

Unreliability of the Gas Discharge Visualization (GDV) Device and the Bio-Well for Biofield Science: Kirlian Photography Revisited and Investigated Part I

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Abstract – This is the first part of a research work to study the reliability of the Gas Discharge Visualization (GDV) device and the Bio-Well, two biofield machines based on the Kirlian effect and electrophotonic imaging. Their working, accuracy, and usefulness were analyzed in a Pranic Healing experiment, which is reported in the second part of this study. Here the scientific literature concerning Pranic Healing and Kirlian photography, as well as the functioning of these biofield machines, are reviewed. Pranic Healing has been practiced in Ayurveda for millennia, in order to restore and promote health, by manipulating the flow of subtle energy Prana throughout the human organism. Kirlian photography has been used for decades to measure the human energy field, in order to assess its bioenergetic condition and potential, as well as validate a variety of therapeutic modalities. In the second part of this work, previous reliability studies on Kirlian photography devices will be reviewed, drawing negative conclusions about the utility of these machines in biofield science. An original experiment will also be presented, where the GDV device and the Bio-Well were utilized to evaluate the effect of Pranic Healing on human and water energy fields, with controls. Results were inconsistent, showing the limitations of these technologies, highlighting their incapacity to return meaningful bioenergetic information, and thus suggesting that their use in biofield science should be revisited.

Keywords: Kirlian photography – GDV device – Bio-Well – Pranic Healing – Prana – subtle energy – biofield – biofield devices – electrophysiology – bioelectromagnetism

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Unzuverlässigkeit des Gasentladungsvisualisierungsgeräts (GDV) und des Bio-Well's für die Biofeldwissenschaft: Kirlian-Fotografie neu betrachtet und erforscht. Teil I

Zusammenfassung – Dies ist der erste Teil einer Forschungsarbeit zur Untersuchung der Zuverlässigkeit des Gasentladungsvisualisierungsgeräts (GDV) und des Bio-Well, zweier Biofeldgeräte, die auf dem Kirlian-Effekt und der elektrophotonischen Bildgebung basieren. Ihre Funktionsweise, Genauigkeit und Nützlichkeit wurden in einem Pranic-Healing-Experiment analysiert, über das im zweiten Teil dieser Studie berichtet wird. In diesem Teil werden die wissenschaftliche Literatur über Pranic Healing und die Kirlian-Fotografie sowie die Funktionsweise dieser Biofeldgeräte erörtert. Pranic Healing wird im Ayurveda seit Jahrtausenden praktiziert, um die Gesundheit wiederherzustellen und zu fördern, indem der Fluss der subtilen Energie Prana im menschlichen Organismus manipuliert wird. Die Kirlianfotografie wird seit Jahrzehnten zur Messung des menschlichen Energiefeldes eingesetzt, um seinen bioenergetischen Zustand und sein Potenzial zu beurteilen und eine Vielzahl von therapeutischen Methoden zu validieren. Im zweiten Teil dieser Arbeit werden frühere Zuverlässigkeitsstudien über Kirlian-Fotografiegeräte überprüft und negative Schlussfolgerungen über den Nutzen dieser Geräte in der Biofeldwissenschaft gezogen. Es wird auch ein Original-Experiment vorgestellt, bei dem das GDV-Gerät und der Bio-Well verwendet wurden, um die Wirkung von Pranic Healing auf die Energiefelder von Mensch und Wasser unter kontrollierten Bedingungen zu bewerten. Die Ergebnisse waren widersprüchlich, was die Grenzen dieser Technologien aufzeigte und ihr Unvermögen herausstellte, aussagekräftige bioenergetische Informationen zu liefern. Deshalb sollte ihre Verwendung in der Biofeldwissenschaft überdacht werden.

Schlüsselbegriffe: Kirlian-Fotografie – GDV-Gerät – Bio-Well – pranische Heilung – Prana – feinstoffliche Energie – Biofeld – Biofeldgeräte – Elektrophysiologie – Bioelektromagnetismus

Introduction

The history of the Gas Discharge Visualization (GDV) technique dates back to the 18th century, when German physicist and writer Georg Lichtenberg discovered that any object placed in a strong electric field emanates a glow of light (Korotkov & Jakovleva, 2013; Priyadarsini et al., 2014). Using plates coated with coal dust, he managed to print these images, which came to be called Lichtenberg figures. Later on, in the 19th century, Czech physicist Bartoloměj Navrátil coined the term *electrography* to describe those images, which are photographic impressions of the gas discharge pattern, induced on the air molecules surrounding the electrified object: Since air ionization is accompanied by photon emission, the process can be photographed. Interest in the topic continued to increase, especially as electromagnetism, which was still a novel frontier in science, was being studied and used in medical contexts.

In the 1930s, this phenomenon was discovered again by Russian electrician Semyon Kirlian and his wife Valentina, who began to assess the possible significance of the colored auras

induced around objects with this technique, which assumed the name of Kirlian photography. Interestingly, they found out that fingertip corona discharge would change according to the subjects, their health status and psycho-emotional state, having different shapes and intensities. These discoveries turned electrography into a popular topic of investigation internationally, to study disease and healing.

Konstantin Korotkov, a Russian physicist, biophysicist, and computer scientist, advanced the frontiers of electrography, developing a compact GDV machine that can be easily used for medical research and practice, and that will be tested in this experiment: Through a high intensity and high frequency electric field, the machine stimulates an electrophotonic emission around an object, digitally recording and analyzing the glow. In this study, Korotkov's GDV device, as well as its newer model called Bio-Well, will undergo a reliability test, aimed at evaluating their measurement variability and consistency. The transfer of subtle energy from hands to water will be investigated: The fingertip corona discharge of Pranic healers, instructed to send energy to water, will be analyzed before and after the treatment, and compared with controls. Drops of energized water will be tested as well and compared with controls.

Pranic Healing, which will be investigated in this research work, includes the word "Prana", which means "life force" or "vital energy" (Sui, 2012a, 2012b): Prana would flow across the body through invisible channels, called "nadis", and converge in invisible vortices, called "chakras", keeping the organism alive and healthy. In this non-touch modality, a healer sends subtle energy from their hands towards a healee, stimulating and accelerating the person's inner capacity to heal physically, mentally, and emotionally. Pranic Healing in its existing form was systematically developed and synthesized at the end of the past century by Master Choa Kok Sui, a Philippine chemical engineer who spread this technique all over the world, providing a means to relieve humanity from suffering. This energy healing modality was successfully used to treat many health conditions, including musculoskeletal dysfunctions, arthritis, inflammation, pain, skin diseases, gastrointestinal illnesses, kidney and urinary ailments, pneumonia, migraine, neurological diseases, and cancer (Sui, 2012a); as well as stress, irritability, anxiety, phobias, obsessions, compulsions, addictions, depression, paranoia, and schizophrenia (Sui, 2012b).

Pranic Healing is based on two fundamental laws: self-recovery and Prana. The former states that the body is able to heal itself, thus the practitioner's role is simply to stimulate its innate ability to do so. The latter asserts that any living being must have Prana to be alive and heal itself, therefore sending vital energy towards a diseased body can accelerate its self-recovery process. With proper training and spiritual education, anyone can learn how to scan the human energy field, also called biofield, identifying areas of Pranic depletion or congestion; and through hand movements, intentions, and visualizations, they can cleanse, energize, and stabilize it. Pranic Healing is a promising modality, which seems effective at improving numerous physical, men-

tal, and emotional disturbances, and thus could offer a valid contribution to resolving our current healthcare crisis. In this research, the transfer of subtle energy from Pranic healers' hands to water will be studied scientifically, analyzing whether and how it occurs.

Literature Review on Pranic Healing

Healing through Prana is a fundamental concept of Ayurveda, which interprets this cosmic energy as life giving, supporting, and nourishing (Narayanan & Herswani, 2015; Parmar et al., 2018). With proper guidance and training, even common people can perceive Prana and they may experience positive feelings (Jois et al., 2015, 2017a, 2017b, 2017c, 2017d, 2017e, 2019a): For example, many will see small bright globules moving around fast in the sky or waves emerging from the earth, which are subtle energy emanations from the sun, air, and ground; or they will view auras around living beings, such as trees and people; or they will feel energy in between their hands; finally, many will sense physiological changes while projecting or receiving Pranic energy.

According to Ayurveda, Prana sustains also the human body, flowing through subtle channels (nadis) and vortices (chakras), and determines its state of health: Impediments, depletions, and congestions in the vital energy movements can cause ailments and diseases. Therefore, harmonizing the biofield subtle-energy flow is the main objective of Pranic Healing, an ancient art which manipulates, corrects, and rebalances the energetic circulatory system of the organism, restoring health and wellbeing. In modern times, this technique was conceptualized, developed, and brought to the West by Philippine chemical engineer and spiritual master Choa Kok Sui, thus it is now easier to integrate it into clinical practice (Sui, 2012a, 2012b).

