REVIEW ARTICLE

Electric Nutrition: The Surprising Health and Healing Benefits of Biological Grounding (Earthing)

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ABSTRACT

Context • Modern biomedicine has discovered that many of the most debilitating diseases, as well as the aging process itself, are caused by or associated with chronic inflammation and oxidative stress. Emerging research has revealed that direct physical contact with the surface of the planet generates a kind of electric nutrition, with surprisingly potent and rapid anti-inflammatory and antioxidant effects.

Objectives • The objective of this study was to explain the potential of grounding to clinicians as a simple strategy for prevention, therapy, and improving patient outcomes. The research summarized here has pursued the goal of determining the physiological and clinical significance of biological grounding.

Design • The research team has summarized more than 12 peer-reviewed reports. Where appropriate, blinded studies examined in this paper were conducted using a variety of statistical procedures.

Interventions • In all cases, the intervention examined conductive contact between the surface of Earth and the study's participants, using conductive bed sheets, floor or desk pads, and electrode patches, such as those used in electrocardiography.

Results • All studies discussed revealed significant physiological or clinical outcomes as a result of grounding.

Conclusion • This body of research has demonstrated the potential of grounding to be a simple, natural, and accessible clinical strategy against the global epidemic of noncommunicable, degenerative, inflammatory-related diseases. (*Altern Ther Health Med.* 2017;23(5):8-16)

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Health experts describe a sharp rise in noncommunicable diseases as a major challenge and barrier to global development in the 21st century. The diseases include cardiovascular, respiratory, neurodegenerative, and autoimmune diseases; type 2 diabetes; chronic kidney disease; and some cancers.

These conditions affect all nationalities and classes and are reaching epidemic proportions worldwide, accounting for approximately 40 million deaths annually.[1] The costs in terms of human suffering and the economics of health care are staggering. The former director general of the World Health Organization (WHO) has described the situation as an impending disaster, commenting that the "root causes of these diseases are not being addressed."[2]

Modern biomedicine has discovered that many of the most debilitating diseases, as well as the aging process itself, are caused by or associated with chronic inflammation and oxidative stress, intimately related pathologies. Cells of the immune system release various reactive species, known as free radicals, at sites of inflammation, promoting escalating oxidative stress, intracellular signaling cascades, and proinflammatory gene expression. Both chronic-inflammation and oxidative-stress processes can be simultaneously in play in many chronic disorders.[3]

Age is another factor; people are living longer. Researchers have documented the deterioration of the immune system as humans age, referring to it as *immune-senescence*. A prominent

medical theory, repeatedly confirmed, states that the general deterioration during aging is caused by oxidative stress and results in inflammation and injury to cells and DNA and protein cross-linking that creates wrinkles in the skin and impairs enzymatic functioning. As an example, chronic, low-grade inflammation is recognized as one of the major risk factors underlying brain aging.[4]

As of the end of May 2017, approximately 202 298 studies have correlated inflammation with various diseases, led by cancer, with 66 155 citations.[5]

Inflammation is defined as a localized response to trauma or infection that can wall off damaged tissues until the immune system removes foreign matter, damaged cells, and bacteria. The wall, or inflammatory barricade, serves the function of preventing bacteria or other pathogens or debris resulting from an injury from penetrating nearby heathy tissues. The problem is that the barricade can also be relatively impermeable to circulating antibiotics and antioxidant molecules, slowing the healing response and preventing regenerative cells from entering the region that needs repair.

Because of the barrier, interactions between inflammation and oxidative stress can continue—long after the injury—as a vicious cycle created by the immune system's relentless and unsuccessful efforts to complete the healing process. A low level of chronic inflammation, often referred to as *silent inflammation*, can thus continue for years, damaging and compromising the functioning of adjacent healthy tissues and unnecessarily weakening the immune system.

These situations pose a challenge to the physician because a small pocket of chronic inflammation from an old injury can release toxins into the body fluids that gradually compromise distant organs. The difficulty for the physician is finding the source of the problem, which can be a pocket of inflammation from a long-forgotten trauma, an unrecognized dental issue seemingly (but not) resolved, or a walled-off tissue injury, to mention a few.

