement in SOC Behavior

**B. SCIO Harness Treatment 201 patient visits**

There were 0 cases of patients who reported a negative improvement.
None of these cases reported any major difficulty.

There were:

- 0 cases reporting no improvement of Symptoms, 0% of Subgroup
- 0 cases reporting no improvement in feeling better, 0% of Subgroup
- 0 cases reporting no improvement in stress reduction, 0% of Subgroup
- 32%—Percentage of Improvement in Symptoms
- 34%—Percentage of Improvement in Feeling Better
- 39%—Percentage of Improvement Measured
- 50%—Percentage of Improvement in Stress Reduction
- 7%—Percentage of Improvement in SOC Behavior

**Discussion:**

The results show significant improvement in symptoms and feeling better. The collective results
show a dramatic benefit to the SCIO therapist visit.
The Tassel is worth the Hassel. In a world so concerned of Wellness can be yours in just 12 months of Home Study, a simple thesis, a practicum and four days of monitored supervised contact.

Big Tobacco, Big Sugar, Big Pharma, Big Oil, and Big War Industry are exempt from lay and they kill and injure, maim and cripple in the name of profit. They seek to control and dominate medicine to further build their profits.

Their money controls governments, regulators, and the small minded media. The Ultra Rich Master Echelon Computer now sees and hears all the things we say, write, and do. Rights of privacy are gone worldwide. They have taken away our rights of free speech.

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Abstract

This study demonstrates the safety and effective qualities of the SCIO device used in a large scale study. A large scale study of over 97,000 patients with over 275,000 patient visits reported their diseases. Many of them reported this disease. And the results of their therapy is reported in this study.

In this report we review the detection and treatment of injured tissue. In our testing procedure we use measurements of multiple voltage potential, amperage potential, and resistance vectors. We can determine the potentials as normal or as diseased from the experiences of energetic medicine. Once detected the computer can then repair these injured tissue with proper autofocused TENS electrical stimulation. The SCIO device allows for detection and correction at biological speeds or in excess of one hundredths of a second. Many athletes such as Lance Armstrong, Micheal Shumaker, Valentino Rossi, AC Milan football team, the San Antonio Spurs use and have used the Injured tissue repair system. It helps to get an athlete back into the game after an injury.

This report relates how a large scale use of the system has proven the safety and efficacy.

Introduction

Overview

This large scale research was designed to produce an extensive study of people with a wide variety of diseases to see who gets or feels better while using the SCIO for stress reduction and patient monitoring. The SCIO is a evoked potential Universal Electro-Physiological Medical apparatus that gauges how an individual reacts to miscellaneous homeopathic substances. The device is registered in Europe, America, Canada, S Africa, Australia, S. America, Mexico and elsewhere. The traditional software is fully registered. Some additional functions where determined by the manufacturer to be worthy of evaluation. Thus a study was necessary to determine safety and efficacy. (As a result of these studies these additional functions are now registered within the EC)

An European ethics committee was officially registered and governmental permission attained to do the insignificant risk study. Qualified registered and or licensed Biofeedback therapists where enlisted to perform the study. Therapists were enrolled from all over the world including N. America, Europe, Africa, Australia, Asia, and S. America. They were trained in the aspects of the study and how to attain informed consent and transmit the results to the ethics committee or IRB (Institutional Review Board).

2,569 therapists enlisted in the study. There were 98,760 patients. 69% had more than one visit. 43% had over two visits. There were over 275,000 patient visits recorded. The therapists were trained and supervised by medical staff. They were to perform the SCIO therapy and analysis. They were to report any medical suspected or confirmed diagnosis. Therapists personnel are not to diagnose outside of the realm of their scope of practice. Then the therapist is to inquire on any reported changes during the meeting and on follow-ups any measured variations. It must be pointed out that the Therapists were free to do any additional therapies they wish such as homeopathy, nutrition, exercise, etc. Therapists were told to not recommend synthetic drugs. Thus the evaluation was not reduced to just the device but to the total effect of seeing a SCIO therapist.

Methods and Materials

SCIO Device

The SCIO is an evoked potential Universal Electro-Physiological Medical device that measures how a person reacts to items. It is designed to measure reactions for allergy, homeopathy, nutrition, sarcomes, nosodes, vitamins, minerals, enzymes and many more items. Biofeedback is used for pre-diagnostic work and or therapy.

The QXCI software will allow the unconscious of the patient to guide to repair electrical and vibrational aberrations in your body. For complete functional details and pictures, see appendix.

Subspace Software

The QXCI software is designed for electro-physiological connection to the patient to allow reactivity testing and rectification of subtle abnormalities of the body electric. If a patient is not available a subspace or distance healing link has been designed for subspace therapeutics. Many reports of the success of the subspace have been reported and thus the effectiveness and the safety of the subspace link is part of this test. Many companies have tried to copy the subspace of Prof. Nelson and their counterfeit attempts have ended in failure.

SOC Index

The SCIO interview opens with a behavioral medicine interview. This is called the SOC Index. Named after the work of Samuel Hahneman the father of homeopathy, he said that the body heals itself with it’s innate knowledge. But the patient can suppress or obstruct the healing process with some behavior. Hahneman said that the worst way to interfere with the healing natural process was allopathy or synthetic drugs. Theses upset the natural healing process by unnatural intervention and regulation disturbance. Other ways to Suppress or Obstruct the Cure are smoking, mercury amalgams, stress, lack of water, exercise and many others. This behavioral survey then gives an index of SOC. The scores relate to the risk of Suppression and Obstruction to the natural Cure. The higher the scores the more the Suppression and or Obstruction. The scores of 100 or lower are ideal. A copy of the SOC index questions appear in the appendix.

Study Technicians

The study technicians were educated and supervised by medical officers. The study technicians were to execute the SCIO therapy and analysis. All were trained to the standards of the International Medical University of Natural Education. Therapists from all over the world including N. America, Europe, Africa, Australia, Asia, S. America and elsewhere were enlisted to perform the study according to the Helsinki study ethics regulations. They were to chronicle any medical suspected or confirmed diagnosis. Therapists personnel are not to diagnose outside of the realm of their scope of practice. Then the study technician is to inquire on any disclosed observations during the test and on follow-ups report any measured changes.