For example, in an experiment on a breast cancer patient, positive results were obtained (Tsuchiya & Motoyama, 2009): A specific Pranic Healing protocol was applied for four sessions, leading the healee to energetic changes that were consistent with the therapy and conducive to recovery, as assessed by the Apparatus for Meridian Identification (AMI). Besides, Pranic Healing on clinical patients reduced the size and spread of cancer (Nittur & Ganapathi, 2020); improved lung function, psychophysical condition, and quality of life in chronic obstructive pulmonary disease (Mahesh et al., 2017); decreased pain in musculoskeletal conditions (Gangmei & Upendra, 2020; Soni et al., 2013); and relieved fibromyalgia symptoms, such as pain, stiffness, and sleep disturbances (Vinushree, 2021). Furthermore, after eight months of Pranic Healing treatments, a partially-blind subject, diagnosed since birth with a visual impairment, recovered from most of his symptoms and improved his visual acuity (Jois & Prasad, 2018).

Insomnia is another disorder that responded positively to this modality (Aithal et al., 2018): A patient affected by such condition and complaining of irritability, low energy, daytime sleepiness, and depressed mood, went through six Pranic Healing sessions, experiencing at the end a normal

sleeping pattern, as well as a sense of calmness, wellbeing, and enhanced energy. Besides, Pranic Healing, on a group of adults suffering from poor sleep, resulted effective at enhancing their sleep quality (Amritha & Shalini, 2020). Other case reports and clinical studies confirmed the great potential of this complementary therapy for the management of sleep disturbances (Dewi et al., 2022).

Depression patients were treated with Pranic Healing for four weeks in a randomized, double-blind, controlled trial, which proved that this technique is an effective adjuvant therapy to ameliorate mental disorders (Rajagopal et al., 2018). A subject, suffering from moderate panic disorder with mild agoraphobia, was Pranic healed for two months, along with homeopathic treatment, and experienced a reduction in his symptoms (Vinu & Jois, 2021). Similarly, this energy healing modality improved the mental health of university students, who were treated for one month and experienced relaxation, inner peace, harmony, and positive thinking in their daily work and activities (Srivastava et al., 2019).

Pranic-Healing founder developed the Superbrain Yoga, designed to move Prana from the lower to the higher chakras, in order to increase mental focus, capacity, and creativity (Aniruddha et al., 2020; Chakrabarty & Krishna, 2022; Farahani et al., 2019; Janagap & Janagap, 2022; Jois & D'Souza, 2018a, 2018b; Jois et al., 2017f, 2018a, 2020; Koterba, 2007; Kumar & Singh, 2016; Pandey & Singh, 2019; Premalatha et al., 2021; Ramesh, 2007; Siar, 2007; Sui, 2010; Thomas & Venkatesh, 2017; Vinu et al., 2022). This yogic exercise works as a mind-energizing and learning-enhancement tool, to increase and balance brain activity, regulate behavior, and improve academic performance; especially for students with attention deficit disorder (ADD), attention deficit hyperactivity disorder (ADHD), autism, down syndrome, and other cognitive delays.

Beneficial psychological effects were also observed in organization managers, whose leadership effectiveness significantly improved after three months of Pranic Healing treatments, which enhanced their emotional intelligence, stress management, risk-taking ability, optimism, and integrity (Singh et al., 2015). In another experiment, on employees working in a garment factory, it was found that one month of Pranic Healing sessions improved their quality of life (Jois et al., 2018b). Finally, inmates experienced numerous benefits in their physical fitness, pain, sleep, feelings, and overall health, after only one week of Pranic Healing, which ameliorated the disturbances caused by their solitary confinement (Jois et al., 2018c).

Studies were conducted to analyze the effects of Prana on water, cells, animals, and humans, from a biophysical perspective. For example, the application of Pranic Healing decreased the surface tension and increased the wettability of water, which can be used to improve the absorption of nutrients from liquids by living beings (Ananthakeshava et al., 2021). The effect of Pranic Healing on human cells in culture was investigated in a long-term study, using rigorous scientific methods (Jones, 2006). In hundreds of experiments, involving 10 healers, the survival rates of irradiated HeLa cells were impacted by Pranic Healing (PH) treatments, as follows:

Designation	Survival Rate, 1 Day Post Radiation
• Control	~ 100%
• Radiation only	~ 50%
• PH after radiation	~ 70%
• PH before radiation	~ 80%
• PH before and after radiation	~ 90%

Increasing the distance between healers and cells (up to 6,000 miles), and/or using electromagnetic shields, had no effect on the results, suggesting that a subtle form of energy (Prana), which is not blocked by physical means, was at work.

In another study, mouse keratinocyte HaCaT cells were treated with Pranic Healing and showed a significant increase in intracellular calcium concentration, compared to the untreated cells (Silva et al., 2015): Such phenomenon may have been caused by an energetic stimulation of the intracellular calcium storage. Calcium is involved in many cell signaling processes, therefore this result may help understand the effects of complementary therapies on cellular healing and regeneration. Besides, Pranic energy positively influenced the behavior of zebrafish, under normal conditions and during circadian rhythm changes (Nadig et al., 2020a, 2020b): The treated zebrafishes showed increased locomotion and decreased anxiety, compared to the control group.

Furthermore, through functional Magnetic Resonance Imaging (fMRI), neurophysiological changes in a human Pranic healee were measured (Jones, 2001): Two healers focused Prana onto the subject's acupoint BL-67 (in the foot), known to be related to vision, and produced a stimulation of his brain visual cortex. Additional experiments, in which the healers were located at some distance from the healee, returned identical results. The Pranic-Healing Twin-Heart Meditation, together with yoga, was practiced for three weeks by university students, whose brainwaves were measured pre and post (Nikhra, 2016): At the end of the experiment, EEG data showed a significant stress reduction in the meditators, who felt relaxation, inner peace, harmony, and joy. Moreover, the heart rate variability of Pranic healers was studied during deep relaxed meditation and was found to be increased by the practice, suggesting a modulation, stabilization, and improvement of their Autonomic Nervous System (ANS) activity (Jaisri et al., 2011).

Pranic Healing was also used for agronomic purposes, to enhance crop growth, development, and storage. Energy-treated seeds, land, and seedlings yielded tomato plants which resulted higher, larger in diameter, with more fruits and flowers, compared to controls (Jois et

al., 2016); besides, tomatoes showed better shelf life and compositional changes, such as lower weight loss and shrinkage. Similar effects were observed in other plants, such as cucumber (Jois et al., 2017g; Keerthika et al., 2016; Yathindra et al., 2017a), pole bean (Yathindra et al., 2017b), drumstick (Prasad & Jois, 2019), brinjal (Jois et al., 2019b), papaya (Prasad & Jois, 2020a), spinach (Prasad & Jois, 2020b), ridge gourd (Poornima et al., 2020a), marigold (Poornima et al., 2020b), cluster bean (Prasad & Jois, 2021a), green gram, paddy, and radish (Nadig et al., 2021; Prasad & Jois, 2021b), chilli (Poornima et al., 2021a), and lettuce (Poornima et al., 2021b). Pranic agriculture could become a novel and eco-friendly farming system, to improve the quality, quantity, and preservation of produce products.

The Western world is facing a severe health crisis, and indigenous healing modalities, based on spirituality, energy balance, and interconnectedness, could bring holistic and cross-cultural perspectives to the way we approach medical practice (Yeh et al., 2004). Pranic Healing seems to benefit human psychophysical comfort and wellbeing: Further research is encouraged to investigate the full potentialities and applications of this technique, for humankind and the Earth. In this experiment, a Pranic Healing treatment will be assessed with Kirlian photography, on human and water energy fields, comparing the results with controls. This literature review on Pranic Healing is summarized in Appendix A.

Literature Review on Kirlian Photography

The mechanism underlying Kirlian photography is the detection of the electrophotonic emission, stimulated by a high intensity and high frequency electric field (Korotkov et al., 2004a): What the Gas Discharge Visualization (GDV) method indirectly measures is the amount of free electrons in molecular systems, which are pulled out from the organic material and whose ionization process is analyzed. Communities of delocalized and excited π -electrons,² in protein macromolecules, constitute the main energy reservoir in biological processes. Therefore, their detection allows to evaluate the amount of energy resources available in a biological system, and thus its biophysical status and potential. Exploring biological systems from an energetic perspective, beyond the chemical one, is a promising and innovative approach, which may provide subtler information about their health and vitality level.

Many experiments were conducted using the Kirlian technique on the human energy field, for example to validate Complementary and Alternative Medicine (CAM) modalities from a biophysical perspective. The effects of osteopathy – a therapy involving the manipulation of

2 π -electrons are so called because they reside in π -orbitals. In these orbitals, electrons are held more loosely, form diffuse clouds of charge, and thus can be more easily extracted from their molecular systems.

the musculoskeletal system – were evaluated with electrophotonic imaging, and the recipients' biofield resulted wider, more intense, and more relaxed after the treatment (Korotkov et al., 2012). Significant bioenergetic changes were also found in a pre-post GDV screening, to investigate the impact of massage therapy (Haun et al., 2015; Korotkov & Korotkova, 2018). A GDV test on a group of participants, before and after performing Qigong – a Chinese life-energy cultivation practice, aimed at regulating the flow of Chi through movements, breath, and intention – showed that their biofield increased in density after the session (Rubik & Brooks, 2005). Other biofield parameters were impacted as well, depending on the subjects' health status and experience with the practice.