This inflammation process has been summarized in a recent publication[6] and was first described by Selye[7] in his classic 1956 book, *The Stress of Life*, and in his various journal articles. Selye's work tied inflammatory responses to stress, cortisol secretion, and adaptation. Based on Selye's work, the current research team has proposed that the inflammatory barricade is formed by a coagulation of debris that has been produced by collateral damage from highly reactive free radicals, which have been leaking beyond the injury site and damaging previously healthy tissue.

Selye's histological studies showed that the inflammatory barricade is composed of connective tissue. Selye developed a model for his studies in which he injected air under the skin to create an artificial inflammatory pocket, which came to be known as a *Selye* or *granuloma pouch*. The method has been used in nearly 2000 studies of inflammation. Selye injected various irritants or pathogens into such pouches to research the ways cortisol and related hormones affected them.

One of these studies examined the effects of the bacteria that cause rheumatic fever. Gundry,[8] a cardiologist, has described the mechanism. Strep throat, caused by β-hemolytic *Streptococcus*, can lead to rheumatic fever, which can lead to rheumatic heart disease and the slow destruction of the heart valves. The immune system recognizes proteins on the surface of the bacteria and attacks and destroys them. Unfortunately, cells comprising the heart valves contain a very similar protein, and the immune system mistakenly identifies them as *Streptococcus* and then silently, painlessly, and systematically attacks the valves. Eventually, the destruction involved may require valve replacement. This process is a classic example of how an old inflammatory condition can slowly lead to damage to a distant organ or tissue.

Today, clinicians routinely deal with the manifestations of inflammation by prescribing anti-inflammatory drugs. Such drugs are important clinical agents in their ability to reduce inflammation-related pain, but they have substantial side effects. Practitioners of alternative medicine bring other factors into the picture, such as a noninflammatory diet, targeted supplementation, and mind-body techniques.

Many studies have investigated the potential of nutritional antioxidants to prevent or ameliorate diseases such as cardiovascular disorders, cancer, diabetic complications, and Alzheimer's disease. Results of these antioxidant trials are mixed in humans. Some studies indicate positive health effects; others show no effects or even harmful effects. Among the reasons for lack of consistent findings could be that the studies have not selected agents that target inflammation and oxidative stress simultaneously or use agents that block some of the oxidative and/or inflammatory pathways but exaggerate others.[3] The best dietary antioxidant or combination of nutrients for reducing cancer risks is unknown.[9]

The current research team sees the inflammatory barricade as a barrier that prevents circulating antibiotics, anti-inflammatory drugs, and nutritional supplements from reaching the sites where they are needed. As a wall of connective tissue, the barricade is relatively impenetrable to these molecules. However, connective tissue is primarily composed of collagen molecules, and research has shown that collagen is a semiconductor, which is a class of materials providing electron conductance between an insulator and a conductor. Hence, the barricade, with its role in isolating chronic inflammation from nearby healthy tissue, can prevent antioxidants from reaching the free radicals in the inflammatory pouches and completing the inflammatory process. Electrons, however, can cross the barrier by semiconduction.

One overlooked element in the human environment—the surface of Planet Earth, including its landmasses and bodies of water—may provide a potent and surprising natural remedy for this challenge and the alarming rise in chronic inflammatory-related diseases. The current study intended to evaluate the physiological and clinical significance of biological grounding.

THE MISSING LINK: PLANET EARTH

In the late 19th century, a back-to-nature movement in Germany claimed many health benefits from being barefoot or sleeping naked on the ground outdoors, even in cold weather.[10] In the 1920s, G. S. White, an American medical doctor, investigated the practice of sleeping grounded after being informed by some individuals that they could not sleep properly unless they were on the ground or connected to the ground in some way, such as with copper wires attached to water, gas, or radiator pipes that were grounded to Earth. He reported improved sleep using these techniques.[11] However, these ideas never caught on in mainstream society.