• Part 1. The emphasis was on substantiating safety followed by efficacy of the SCIO.
• Part 2. Proving the efficacy of the SCIO on diseases (emphasis on degenerative disease)
• Part 3. Proving the efficacy of the SCIO on the avant garde therapies of Complementary Med
• Part 4. QQC standardization
To test the device as subspace against the placebo effect, two of the 2,500+ therapists were given placebo SCIO devices that were totally outwardly the same but were not functional. These two blind therapists were then assigned 35 patients each (only 63 showed). This was to assess the double blind factor of the placebo effect as compared to the device. Thus the studied groups were A. placebo group, B. subspace group, and C. attached harness group.

Cross placebo group manipulation was used to further evaluate the effect.

**Important Questions:** these are the key questions of the study

1. Define Diseases or Patient Concerns
2. Percentage of Improvement in Symptoms
3. Percentage of Improvement in Feeling Better
4. Percentage of Improvement Measured
5. Percentage of Improvement in Stress Reduction
6. Percentage of Improvement in SOC Behavior
7. What Measured+How (relevant measures to the patient’s health situation)
8. If Patient worsened please describe in detail involving SOC_

After the patient visit was complete the data was e-mailed to the Ethics Committee or IRB for storage and then analysis. This maneuver minimized the risk of data loss or tampering. Case studies were reported separately in the disease analysis.

**Results:**

Before we review the direct disease improvement profiles, we need to review the overall results. The first most basic of question in the results is the basic feedback of the generic patient conditions.

1. Percentage of Improvement in Symptoms
2. Percentage of Improvement in Feeling Better
3. Percentage of Improvement Measured
4. Percentage of Improvement in Stress Reduction
5. Percentage of Improvement in SOC Behavior

The SOC index gives us great insight to this study. Each disease has a different cut off where the ability of the SCIO to help was compromised. As a general index scores of 200 + where much less successful.

**This groups significant SOC cut off was ----.**

The Large scale study had over 98,000 patients and 275,000 patient visits we have direct evidence of the safety and efficacy. A placebo group was used for the large scale test to help validate the results.

This disease group total number of patients was

**Subspace Treatment 15,032 patients, 19,900 SCIO Harness Patients**

**OVERALL ASSESSMENT**

**A. Subspace Treatment 45,082 patient visits**

There were 23 cases of patients who reported a negative Improvement.

None of these cases reported any major difficulty.

There were

- 592 cases reporting no improvement of Symptoms, % of Subgroup
- 326 cases reporting no improvement in feeling better, % of Subgroup
- 44 cases reporting no improvement in stress reduction, % of Subgroup
- 21%--- Percentage of Improvement in Symptoms
- 31%--- Percentage of Improvement in Feeling Better
- 16%--- Percentage of Improvement Measured
- 43%-- Percentage of Improvement in Stress Reduction
- 9%----Percentage of Improvement in SOC Behavior
- 12,985 patients reported measured injuries. There was a 22% measured improvement over a one month period.

**B. SCIO Harness Treatment 53,891 patient visits**

There were 32 cases of patients who reported a negative Improvement.

None of these cases reported any major difficulty.

There were

- 23 cases reporting no improvement of Symptoms, % of Subgroup
- 56 cases reporting no improvement in feeling better, % of Subgroup
- 3 cases reporting no improvement in stress reduction, % of Subgroup
- 69%--- Percentage of Improvement in Symptoms
- 67%--- Percentage of Improvement in Feeling Better
- 45%-- Percentage of Improvement Measured
- 42%-- Percentage of Improvement in Stress Reduction
- 21%----Percentage of Improvement in SOC Behavior
- 35,811 patients reported measured injuries. There was a 65% measured improvement over a one month period.

**Discussion:**

The results show significant improvement in symptoms and feeling better. The Collective results show a dramatic benefit to the SCIO therapist visit.
China Men and Women teams both use the SCIO to beat USA to win beach volleyball gold in Moscow.

SWATCH FIVB Beach Volleyball World Tour: Moscow Gold Medal Results
China’s men and women beach volleyball teams defeat the U.S. teams and win the final gold medal matches in the SWATCH FIVB World Tour held in Moscow. Double Gold again for the SCIO. The SCIO Heals injured tissue and increases the body electro-potential of muscles.

International beach volleyball history was made in the final gold medal matches held Monday June 14, 2010 in Moscow as both the Chinese men’s and women’s pairs won gold medals for the first time in the SWATCH FIVB Beach Volleyball World Tour. The Chinese team had used the SCIO to tune and charge their bodies. The Chinese were rated below the top ten placed as thirteenth rated but the SCIO changes that and gave them the edge to win.

China’s men and women pairs beat out strong international volleyball competition, including facing top-seeded U.S. teams for the final FIVB gold matches. The FIVB $600,000 (USD) Grand Slam presented by SEAT featured a 24-team elimination bracket competition at the SWATCH FIVB World Tour stop on the Poklonnaya Gora (Victory Park) courts in Moscow June 10-14, 2010.

The SCIO once again delivers results like it did in the 2008 Olympics

**China’s Wu and Xu Win Men’s Gold Medal in International Beach Volleyball**

As the 13th-seeded team of the SWATCH FIVB World Tour in Moscow, Penggen Wu and Linyin Xu surpassed expectations by winning their first-ever gold medal match on the international beach volleyball circuit. The winners were quoted as saying the SCIO helped them to increase their performance and sharpen their skills. The international results have shown the SCIO can accelerate healing of injuries and traumas. Also sport studies have shown it is capable of increasing the body electric levels and thus increasing performance about 5% in an athlete.

Wu and Xu defeated top-seeded Phil Dalhausser and Todd Rogers of the United States by scoring 21-17, 17-21 and 17-15 in only 57 minutes of finals play. Wu and Xu had previously lost to Dalhausser and Rogers at the 2008 final match in Moscow, the last match between the two teams at the SWATCH FIVB World Tour.

According to China’s Wu, the gold medal win was based on “a lot of luck and the use of the SCIO”. As the reigning Olympic Champions, Dalhausser and Rogers already held three SWATCH World Tour wins and a recent tournament win at the AVP Pro Beach Tour Huntington Beach event in the U.S. one week prior to the Moscow event.

**The results of the semi-finals brackets leading up to the final match were:**
- Wu and Xu defeated Casey Jennings and Brad Keenan of the United States (21-12 and 21-16)
- Dalhausser and Rogers defeated Julius Brink and Jonas Reckermann of Germany (21-15 and 21-15)

**China’s Women Win Gold Medal at SWATCH FIVB Beach Volleyball World Tour**

**AVP Pro Beach Volleyball Tournaments 2010 Game and Tour Schedule**

**Professional beach volleyball tournaments held by AVP Pro Beach Volleyball can be viewed throughout 2010 with games scheduled to tour 12 U.S. locations.**

Just two days prior to the men’s Chinese team winning the gold medal, the women’s Chinese team of Chen Xue and Xi Zhang also took the gold at the SWATCH FIVB Beach Volleyball World Tour.

