

# **Earthing (Grounding): Nature's Original Anti-Inflammatory**

## **Why Connection to the Earth is Important to our Health!**

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### **What is “Earthing” or Grounding?**

- Earthing or Grounding refers to the direct physical connection to the earth's surface.
- The earth's surface contains huge reservoir of free electrons obtained from the 3 billion lightning strikes yearly and other atmospheric phenomena.
- Since humans are highly conductive, when we are in direct contact with the earth some of this never ending supply of electrons from the earth are absorbed.
- As a result, our electric potential immediately drops to near zero and our bodies reflect the electromagnetic fields generated around us and gradually become charged with these free electrons.

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### **Humans Evolved Connected to the Earth**

- We walked barefoot or with conductive leather footwear and slept on the ground or animal hides.
  - Over time we started sleeping on raised beds and walking on wooden floors, reducing our contact with the earth.
  - In the 1950s insulating rubber and synthetic soled footwear began replacing leather soles, and by the end of the last century, had replaced leather soles in virtually all footwear.
  - Now most of us are never grounded except on those rare occasions when we go barefoot outside or take a trip to the beach.\*
- \*Maybe this is the real reason we usually feel better at the beach after walking barefoot in the wet sand or swimming in the ocean (as both are highly conductive).

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**Digital copy of poster and handout are located at**

<http://www.earthinginstitute.net/wp-content/uploads/2018/05/poster-2018-congress-on-integrative-medicine.pdf>

## So Why is Grounding Important?

- The earth's surface serves as a reservoir of electrons which are readily absorbed when we connect with it.
- It is well known that electrons are critical to the efficient operation of the millions of biochemical reactions within our cells including the energy producing mitochondria.
- Electrons can also neutralize the free radical cascades in our bodies that contribute to the epidemic of inflammatory diseases plaguing modern society.
- **Thus, the ground under our feet provides an unlimited, constant and free source of “anti-inflammatory/anti-oxidant” electrons!**

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## Grounding Reduces Electric Field-induced Voltage

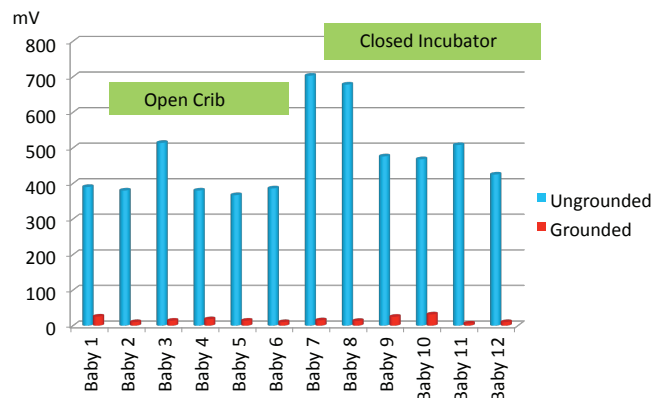
What most people don't realize is that if you sleep with a lamp, clock, or radio next to your bed, the electric field from the wires will extend out to your body, even if the appliances are turned off. As measured by a voltmeter, in the bedrooms of the 10 study subjects there was an average of about 3.3 volts pre-grounding. This level was significantly reduced, averaging 0.007 volts, when subjects slept on the grounded bed pads. The stark differences, and EMF protective effect of grounding, are presented in this Table.<sup>1</sup>

SUBJECTS	VOLTS BEFORE GROUNDING	VOLTS AFTER GROUNDING
1	3.94	0.003
2	1.47	0.001
3	2.70	0.004
4	1.20	0.002
5	2.70	0.005
6	1.67	0.005
7	5.95	0.008
8	3.94	0.008
9	3.75	0.010
10	2.30	0.009
11	5.98	0.020
12	3.64	0.006
AVG	3.27	0.007

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## Grounding Reduces Neonate Exposure to EMFs in NICU