At the end of the 20th century, Ober[12] in the United States and Sokal and Sokal[13] in Poland independently found distinct physiological and health benefits with the experimental use of a variety of indoor conductive arrangements—bed pads, mats, EKG and TENS-type electrode patches, and copper plates—connected to Earth outside.

Ober, a pioneer in the cable-television industry, recognized a similarity between the stabilizing effects of ground energy on television cable systems specifically and on electrical systems in general and its effects on the human body.[12] Sokal and Sokal,[13] meanwhile, concluded that grounding the human body represents a universal regulating factor in nature that strongly influences bioelectrical, bioenergetic, and biochemical processes and appears to offer a significant modulating effect on chronic illnesses.

It is a well-known scientific fact that Earth possesses a slightly negative electric charge, the result of countless lightning strikes and solar radiation, among other factors. This planetary attribute is based on a virtually limitless, unseen, and continuously renewed reservoir of free electrons, which are negatively charged subatomic particles.[14,15] We use the terms *free* or *mobile electrons* to distinguish them from *charged ions*, which diffuse much more slowly through tissue fluids.

Throughout the world, electrical systems are connected to Earth's surface and its negative charge to maintain stability and safety. These systems, from large grids and power stations to homes, buildings, and factories as well as the machinery and appliances that are operated by electricity, are thus said to be *grounded* or *earthed*.

Herein lies the surprise. Research conducted for more than a decade has demonstrated that Earth's charge and storehouse of electrons represent a major natural resource of health and healing. Research on biological grounding is now suggesting that this very same electric charge on the planet's surface plays a governing and nurturing role for both the animal and plant kingdoms—a form of electric nutrition, so to speak. It appears to have the potential to restore, normalize, and stabilize the internal environment of the human body's countless bioelectrical systems that govern the functions of organs, tissues, cells, and biological rhythms.[16,17]

Significant benefits—such as better sleep, reduced inflammation and pain, and improved blood flow—result from walking barefoot outdoors or sitting, working, or sleeping indoors in contact with conductive sheets, pads, mats, bands, and patches that are connected to Earth. Such contact is believed to transfer Earth's free or mobile electrons from the ground into the body, a transfer resulting in rapid, sometimes instant, and significant physiological changes now documented in multiple published studies, most of them peer reviewed.[18]

Throughout history, humans mostly walked barefoot and slept on the ground, or they used footwear and bedding fashioned from animal skins that become permeated with body perspiration or ground moisture and thus permitted transfer of Earth's electrons into the electrically conductive body. Through this mechanism, every part of the body could equalize with the electric potential of Earth.

Modern lifestyles, however, have increasingly created a barrier between humans and a natural conduction of Earth's electrons into the body. Since the 1950s, for example, humans have increasingly worn insulating rubber or plastic soled shoes, instead of traditional leather, fashioned from hides and largely conductive. Obviously, humans also no longer sleep in conductive contact with the ground as they did in times past.

The results of grounding research raise an important question. Does the current disconnect with Earth's electrons represent a critically important and overlooked contribution to physiological dysfunction and to the alarming global rise in inflammatory-related chronic diseases? The research, together with global anecdotal feedback, suggests that Earth's electric charge is fundamental for maintaining health and promoting healing.

