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DOES GROUNDING THE HUMAN BODY TO EARTH REDUCE CHRONIC INFLAMMATION AND RELATED CHRONIC PAIN?

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INTRODUCTION

In modern societies our bodies are not normally grounded to earth because synthetic soled shoes, elevated sleeping places, motorcars, etc insulate us from the earth's surface. Accordingly the human body can become charged with static electricity, exacerbated by exposure to extraneous stray fields and currents from artificial sources such as cell phone masts, cell phones, power lines, and domestic appliances. On the surface of the earth a flow of electrons encompasses the entire planet. This natural flow of electrons and its related electric field also exists on the surface of all conductive objects (including people, plants and animals) in physical contact with the earth. The earth's electron current flow and its associated electric field pulsate at approximately 10 Hz (similar to alpha brain waves) and follow a rhythmic 24-hour circadian rise and fall in amplitude (Natural Electric Currents of the Earth, 43(1):47-57).

It is known that exposure to environmental 50-60 Hz electromagnetic fields increases concentrations of free radicals, lengthens their lifespan, and enhances the probability that they can do damage to the body (Bonnafous 1999, Brezitskaia 2000, Cannistraro 1980, Eveson 2000, Fernie 2001, Fiorani 1997, Hanel, 2000, Jajte 2000, Koana 1997, Roy 1995, Simko 2001(A), Simko 2001(B), Scaiano 1995, Scaiano 1994(A), Scaiano 1994(B), Supino 2001, Varani 2000, Yoshikawa 2000, Zmyslony 1998).

We propose that physical contact with the earth maintains the human body at the natural electrical potential (voltage) of the earth. When the body is electrically coupled with the earth, the DC electrons of the earth and/or its related electric field, then

residing on the surface of the body, absorb the excitation effects of environmental electric fields. By transferring (offsetting) the attraction of an electric field from the body (which has a limited supply of electrons) to the earth (which has an infinite supply of electrons), perturbing excitation of the body's endogenous electrons is significantly reduced. When the body is shielded with the DC of the earth, the electrons of the body are then protected from perturbation.

GROUNDING AND FREE RADICALS

Free radicals are unpaired electrons which can have damaging effects on organic cells, hence the ubiquitous existence in all organisms of free radical scavengers such as catalase, superoxydismutase, glutathione and hormones like melatonin. Free radicals can arise from faulty metabolism -e.g. when insufficient molecular oxygen is available to act as final electron acceptor in the ox-phos pathway. The effects of grounding on free radical formation appear to assist in the antioxidant scavenging process by supplying additional electrons from the unlimited reservoir on the earth's surface (we dub this "the Mother Earth effect"). All electrons carry a negative charge, but friction, e.g. on water travelling through a subterranean aquifer, or on a warm wind traversing a desert, can remove some electrons from the passing molecules, leaving positively charged ions which interact with organisms with biological sequelae. ***(Editor's addition: Webster's Dictionary, se-que-la: an abnormal condition resulting from a previous disease.)*** **This generally adverse effect can be mitigated by contact with the earth. Similar adverse effects are claimed from exposure to ambient EMF.**

One indicator of such sequelae is the release of Cortisal, a natural stress hormone signalling oxidative stress. Cortisal is a steroid hormone made in the adrenal glands, which are small glands adjacent to the kidneys (*renum*, Latin for kidney). It can easily be measured by a standard saliva test. Among its important functions in the body include roles in the regulation of blood pressure and cardiovascular function as well as regulation of the body's use of proteins, carbohydrates, and fats. Cortisol secretion increases in response to any stress in the body, whether physical (such as illness, trauma, surgery, or temperature extremes) or psychological.

