



Review Article

Grounding and Skin Repair: The Power of DC Energy

Laura Koniver, M.D.*

Intuition Physician, LLC, Fort Mill, South Carolina, USA.

*Corresponding author: Laura Koniver, M.D., Intuition Physician, LLC, Fort Mill, South Carolina, USA.

Citation: Koniver L (2023) Grounding and Skin Repair: The Power of DC Energy. Curr Res Cmpl Alt Med 7: 197. DOI: 10.29011/2577-2201.100097

Received Date: 10 August 2023; **Accepted Date:** 17 August 2023; **Published Date:** 21 August 2023

Abstract

Our earth provides a natural direct current (via a DC global electrical grid) that provides multiple health benefits to the human body — an exciting field of research which is just beginning to emerge. Many of the organ systems of the human body, including the cardiac system, musculoskeletal system, and central nervous system, utilizes a DC energy current to operate. Skin, in particular, uses a small DC electrical field to guide cell migration and wound healing after injury, a process known as electrotaxis. Recent research into exogenously applied DC energy has shown promising results in boosting keratinocyte recovery and improved wound healing, which gives rise to the possibility of applying the earth's DC energy field directly to the skin (a healing modality known as grounding) to support skin health. There are several health benefits from grounding that may directly boost the skin's ability to heal, including improving circulation to the skin (which boosts oxygen and nutrients as well as removes metabolic waste) and improved keratinocyte repair in both healthy keratinocytes and damaged keratinocytes. Indirectly, grounding may also protect skin by deepening sleep, which has been found to improve collagen integrity and may help protect skin volume, firmness and elasticity, preserving its strength. This is an exciting area of research that has interesting applications not only to help treat dermatologic conditions and to improve wound healing, but also in the anti-aging and cosmetic industry as well. More research on the health benefits of DC energy, and in particular receiving DC energy through direct contact with the earth's global electrical DC energy grid via grounding, is much needed.

Keywords: Skin; Dermis; Epidermis; Keratinocyte; Collagen; Grounding; Earthing; Direct Current; DC; Electrotaxis; Wound; Wound Repair; Dermatology; Anti-Aging; Restorative Medicine; Regenerative Medicine; Complimentary And Alternative Medicine; Holistic Medicine.

Introduction

DC Current and Skin Repair

When skin is injured, it naturally creates a small electrical field of DC energy that helps guide tissue repair [1-4]. This DC current allows cells to migrate along that mini electrical field, a healing modality called electrotaxis. Many of the cells of the

skin required for healing are electrotactic, including neutrophils, monocytes, lymphocytes, macrophages, endothelial cells, fibroblasts, and keratinocytes themselves [5-9].

Because electrotaxis is an essential part of skin repair, recent research has examined if externally applied DC energy currents can help boost wound healing. Researchers examined if exogenously applied DC energy helped to encourage skin healing by boosting the flow of this DC guidance to our skin cells. To do this, they set up a model of healthy skin cells that they created a wound in and then applied DC energy to. They also set up a model of injured skin (replicating diabetic skin with impaired healing ability) and applied DC energy to that skin model as well.

Researchers found that exogenously applied DC stimulation boosted the rate of wound closure of keratinocytes and keratinocyte repair, accelerating wound closure for both healthy as well as unhealthy skin. DC stimulation tripled the rate of wound healing for healthy skin, making normal skin heal three times faster. DC stimulation also improved keratinocyte recovery in damaged skin with impaired wound healing (approximating diabetic skin). In fact, DC energy improved skin healing in impaired skin so well that it healed at almost the same rate as totally healthy skin did [10].

Direct Ways Grounding Supports Skin Repair

Grounding (the holistic health practice of touching the earth outside) is the all natural way to apply DC energy to our skin. By touching our conductive skin to the earth's crust, we become part of the earth's global electrical grid, an electrical system that naturally flows with DC energy [11]. This DC earth energy is a totally natural version of the exogenous DC energy that the scientists used in the wound healing in vitro study discussed above.

Multiple grounding studies have shown health benefits to the skin through contact with the DC energy of the earth. One double blind placebo based study found that after only one hour of grounding there was improved blood flow and decreased blood viscosity [12]. Another study confirmed that grounding by connecting skin on the foot to the earth's DC energy field immediately and significantly improved blood flow to the skin all the way up to the face [13]. This double-blinded placebo-controlled study found that grounded test subjects had significantly increased capillary blood flow in their facial skin while subjects who were ungrounded had no change in their facial blood flow. This nearly instantaneous physiologic change in the circulatory system happened all over the body, from the grounded point of contact in the foot all the way up to the capillaries of the face.