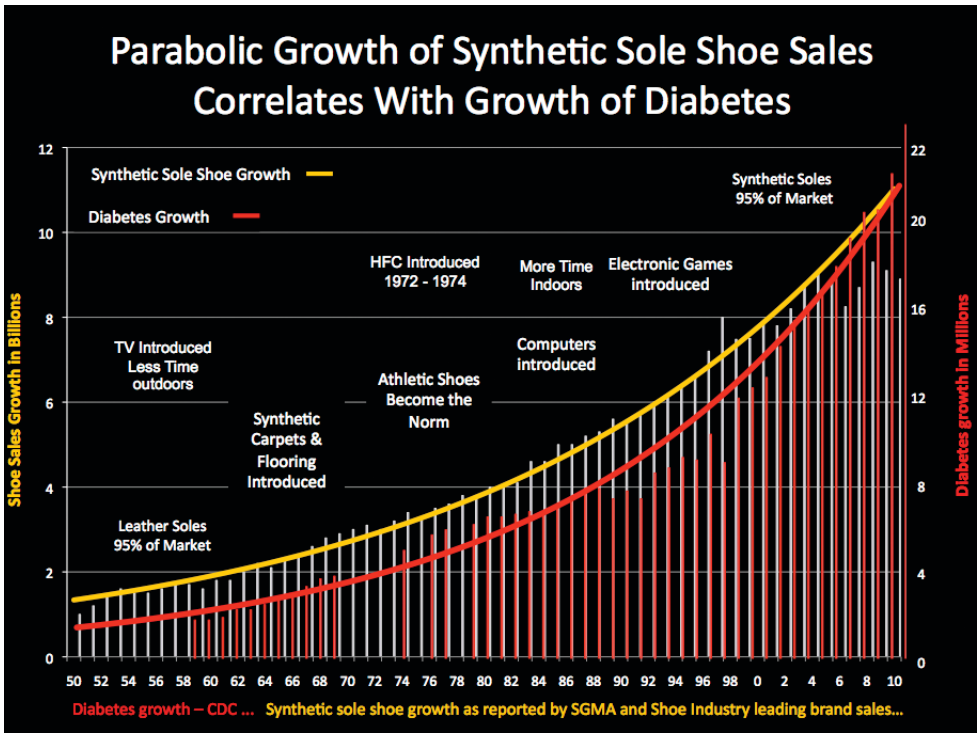
Figure 1 shows a possible relationship between the shoe-driven disconnection from Earth's natural electric charge and diabetes, an inflammatory-related disease. Sales of shoes with synthetic soles have soared in the United States since the 1950s. The curve of increase is similar to that of diabetes. In the 1950s, 95% of shoes were made with leather soles, many of which were conductive. Currently, 95% of shoes have synthetic, nonconductive soles. The question arises as to whether this observation represents a correlation or a coincidence. Is the loss of our electrical roots a factor in the rise of diabetes and other inflammatory diseases, together with the usual suspects of sedentary living and overconsumption of calorie-rich, unnatural, nutrient-poor food loaded with sugar and high-fructose corn syrup sweeteners?[18]

FUNCTION OF ELECTRONS IN THE BODY

Humans are bioelectrical beings, with hearts, brains, and immune and endocrine systems being regulated by internal bioelectrical signals. On this bioelectrical stage, electrons are marquee performers. They are intimately involved in the body's countless processes. They make it possible for atoms to bond with other atoms and form molecules. Redox reactions involve the transfer of one or more electrons from one atom or molecule to another.

Oxygen and reactive oxygen species—free radicals—are powerful oxidizing agents. When they are secreted at an injury site by white blood cells, they literally rip electrons out

Figure 1. Possible Relationship Between a Shoe-driven Disconnection From Earth's Natural Electric Charge and Diabetes, an Inflammatory-related Disease



Abbreviations: CDC, Centers for Disease Control; SGMA, Sporting Goods Manufacturers Association.

of molecules, which is the way that damaged cells and other debris from an injury are destroyed to clear the repair field so that regenerative cells can move in and restore structures and functions. In the oxidative process, oxygen becomes more stable, while the attacked molecules and cellular debris disintegrate to be phagocytized by other white blood cells.

Although oxygen is essential to metabolism and life, the oxygen molecule itself is extremely toxic and the body uses a variety of antioxidant processes to keep the concentration of oxygen low in the tissues. Too much oxygen creates oxidative stress. One of the key reactions in living cells, of course, is the electron transport chain in mitochondria that produces adenosine triphosphate (ATP), the energy source for all living processes. Studies have shown that providing electrons to animals dramatically increases ATP production and protein synthesis, 2 processes that are essential for wound healing.[19]

Electrons from Earth serve as a potent neutralizer or quencher of electron-seeking free radicals. The term *electron deficiency* may be appropriate to describe the largely ungrounded status of most of humanity. As noted, the modern lifestyle, notably the wearing of shoes with synthetic soles, has severed us from our *electric roots,* our connection with Earth and its natural supply of electrons.