Through bioelectrography, yoga was shown to regulate and balance the subtle energy system of the intervention group compared to the control one (Xu et al., 2021). Similarly, yoga and naturopathy on autistic children were found to improve their energy levels, while no change occurred in the control group (Sankhala et al., 2021). Moreover, using the GDV machine, the energy fields of children, youths, adults, and masters of Dahn Hak – a Korean practice which includes movements, meditation, and energy release – were compared (Leigh et al., 2003): Results showed that Dahn masters had the largest fields; children the smallest but the most open and receptive ones; while adults presented the most shutdown fields, denoting the presence of accumulated psycho-energetic traumas and blockages. Additionally, it was found that overall the energy fields of Dahn masters were significantly different from regular adults and more similar to younger groups, suggesting that this mind-body technique allows to maintain healthier biofields throughout lifetime.

The impact of musicotherapy was evaluated with Kirlian photography (Rao et al., 2014): It was demonstrated that Indian devotional music increased the biofield area and intensity of the listeners, who were thus positively influenced and energized. Significant bioenergetic changes were also found in the fingertip electrophotonic emission of attendees to the Bhaishajya Maha Yajna, an Indian fire ceremony that includes spiritual practices and rituals, such as herbal offerings and sacred chanting (Sushrutha et al., 2014). Pranic Healing on pregnant women was assessed using the GDV technique (Astuti et al., 2019): The treated group showed a significant decrease in emotional stress, while no change occurred in the control one. Meditation as well resulted to have a significant and beneficial impact on the practitioners' electrophotonic parameters (Deo et al., 2016; Kumar et al., 2016a).

During a CAM workshop, various healing modalities were put to test through bioelectrography (Korotkov et al., 2009): Reconnective Healing induced an increase in the participants' biofield area and a decrease in entropy variation, indicating the energization and harmonization of their energy field; focused group meditation, sending positive intentions to water, produced significant variations in its parameters; sound therapy on a volunteer returned consistent results

as well, increasing and harmonizing this participant's biofield; the energetic activity of the room was monitored with an antenna (Sputnik), attached to the discharge plate of the GDV apparatus, and significant fluctuations were observed throughout the workshop.

Besides, in an experiment designed to investigate the electrophotonic discharge of healers, it was found a reproducible and statistically significant correlation between their fingertip emission and conscious desire to change their energetic state (Russo et al., 2001); unlike the control subjects, who were unable to consistently alter their fingertip electrophotonic discharge through their will power. Finally, the bioelectromagnetic therapeutic influence on the visual acuity of subjects with various vision disorders was studied with bioelectrography, and an association was found between wider corona discharges and better healing results (Ignatov et al., 2021a).

The GDV technology was used also to assess diseases, by detecting anomalies in the bioenergetic condition of the body. Stimulated fingertip discharge seems to be a powerful tool for oncological applications, with high specificity and sensitivity in distinguishing between healthy subjects and patients suffering from colon tumors (Yakovleva et al., 2016). Similarly, electrophotonic emission parameters resulted different between heart-disease patients and healthy individuals, allowing to evaluate and compare their health status from a biophysical perspective (Nevoit, 2021; Nevoit et al., 2021). Significant differences were also found in healthy, pre-diabetic, and diabetic populations (Bhat et al., 2017; Kumar et al., 2016b; Sharma et al., 2014): Specific organs and apparatuses, related to the disease, were characterized by clear energetic differences among the study participants, depending on their group membership.

Moreover, the GDV technique was helpful to detect energetic imbalances in the diseased body regions of smokers (Anitha et al., 2019; Cohly et al., 2009) and stroke patients (Lee et al., 2005), sufferers from arterial hypertension (Aleksandrova et al., 2015; Korobka et al., 2018), thyroid hyperactivity (Cohly et al., 2009), and chronic abdominal pathology (Polushin et al., 2009), compared to their controls; assess geopathic stress (Hacker et al., 2005) and mobile-phone induced electromagnetic stress (Bhargav et al., 2016, 2017), student psychophysical stress (Basarab et al., 2021) and learning anxiety (Kostyuk et al., 2010a), children autism (Kostyuk et al., 2009, 2010b), attention deficit hyperactivity disorder (ADHD) (Korotkov et al., 2022), speech disorders and therapies (Skuratovskaya et al., 2020), with consistent results; finally, to study the effects of an anti-depressant drug on the cognitive functions of clinical patients, who showed significant correlations between their electrophotonic and psycho-diagnostic parameters (Rgeusskaja & Listopadov, 2009).

Interestingly, the American Central Intelligence Agency (CIA) investigated Kirlian photography, collecting evidence from Russia that it is an efficacious and expeditious diagnostic tool to evaluate the bioenergetics of living organisms (Stepanov, n. d.): For example, by examining cancerous tissues, taken from patients being operated on, their pathological condition

could be revealed. The utility of bioelectrography as a non-invasive and reliable test for tracking malignant processes was found by others as well, who identified specific spectral signatures in the tumor tissue and fingertip corona discharge of diseased individuals (Rein, 1985; Shaduri & Bouchoucha, 2013).

Corona discharge photography of human fingertips does not seem to return an accidental or random pattern, but an individual-specific signature, reflective of the testee's electromagnetic field, energetic condition, and health status (Ignatov et al., 2021b; Treugut et al., 2000). For example, it was found that the parameters of the fingertip discharge glow were correlated to the state of immunity (Babelyuk et al., 2021a, 2021b), neuroendocrine factors of adaptation (Babelyuk et al., 2017), and biorhythmic fluctuations of the body (Tsubouchi et al., 2018), as corroborated by biochemical and conventional measurements. In sports, this technology found the highest level of psycho-energetic functional reserves in athletes who were in their favorable periods of the year, thus returning reliable evaluations about human psychophysical potential, readiness for contest, and capacity to perform (Bundzen et al., 2005).

Therefore, the GDV technique appears to be a useful and non-intrusive biometric tool, which can capture the psychophysiological status of the patient (Kostyuk et al., 2011). In this way, it would be possible to identify, at early stages, deviations from the normal functional state, through a real-time feedback. Electrophotonic imaging seems a promising, easy-to-use, and express health-evaluation method, which could be effectively implemented in medical settings, both for preventive healthcare and treatment assessment (Korotkov et al., 2010; Singh, 2014).

Furthermore, human electrophotonic emission was used to study consciousness and psi phenomena, leading to very interesting findings. In an experiment designed to explore altered states of consciousness, the fingertip corona discharge of participants, who underwent systematic mental training, showed an “explosive activation” compared to controls (Bundzen et al., 2002). The direct vision phenomenon – which consists in perceiving visual information without using the eyes – was monitored in a group of children through bioelectrography, that registered specific dynamics associated to this perceptual capacity (Korotkov et al., 2005). Additionally, intuitive thinking was studied with Kirlian photography in a group of students, whose fingertip luminescence area reflected their ability level (Tretyak et al., 2016): A larger size corresponded to a higher intuition on cognitive tasks. Finally, the Sputnik antenna was used to explore energetic changes in environments, where emotional gatherings were taking place, such as a water blessing ritual, a healing workshop training, a musical performance, a shamanic ceremony, and others (Korotkov et al., 2008). Significant variations were detected during these events, suggesting that collective human emotions can have an impact on the energetic condition of the environment.

Electrography seems to be very sensitive also for the study of subtle structural-informational characteristics of liquids (Korotkov & Orlov, 2010). For example, statistically significant

differences were found in the electrophotonic parameters of different types of water, as well as foods, influenced by a water-structuring bio-disc, compared to their controls (Korotkov, 2019). Similarly, with electrophotonic analysis, it was demonstrated that the bioenergetic properties of water were significantly influenced by the features of its container (Abella et al., 2017).

Moreover, homeopathic remedies – highly diluted and vigorously shaken solutions deriving from natural substances – were tested and compared with solvent controls (Bell et al., 2003): The former showed a unique electromagnetic pattern, which may be used as an effective means to differentiate them from other compounds and understand their effects on living systems. Similar results were obtained by comparing salt solutions with distilled water, and natural essential oils with their synthetic analogs (Korotkov & Korotkin, 2001; Korotkov et al., 2004b; Škarja et al., 1998). Different medicines could be distinguished through their electrophotonic emission, opening new prospects for pharmacological assessment (Shipko et al., 2021). Blood and its components were analyzed as well with the GDV technique, and their degree of oxidative stress could be effectively evaluated (Stepovich et al., 2018). Finally, the properties of wines were studied, comparing those produced by biodynamic and standard organic agriculture (Bigler et al., 2009): Results showed that wines from biodynamically-grown grapes had a higher-intensity energy field.

Bioelectrography was used also in other contexts, showing to be an accurate health-assessment tool for a variety of purposes. Human hair was tested through the GDV technique, revealing not to be an inert tissue, but instead an active and conductive channel, transmitting electrons and interacting with the body (Vainshelboim et al., 2005). The influence of different raw materials, such as wool, acrylic, and viscose fabrics, in contact with the skin, was investigated, with results that confirmed the impact of textiles on the body bioenergetics (Ciesielska, 2009; Ciesielska & Masajtis, 2007).