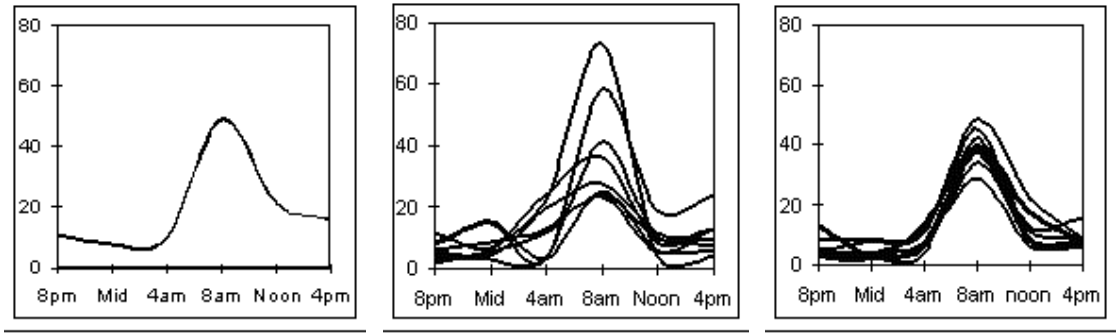
When Cortisal is secreted, it causes a breakdown of muscle protein, leading to release of amino acids (the "building blocks" of protein) into the bloodstream. These amino acids are then used by the liver to synthesize glucose for energy, in a process

called *gluconeogenesis*. This process raises the blood sugar level so the brain will have more glucose for energy. At the same time the other tissues of the body decrease their use of glucose as fuel. Cortisol also leads to the release of so-called fatty acids, an energy source from fat cells, for use by the muscles. Taken together, these energy-directing processes prepare the individual to deal with stressors and insure that the brain receives adequate energy sources. Excess Cortisal is associated with sleep disorders, inflammation, pain and other adverse symptoms.

EXPERIMENTAL STUDIES

A new study (Ghaly, Teplitz, 2003 http://www.liebertonline.com/doi/abs/10.1089/acm.2004.10.767?cookieSet=1&journalCode=acm) reports that electrical grounding during the night significantly reduced Cortisal levels in eight female subjects.

Charts 1-3: Cortisol levels in normal and grounded subjects



Normal cortisol levels *Measured cortisol in ungrounded subjects* *Measured cortisol in grounded subjects*

Cortisol measurements by Sabre Sciences Laboratory of San Diego, CA using a standard radioimmunoassay

In this study, conducted to identify the biological effects of grounding the human body during sleep, a grounding method of sleeping on a grounded bed pad was used (see Photo 1).

Table 1: AC electric field induced voltage measured on subjects' bodies while lying in their own beds

Subject	Before Grounding	After Grounding
1	3.940 V	0.003 V
2	1.470 V	0.001 V
3	2.700 V	0.004 V
4	1.200 V	0.002 V
5	2.700 V	0.005 V
6	1.670 V	0.005 V
7	5.950 V	0.008 V
8	3.940 V	0.008 V

Photo 1: Grounding pad on bed

During a six-week period, eight female subjects (age range 24-52) were grounded to the earth during sleep. Conductive bed pads were placed on their own beds (under the fitted sheet) and were connected to a fuse-protected ground wire attached to a ground rod that was placed directly in the earth outdoors (grounding via water pipes or internal ground wiring was not considered adequate in view of stray currents present in such systems). The electric field induced body voltage (from exposure to common electrical wiring and cords near the bed), created on subjects' bodies while in bed, and averaged 2.9 volts pre-grounding. Levels were significantly reduced, averaging 0.004 volts, when subjects slept on the earthed bed pads.

In addition to the objective measured reduction in body voltage potential, subjective responses were also obtained from the eight subjects. Though these clearly indicated an improvement in sleeping pattern and depth, cramps, numbness, PMS,

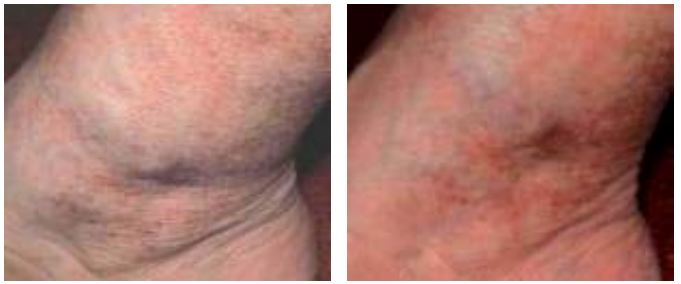
aches and pain, and flatus the study was not controlled or blinded, hence not amenable to statistical treatment, and does not measure any placebo effect. A follow up three months later however still reported the same improvements.