The eighth-seeded team Xue and Zhang defeated the second-seeded team of Jennifer Kessey and April Ross of the United States, winning the $600,000 (USD) Grand Slam presented by SEAT. China’s team won for the second time in three years against one of the U.S. women’s teams. Both match wins were held in Moscow. The girls also attributed credit for their win to the help of the SCIO and Tawra Geerdink their SCIO technician. International studies have shown that the SCIO charges the human battery so to speak. It makes the Voltage, Amperage, Resistance Hydration and oxygen improve while balancing the Ph. Thus it positively affects all sport actions including endurance, coordination, and strength.

**The results of the semi-finals brackets leading up to the final match were:**
- Chen Xue and Xi Zhang defeated Juliana Felisberta Silva and Larissa Franca of Brazil (12-21, 21-14 and 15-13)
- Jennifer Kessey and April Ross defeated Maria Antonelli and Talita Antunes of Brazil (18-21, 21-18 and 15-13)

**SWATCH FIVB Beach Volleyball World Tour 2010 Schedule**

The International Federation of Volleyball (FIVB) consists of 220 affiliated Federations and governs, manages and promotes all forms of Volleyball and Beach Volleyball worldwide through tournaments such as the SWATCH FIVB World Tour.

The 2010 SWATCH FIVB World Tour schedule continues with upcoming matches for both men and women. The women’s international beach volleyball competition takes a two week hiatus after the Grand Slam presented by SEAT and will resume in Norway for the $600,000 ConocoPhillips Grand Slam in Stavanger. Men’s international beach volleyball competitions will be held June 15-20 in Prague.
injured
Recently, breathing problems, shoulder pain and allergies have sometimes prevented Novak from realizing his full potential on court, but deep runs at the French Open and Wimbledon have meant that the Serb is struggling to fight on.

Djokovic's breakthrough year was in 2007, when he first finished second to Nadal at the Masters event in Indian Wells, and then won the important tournament in Miami, sometimes described as the "fifth Slam." He beat Nadal along the way at that Masters and the world began to take note of his prowess, especially on the hard courts.

But the serve let him down in the semifinals against Tomas Berdych, when double-faults on critical points sealed his fate. His post-Wimbledon work must have centered on the improvement of that shot, and once he steps out on his preferred surface his serve will be firing again. The slight health problems disturbed him and his game went down.

Nole, as his many fans know him, will survive the onslaught of the emerging talent, and fight his way to the summit.

Sick and tired and with shoulder pain Novak hired a private SCIO therapist Dr. Igor. Igor stared to treat him with the SCIO and he was trying to help his oxygen transport. I sent him some sport formula and he responded well. He responded rapidly and went on a tear at the US Open and then after that we worked hard with the SCIO to fix his sore shoulder. He responded very well to SCIO allergy work, breathing problems and muscle repair. The SCIO boosted his VARHOPE and his performance went up and up. Research has shown an increase of 5% in body electrical factors that increase performance.
Rise and Rise of Novak Djokovic continues Novak goes from sick and tired to undefeated using the SCIO

26-0

ANOTHER BIG SCALP: Novak Djokovic’s imperious winning streak continues after a thrilling final win over Rafa Nadal in the final.

In an epic final, Novak Djokovic defeated world No 1 Rafa Nadal in a third set tiebreak to win the Sony Ericsson Open 4-6 6-3 7-6 in Miami.

The victory extends Djokovic’s undefeated winning streak to 26-0 matches going back to last year and follows his victory over the Spaniard in Indian Wells two weeks ago.

“It is just incredible to win against the number one player in the world in a third set tie break,” a delighted Djokovic said on court before he was handed the trophy.

It was a magnificent battle that lived up to its billing as a clash between the sport’s top-ranked
injured

player and the most in-form competitor on tour at the moment, producing quality, drama and tension throughout.

Nadal began strongly, breaking the Serb in the third game of the opening set to end Djokovic’s remarkable streak of 41 successive service games held in the tournament.

Miami Open 2011: all-conquering Novak Djokovic is too hot for Rafael Nadal in final

The most frequently used words of this men’s tennis season, “game, set and match, Novak Djokovic”, were once again bouncing around a stadium’s sound system, after he came from a set down to beat Rafael Nadal in a decisive tiebreak on the purple cement of south Florida.

Triumphant: Novak Djokovic celebrates his defeat of Rafael Nadal in Miami

In the broiling Miami heat, the best two players in the world produced some compelling, if not always immaculate, tennis, and it ended after more than three and a quarter hours with another Djokovic victory.

Triumphant: Novak Djokovic celebrates his defeat of Rafael Nadal in Miami

Davis cup goes to the SCIO team

As does the Grand Slam Australian Open

Wins in Davis cup, Hopman Cup, Dubai and Indian Wells now Miami Masters (the fifth Slam) mark an undefeated year so far for Novak using the SCIO

The SCIO sharpens the body electric to increase sport performance by re-education of the muscles and the VARHOPE. As we have seen over and over again the device can increase the body electric 5%, the difference between fourth and first place. The SCIO electrically repairs traumatized tissue from injury. Everyone in the world of tennis is scratching their heads wondering how Novak went from sick and tired to undefeatable. The ones with fifth grade education are starting to see that there is energetic medicine, we are made of electrons and electronic fields, and we can enhance those fields with the SCIO technology. People without a fifth grade education still think all is drugs and surgery.

Listen and you hear “game, set and match, SCIO ”
LONDON – Ever since eliminating pizza from his diet, Novak Djokovic has been on a roll.

Djokovic has been boasting all season about how he has more energy on the tennis court since starting a gluten-free diet, cutting out pizza and bread from his daily life. But the top-ranked Serb has been reluctant to discuss his new regimen in any detail, preferring to let his game do the talking.

The man with the answers is Igor Cetojevic, a Serbian doctor, medical professor with the International Medical University of Natural Education and nutritionist who began working with Djokovic at the end of last year.

“I checked him with the SCIO to see what is going on, gave some advice and therapy,” Cetojevic told The Associated Press in a telephone interview. “He started to follow them. He started to sleep properly for the first time in his life.”