It is interesting to note that one of the side effects of therapies involving touch, such as massage, is that the therapist can become depleted. Is this a result of donating their electrons to patients with a great deal of inflammation? The patient feels better; the therapist gets burned out.[21]

The current team's research indicates that the immune system may not function efficiency in an organism that has an insufficiency of free electrons. Grounding provides the reinforcements, like the cavalry coming to the rescue.

The manner by which grounding produces rapid and measurable improvements in whole-body physiology provides support for a concept first introduced by Nobel Laureate Albert Szent-Györgyi in 1941 and again in the 1980s. His remarkable insight was that proteins are semiconductors, rather than insulators, as had been thought previously.[21-23]

Moreover, when many proteins are organized in parallel, into arrays, as in the crystal lattices found throughout the human body (eg, in connective tissues, myofascia, tendons, cell membranes, bones, and muscles) some electrons will cease to belong to particular atoms or molecules and will be free to move from place to place within the organism, which is what the current research team means when it uses the terms *free* or *mobile* to describe these electrons. These revolutionary concepts are never discussed in conventional medicine but must now be reconsidered because they provide the best explanation for the rapid effects of Earthing. For a review, see Oschman, Chevalier, and Brown.[6]

The contemporary research of Gerald Pollack at the University of Washington features exclusion zone (EZ) water.[24] EZ water refers to the highly organized state of water within cells discovered to have a vital influence on every biochemical process, including the way by which proteins

carry out their functions. EZ water is negatively charged and, according to Pollack, grounding contributes negatively charged electrons, which further builds EZ water, enhancing protein folding and providing healthier functioning.

CLINICAL RESULTS OF GROUNDING

The grounding studies conducted to date indicate multiple and rapid effects achieved by what appears to be the body's broad uptake and use of electrons received from Earth. Findings among the documented results include (1) reduced inflammation and pain, (2) improved blood flow and reduced blood viscosity, (3) reduced stress, (4) better sleep, (5) improved energy, and (6) improved response to trauma and injuries and accelerated wound healing.

Reduction in Inflammation and Pain

Grounding reduces or even prevents the cardinal signs of inflammation following injury: redness, heat, swelling, pain, and loss of function. Most pains, including the most severe, are due to inflammation and typically respond rapidly to Earthing. Healing-related pains usually lessen, often significantly, in intensity and duration.[25-29]

Improved Blood Flow and Reduced Blood Viscosity

Thick, sludgy, and clumped blood is a hallmark of cardiovascular disorders and diabetes. Two studies investigated the effects of Earthing on blood viscosity. The first involved participants relaxing for 2 hours, with blood viscosity determined before and after by measuring the zeta potential of red blood cells. The greater the zeta potential, the greater is the negative charge on the red cells, pushing them apart and lowering blood viscosity.[30] The second study used a commercial blood viscometer to measure viscosity of individuals practicing yoga on a grounded yoga mat.[31] Both studies found that Earthing significantly reduced blood viscosity.

Two additional studies showed that blood flow regulation and circulation to the head, face, torso, and extremities were enhanced within a 1-hour session of grounding in a chair.[32,33] These studies involved the use of laser speckle contrast imaging and thermography. Together, these studies found significant systemic benefits, affecting overall and local health, and suggest that grounding may represent an effective preventive and therapeutic strategy against diabetes and cardiovascular disease.

Reduced Stress

Cortisol, a mediator and marker of stress, is associated with emotional and physiological stress, inflammation, and sleep dysfunction. Chronic elevation of cortisol from stress can lead to a disruption of the body's circadian rhythms and contribute to sleep disorders, hypertension, cardiovascular disease, decreased bone density, decreased immune response, mood disturbances, autoimmune diseases, and abnormal glucose levels. Emotional and physical stress are aggravating factors for pain and psychological disorders.