Other case histories indicate that electrical grounding can alleviate ailments such as diabetes and inflammation:

2. 3.

Photos 2 to 5:
Diabetes before (left) and after grounding for 7 nights with Earth Tether ground pad.

4. 5.



Inflammation before (left) and after grounding for 7 nights with Earth Tether ground pad.

FURTHER EXPERIMENTAL SUPPORT

INTRODUCTION

This study (Ober, 2000 **http://www.esdjournal.com/articles/cober/ground.htm**) investigated the changes following electrical grounding in 60 sleep-disturbed and/or chronic muscle and joint pained subjects (22 male, 38 female) who slept on grounded mattress pads for 30 consecutive nights

METHOD AND MATERIALS

To effectively restore ground contact for an extended period, test subjects slept on dissipative carbon fiber mattress pads placed under their fitted sheets, connected via a ground wire [protected with an inline 1/100 amp fast blow fuse], to a ground rod driven into the earth near their bedroom window. The grounded mattress pads were designed to replicate the ground plane of the earth in the bed. Sleep disturbances along with chronic muscle and joint pain, which the subjects had been experiencing for at least six months, were recorded to establish a base line.

SELECTION OF PARTICIPANTS

An advertisement, distributed to ten beauty salons in Ventura County, CA solicited individuals experiencing sleep problems accompanied by tense muscles and/or chronic joint pain to participate in the study. Of the respondents, sixty individuals participated. Age of subjects was between 23 and 74 years.

The subjects were randomly divided into two groups. The first group of thirty slept on carbon fiber mattress pads connected to a dedicated earth ground, just outside their bedroom window. The second control group of thirty slept on carbon fiber mattress pads but were not connected to an earth ground. The E-field created charges on their bodies were recorded with an AC voltmeter connected to the earth ground and body contact made with a hand held probe or an EKG electrode patch.

Table 2: E-field created charges measured on subject's bodies while lying in their beds were as follows:

	Test subjects	Controls
< 1 volt:	2	2
1-1.9	12	13
2-2.9	8	9
3-3.9	4	3
4-4.9	1	1

5 +	3	2
Total:	30	30

**All subjects averaged 2+ volts on their bodies while lying in their beds.*

The E-field created charge measured on test subjects' bodies after grounding averaged 10 millivolts or less.

SUBJECTIVE RESULTS

	Test Subjects*		**Control Subjects****	
Categories	**Same**	**Improved**	**Same**	**Improved**
Time to fall asleep	4 - 15%	23 - 85%	20 - 87%	3 - 13%
Quality of sleep	2 - 7%	25 - 93%	20 - 87%	3 - 13%
Wake feeling rested	0 - 0%	27- 100%	20 - 87%	3 - 13%
Muscles stiffness & pain	5 - 18%	22 - 82%	23- 100%	0 - 0 %
Chronic back and/or joint pain	7 - 26%	20 - 74%	23- 100%	0 - 0%
General well-being	6 - 22%	21 - 78%	20 - 87%	3 - 13%

**Reports not received from three participants. **Reports not received from seven participants.*

DISCUSSION

This study provides evidence that when the human body is electrically grounded to the earth it is naturally protected from static electricity and ambient electric fields. Meter readings of the grounded subjects support the finding. The benefit of grounding the body appears to relax muscles and improve sleep.