An increasing amount of research seems to demonstrate that the GDV technique is a fine and versatile health-assessment means, which can be utilized in many different fields of science and life, such as medicine, psychology, and sports – alternative medicine being the most prevalent area of application (Grozdeva & Dikova, 2018).

As discussed so far, the scientific literature concerning Kirlian photography tends to support the claim that such devices are useful and reliable tools for biofield science. But most researchers do not conduct specific studies about the accuracy of these machines and the repeatability of their assessments: They trust the conclusions drawn by the inventors, using the devices as black boxes. However, one study did question the consistency of Korotkov's GDV camera, showing that it does not provide informative and reproducible results (Shaduri, 2011). Similarly, another Kirlian-photography device, called Plasma Print and developed by German researcher Dieter Knapp, was investigated and revealed poor repeatability (Jessel-Kenyon et al., 1998).

Moreover, also the Energy Emission Analysis (EEA) bioscan, yet another Kirlian-photography device, developed by German holistic therapist Peter Mandel, was found to have low reliability (Treugut et al., 1998). Finally, the large variability and inaccuracy of the Kirlian technique, as well as its natural explanations which do not necessitate mysticism, were emphasized over time by various authors (Boyers & Tiller, 1973, 1976; Dakin, 1975; Gadsby, 1993; Krippner, 1979; Marino et al., 1979; O'Regan, 1989; Watkins & Bickel, 1986).

This research work is aimed at exploring further the functioning of Korotkov's machines, which are widely used, in order to advance our understanding of stimulated electrophotonic emission and the tools available to measure it. Specifically, these machines will be used to assess the biofield of Pranic healers and their water energy field after a treatment, using controls. This literature review on Kirlian photography is summarized in Appendix B.

GDV-Device and Bio-Well Functioning

The Gas Discharge Visualization (GDV) device, developed by Konstantin Korotkov, is a biofield machine that exploits the Kirlian effect to assess the energetics of living and non-living things (Korotkov, 2002, 2011, 2014, 2017; Korotkov & Jakovleva, 2013; Korotkov & Yusubov, 2012). The object under investigation is placed in a high intensity and high frequency electric field, which induces on its surface an electron discharge, whose glow is recorded.

In detail, a burst of 10/20-kV, 10- μ s bipolar pulses, with a frequency of 10^3 Hz, is applied for 0.5 s to an electrode, which is separated from the object by a dielectric material, so that electric fields can pass through but electrons cannot. The tested object is thus exposed to an electric field, with a 10^6 – 10^8 V/cm intensity, pulsed every 10 μ s, for a time length of half a second. The short pulse duration is used to obtain more informative, reliable, and reproducible results, without causing tissue depolarization or stimulating ionic currents.

A potential difference builds up between the electrode and the tested object, causing the electrons in the object to accumulate on the surface exposed to the electric field. Eventually, the potential difference breaks down and the electrons flow from the object onto the surface of the dielectric, exciting and ionizing the surrounding air molecules (avalanche discharge). The total time of the avalanche discharge is very small, only 10^{-8} – 10^{-7} s: The negative charge, accumulated on the dielectric, screens out the electric field in the avalanche area, decreasing its intensity to a value insufficient for any further development of the discharge process; subsequently, the polarity change of the external voltage neutralizes the discharge accumulated on the dielectric; this process repeats periodically. The total charge and energy transferred by every avalanche are respectively 10^{-12} – 10^{-9} C and 10^{-9} – 10^{-7} J. The alternating electric potential promotes the movement of electrons along the dielectric plate (sliding discharge).

In the GDV technique, the discharges in the gaseous medium amplify the weak body emission, allowing to detect and analyze it. The photon ionization glow, which includes a part of the ultraviolet and visible electromagnetic spectrum ($\sim 150\text{--}500\text{ nm}$), is digitally recorded by a CCD camera, placed under the optically-transparent electrode. The camera photographs the visible part of the spectrum ($\sim 400\text{--}500\text{ nm}$), which is analyzed by a computer software. The snapshot of the photon glow is called GDV-gram.

The electrons extracted from the fingertip tissues are delocalized and excited π -electrons, which move freely across protein macromolecules and constitute the main reservoir of biological energy in the organism. The intensity and features of the air ionization process are related to the characteristics of the electrons that trigger it, and thus to the quantity and quality of the free energy that flows through the organism. Therefore, evaluating the fingertip corona discharge can provide information about the physiological functioning, energetic vitality, and health status of the body systems.

In Figure 1, the GDV-device measurement process is schematized, while in Figure 2 the photograph of a fingertip corona discharge, or GDV-gram, is shown.

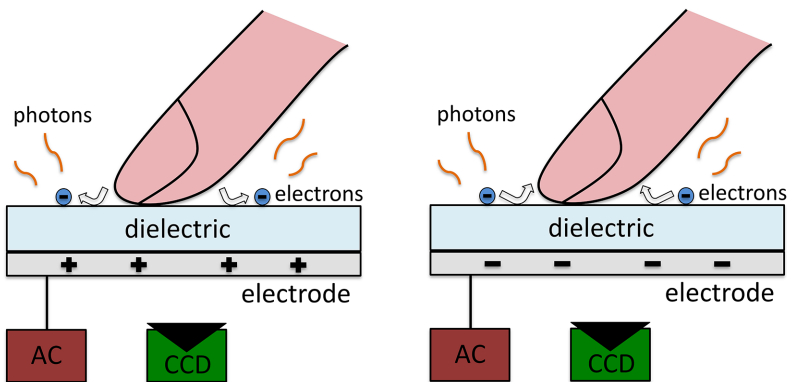
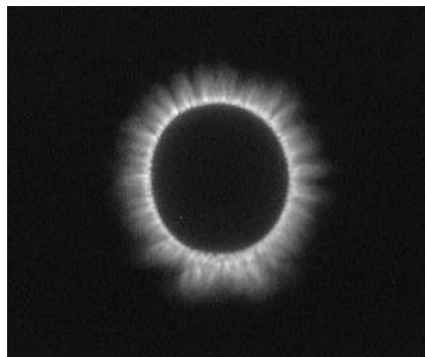


Figure 1. Schematics of the GDV technique. A fingertip is placed on a dielectric (optic plate), which separates it from an electrode, that is connected to an alternating current generator (AC) in the μA range. When the generator feeds the electrode with a voltage, a potential difference accumulates between the electrode and the fingertip. Eventually, this potential difference breaks down, causing the electrons to flow from the fingertip onto the dielectric, moving back and forth due to the alternating electric field. The avalanche of electrons ionizes the air molecules and photons are emitted in the process. These photons, which cover a part of the ultraviolet and visible electromagnetic spectrum ($\sim 150\text{--}500\text{ nm}$), are photographed by a CCD camera, which is placed under the optically-transparent electrode and records the visible part ($\sim 400\text{--}500\text{ nm}$). A finger is correctly positioned when it is 45° -inclined with respect to the dielectric. Copyright with the author.

Figure 2. Black-and-white snapshot, or GDV-gram, of a fingertip corona discharge, recorded by the CCD camera inside the GDV device. The photographed photons are emitted around the fingertip during the air ionization process, induced by electrons that are extracted from the tissues through a high intensity and high frequency electric field (electro-photonic emission [EPE]). Copyright with the author.



There are many factors that influence the features of the ionization process, for example the parameters of the applied electric field, the capacitance of the object, and the properties of the surrounding gas, which are affected by the ambient conditions. A calibration of the device, using a metal cylinder, is thus performed to take into account environmental factors, such as temperature, humidity, etc.

When a human subject is tested, the health assessment is based on the analysis of the fingertip GDV-grams. The measurement is repeated twice, without and with a thin polyethylene filter, placed on the surface of the optic plate. Korotkov claims that this plastic filter is able to screen out the subject's psycho-emotional response, by cutting out the cutaneous covering, caused by perspiration processes that are related to the Autonomic Nervous System (ANS) activity. When the filter is in place, electrons penetrate inside the film and multiply, making the discharge images smoother and more continuous: In this way, only large energetic imbalances, present in the physical body, stand out. Therefore, filtered GDV-grams are used to evaluate the subject's physical condition; while unfiltered GDV-grams, where the fingertip is in direct contact with the optic plate, are used to assess the physical condition as it is influenced by the psychological one, i. e., the subject's psychosomatic



Figure 3. The Gas Discharge Visualization (GDV) device. Under the optic plate (glass), a high intensity and high frequency electric field stimulates a fingertip corona discharge, which is photographed by a CCD camera. A guide is placed on the glass, to help position the fingertip correctly and screen out environmental light sources. During the measurement, it is recommended to wear a cloth around the hand, similar to a small cloak, as a further screen from external light. Picture retrieved from gdvusa.org

state. According to Korotkov, large differences between filtered and unfiltered images indicate a strong autonomic deregulation and imbalance.

The GDV device is shown in Figure 3. GDV-grams are analyzed by a computer software, which divides the fingertip corona discharges into sectors, corresponding to different organs and apparatuses. The model is based on the Korean Su-Jok medical system, which was tested and refined by Korotkov, and previously by German holistic therapist Peter Mandel, through their bioenergetic studies and clinical experience. In Figure 4, the correlation between fingertip sectors and body parts/systems is shown.