Consequently, any natural method for relieving stress has enormous potential to prevent or decrease the negative effects of most diseases. In multiple studies,[25,29,34-36] grounding has been documented to exert a beneficial effect on stress, a likely result of systemic influences in the body, including (1) a normalizing influence on cortisol, the stress hormone[25]; (2) a calming impact on the electrical activity of the brain[34]; (3) a normalization of muscle tension[34]; (4) a rapid shift from a typically overactive expression of the sympathetic nervous system, associated with stress, into a parasympathetic, calming mode within the autonomic nervous system (ANS) that regulates heart and respiration rates, digestion, perspiration, urination, and even sexual arousal[35]; and (5) within the ANS, an improvement in heart rate variability (HRV)—the miniscule variations in the heart's beat-to-beat interval—that serves as an accurate reflector of stress.[38] Low HRV is associated with stress-related disorders, cardiovascular disease, diabetes, mental health issues, and reduced lifespan. Grounding improves HRV to a degree far beyond mere relaxation.

In a recent study, researchers at Pennsylvania State University documented immediate and significant increases in HRV measurements that indicated improved vagus-nerve transmission among premature babies.[37] Such an effect could potentially enhance stress and inflammatory regulatory mechanisms.

Better Sleep

This effect is one of the most common responses from people, including many insomniacs, after they start grounding. In a 2004 study, 12 participants slept grounded for 8 weeks.[25] Eleven reported that they fell asleep faster. All reported waking fewer times during the night. While different people respond differently, for many grounded sleep reduces pain from inflammation and thereby helps them get better rest.

Improved Energy

Sleeping grounded provided more morning energy as well as vitality throughout the day.[12,25,29] In the 2004 study, 9 of 12 participants reported a decrease in fatigue (ie, they were more refreshed and less fatigued).[25] Better, deeper sleep, due to improvement in the day/night cortisol rhythm, is one explanation.

Improved Response to Trauma and Injuries and Accelerated Wound Healing

Faster-than-normal wound and surgical healing has been reported frequently through the years. Accelerated wound healing, whether involving injury, surgery, or burn, may result from a combination of reduced inflammation as well as improved circulation—vasodilation and lower blood viscosity—facilitating the delivery of healing factors to the site.[26,29]

In the domain of exercise and sports, significant changes in immune function responses and markers have been found among grounded—but not among nongrounded—

Figure 2. Accelerated Improvement of an 8-month-old, Nonhealing, Open Wound by the Ankle, Suffered by an 84-year-old Woman With Diabetes[a]

[a]The pictures in the right column represent closeups of the photos to the left. The top row shows the open wound and a pale-gray hue to the skin before grounding. The middle row shows the marked level of healing and improvement in circulation, as indicated by the skin color, after 1 week of grounding. The bottom row shows the wound healed over and the skin's color looking dramatically healthier after 2 weeks of grounding.

individuals. In 2 studies of grounding on delayed onset muscle soreness, grounded participants had less pain, little inflammation, and a shorter recovery time.[28,38] Researchers have also found that grounding during cycling exercise significantly reduced the level of blood urea, indicating less muscle and protein breakdown. These findings represent a major recovery benefit for training athletes.[39]

In competitive sports, dramatic examples of accelerated healing were reported by chiropractor Jeff Spencer,[40,41] assigned to promote recovery from exertion and injury among American cyclists during several Tour de France competitions. It is well known that at this extreme level of grueling performance, cyclists tend to experience slow wound healing after injury, threatening their ability to continue competing. Spencer found that grounding produced very rapid healing, together with only minimal classical signs of inflammation.

The series of photographs in Figure 2 above demonstrate vividly the potential for accelerated wound healing, in this case a typical open, nonhealing wound on the foot of an elderly diabetic woman. Within one week of grounding, signs of healing are already obvious.