Several of the 60 subjects in the study also experienced significant relief from asthmatic and respiratory conditions, rheumatoid arthritis, PMS, sleep apnoea and hypertension, while sleeping grounded. These unexpected results indicate that loss of grounding contact plays a much larger role in overall health than was anticipated.

DISSCUSSION

In any home the ambient ELF electric fields can vary surprisingly, being especially high near to appliances such as water heaters, fish tanks, storage heaters and other domestic electric wiring and/or appliances. A typical range is 1-10 Volts/metre, though near to such appliances the ELF fields can exceed 100V/m. Epidemiological studies of exposure to electric fields are few, since most have concentrated on the magnetic component, without any clearly accepted outcome except a persistent elevation of health disorders being reported, e.g. in childhood leukaemia where the focus of studies has been directed.

One 1996 study of 56 ALL cases and matched controls (Coghill, Stewart et al., 1996) reported a nigh fivefold elevation of childhood leukaemia where the mean 12 hour bedplace exposure to ELF electric fields exceeded 20V/m. A later and much larger study (Skinner et al., 2000) however found no effects, though this relied only on spot (3 mins.)daytime measurements and 48 hour continuous measurements, both of which could arguably be unrepresentative of bedplace exposures.

These results of the grounding experiments may implicate an improvement of circulation. Blood cells are normally net negatively charged on their surface, as are the surfaces of the blood vessels down which they travel. In consequence the mutually repulsive action of the two tissues will ensure an easier flow hence better tissue oxygenation. If the level of inhaled positive ions is high however this will cause a more attractive cohesion or “stickiness” in the bloodstream and inhibit bio-availability of molecular oxygen, leading to increased levels of free radicals, consequent oxidative stress, and symptoms such as arthritic inflammation, increased Cortisal, and other indicators of stress.

By grounding the body directly to earth this will permit the introduction of negatively charged electrons from the earth’s unlimited reservoir, and thus may restore the equilibrium, reducing free radical action. It is noteworthy that people suffering with arthritic conditions appear particularly sensitive to incoming positive air ionisation occurring with the build up of storms, and at times of the full moon (we dub this the Lunar effect).

DISCUSSION CONTINUED: the benefits of electrical grounding

According to the American Institute of Stress, over 75% of all visits to primary care physicians are now for stress-related health conditions. The description of stress is: a state of continuous anxiety and nervousness in which muscles become and remain tensed. Stress is now confirmed to be a primary contributor to cardiovascular disease, cancer, gastrointestinal, skin, neurological and emotional disorders, and a host of disorders linked to immune system disturbances ranging from the common cold and herpes, to arthritis and AIDS (see American Institute of Stress website, www.stress.org/problems).

According to the National Sleep Foundation's "Sleep-2000" report (see website: www.sleepfoundation.org/pressarchives), nearly two thirds of American adults [62%] now suffer from sleep problems. Americans have the most comfortable beds and the most protected sleep environments in the world. Yet, in traditional societies where most humans' sleep on animal skins, grass mats or directly on the ground, sleep problems do not exist (see *Slumbers Unexplored Landscape* [1999] Carol M. Worthman, Anthropologist, Emory University Atlanta, GA).

As for Americans and others in industrialised societies, most now sleep within 12 inches of electrical wires hidden in the wall at the head of their bed and with electric cords around or near the bed, which emanate ELF electric fields throughout the night and create weak electric currents in the body (see National Institute of Environmental Health Sciences and the U.S. Department of Energy*, Questions and Answers about EMF, electric and magnetic fields associated with use of electric power,* 1995).

It is noteworthy that the electric component of the ELF EM field is present *all the time the wiring is switched on* at the mains, whether the appliance or light bulb is in use or not, whereas the magnetic component is only present when an appliance or other load is energised. This fact may well have confounded epidemiological studies of domestic magnetic field exposure. Moreover, a recent study reported that over half UK children sleep with a light switched on in their bedroom, possibly disrupting synthesis of melatonin, an important oncostatic hormone, produced almost only in the brain's light-sensitive pineal gland.

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