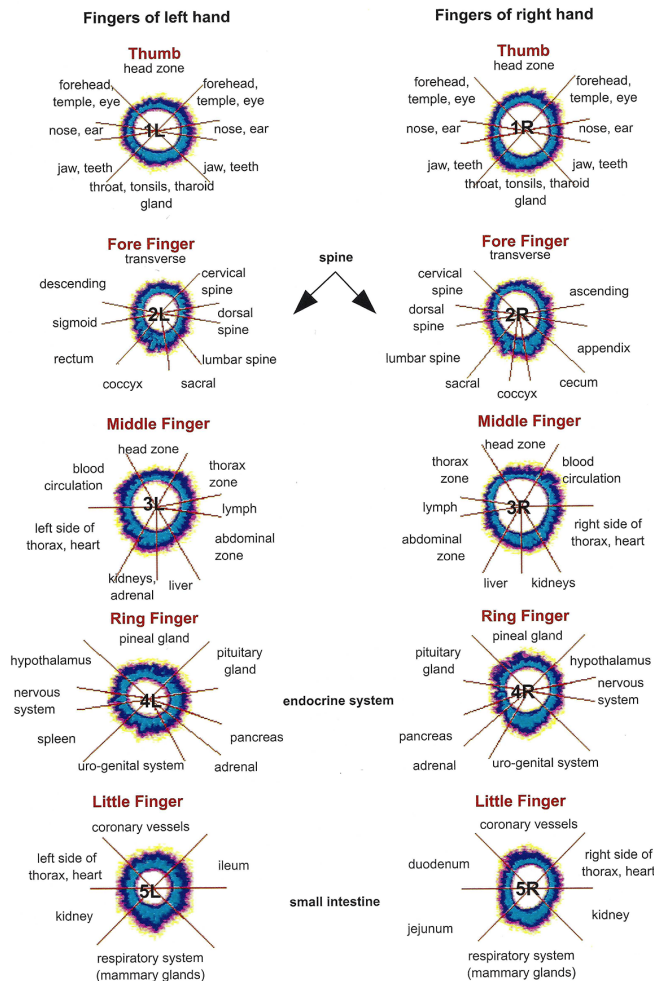


Figure 4. Correlation between fingertip sectors and body parts/systems. Body parts and systems are mapped around the fingertips, whose corona discharge thus reflects the bioenergetic status of the organism. The map is based on Su Jok, a Korean medical system which was revised by Mandel and then Korotkov through their clinical studies. The same body parts and systems may be found on different fingertips and hands: According to Korotkov, if energetic abnormalities are found in more sectors, corresponding to the same body part/system, that is a strong indication that such part/system is in a pathological or pre-pathological state. The more pronounced the defect, the more serious the health condition. Corona discharges are shown in intensity-palette pseudo colors. Image retrieved from Korotkov (2002).

The health assessment, returned by the GDV-device software, includes numerous parameters, among which:

Integral Area: is calculated for each body organ, part, or apparatus, as

$$IA = \frac{\ln\left(\frac{S}{S_1}\right)}{\ln\left(\frac{S'}{S'_1}\right)}$$

where S and S_1 are the GDV-gram area and inner-contour area, while S' and S'_1 are the area and inner-contour area of the ideal GDV-gram (obtained through the calibration). The area of a GDV-gram corresponds to the number of computer pixels (px) with value above the threshold. The area parameter quantifies the amount of electrons extracted from the fingers, and thus the amount of vital resources, or functional reserves, within the organism: The more abundant the flow of electrons, the higher the metabolic rate of the body. A diagram is created for right and left hand, where organ IA coefficients, calculated as $IA - 1$, are reported and connected by a curve. According to Korotkov's studies, the healthy range for IA coefficients lies between $[-0.6, +1]$, but can change depending on the testee's age, with 0 being the optimal value: Areas of hypo- or hyper-functional organs fall respectively below or above this healthy range.

JS and RMS: arithmetic average and root mean square of the IA coefficients. JS shows the deviation from the ideal condition: The closer its value is to zero, the more balanced the organ areas are ($[-0.6, +1]$ is the optimal range, but can change depending on the testee's age). RMS reflects the fractality of the diagram curve, i.e., the area variations among the organs: The smaller its value, the more uniform the organ areas are. JS and RMS are reported for the right and left organ diagrams.

Activation Coefficient: is an absolute magnitude of difference of IA coefficients, calculated using GDV-grams without and with filter, and taking into account their corresponding dispersions.

$$A = \text{sumR} + \text{sumL} + |\text{sumR} - \text{sumL}|$$

where sumR and sumL are respectively the variability of all organ areas in the right and left fingers. The Activation Coefficient, which is reported on a scale from 0 to 10, with $[2, 4]$ being the optimal range, represents the difference in the energy levels between the psychological and physical state of a subject. Korotkov claims that this parameter measures psychophysical stress and anxiety: The greater the difference between the psycho-physiological (unfiltered GDV-grams) and physiological (filtered GDV-grams) state of a testee, the greater their level of physical and mental pressure. The range $[0, 2]$ may be an indication of a very calm, balanced, and low-stress condition, found by Korotkov in experienced meditators and Qigong masters, but it

may also be a sign of chronic depression or use of psychedelics. High levels of stress would be associated to anxiety, nervousness, and autonomic dysfunction.

Integral Entropy:

$$IE = \frac{\left(\frac{L}{L_1}\right)}{\left(\frac{L'}{L'_1}\right)}$$

where L and L_1 are respectively the GDV-gram external and internal contours, while L' and L'_1 are the external and internal contours of the ideal GDV-gram (obtained through the calibration). According to Korotkov, the IE, whose optimal range falls between [1, 2], reflects the functioning of the organism vital activities. An increase in entropy would indicate the emergence of new processes leading to cell and organ activity; while a decrease in entropy would be related to the inhibition of metabolic reactions, thus to the switching off of body systems and the disappearance of energy fields for their development. The IE is calculated for right and left hand.

Form Coefficient:

$$FC = a \cdot \frac{L^2}{S}$$

where L is the length of the GDV-gram external contour, S is the GDV-gram area, and “ a ” is a constant. Based on his studies, Korotkov suggests that this parameter is related to the level of physiological regulation: The higher its value, the more regulation systems are active in the body. The FC is returned for right, left, and front parts of the body.

Aura: The fingertip electrophotonic glows are mapped around the contour of a human figure to create an aura; in this way, excesses, deficiencies, heterogeneities, and irregularities of the energy field get associated to certain portions of the body. The energy field **Area** is given for right, left, and front parts of the body, and its overall **Symmetry** is returned as well. Korotkov claims that a healthy, strong, and coherent field should have an area above 14,000 px and a symmetry higher than 80%. Values of the **Entropy** (IE not divided by the ideal case) are also given for right, left, and front parts of the body.

Chakras: The **Energy Activity Level** and **Psychological Priority** of every chakra is calculated – the chakra representation follows the Indian Ayurvedic model. The former parameter indicates the amount of energy that flows through the dominant right-left chakra component, i. e., the strength of the chakra; while the latter shows which is the dominant chakra component, i. e., whether the chakra is right- or left-shifted (balance is at 0, on the spinal cord). Chakra imbalance towards the right or left side would reflect an extrovert or introvert psychological character. The

specific calculation of these parameters is not revealed by the device inventors; however, it is reported that chakras are mapped on fingertip halves, corresponding to their associated body systems, according to ancient Ayurvedic knowledge, as well as Korotkov's research (Figure 5). Therefore, the analysis of the electrophotonic glow, emitted from fingertip halves, determines the parameters of the corresponding chakras: The Energy Activity Level is related to the area of the glow, while the Psychological Priority to the difference in area between right and left hand.

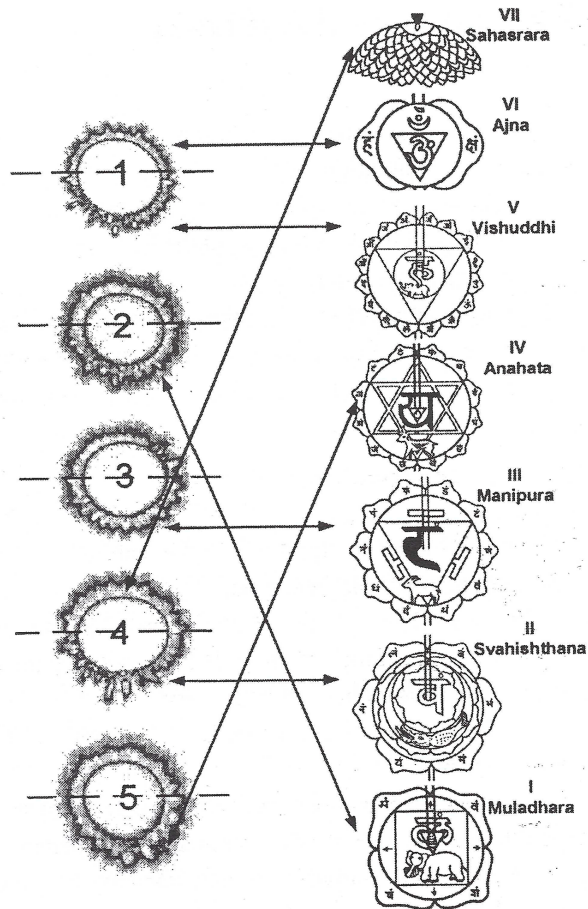


Figure 5. Correlation between fingertip sectors and the seven chakras, reported with their Indian names. The map is valid on both hands. The association is based on the Ayurvedic relationship between body organs, mapped on fingertips, and chakras, as well as on Korotkov's experimental research. Image retrieved from Korotkov (2002).