It actually seems as if it was as easy as that.

Djokovic had won only one Grand Slam title heading into 2011. He now has four after winning the Australian Open, Wimbledon and the U.S. Open, while compiling an amazing 64-3 record this year – with two of those losses coming from injury retirements, including in a Davis Cup match to Juan Martin del Potro of Argentina last Sunday.

For the past couple of years, Djokovic had been firmly entrenched as the No. 3 player in the world behind Roger Federer and Rafael Nadal. Although he was consistently going deep into the majors, Djokovic’s lone big title came at the 2008 Australian Open. Otherwise, he was losing early or even pulling out of matches because he wasn’t in good enough shape.

When things started to change, Djokovic hushed up, declining to talk about his new training routine.

“I can’t talk about it,” Djokovic said at the French Open, “because it’s private.”

Last month, about two weeks before the start of the U.S. Open, Djokovic again demurred when asked about the diet.

“I cannot tell you everything,” said Djokovic, who grew up at his parents’ pizza parlor on Mt. Kopaonik in southern Serbia. “There are things that I keep for myself.” (Like the SCIO)
But the science behind the decision to essentially cut wheat, barley and rye out of Djokovic's diet isn’t all that secret.

Cetojevic said he used a SCIO bio-feedback machine – basically attaching some wires to a person and connecting them to a computer – to study the effects that food has on Djokovic’s body. He saw that the gluten was “through the roof,” and knew he needed to do something about it.

“We can see most reactions in the body so we can eliminate the bad guys and put good guys in,” Cetojevic, a medical Professor for the International Medical University, explained, keeping it as simple as can be.

Cetojevic said the details behind the program can be complicated and he isn’t surprised when Djokovic evades questions about the diet and the electrical treatment.

“Novak’s not a medical doctor,” said Cetojevic, adding that even he found it difficult to explain to people what was going on. “He cannot talk about that.”

The idea of working with Djokovic came about two years ago, long before Cetojevic had ever met the tennis star. And it started because of his wife, a holistic therapist from the United States.

“I saw Nole playing some match against (Jo-Wilfried) Tsonga in Australia,” Cetojevic said. “My wife told me, ‘This guy has some allergy.’ I said, ‘I don’t think so. Something else is there.’

“She told me, ‘Help him. He’s your countryman,’” Cetojevic said with a laugh.

Cetojevic made some calls to people who knew Djokovic and left the message that he might be able to help.

“Time passed, and one day they called me,” said Cetojevic, who flew to Split, Croatia, to meet Djokovic for the first time as he played in the Davis Cup quarterfinals against Croatia in July 2010. It was there that the lessons started, and they involved more than just nutrition.

“I started teaching Nole simple things, like avoid talking on the telephone and eating because you’re ignoring your food,” said Cetojevic, who also studied traditional Chinese medicine, Quantum energetic medicine and magnetotherapy. “He started responding very well. Started to kind of eat well, not have weak stomach, vomiting after meals.

“Slowly, slowly he started to build up. I started to observe how he behaves.”

The new ideas, including blessing his food before eating in order to have an “emotional, spiritual connection with food,” were not completely accepted by some in Djokovic’s camp, Cetojevic said, especially after the player started losing weight. But once the results started coming and the weight came back, Cetojevic was hired full time.

“In Chinese medicine, confidence is in the stomach,” Cetojevic said.

Even Federer, a 16-time Grand Slam champion and former No. 1, said he doesn’t really understand what it is about the gluten-free diet that has made Djokovic so tough to beat.

“I don’t even know what that all means,” Federer said last month at the U.S. Open. “I eat healthy, and I think that’s what people should do, too, if they have the options.”

But believing in it, and putting it into effect, is really what matters. And Djokovic has done just that. Cetojevic sat in the players’ box at Rod Laver Arena as Djokovic beat Andy Murray to win his second Grand Slam title at the Australian Open.

Djokovic then ran his winning streak to 43 straight matches before losing to Federer in the French Open semifinals. A few weeks later, Djokovic beat defending champion Nadal to win his first Wimbledon title.

It was Djokovic’s desire to win Wimbledon that initially endeared him to Cetojevic.

“When he was a very small boy, he played at home with this little empty pot and on a little chair he stepped on it and said, ‘Novak Djokovic, Wimbledon champion.’ He was already visualizing what he wants to be,” Cetojevic said. “That pure will to succeed touched me.”

And after that win, right after Djokovic pulled a few blades of grass from the manicured lawn at the All England Club to physically taste his victory, Cetojevic knew his job was complete.

“I stopped after Wimbledon because that was our goal,” said Cetojevic, who returned to his practice in Cyprus. “We had our target.”

The last two losses of Novak came while NOT being on the SCIO. Showing just how powerful the SCIO is.

By CHRIS LEHOURITES AP Sports Writer
These are the **TOP FIVE REASONS** to get a Doctorate in Wellness PhD International Medical University degree at home.

1. Getting a degree means you will increase your earning potential. Studies have shown that at home study is just as good as attended classes.
2. Study and Complete Courses at Your Own Pace. Use this to maximize the learning.
3. Scheduling Convenience. Work when you are ready to work.
4. Teaching Faculty Who Actually Have Work Experience in Your Field of Study. Global faculty at IMUNE is with worldwide famous doctors.
5. Save Money on Travel, Parking, Childcare, and Books. You save money the world saves energy, this makes you and the world better.
6. Employer Support. Many employers offer tuition reimbursement for employees’ tuition associated with training in their fields. Employers also tend to encourage enrollment in online degree programs because they know employees will be able to go to school and still be able to be committed to their jobs. Don’t be afraid to ask your employer. Every company needs a wellness consultant.

Professor Desiré Dubounet, the world’s most famous Naturopath and her friends have spent over 35 million dollars to bring the world a professional and thorough course on Wellness, Naturopathy and Neuro-Electro-Physiology of Biofeedback as Bioresonance. She is such a humanitarian Angel, she lets you **pay for the course videos, books and materials with Karma** go to www.imune.name for more information.

**Bio-electronic Increase of Power Lifting Performance Clinic**

**Details**

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**RENEDEO és IRODA**
Budapest III.
Nánási út 67 . I.em.
Tel.:1-188-68-65
06-20-342-662

Supervising researcher: Dr Istvan Bandics MD Licensed Hungarian Medical doctor. This study was done at the Hippocampus office in Budapest in January 1994. Studies done with the supervision of a local ethics committee and all subjects gave informed consent to participate.