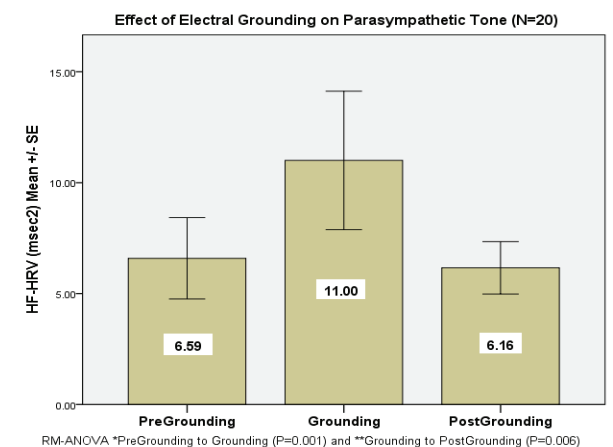
Preterm infants cared for in a modern NICU are exposed to electromagnetic fields (EMFs) from incubators and other electrical equipment. These fields create a measurable electric potential on the preterm infant's skin when referenced to ground (floating skin voltage, mV). Grounding immediately and dramatically reduced the neonates voltage to near zero.<sup>2</sup> More dramatic reductions in voltage are seen in adults (see table above).



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## Grounding Improves Vagal Tone and HRV in Neonates

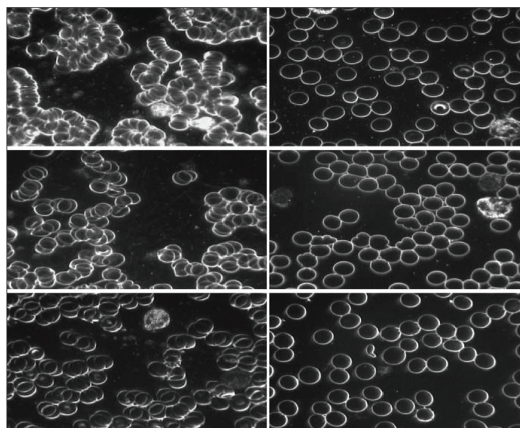
Parasympathetic vagal tone as measured by high frequency power in spectral analysis of heart rate variability (HF-HRV) increased during grounding. Tonic activity of the parasympathetic system (vagal tone) is critically important in the regulation of inflammatory and stress systems. Grounding may provide a means to enhance vagal tone and thereby improve stress regulatory mechanisms in preterm infants.<sup>2</sup> Similar improvements in HRV were observed in adults.<sup>3</sup>



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## Grounding Thins Blood and Enhances Circulation

These darkfield microscope images are taken from 3 participants before and after 2 hours of grounding. Left: As we age red blood cells of most people who are not grounded form clusters for lack of negative charge. Right: After 2 hours of grounding the normal zeta potential is restored. Zeta potential is proportional to the charge on the red blood cells. The greater the zeta potential, the greater the negative charge on the cells and the better the repulsion and the thinner the blood.<sup>4</sup>



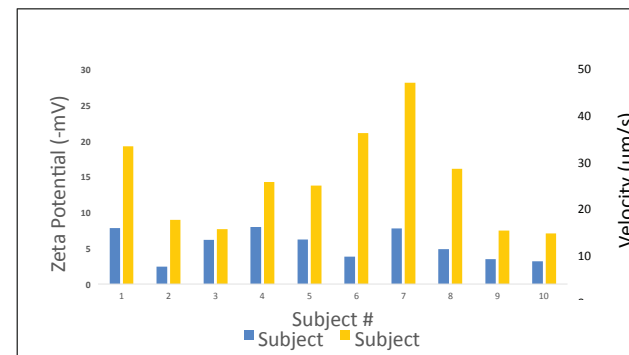
Before Grounding

After Grounding

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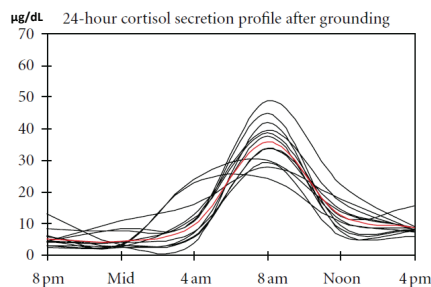
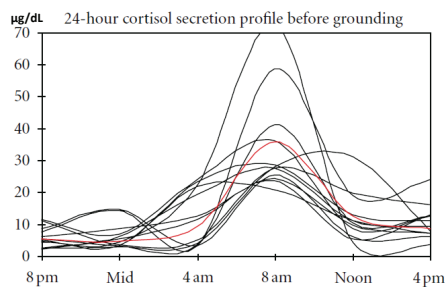
## Grounding Increases Blood Velocity and Zeta Potential