The cause of the wound was a poorly fitted boot that had resulted in a blister that developed into a resistant open wound. The sole treatment was a daily, 30-minute grounding session with an electrode patch while the woman was seated comfortably. The patient had undergone various treatments at a specialized wound center with no results. Vascular imaging of her lower extremities revealed poor circulation. When first seen, she had a mild limp and was in pain. After the first 30 minutes of grounding, the patient described a noticeable lessening of pain. After 1 week, a reduction in pain of approximately 80% had occurred. At that time, she showed no evidence of a limp. After 2 weeks of daily grounding, she said the pain had disappeared totally.[19]

DISCUSSION

Grounding and Biological Rhythms

In explaining the dynamics of grounding, it is important to mention that the electrically active surface of Earth is a source of not only electrons, but also key rhythmic processes vital to normal biological rhythms. The electric field of Earth is not steady but varies from moment to moment in a rhythm known as the *Schumann resonance*. Behind the world that we can see with our senses lies a fantastic web of powerful but invisible energies and forces that affect us every moment of every day and that can be referred to as *geophysical fields*—the invisible energies of Earth's gravity, magnetism, electricity, and electromagnetism. Human knowledge of these fields comes from centuries of detailed study in a variety of scientific fields: biology, physics, geophysics, atmospheric physics, astronomy, astrophysics, and cosmology.

Relationships with these geophysical rhythms are absolutely vital for health. Human physiology has more than 100 biological rhythms that are timed and coordinated with rhythms in the environment.[42]

These rhythms are especially important for women. Female physiology and reproduction are regulated by an array of hormones, the concentrations of which vary from moment to moment in relation to rhythmic changes in the environment. When a woman's body rhythms are properly synchronized with her geophysical environment, she feels fine. When she becomes disconnected from the environmental pace-setting rhythms, her hormonal systems can become chaotic and can make themselves known with a variety of symptoms, some of which are very uncomfortable. The invisible silent pulses of nature give rise to normal hormonal regulations. Disconnection from the environment can disrupt these regulations, and grounding provides a simple way to restore balance.

One of the key elements in the grounding package is connection with the Schumann resonance, a standing wave made of electromagnetic fields vibrating at 7.83 Hz—vibrating approximately 8 times per second. It also has harmonics at higher frequencies, such as 14.3 Hz, 20.8 Hz, 27.3 Hz, and 33.8 Hz, produced collectively by lightning strikes throughout the world.

Have you ever stood in a hallway or stairwell or a large room and noticed that your voice creates a sort of echo or reverberation? You are creating standing waves. In physics, a standing wave is caused by the presence of 2 waves traveling in opposite directions. Common examples of standing waves are provided by musical instruments, such as organ pipes or violin strings. Waves traveling in a pipe or along a string will reflect back when they reach the ends. The back-and-forth waves join to create a resonant tone or frequency that is characteristic of the geometry of the space. Pressing a guitar or violin string against different regions on the fret or fingerboard changes the effective length of the string and, therefore, the resonant frequency of the standing waves that can be produced.

In 1952, the German physicist Professor W. O. Schumann of the Technical University of Munich predicted that electromagnetic standing waves would be established in the atmosphere, within the giant resonant space between the surface of Earth and the ionosphere. The space or cavity between the ionosphere and Earth's surface is now used in wireless information transfer over long distances. Radio signals bounce back and forth between the 2 surfaces. This skip phenomenon has been widely studied because it is the basis for long-distance radio communications.

Similarly, cloud-to-Earth lightning bolts pump energy into the cavity, creating standing electromagnetic waves that travel around Earth at the speed of light, circumnavigating the entire planet on average 7.83 times per second. A person standing on Earth at any point will be exposed to these Schumann frequencies. To use physics terminology, lightning pumps electromagnetic energy into the cavity, which causes that electromagnetic energy to vibrate or resonate at the resonant frequency of the cavity in the extremely low-frequency range (7.83 Hz). At the same time, lightning bolts bring electrons from the ionosphere to the surface of Earth. Multiple lightning strikes produce complex standing waves.

Just as organs use pipes of different sizes to produce different notes and different frequencies of standing waves, the frequency of the Schumann resonance varies as the ionosphere breathes in and out due to the atmospheric tides. Many scientists have recognized the similarity of the Schumann signal and the alpha brainwave measured with an electroencephalogram. It has been suggested that the Schumann resonance has been ingrained into all life. Many biologists have concluded that the frequency overlap of Schumann resonances and biological fields is not accidental but is the culmination of a close interplay between these fields over evolutionary time.