**Abstract**

This study took 18 members of a Hungarian Power lifting team and measured their performance before and after an EPFX therapy and some sport oxygen formula. Their personal best are a matter of record. Each had two sessions on the EPFX over two days and they were asked to do their best in Squats and Bench press. By comparing to the personal bests most of these athletes had increases in performance after two sessions on the EPFX.

**Introduction**

The body electric is well known factor in sports medicine performance. The EPFX devices address many factors of the body electric. Muscles are magnetic in action. Nerve impulses trigger magnets in muscle tissue to pull over each other. Size of the tissue increases performance as does the electrical factors. The power is an index of voltage and amperage which when multiplied against each other gives the power coefficient called watts.

The EPFX device measures the body voltage, amperage, and skin resistance. Voltage and amperage are correlates of eeg emg and ecg amplitude and volume. Where skin resistance or impedance is directly measured as voltage loss thru skin tissue. The EPFX then can further calculate estimates of hydration, oxidation and ph.

Then the EPFX can input low current oscillations to harmonically tune to tissue electrical factors to help balance this Voltage, Amperage, Resistance, Hydration, Oxidation and ph. This is referred
to as VARHOP repair and it is refurbished of the body electric factors. They also used the sport oxygen formula. This results in increased performance.

In this test members of a Hungarian power lift team are given two sessions on the EPFX to balance their body electric VARHOP profile.

Method

The members of a Hungarian weight lifting team of each division had records of their personal bests in the events. We choose Squats and Bench press to measure their performance. Each athlete for the divisions was treated with the EPFX by Dr. Bandics and or his staff. Recommendations of supplements were made. They were treated again the next day and afterwards immediately asked to challenge their best previous records. The personal best of a power lifter is a valuable number. There was no need for a control group since the personal best record would reflect the baseline.

The EPFX device is registered as a medical device in America since 1989 to measure voltage, resistance, temperature and to make virtual calculations of the body electric from these simple measure.

Results

Here are the records of Pre and Post measure of sport performance.

<table>
<thead>
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<th>Subject</th>
<th>comments</th>
<th>Pre/Post</th>
<th>Dif</th>
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<td>Could feel each treatment</td>
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<td>See bench press</td>
<td>95/100</td>
<td>+5</td>
</tr>
<tr>
<td>56</td>
<td>#11</td>
<td>Felt nothing</td>
<td>110/112</td>
<td>+2</td>
</tr>
<tr>
<td>60</td>
<td>#12</td>
<td>Felt nothing</td>
<td>145/151</td>
<td>+6</td>
</tr>
<tr>
<td>67.5</td>
<td>#13</td>
<td>Felt nothing</td>
<td>153/155</td>
<td>+2</td>
</tr>
<tr>
<td>75</td>
<td>#14</td>
<td>Felt nothing</td>
<td>175/175</td>
<td>0</td>
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<tr>
<td>82.5</td>
<td>#15</td>
<td>Felt nothing</td>
<td>200/205</td>
<td>+5</td>
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<tr>
<td>90</td>
<td>#16</td>
<td>Felt nothing</td>
<td>225/225</td>
<td>0</td>
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<tr>
<td>100</td>
<td>#17</td>
<td>Felt nothing</td>
<td>230/233</td>
<td>+3</td>
</tr>
<tr>
<td>110</td>
<td>#18</td>
<td>Felt nothing</td>
<td>230/232</td>
<td>+2</td>
</tr>
<tr>
<td>Boys 18-22</td>
<td>#19</td>
<td>Felt nothing</td>
<td>230/232</td>
<td>+2</td>
</tr>
</tbody>
</table>

- Total difference in Bench Press performance = +38 kilo
- Total difference in Squat performance = +33 kilo
- Average kilo increase= 1.97.

Conclusions

It was shown that there was a significant increase in performance after two EPFX treatments from professionally trained staff. Measures of the volts and amps increased and this was reflected in an increase in power. Seven of these boys took medals and three gold medals in European
Double Blind Study of Sport Performance with the SCIO device versus Placebo control

STUDY INFORMATION

SUPERVISING RESEARCHER: Dr. Danis György, MD, Licensed Hungarian Medical Doctor

DATES: March 2011

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Kalvaria ter 2.

Hungary

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Fax: 36-1-210-9340

MONITOR

IMUNE (International Medical University of Natural Education)

Abstract

This study took 10 healthy athletic subjects and measured their performance before and after a SCIO therapy and compared to Placebo control group. This study showed an increase in performance in the treatment SCIO group versus the control group in most patients.

Introduction

There is much double blind evidence at the SCIO device can increase the VARHOPE electrical parameters of the body over a short 45 min session. (VARHOPE is an acronym for Voltage-Amperage-Resistance-Hydration-Oxidation- Ph- Eh). For more complete description of the studies and science see the VARHOPE medical textbook.

There is also much evidence of increased sport performance from SCIO treatment over twenty years of clinical sport use. This study theorizes that the VARHOPE increase results in increased muscle performance. In preliminary studies a grip strength measure was inaccurate and not of much use for this study. This study will seek a better more refined measure of strength using free weight repetition.

Since there has been a documented increase in Voltage and Amperage and since Voltage times Amperage equals power there should be a documented physical strength measure.

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Since there has been a documented increase in Voltage and Amperage and since Voltage times Amperage equals power there should be a documented physical strength measure.

ARTICLES AND STUDIES


BOOKS


ARTICLES AND STUDIES

The body resists excess stimulation and disperses the extra energy off of the skin. Only using an electrical stimulus exactly the same as the body's own electrical field potential will the body allow the charges to accumulate. The body must also harmonize to an electrical oscillation of stimulus. The SCIO system uses a autofocusing method to find the unconscious body harmonization frequencies that maximize the transfer. Thus we use the analogy of a trickle charger of a battery. A harmonic pulse of the body resonant frequencies and chosen frequency and at a balanced similar potential the body will allow the SCIO to charge the body electric and thus increase the VARHOPE factors. For more complete description of the studies and science see the VARHOPE medical textbook.

This trickle charge can have maximum benefits in a simple 45 min session. The total change is limited to the body factors of free ions, free minerals, free fatty acids pools, and specifically the membrane potentials of the body.