Some examples of the GDV-device health report are shown in Figures 6, 7, and 8, which display respectively the organ, energy field, and chakra assessments.

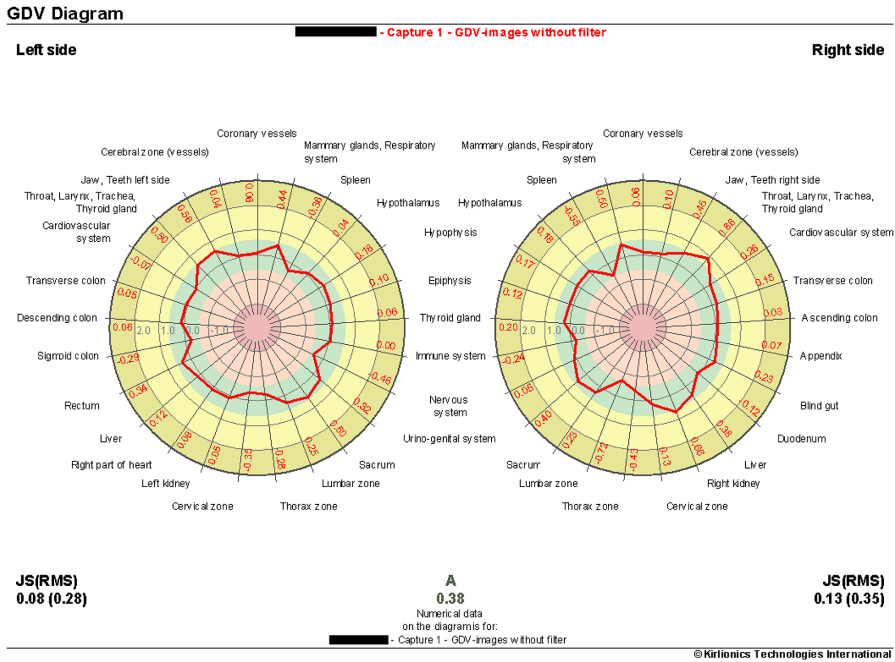


Figure 6. GDV-device organs. The charts show the Integral Area (IA) coefficients, for left and right hand, relative to GDV-grams captured without filter. The bioenergetic condition of the testee is represented by the curved line, connecting all body organs, parts, and apparatuses, which are located in different sectors of the diagrams. Ranges of deficiency, normality, and excess are highlighted on the diagrams, respectively through a pink, green, and yellow band. The values of JS, RMS, and the Activation Coefficient (A) are reported. The name of the subject is covered with a black box. Copyright with the author.

GDV Energy Field

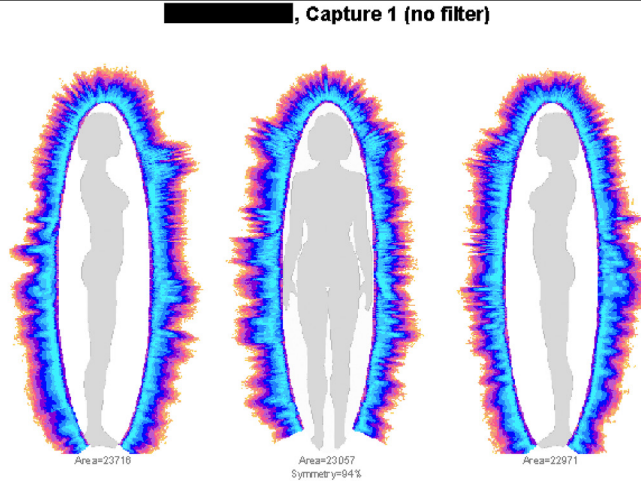


Figure 7. GDV-device energy field. The front and side parts of the energy field are depicted around the figure of a human body, based on GDV-grams captured without filter. The Area (px), for each body side, and the overall Symmetry (%) of the energy field are reported. The name of the subject is covered with a black box. Copyright with the author.

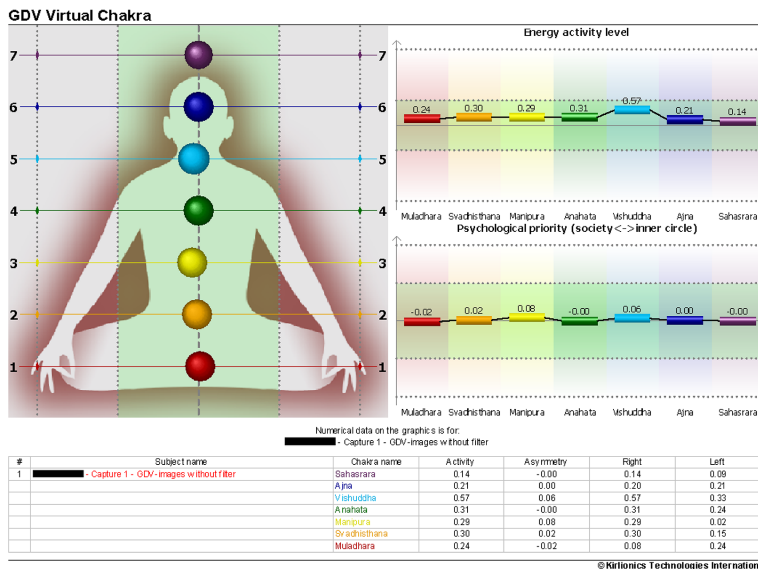


Figure 8. GDV-device chakras. The seven Ayurvedic chakras are shown, based on GDV-grams captured without filter. Bands of normality and abnormality are highlighted respectively in green and pink. The Energy Activity Level and Psychological Priority are reported for each chakra in the side diagrams and in the bottom table, where the energy activity levels of right and left chakra components are also listed. The name of the subject is covered with a black box. Copyright with the author.

In this experiment, the water electrophotonic discharge was measured as well, using the GDV device and a specific software. The following parameters were selected for analysis: Area, Entropy by Isoline, Form Coefficient, Spatial Fractality, Average Intensity, Mean Radius of Isoline, and Length of Isoline.

The definitions of **Area**, **Entropy**, and **Form Coefficient** were previously given.

Spatial Fractality: is computed according to the algorithm of Mandelbrot, as the ratio between the lengths of GDV-gram perimeters, obtained in different scales. Similarly to the Form Coefficient, the Spatial Fractality shows the degree of irregularity of the GDV-gram external contour.

Average Intensity: is calculated as the ratio between the sum of the values of all pixels (ranging 0-255), above the threshold, and the area of the GDV-gram, and it is thus expressed in px^{-1} .

Mean Radius of Isoline and **Length of Isoline:** indicate respectively the GDV-gram average radius, measured from the center of the image to the external contour, and the length of the GDV-gram external contour. They are measured in px.

The Bio-Well is a compact version of the GDV device, with the same principle of working, based on stimulated electrophotonic emission and gas discharge visualization (Korotkov, 2017). However, the Bio-Well is more user-friendly and its health report includes more parameters of the biofield energetic status. In this experiment, measurements were taken only without filter, as common in research and practice. In fact, the Bio-Well software does not allow to take sequential measurements of unfiltered and filtered electrophotonic images, nor makes a direct comparison between the two. A list of the Bio-Well parameters follows:

For each body organ, part, or apparatus, the area is calculated by comparing the glow of a fingertip sector (i.e., number of computer pixels with value above the threshold) with that of the calibration cylinder [**Area (C)**]. A diagram is created for right and left hand, with the area coefficients computed as $\text{Area (C)} - 1$, where $[-0.6, +1]$ is the optimal range but can change depending on the testee's age. Raw values of the **Area**, not divided by the ideal case, are also returned.

For each body organ, part, or apparatus, the energy is calculated and diagrammed, for right and left hand. The energy of light, expressed in 10^{-2} J, is corrected to the angular size of the sectors: **Energy (C)** = $E \cdot 360/a$, where E is the energy of a sector and "a" is the width of that sector in degrees. The energy of the light glow is calculated as $E(J) = k \cdot S \cdot I$, where k is a constant, S is the area of the glow, and I is the intensity of the glow. According to Korotkov, this parameter shows the functional state of the body organs, with $[4, 6] \cdot 10^{-2}$ J being the optimal range. Aver-

age values of the organ energies between right and left hand, as well as raw values of the energy uncorrected to the sector angular size, are reported.

A representation of the human **Energy Field** is depicted and followed by these parameters:

Stress: is calculated similarly to the GDV-device Activation Coefficient, but can be estimated using unfiltered captures alone, and shows the emotional pressure of the testee. This parameter is measured in units from 0 to 10, with [2, 3] being the optimal range, which would correspond to a state of calmness, relax, and quiescence.