In this experiment, two hours of grounding improved the average zeta potential of the ten participants from a depressed level of  $-5.28$  mV before Earthing to a healthy  $-14.26$  mV. It also increased blood velocity by on average a factor of 2.7. Blood velocity is proportional to zeta potential.<sup>4</sup>



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## Grounding Normalizes Cortisol Levels



After 8 weeks sleeping on a grounding pad, all but 2 of 12 subjects developed more natural cortisol rhythm, and one of the exceptions was someone already in a normal pattern.<sup>1</sup>

- 11 of 12 participants said they fell asleep faster all 12 reported waking fewer times during the night.
- 9 of 12 described reductions in their emotional stress; 2 said there was no change; 1 said the stress was worse.
- 5 out of 6 women with either PMS and/or hot flashes said their symptoms were better.
- All 3 individuals with TMJ (temporomandibular joint) pain said their discomfort was less.

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## Grounding Improves Sleep and Reduces Pain

Subjective sleep, pain, and well-being feedback from 60 randomized, blinded subjects

In a one-month blinded, pilot study, 60 subjects (22 males and 38 females) who suffered from sleep disturbances and chronic muscle and joint pain for at least six months were randomized to treatment and sham groups. Most of the grounded subjects described symptomatic improvement while most in the control group did not.<sup>5</sup>

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

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

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## Grounding Reduces Fasting Blood Glucose

Effect of Grounding the Human Body on Serum Concentration of Glucose

Fasting blood glucose (mmol/L)	Group ungrounded (N = 6)	Group grounded (N = 6)
Control	10.8 ± 1.2	10.6 ± 1.3
After 24 hours	10.4 ± 1.3	8.8 ± 1.2
After 72 hours	10.6 ± 1.2	7.4 ± 0.8

Values are mean ± standard error of the mean in mmol/L.

Using a double-blind randomized study, one group was continuously grounded during 72 hours, while the second one remained without contact with earth potential (EP). **In the grounded group of subjects, glibenclamide and ACE inhibitor were discontinued after 24 hours.**<sup>6</sup>

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## Grounding Promotes Accelerated Wound Healing

The pictures in the left column show accelerated improvement of an 8-month-old, non-healing, open wound by the ankle, suffered by an 84-year-old woman with diabetes. The top (picture A) shows the open wound before grounding and the next 2 pictures (B and C) show marked improvement in that same ulcer 1 and 2 weeks after grounding.<sup>7</sup>

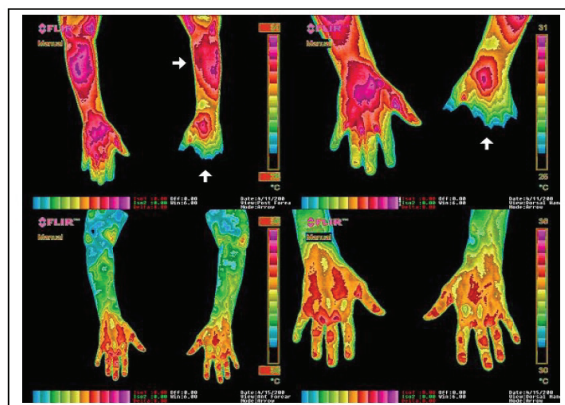
Picture in the right hand column shows a serious wound suffered by a Tour de France cyclist. Pictures B and C show the same injury 1 and 2 days after grounding. Note the cyclist continued in the race and made significant contributions to the winning American Team.<sup>7</sup> (Also see "Earthing and Tour de France" video)<sup>8</sup>



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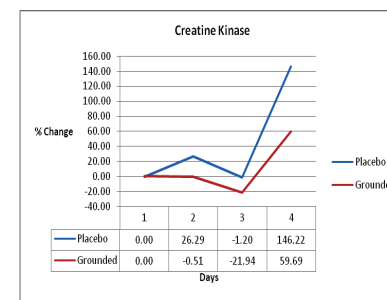
## Grounding Reduces Inflammation and Restores Circulation