**Literature Review:** In the 1980's several pilot studies indicated ability for an auto-focusing electrical stimulation device to increase sport performance. Results with the Cleveland Browns and boxers such as Boom Boom Mancini showed some promise. A 1994 study with the Hungarian power lifting team showed great results versus the personal bests of the participants. The work at AC Milan's football team at reducing the injury rate was very interesting. A pilot study done by the NBA's former MVP Dennis Johnson on players in the San Antonio Spurs organization showed that this technology increased eye-hand coordination and there was improvement with free throw shooting versus their known norms. The Chinese 2008 Olympic team study showed great promise in helping athletes.

A SCIO doctor signed up to help Novak Djokovic when he had so many health problems with breathing and his shoulder. The therapy has improved his game and he now has an unbeaten record during 2011 and is heading for number one in the world ranking of tennis players.

Now a clinical test of athletes in 2011 has shown further the ability of this technology to help people.

**Method:** Ten athletes were used and the device was set on treatment or placebo by the placebo officer. Thus the therapist and subject did not know which setting was used making this a double blind setting. The athletes were told to do a free weight exercise to the best of their abilities and then to repeat each after testing. The base line was used for comparison. Some were asked to return of different days for comparisons. We wanted to see the long range effects of placebo versus therapy to see how long the effect might last.

<table>
<thead>
<tr>
<th>Visit no.</th>
<th>Date</th>
<th>Type of treatment</th>
<th>Pre measurement</th>
<th>Post measurements</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 March 2011</td>
<td>Treatment</td>
<td>15 right bicep Curl 15 left bicep Curl 15 bench press</td>
<td>20 right bicep Curl 20 left bicep Curl 25 bench press</td>
</tr>
<tr>
<td>2</td>
<td>3 March 2011</td>
<td>Placebo</td>
<td>-</td>
<td>15 right bicep Curl 15 left bicep Curl 15 bench press</td>
</tr>
<tr>
<td>3</td>
<td>5 March 2011</td>
<td>Treatment</td>
<td>-</td>
<td>20 right bicep Curl 15 left bicep Curl 20 bench press</td>
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<tr>
<td>4</td>
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**Subject no.2**

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**Subject no.3**

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<td>Treatment</td>
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<td>21 right bicep Curl 21 left bicep Curl 42 bench press</td>
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<td>3 March 2011</td>
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<td>-</td>
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</tr>
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<td>4</td>
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<td>Placebo</td>
<td>-</td>
<td>18 right bicep Curl 18 left bicep Curl 29 bench press</td>
</tr>
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<td>-</td>
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<td>Pre measurement</td>
<td>Post measurements</td>
</tr>
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<td>25 right bicep Curl</td>
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</tr>
<tr>
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<td>25 March 2011</td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<td>20 bench press</td>
</tr>
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<td></td>
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</tr>
<tr>
<td></td>
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<td>20 left bicep Curl</td>
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</tr>
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<td></td>
<td></td>
<td></td>
<td>15 bench press</td>
<td>16 bench press</td>
</tr>
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<td>23 March 2011</td>
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<td>-</td>
<td>30 right bicep Curl</td>
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<td></td>
<td>20 bench press</td>
</tr>
</tbody>
</table>
Conclusions

• In subject #1 there was an increase after the first treatment, not the placebo second visit. On the third there was an increase and an increase found after the next day.
• Subject #2 had a great increase after the treatment and it wore off after over two weeks.
• Subject #3 had marked increases that maintained for over a week but fell off and returned after the next treatment.
• Subject #4 showed some increases from Placebo expectations and greater increase after treatment.
• Subject #5 had no increases from placebo or treatment. There was lots of stress and a very low Oxidation number.
• Subject #6 had increases from placebo and no increases from treatment.
• Subject #7-8-9 had no increase from placebo and marked increases from treatment.
• Subject #10 had increases from treatment that fell off in a week and returned with treatment.

The effect of the treatment is profound in most athletes. It does wear off at different rates for the subjects. Approximately one week is the time of the effect wearing off for a young clean healthy subject.

So the VARHOPE effect has been shown to help athletes improve their performance.

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• Varhope, charging the batteries, by Desire Dubouneet, Professor of IMUNE, IMUNE Press 2011.
The neural control of eye–hand coordination is complex because it involves every part of the central nervous system involved in vision, eye movements, touch, and hand control. This includes the eyes themselves, the cerebral cortex, subcortical structures (such as the cerebellum, basal ganglia, and brain stem), the spinal cord, and the peripheral nervous system. Some other areas involved in eye–hand coordination that have been most studied most intensely are the frontal and parietal cortex areas for the control of eye saccades and hand reach control. Both of these areas are believed to play a key role in eye–hand coordination and the planning of movements during shooting a free throw.

A more specific area, the parieto occipital junction, is believed to be involved in the transformation of peripheral visual input for reaching with the hands, as found via fMRI.[8] This region in particular has been shown to have subdivisions for reach, grasp, and saccades. In additional to the parieto occipital junction, the posterior parietal cortex is believed to play an important role in relating proprioception and the transformation of motor sensory input to plan and control movement with regards to visual input.[9]

The SCIO has been shown to be able to increase and stabilize the VARHOPE electrical measure of a patient.[11] This has been associated with sports performances and increases of performance in AC Milan, Chinese Olympics, and the Hungarian Powerlifting team. So it is possible that in just one treatment we can increase eye hand coordination.

Impairments to eye-hand coordination have been shown to occur in older adults, especially during high velocity and precise movements. This has been attributed to the general degeneration of the brain’s cortex, resulting in a loss of the ability to compute visual inputs and relate them to hand movements.[10] However, while older adults tend to take more time for these sorts of tasks, they are still able to remain just as accurate as younger adults, but only if the additional time is taken.

Years ago I had some phone conversations with Dennis Johnson former MVP of the NBA. He asked to get a SCIO device for testing with is players in Texas who were part of the San Antonio Spurs team. I was quite excited and immediately sent him a device for research. After a few months he called back to tell me he had done a short study and found the device helped his players improve free throw shooting 5% over the life time average.

Method: So to test this effect in professional patient blind fashion we got 20 atheltic players to do 10 freethrows as a baseline and then 10 more after a 20 min SCIO treatment and 10 after a placebo treatment. The subjects were blinded as to when the placebo versus therapy happened. VARHOPE measures were also calculated and compared for improvements.