Grounding and the Immune System

Scientists believe that our immune system evolved in the course of millions of years of barefoot contact with the surface of Earth. One can assume that protective antioxidant and anti-inflammatory electrons from Earth were readily obtained by previous cultures during this vast stretch of time as a result of ordinary existence. Life involved direct contact with Earth, which is no longer the case.

Did the immune system begin weakening as we started wearing shoes with insulating soles during the 1950s, leading to the ever-rising unwellness plaguing the world today?

It is widely suspected that causal factors include overload from environmental toxicants, chronic antibiotic use, sedentary living, emotional stress, and ingestion of unnatural, processed foods, genetically modified-GMOs among them. Nobody thinks of their shoes, however, as a cause of chronic inflammation, but grounding research certainly points an incriminating finger at footwear and the resulting disconnection with Earth's healing energy.

Grounding research is at an early stage, but the evidence compiled thus far consistently demonstrates that a great frontier of health and healing potential has been opened—right beneath our noses, or, more specifically, right under our feet. Humans have abandoned nature in many ways. Grounding reconnects humans to one aspect that has been largely lost and overlooked.

The Clinical Prospects of Grounding

For clinicians, grounding offers the prospect of a practical and simple strategy to help restore health, relieve patients' aches and pains, and serve both preventive and therapeutic goals. Either by itself or in conjunction with conventional strategies, it can greatly improve patient outcomes with little effort.

Some ways to integrate grounding as a clinical strategy include (1) recommending outdoor barefoot sessions, (2) holding grounding sessions in the clinic, (3) offering grounding products to patients, and (4) using a grounding mat on the treatment table to reduce practitioners' typical energy burnout.

Barefoot Sessions. Recommend outdoor barefoot sessions to patients, weather and conditions permitting. Ober has observed that going barefoot for approximately 30 or 40 minutes daily can significantly reduce pain and stress.[18] Barefoot grounding outside is free; however, many people will neither have the time nor the inclination to add such a routine to their lives. For these and other people interested in pursuing outdoor grounding, conductive footwear is commercially available.

Grounding in the Clinic. Ground patients in the clinic with 30-minute or 1-hour sessions using grounding products, such as conductive chairs, mats, and patches.

Grounding Products. Offer grounding products to patients or direct them to vendors. A variety of grounding systems are available for indoor use while sleeping, working, or relaxing.

Grounding Mat. For physicians or their assistants using touch for palpating or adjusting patients, a grounding mat placed on the treatment table has been reported by practitioners to reduce typical energy burnout at the end of the day.[20]

One caveat exists. Because of the broad physiological effects generated by grounding, medication dosages may be impacted. This clinically relevant issue is discussed in the Earthing book[18] and on the Earthing Institute's Web site.[43] As an example, the combination of earthing and warfarin (Coumadin) has the potential to exert a compounded blood thinning effect and must be supervised by a physician. Anecdotes of an elevated international normalized ratio (INR) have been reported. INR is a widely used measurement of coagulation. Earthing may also improve thyroid function and glucose metabolism and possibly require an adjustment in medication dosages.[18]

CONCLUSIONS

New research indicates that grounding the body generates broad, beneficial, and significant physiological changes. The source of these effects is believed to be the mobile electrons omnipresent on the surface of Earth, which are responsible for the planet's negative charge. Lifestyle changes have disconnected most humans from this primordial health and healing resource, creating what may be an unrecognized electron deficiency in the body, an overlooked cause or contributor to chronic inflammation and common chronic and degenerative diseases. When Earth connection is restored through grounding, electrons flood throughout the body, reducing inflammation and oxidative stress while also reinforcing the body's own defense mechanisms. Electron transfers are the basis of virtually all antioxidant and anti-inflammatory activity. And Earth may very well be the ultimate supplier! When the supply is restored, humans have the potential to thrive.

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AUTHOR DISCLOSURE STATEMENT

James L. Oschman, Stephen T. Sinatra, and Gaétan Chevalier own shares of EarthingFX, the company that manufactures indoor grounding systems.

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