The fact that grounding through the soles of the feet boosted blood circulation all the way up in facial skin tissues suggests the positive effects of increased circulation are available even in distant sites of the body that are far away from the grounding point of contact. This enhanced blood flow through human capillaries while grounding was filmed in the health documentary "Heal For Free" [14]. This film captures on retinal scan the dramatic changes in blood flow through the retina, which included boosted blood flow to the macula in a patient with macular degeneration, who was grounded through the skin on the bottom of the foot.

In another double-blinded, placebo-controlled study, researchers found decreased blood viscosity and enhanced blood flow during both diastolic and systolic phases of circulatory flow [15]. Another study found a decrease in the zeta potential of the cell membranes of red blood cells in the blood, which decreased red blood cell clumping and significantly decreased

blood viscosity during grounding [16]. Another study found that grounding simultaneously decreased inflammation and boosted immune function which then resulted in improved wound healing in multiple test subjects [17]. Grounding was even found to decrease blood glucose in diabetic patients, which helps explain why applying a DC energy current to diabetic skin made it heal almost as fast as healthy, non-diabetic skin [18].

All together, grounding to the earth — a totally natural DC energy source — is a completely natural, exceptionally easy way to support skin health, helping to heal wounds and repair skin by boosting blood flow, improving oxygen and nutrients to the surface of the skin. All it takes is going outside to touch the earth directly, or applying the earth's DC energy to the skin through a grounding cord or ground stake.

Indirect Ways Grounding Supports Skin Health

The studies above suggest that boosted circulation (which boosts oxygen and nutrients to the skin as well as removing metabolic waste and inflammation) and improved keratinocyte repair, via the skins electrotoxic properties, directly support skin health. Another way that grounding may be beneficial to skin indirectly is through improved sleep.

Experiments as far back as 1970 have helped elucidate how the presence of the earth's DC energy current helps human beings maintain a healthy circadian rhythm [19]. Test subjects who lived for a month in an underground bunker, completely removed from exposure to natural daylight, were able to maintain an internal synchronization to a day/ night rhythm, even with the complete absence of sunlight. But test subjects who lived for a month in an underground bunker that was additionally shielded from the DC energy of the earth (effectively shielding over 99% of the earth's natural EMFs) became internally desynchronized, unable to maintain a consistent day/night rhythm.

In repeated experiments of over 100 test subjects, the only test subjects that became internally desynchronized were the ones that were shielded from the earth's DC energy fields, but never the ones that were shielded only from the sun. Then, in follow up studies, when a low frequency electromagnetic field replicating the earth's DC energy was re-introduced to the earth shielded test subject's living quarters, they began to re- synchronize to a healthy day/night rhythm once again [20].

Because of these experiments, we understand that it is not only exposure to light, but additionally it is exposure to the earth's DC electromagnetic fields that contributes to a healthy day/night pattern. This helps to make sense of why grounding has been found to normalize sleep and boost daytime wakefulness, improving our circadian rhythm. Studies on grounding and sleep have shown that being conductively connected to the earth deepens restorative

sleep, normalizes cortisol, helps to relax muscles, and boost mood [21]. Studies evaluating grounding and sleep quality found that just grounding for 30 minutes a day significantly improved sleep quality. This was a double blinded placebo based study that found that a 30 minute session was enough to make a statistically significant improvement in quality of sleep in Alzheimers patients [22].

What does sleep and sleep quality have to do with skin health? Recent studies have found a direct correlation between sleep and collagen integrity, suggesting that beauty sleep is real. Good sleep may directly preserve your skin by protecting your collagen, the most abundant protein in the human body, found throughout all our tissues and particularly crucial to skin structure. Collagen fibrils get damaged every day through normal wear and tear as well as from the effects of gravity. By intentionally disrupted circadian rhythm in animal models, researchers found that collagen fibrils had decreased integrity, decreased elasticity, and decreased strength. Poor sleep actually caused a decrease in the structural integrity of collagen with an increase in collagen misalignment [23].

So over a lifetime, decreased sleep quality may literally be visible in your skin as your collagen becomes more misaligned, weaker, less elastic, and contributes to accelerated aging. Conversely, improving sleep over a lifetime may help provide skin healing and even anti-aging benefits by boosting collagen integrity and skin repair while you sleep. Because connecting to the earth's DC energy through grounding has been shown to improve sleep, grounding to the earth may be a very important, all natural way to protect skin structure for a lifetime, providing a long term way to boost skin health.

Utilizing The Earth's DC Energy to Protect Skin's Longevity

While more studies are need to determine exactly how grounding may additionally support skin repair, and to elucidate the optimal length of time that the earth's DC energy is needed to support different wound repair goals, there is already evidence that grounding directly and indirectly boosts our skin's health. Directly, grounding may protect skin health by immediately improving circulation to the skin, as well as boosting keratinocyte repair in areas of where skin is wounded. Over the long term, grounding may help protect skin and provide anti-gaining benefits by deepening sleep which may protect skin volume, firmness and elasticity via improved collagen structural integrity. Whether for short term use to improve wound healing, or long term use to support skin over a lifetime, grounding to boost skin health is an emerging concept that deserves more exploration.