<table>
<thead>
<tr>
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<th>Device</th>
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**Volt**
- Subject 2: 44, 66, 79, 91, 83
- Subject 4: 4, 79, 43, 83

**Amp**
- Subject 2: 11, 46, 20, 92, 90
- Subject 4: 93, 52, 68, 90, 90

**Resistance**
- Subject 2: 39, 99, 10, 89, 79
- Subject 4: 80, 70, 2, 79, 79

**Hydration**
- Subject 2: 58, 41, 1, 90, 90
- Subject 4: 36, 76, 49, 50, 50

**Oxid**
- Subject 2: 1, 41, 12, 97, 88
- Subject 4: 65, 13, 2, 65, 2\n
**Proton**
- Subject 2: 65, 71, 65, 71, 71
- Subject 4: 65, 64, 65, 64, 65

**Electron**
- Subject 2: 74, 71, 70, 61, 61
- Subject 4: 74, 70, 70, 60, 60

**Resonant Freq**
- Subject 2: 19592, 0, 0, 20911, 28655
- Subject 4: 284, 0, 28655, 284, 284

**Reactance Speed**
- Subject 2: 97, 98, 97, 97, 97
- Subject 4: 89, 0, 101, 89, 101

**Subject 5**
- Pre test 1 of 10
- Placebo
- Post test 0 of 10
- SCIO
- Post test 3 of 10
- SCIO
- Post test 2 of 10

**Volt**
- Subject 5: 43, 83, 83, 85, 88

**Amp**
- Subject 5: 68, 90, 90, 70, 95

**Resistance**
- Subject 5: 64, 79, 79, 70, 95

**Hydration**
- Subject 5: 49, 50, 50, 50, 50

**Oxid**
- Subject 5: 1, 2, 3, 2, 2

**Proton**
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**Electron**
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**Resonant Freq**
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**Reactance Speed**
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<td>Volt</td>
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<td>Resistance</td>
<td>Hydration</td>
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<td>Post test 4 of 10</td>
<td>Volt</td>
<td>Amp</td>
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<td>Pre test 3 of 10</td>
<td>Volt</td>
<td>Amp</td>
<td>Resistance</td>
<td>Hydration</td>
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<td>Resonant Freq</td>
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<td>Subject 20</td>
<td>SCIO</td>
<td>Post test 7 of 10</td>
<td>Volt</td>
<td>Amp</td>
<td>Resistance</td>
<td>Hydration</td>
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<td>Proton</td>
<td>Electron</td>
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<td>Subject 21</td>
<td>Placebo</td>
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<td>Amp</td>
<td>Resistance</td>
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<tr>
<td>Subject 21</td>
<td>SCIO</td>
<td>Post test 3 of 10</td>
<td>Volt</td>
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<td>Resistance</td>
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</table>

Pretest total= 39  Placebo Posttest= 41  SCIO Posttest= 82
Pretest avg= 1.85  Placebo avg= 1.95  SCIO avg= 3.9
Here is an article from the FDA wanting you the therapists to do clinical research. If you have an idea of what your SCIO has done to help your patients here is your chance to prove it to the world. You can write up a case study on a patient and submit it to us for publication. You might get approved to present it at our world congress in Budapest. But if you want to do a proper study here is your chance.

The FDA is helping people to do Investigator Sponsored Trials, known as IST. The following article is from an FDA approved journal on compliance. We have the proper Institutional Review Board, we have a study protocol for you to work with or amend for your needs, and we have the medical supervision. We have all you need. You just need an idea, some patients, and the dedication to see it thru. If you can finish a full 20 patient dbl blind study you can get a refurbished SCIO from the sponsor Maitreya / SCIO USA. So think this is your chance to get your name on a study and show the world what you are doing. We can do it together.

Prof. Desiré Duboune

16 of the 21 subjects improved on the treatment posttest. This result shows a definite effect but not at significant levels to allow a claim. Further testing needs to be done for more complete analysis of the effect to be understood. There were the usual VARHOPE improvements in treatment group versus the placebo. The 5 patients with no treatment improvements had lower VARHOPE improvements than their cohorts. This hints strongly that the positive effects lie in VARHOPE improvement.

Discussion: This study shows that one session on the SCIO can have stimulating and balancing effects on the VARHOPE electrical measures of the subjects and there was improvement in their eye to hand exercise of free throw shooting. Longer use and multiple sessions can improve the effect.

References
11. Nelson WC, ISSN # 978-615-5169-13-7 Injury and Sport Medicine Medical Textbook
Investigator-sponsored Trials

Thousands of clinical trials are conducted each year around the world. They are sponsored or funded by a variety of organizations such as medical institutions, foundations, voluntary groups and pharmaceutical companies, in addition to federal agencies such as the National Institutes of Health and the Departments of Defense and Veterans Affairs. In addition, some clinical trials, sponsored by individual physicians, are called investigator-sponsored trials (ISTs).

ISTs are like other clinical trials, except that they are mostly single-center studies with an individual physician acting as both the lead investigator and the sponsor. As a result, ISTs tend to be minimally funded. However, if the drug or medical device under investigation in the trial is already available commercially (perhaps for another indication or population), the investigator will often try to engage the manufacturer to obtain some form of funding (e.g., donating the drug or medical device). Data generated through ISTs are often published and contribute significantly to academic research that in turn is referenced and utilized by other treating physicians. Data from ISTs are like any other clinical trial in that they are subject to the same laws and regulations governing the conduct of human studies to ensure compliance. In the US, the Code of Federal Regulations (21 CFR Part 312 Subpart D for drugs and biologics and Part 812 Subparts C and E for medical devices) describes these serious responsibilities for both the sponsor (21 CFR 312.50) and for the investigator (21 CFR 312.60). Investigator-sponsors must determine whether the study is exempt from the requirement to submit an IND. FDA investigators sponsor clinical trials in spite of the tremendous regulatory burden such studies entail. A key challenge investigator-sponsors face is the large amount of time they must dedicate to the study and how that impacts caring for patients in their medical practices. Investigator-sponsors must supervise the trial, interact with the IRB, develop budgets, deal with audits and inspections and travel as needed. Well-qualified, experienced, trained and efficient personnel (in particular the study coordinator, but also including the sub-investigators, research nurses and laboratory personnel) become essential to the investigator in managing the trial workload.

Table 1 lists some common reasons why investigators sponsor clinical trials in spite of the tremendous regulatory burden such studies entail. A key challenge investigator-sponsors face is the large amount of time they must dedicate to the study and how that impacts caring for patients in their medical practices. Investigator-sponsors must supervise the trial, interact with the IRB, develop budgets, deal with audits and inspections and travel as needed. Well-qualified, experienced, trained and efficient personnel (in particular the study coordinator, but also including the sub-investigators, research nurses and laboratory personnel) become essential to the investigator in managing the trial workload.