Energy: measures the light glow energy of the overall field and it is reported on a $0-100 \cdot 10^{-2}$ J scale, with $[40, 70] \cdot 10^{-2}$ J representing the optimal range. According to Korotkov, very low energy states would be a sign of psychophysical exhaustion, while very high energy ones an indication of over-activity or inflammation. Values of the energy, as well as the area, are given for right, front, and left parts of the body.

Balance: symmetry of the energy field, calculated on a 0–100% scale, with [90, 100]% being the optimal range. Korotkov suggests that a low balance is due to ANS and functional imbalance.

Organs imbalance: indicates the overall imbalance in the energy glow of fingertip sectors, associated to the same organs, between right and left hand. This parameter ranges from 0 to 15%, with the optimal interval between [0, 5]%. According to Korotkov, a large organ imbalance would be an indication of a functional disorder. An **Energy Balance** bar-chart, expressed in J, showing the right- and left-hand components of body organs, parts, or apparatuses, is also included, with highlights on imbalances larger than 20%.

Entropy Coefficient (EC) and **Form Coefficient (FC)** are returned and calculated similarly to the GDV device.

The **Chakra** parameters are: **Energy** (J) and **Alignment** (in percentage), which reflect respectively their energetic activity (range from 0 to $10 \cdot 10^{-2}$ J, with the optimal interval being $[5, 7] \cdot 10^{-2}$ J) and their shift from the center (100% being the optimal balanced condition). The **Asymmetry** is also reported, indicating for each chakra the shift from the center, on a [-3, +3] scale, with 0 being the perfect balance. Similarly to the GDV device, how these parameters are calculated is not specified by the device inventors. However, their calculation is based on the analysis of fingertip parts, which are reflective of organs and apparatuses associated to the seven Ayurvedic chakras.

The **Energy** (J) of the Traditional Chinese Medicine (TCM) **Meridians** is returned as well, with the optimal range between $[4, 6] \cdot 10^{-2}$ J, and it is calculated from the sectors of organs and apparatuses associated to the meridians according to TCM.

While captures of the fingertip corona discharges are being taken, the Bio-Well software conducts a preliminary analysis on the images, indicating which snapshots need to be cleaned or taken again: A digital pencil tool is available to remove light halos or spots, produced by environmental light sources. The shape and size of the fingertips are also checked: When there are significant discrepancies in shape between right- and left-hand counterparts, or when the size of the fingertips is very different from the natural human dimensions³ – i. e., thumb being the biggest, pinkie the smallest, and the others in-between – the software indicates to take those snapshots again. Similarly to the GDV device, the Bio-Well requires a calibration before being used. A picture of the Bio-Well is shown in Figure 9.



Figure 9. The Bio-Well. This compact version of the GDV device shares with it the same principle of working, based on the Kirlian effect and gas discharge visualization technique, but its software is more elaborated and user-friendly. The fingertip is placed inside the guide, which helps to position the fingertip correctly on the optic glass, where the electrophotonic emission occurs, and allows to screen out environmental light sources. The Bio-Well software checks for and allows to remove potential light artifacts, therefore a hand cloth is generally not used during the measurement process. Picture retrieved from bio-well.com

3 Incongruences in the shape or dimension of fingertip corona discharges may be caused by finger misplacement or different pressure applied by the testee on the optic glass.

Conclusion

Since Kirlian's rediscovery of the Gas Discharge Visualization (GDV) technique and first health applications; to Korotkov's development of compact devices for medical and life-science purposes; for decades, electrophotonic imaging has been widely and creatively used to assess the human biofield. For thousands of years, Ayurvedic healers have manipulated subtle energy Prana to enhance health, by rebalancing the human biofield; until in recent times Master Sui has developed a Pranic Healing format that can be easily and successfully integrated into Western practice. In the second part of this work, the functioning of Korotkov's GDV device and Bio-Well will be investigated in an original Pranic Healing experiment on human and water energy fields: Results will put to question the reliability of these biofield machines for research and practice, as well as the Kirlian technique itself, supporting the negative conclusions of previous studies, which will be reviewed.

References

- Abella, A., Amorós, A., González, M., Corral, A. D., & Peña, J. (2017). Analysis with gas discharge visualization of the possible effects on water in different containers. *Water*, 8, 165–171. <https://doi.org/10.14294/WATER.2017.3>
- Aithal, R., Jois, S. N., & Mahadevaiah, P. P. (2018). Treatment of insomnia by Pranic healing. *Journal of Clinical and Diagnostic Research*, 12(9), KD01-KD02. <https://doi.org/10.7860/JCDR/2018/35961.12006>
- Aleksandrova, E. V., Kovelkova, T. M. N., Strychkov, P. V., Yakovleva, E. G., & Korotkov, K. G. (2015). Electrophotonic analysis of arterial hypertension. *Arterial Hypertension*, 7(28), 5–13.
- Amritha, K. S., & Shalini, A. (2020). Effectiveness of Pranic healing on enhancing the quality of sleep among female adult population. *International Journal of Humanities and Social Science Invention*, 9(1), 47–51.
- Ananthakeshava, I., Srikanth, N. J., Prasad, K. N., & Vinu, V. (2021). Reduction in surface tension of water due to Pranic healing. *Indian Journal of Science and Technology*, 14(26), 2175–2179. <https://doi.org/10.17485/IJST/v14i26.488>
- Aniruddha, G., Santakumari, A., & Saroja, C. (2020). Effect of super-brain yoga on the concentrating ability of students. *International Journal of Physiology*, 8(3), 32–36. <https://doi.org/10.37506/ijop.v8i3.1325>
- Anitha, G., Rakesh, S., Arunachalam, R., Sudharsanam, R., & Muthu, P. (2019). Non-invasive method to diagnose lung energy of the smoking population. *International Journal of Engineering and Advanced Technology*, 9(2), 2080–2083. <https://doi.org/10.35940/ijeat.B3375.129219>
- Astuti, C. P., Widyawati, M. N., & Suryono, S. (2019). Application model of Pranic healing therapy for emotional stress using accurate Bio-Well GDV camera. *4th International Conference on Energy, Environment, Epidemiology and Information System*, 125, Article 05005. <https://doi.org/10.1051/e3sconf/201912505005>

- Babelyuk, V. Y., Gozhenko, A. I., Dubkova, G. I., Korolyshyn, T. A., Kikhtan, V. V., Babelyuk, N. V., Zukow, W., & Popovych, I. L. (2017). Causal relationships between the parameters of gas discharge visualization and principal neuroendocrine factors of adaptation. *Journal of Physical Education and Sport*, 17(2), 624–637. <https://doi.org/10.7752/jpes.2017.02094>
- Babelyuk, V. Y., Gozhenko, A. I., Dubkova, G. I., Zukow, W., Hubyts'kyi, V. Y., Ruzhylo, S. V., Fedyayeva, S. I., Kovalchuk, G. Y., & Popovych, I. L. (2021a). Causal relationships between the parameters of gas discharge visualization and immunity. *Pedagogy and Psychology of Sport*, 7(1), 115–134. <https://doi.org/10.12775/PPS.2021.07.01.008>
- Babelyuk, V. Y., Tserkovnyuk, R. G., Ruzhylo, S. V., Dubkova, G. I., Babelyuk, N. V., Zukow, W., & Popovych, I. L. (2021b). Causal relationships between the parameters of gas discharge visualization and leukocytogram. *Journal of Education, Health and Sport*, 11(7), 258–269. <https://doi.org/10.12775/JEHS.2021.11.07.024>
- Basarab, O., Toptun, A., & Bondarenko, Y. (2021). Study of the psychophysiological state of adolescents using the method of gas-discharge visualization. *Science. Business. Society*, 6(1), 27–33.
- Bell, I. R., Lewis II, D. A., Brooks, A. J., Lewis, S. E., & Schwartz, G. E. (2003). Gas discharge visualization evaluation of ultramolecular doses of homeopathic medicines under blinded, controlled conditions. *Journal of Alternative and Complementary Medicine*, 9(1), 25–38. <https://doi.org/10.1089/107555303321222928>
- Bhargav, H., Srinivasan, T. M., Bista, S., Mooventhan, A., Suresh, V., Hankey, A., & Nagendra, H. R. (2017). Acute effects of mobile phone radiations on subtle energy levels of teenagers using electrophotonic imaging technique: A randomized controlled study. *International Journal of Yoga*, 10(1), 16–23. <https://doi.org/10.4103/0973-6131.186163>
- Bhargav, P., Suresh, V., Hankey, A., & Bhargav, H. (2016). Application of gas discharge visualization technique for assessing effects of mobile phone-induced electromagnetic field on subtle energy levels of teenagers and protective value of yoga intervention. *International Journal of Yoga– Philosophy, Psychology and Parapsychology*, 4(2), 36–41. https://doi.org/10.4103/ijny.ijoyppp_1_17
- Bhat, R. K., Deo, G., Mavathur, R., & Srinivasan, T. M. (2017). Correlation of electrophotonic imaging parameters with fasting blood sugar in normal, prediabetic, and diabetic study participants. *Journal of Evidence-Based Complementary & Alternative Medicine*, 22(3), 441–448. <https://doi.org/10.1177/2156587216674314>
- Bigler, C., Levite, D., van der Meer, M., Kaufmann, A., & Weibel, F. (2009). Rotwein unter Hochspannung: Mehrjährige Qualitäts-Untersuchung mit Gas-Discharge-Visualisation (GDV). 10. *Wissenschaftstagung Ökologischer Landbau*, Zürich.
- Boyers, D. G., & Tiller, W. A. (1973). Corona discharge photography. *Journal of Applied Physics*, 44(7), 3102–3112. <https://doi.org/10.1063/1.1662715>
- Boyers, D. G., & Tiller, W. A. (1976). The colors in Kirlian photography – Fact or artifact? *Functional Photography*, 11(3), 25–27, 38.
- Bundzen, P. V., Korotkov, K. G., & Unestahl, L.-E. (2002). Altered states of consciousness: Review of experimental data obtained with a multiple techniques approach. *Journal of Alternative and Complementary Medicine*, 8(2), 153–165. <https://doi.org/10.1089/107555302317371442>