References

1. Shellard A, Mayor R (2020) All Roads Lead to Directional Cell Migration. *Trends Cell Biol* 30:852-868.
2. Allen GM, Mogilner A, Theriot JA (2013) Electrophoresis of cellular membrane components creates the directional cue guiding keratocyte galvanotaxis. *Curr Biol* 23:560-568.
3. Bonazzi D, Minc N (2014) Dissecting the Molecular Mechanisms of Electrotactic Effects. *Adv Wound Care (New Rochelle)* 3:139-148.
4. Devreotes PN, Bhattacharya S, Edwards M, Iglesias PA, Lampert T, et al., (2017) Excitable Signal Transduction Networks in Directed Cell Migration. *Annu Rev Cell Dev Biol* 33:103-125.
5. Moarefian M, Davalos RV, Burton MD, Jones CN (2021) Electrotaxis-on-Chip to Quantify Neutrophil Migration Towards Electrochemical Gradients. *Front Immunol* 12:674727.
6. Lin F, Baldessari F, Gyenge CC, Sato T, Chambers RD, et al., (2008) Lymphocyte electrotaxis in vitro and in vivo. *J Immunol* 181:2465-2471.
7. Sun Y, Reid B, Ferreira F, Luxardi G, Ma L, et al., (2019) Infection-generated electric field in gut epithelium drives bidirectional migration of macrophages. *PLoS Biol* 17: e3000044.
8. Ammann KR, Slepian MJ (2021) Vascular endothelial and smooth muscle cell galvanotactic response and differential migratory behavior. *Exp Cell Res* 399:112447.
9. Brown MJ, Loew LM (1994) Electric field-directed fibroblast locomotion involves cell surface molecular reorganization and is calcium independent. *J Cell Biol* 127:117-128.
10. Shaner S, Savelyeva A, Kwartuh A, Jedrusik N, Matter L, et al., (2023) Bioelectronic microfluidic wound healing: a platform for investigating direct current stimulation of injured cell collectives. *Lab Chip* 23:1531-1546.
11. Koniver L (2022) Practical Applications of Grounding to Support Health. *Biomedical Journal* 46:41-47.
12. Chevalier G, Sinatra ST, Oschman JL, Delany RM (2013) Earthing (Grounding) the Human Body Reduces Blood Viscosity—a Major Factor in Cardiovascular Disease. *J Altern Complement Med* 19:102-110.
13. Chevalier G (2014) Grounding the Human Body Improves Facial Blood Flow Regulation: Results of a Randomized, Placebo Controlled Pilot Study. *Journal of Cosmetics, Dermatological Sciences and Applications* 4:293-308.
14. Kroschel, Stephen, director. *Heal For Free*. GaiamTV, 2015.
15. Brown R, Chevalier G (2015) Grounding the Human Body during Yoga Exercise with a Grounded Yoga Mat Reduces Blood Viscosity. *Open Journal of Preventive Medicine* 5:159-168.
16. Chevalier G, Sinatra ST, Oschman JL, Delany RM (2013) Earthing (grounding) the human body reduces blood viscosity-a major factor in cardiovascular disease. *J Altern Complement Med* 19:102-110.

17. Oschman J, Chevalier G, Brown R (2015) The effects of grounding (earthing) on inflammation, the immune response, wound healing, and prevention and treatment of chronic inflammatory and autoimmune diseases. *J Inflamm Res* 8:83-96.
18. Sokal K, Sokal P (2011) Earthing the human body influences physiologic processes. *J Altern Complement Med* 17:301-308.
19. Wever R (1970) The effects of electric fields on circadian rhythmicity in men. *Life Sci Space Res* 8:177-187.
20. Wever R (1974) ELF Effects On Human Circadian Rhythms. *ELF and VLF Electromagnetic Field Effects* 104-144.
21. Chevalier G, Sinatra ST, Oschman JL, Sokal K, Sokal P (2012) Earthing: health implications of reconnecting the human body to the Earth's surface electrons. *J Environ Public Health* 2012:291541.
22. Lin C-H, Tseng S-T, Chuang Y-C, Kuo C-E, Chen N-C (2022) Grounding the Body Improves Sleep Quality in Patients with Mild Alzheimer's Disease: A Pilot Study. *Healthcare* 10:581.
23. Chang J, Garva R, Pickard A, Chloé Yeung C-Y, Mallikarjun V, et al., (2020) Circadian control of the secretory pathway maintains collagen homeostasis. *Nat Cell Biol* 22:74-86.