Investigator-sponsors who take the time at the beginning of the trial to train any noncertified personnel in the International Conference On Harmonization (ICH) guideline, *Good Clinical Practice E6(R1)* will generally save time on the back end and improve the quality of the study.

<table>
<thead>
<tr>
<th>Table 1. Advantages for Investigators in Sponsoring Clinical Studies</th>
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<tbody>
<tr>
<td>1. Patient care: Investigators can more rapidly offer their patients unapproved but promising products or</td>
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<tr>
<td>2. Scientific collaboration: ISTs allow Investigators to remain at the cutting edge of their therapeutic interests.</td>
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<tr>
<td>3. Scientific contribution: When Investigators publish the results of their studies, they enable manufacturers to</td>
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<td>4. Professional recognition: Publications provide the Investigator with professional recognition as an expert or</td>
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<td>thought leader in the field. There is value in publishing even those studies that did not meet their primary hypotheses.</td>
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<tr>
<td>5. Funding: As the Investigator becomes well-known in the field, he is able to secure funding more easily, thereby</td>
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<tr>
<td>furthering future research.</td>
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</table>
What's in It for the Patient?

ISTs are a very good option for patients to obtain access to new and as yet unapproved research therapies. People often participate in ISTs because they have exhausted approved treatment options that either did not work for them or produced intolerable side effects. Carefully conducted ISTs are a relatively safe and quick way to get access to products that have the potential to treat the disease or condition or that have the potential to improve patient health or quality of life. Further, since investigators are often specialists in the disease area being studied, some patients participate to gain access to expert medical care for their condition, thereby playing a more active role in their own healthcare. Still others participate in ISTs for the purely altruistic reason of wanting to contribute to the advancement of medical knowledge.

Not all patients who apply to participate in an IST will be accepted. Each patient must meet predetermined eligibility criteria, such as age, sex, type and stage of disease, previous treatment history and other medical conditions. These criteria help to reduce the amount of variation and “noise” in the study, without threatening the scientific integrity of the trial, by removing medical variations that might complicate data analyses and the ability to draw relevant and sound conclusions. Patients may also be excluded because the researcher has already enrolled the required number of participants needed to test the hypothesis stated in the study protocol.

Once subjects are selected to participate in the IST, the law requires the investigator to obtain informed consent. The investigator must provide patients with complete and accurate information about what will happen during the trial and disclose all known or suspected risks. Participants must sign a written informed consent form, which indicates they understand the trial is a research study, have been informed about the associated risks and are aware that their participation is voluntary and they can leave the clinical trial at any time. Additionally, the consent form should outline in detail the amount of time participants will have to devote to the trial and the types of activities; for example, they may need to visit the study site at specified intervals, be subjected to additional tests, get more treatments than are normally necessary, stay in the hospital and/or follow complex dosage requirements. Patients use the material in the informed consent document to decide whether or not to enter a clinical trial and to make an informed decision about the level of risk they are willing to accept before they enter the trial.

The investigator should clearly explain to participants (when applicable) that they may not receive the investigational drug and may instead receive a placebo. They should also be prepared mentally for partial or no effectiveness from the treatment. The investigators should encourage the participants to learn as much as possible about the clinical trial and the investigational treatment and to freely discuss their questions and concerns with members of the research team.

Registration of Clinical Trials

Investigators and sponsors usually register their trials with databases such as http://clinicaltrials.gov/, an interactive online database managed by the National Library of Medicine. Clinicaltrials.gov facilitates the registration of trials in accordance with the International Committee of Medical Journal Editors (ICMJE) initiative requiring prior entry of clinical trials in a public registry as a condition for publication. Members of the public can find information about clinical trials by searching http://clinicaltrials.gov/ as it lists both federally and privately supported clinical research. The site, which is updated regularly, offers information on the objectives of each trial, eligibility criteria, locations and contact details to obtain more information.

Summary

For patients, ISTs are a viable option for obtaining access to unapproved treatments. For physicians acting as investigator-sponsors, ISTs offer key benefits such as professional recognition and the opportunity to continue participating and collaborating in cutting-edge scientific investigations (see Table 1). However, ISTs present challenges to both investigators and patients. To be successful, investigators and investigator-sponsors must be highly motivated leaders with the skills and drive to coordinate the activities of many people to ensure completion of all study activities. Success generally requires careful planning, evaluation and management of the multiple aspects of conducting a clinical trial in accordance with all applicable regulations and ensuring that the various pieces of the puzzle fall into place seamlessly.

While ISTs provide patients with accelerated access to new treatments, these treatments have not received thorough review by a regulatory agency such as FDA or the European Medicines Agency, and as such, risks and uncertainties are unavoidable. Volunteers need to ask relevant questions of the researchers, remain vigilant for changes in their health status (particularly adverse changes), report them immediately and, in general, be aware that they shoulder significant responsibility as participants in an IST.

References

• Good Clinical Practice: Consolidated Guideline E6(R1), ICH (June 1996).
• Code of Federal Regulations, Title 21.

Author

Naseem Kabir, M5, RAC, is director, regulatory affairs international, at Genzyme Corporation, based in Cambridge, MA. She has been in the pharmaceutical and medical device industries for 20 years and in regulatory affairs for the last 12 years. Kabir holds a master of science in zoology from the University of Chennai, India and is RAC-certified in both the US and EU. She is a member of the Board of Editors for RAPS Regulatory Focus magazine and can be reached at naseem.kabir@genzyme.com.
Years ago I was excited to see some infomercials about alternative medicine treatments for diseases. The speaker talked a good show and sold me to buy his books. But there was absolutely no real advice in the book. It only made it very expensive to buy. This made me angry and then I decided to write the best self-help books on natural medicine. Editing and collecting the best in real substantiated advice.

Desiré has written two incredible books and made movies to go with them. What to do for influenza and specifically what to do when the next major virus hits. A movie and a self-help book designed to really help you, your family, and understand the best to do to protect yourself.

Also cancer is such a devastating disease, and there are ways to help yourself in the kitchen with cooking for cancer patients. Full advice on soup to nuts on exercise, meditation, cooking, and more. Coupled with a video for the science of how it works.

The health care debate is bringing a question of health and care. In this incredible new book Desiré has outlined a very thorough review of the real problems of Health Care. This book will tell you the truth the chemical companies do not want you to hear.