Baseline thermographic images of the upper extremities taken prior to grounding are presented on the top row. The arrows denote the areas of poor circulation. The temperature of the left hand is so low that the fingers are at the same temperature as the room and cannot be seen. The bottom row images were taken after 4 nights of sleeping on the Earthing system show the significant improvement in circulation with a return of normal thermal symmetry in both upper extremities.<sup>9</sup>

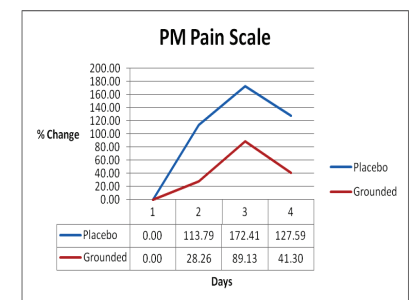


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## Grounding Reduces Delayed Muscle Onset Soreness



Creatine Kinase: a marker of muscle damage



Subjective Pain Scale

Eight subjects were randomized (4 placebo and 4 grounded) for 14 hours/day after intensive exercise on day 1. In this study, grounding improved measures of immune system activity and reduced pain.<sup>10</sup>

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## Observational Evidence Indicates Grounding Can Benefit Many Medical Conditions

- Peripheral Artery Disease
- Hypertension
- Arrhythmias
- Lupus
- Multiple Sclerosis
- Rheumatoid arthritis
- Diabetes
- Autism
- Wound Healing
- Insomnia
- Back Pain
- PMS
- Post menopausal symptoms
- Psoriasis
- Epilepsy
- TMJ
- Fibromyalgia
- Among others

For more information go to [www.Earthinginstitute.net](http://www.Earthinginstitute.net)

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## More Clinical Studies on Earthing are Needed

- Relatively easy to do human and animal studies
- Subjects usually respond in hours, days or weeks (Note: more difficult-to-treat conditions may require more extensive grounding)
- Masked studies can be conducted using sham grounding wires
- **Precautions:** patients on blood thinners as grounding is a natural blood thinner; patients on diabetes, hypertension, and thyroid drugs will need to monitor their status as grounding can lead to a reduction in drug dosage
- **For more information on conducting studies, contact us at** [www.earthinginstitute.net/contact-us-2/](http://www.earthinginstitute.net/contact-us-2/)

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## The “Practice” of Earthing is Simple

- Outside: walking or sitting with bare feet on natural surfaces (grass, dirt, sand, concrete), weather permitting; wet surfaces are better
- Inside: grounding mats, band, and patches are available for indoor use while sitting or sleeping; all products can be connected to an outside ground rod or a ground hole of an electrical outlet
- Some individuals will experience rapid benefits from grounding while others respond more slowly
- Some individuals may need to start slowly, gradually increasing their grounding time.
- **For sustained benefit, grounding must be sustained**

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## References

1. The Biologic Effects of Grounding the Human Body During Sleep as Measured by Cortisol Levels and Subjective Reporting of Sleep, Pain, and Stress; Ghaly, M and Teplitz, D, Journal of Alternative and Complementary Medicine, Volume 10, Number 5, 2004, pp. 767–776
  2. Electrical Grounding Improves Vagal Tone in Preterm Infants; Passi R. et. al., Neonatology 2017;112:187-192
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  5. Earthing: Health Implications of Reconnecting the Human Body to the Earth's Surface Electrons, Chevalier et. al., Journal of Environmental and Public Health, Volume 2012
  6. Earthing the Human Body Influences Physiologic Processes, Sokal, K and Sokal, P, [Med Hypotheses](http://www.med-hypotheses.com), 2011 Nov;77(5):824-6.
  7. The effects of grounding (earthing) on inflammation, the immune response, wound healing, and prevention and treatment of chronic inflammatory and autoimmune diseases; Oschman et. al., Hypothesis, 24 March 2015 [Volume 2015:8](http://www.hypotheses.com): 83—96
  8. “Earthing and Tour de France” video, <https://www.youtube.com/watch?v=abDpW1ZU8Jo>
  9. Medical Thermography Case Studies, Amalu, W., <http://www.earthinginstitute.net/research/>
  10. Pilot Study on the Effect of Grounding on Delayed-Onset Muscle Soreness, Brown et. al., The Journal of Alternative and Complementary Medicine, Volume 16, Number 3, 2010, pp. 265–273
- Links to additional studies can be found at <http://www.earthinginstitute.net/research/>

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