- Bundzen, P. V., Korotkov, K. G., Korotkova, A. K., Mukhin, V. A., & Priyatkin, N. S. (2005). Psychophysiological correlates of athletic success in athletes training for the Olympics. *Human Physiology*, 31(3), 316–323. <https://doi.org/10.1007/s10747-005-0051-y>
- Chakrabarty, S., & Krishna, H. (2022). Effectiveness of super brain yoga on selective attention of physiotherapy students. *Journal of Bio Innovation*, 11(2), 516–527. <https://doi.org/10.46344/JBINO.2022.v11i02.24>
- Ciesielska, I. L. (2009). Images of corona discharges as a source of information about the influence of textiles on humans. *AUTEX Research Journal*, 9(1), 36–41.
- Ciesielska, I. L., & Masajtis, J. (2007). The influence of textiles on corona discharge created around a human fingertip. *Fibres & Textiles in Eastern Europe*, 15(5–6), 179–184.
- Cohly, H., Kostyuk, N., Isokpehi, R., & Rajnarayanan, R. (2009). Bio-electrographic method for preventive health care. *First Annual ORNL Biomedical Science & Engineering Conference*, 1–4. <https://doi.org/10.1109/BSEC.2009.5090493>
- Dakin, H. S. (1975). *High-voltage photography*.
- Deo, G., Kumar, I. R., Srinivasan, T. M., & Kushwah, K. K. (2016). Cumulative effect of short-term and long-term meditation practice in men and women on psychophysiological parameters of electrophotonic imaging: A cross-sectional study. *Journal of Complementary and Integrative Medicine*, 13(1), 73–82. <https://doi.org/10.1515/jcim-2015-0050>
- Dewi, V. T., Utami, D. K. I., & Ayu, K. (2022). Pranic healing as a complementary therapy for insomnia. *International Journal of Research and Review*, 9(9), 310–315. <https://doi.org/10.52403/ijrr.20220933>
- Farahani, P. V., Hekmatpou, D., Khonsari, A. H., & Gholami, M. (2019). Effectiveness of super brain yoga for children with hyperactivity disorder. *Perspectives in Psychiatric Care*, 55(2), 140–146. <https://doi.org/10.1111/ppc.12266>
- Gadsby, J. G. (1993). Kirlian photography diagnosis – A recent study. *Complementary Therapies in Medicine*, 1(4), 179–184. [https://doi.org/10.1016/0965-2299\(93\)90027-B](https://doi.org/10.1016/0965-2299(93)90027-B)
- Gangmei, K. S., & Upendra, S. (2020). A study to assess the effectiveness of Pranic healing therapy on backache among adults at Pranic healing centre in Pune city. *Indian Journal of Forensic Medicine & Toxicology*, 14(4), 3609–3613. <https://doi.org/10.37506/ijfmt.v14i4.12189>
- Grozdeva, D., & Dikova, T. (2018). Gas discharge visualization – Historical developments, research dynamics and innovative applications. *Scripta Scientifica Salutis Publicae*, 4, 27–33. <https://doi.org/10.14748/sssp.v4i0.5448>
- Hacker, G. W., Pawlak, E., Pauser, G., Tichy, G., Jell, H., Posch, G., Kraibacher, G., Aigner, A., & Hutter, J. (2005). Biomedical evidence of influence of geopathic zones on the human body: Scientifically traceable effects and ways of harmonization. *Forschende Komplementärmedizin und Klassische Naturheilkunde*, 12(6), 315–327. <https://doi.org/10.1159/000088624>
- Haun, J., Patel, N., Schwartz, G., & Ritenbaugh, C. (2015). Evaluating the use of gas discharge visualization to measure massage therapy outcomes. *Journal of Complementary and Integrative Medicine*, 12(3), 231–239. <https://doi.org/10.1515/jcim-2014-0014>

- Ignatov, I., Antonov, A., Neshev, N., Niggli, H., Stoyanov, C., & Drossinakis, C. (2021a). High-frequency coronal discharge, infrared thermography and visual acuity measurements of bioelectromagnetic influence. *Physical Science International Journal*, 25(3), 18–28. <https://doi.org/10.9734/PSIJ/2021/v25i330246>
- Ignatov, I., Antonov, A., Neshev, N., Niggli, H., Stoyanov, C., & Drossinakis, C. (2021b). Color coronal spectral analysis of bioelectrical effects of humans and water. *Contemporary Engineering Sciences*, 14(1), 61–72. <https://doi.org/10.12988/ces.2021.91781>
- Jaisri, G., Dayananda, G., Hegde, S., & Sundaram, C. (2011). Heart rate variability during meditation in Pranic healers. *National Journal of Integrated Research in Medicine*, 2(4), 113–116.
- Janagap, A. S., & Janagap, T.M.F.S. (2022). Superbrain yoga: Impact on the reading comprehension and behavior of slow readers. *Psychology and Education: A Multidisciplinary Journal*, 4(3), 322–329. <https://doi.org/10.5281/zenodo.7066929>
- Jessel-Kenyon, J., Pfeiffer, L., & Brenton, M. (1998). A statistical comparison of repeatability in three commonly used bioelectronic devices: Kirlian photography, the segmental electrogram, and the AMI of Motoyama. *Acupuncture in Medicine*, 16(1), 40–42. <https://doi.org/10.1136/aim.16.1.40>
- Jois, S.N., & D'Souza, L. (2018a). Effectiveness of superbrain yoga on the academic performance and attendance of school students. *Psychology and Education: An Interdisciplinary Journal*, 55(1&2), 56–61.
- Jois, S.N., & D'Souza, L. (2018b). The effectiveness of superbrain yoga on concentration, memory and confidence in school students. *Indian Journal of Traditional Knowledge*, 17(4), 741–744.
- Jois, S.N., & Prasad, K.N. (2018). Pranic healing for partially blind – A case study. *Research Journal of Health Sciences*, 6(1), 43–47. <https://doi.org/10.4314/rejhs.v6i1.6>
- Jois, S.N., Aithal, R., D'Souza, L., & Gayatri, R. (2015). The perception of Prana and its effect on psychological wellbeing. *Journal of Research: THE BEDE ATHENAEUM*, 6(1), 210–215. <https://doi.org/10.5958/0976-1748.2015.00025.9>
- Jois, S.N., D'Souza, L., & Gayathri, R. (2018c). Effectiveness of Pranic healing on functional health and wellbeing of inmate at Mysore Central Prison. *Indian Journal of Public Health Research & Development*, 9(1), 146–151. <https://doi.org/10.5958/0976-5506.2018.00027.X>
- Jois, S.N., D'Souza, L., & Moulya, R. (2017f). Beneficial effects of superbrain yoga on short-term memory and selective attention of students. *Indian Journal of Traditional Knowledge*, 16(Suppl), 35–39.
- Jois, S.N., D'Souza, L., & Moulya, R. (2018a). Effectiveness of superbrain yoga on short-term memory, visuo-spatial ability and academic performance of students. *Indian Journal of Public Health Research & Development*, 9(3), 183–187. <https://doi.org/10.5958/0976-5506.2018.00206.1>
- Jois, S.N., D'Souza, L., Aithal, R., & Moulya, R. (2017a). Psychological and bioplasmic states of adolescents upon viewing air and ground Prana. *Indian Journal of Traditional Knowledge*, 16(Suppl), 30–34.
- Jois, S.N., D'Souza, L., Prasad, K.N., & Manasa, B. (2018b). Enhancement of quality of life through Pranic healing among working women employees. *Journal of Psychological and Educational Research*, 26(1), 147–157.
- Jois, S.N., Manasa, B., & D'Souza, L. (2017c). Psychological wellbeing by awareness of air Prana and the aura surrounding a tree among participants from different age group. *Indian Journal of Public Health*

- Research & Development*, 8(3), 326–331. <https://doi.org/10.5958/0976-5506.2017.00209.1>
- Jois, S. N., Manasa, B., & D'Souza, L. (2017d). Pre and post experiences of viewing human aura: An exploratory study. *International Journal of Research in Ayurveda and Pharmacy*, 8(2), 51–55. <https://doi.org/10.7897/2277-4343.08262>
- Jois, S. N., Manasa, B., D'Souza, L., & Prasad, K. N. (2017b). Viewing of air Prana: An exploratory study of perceptions among participants of different gender and education. *International Journal of Research in Ayurveda and Pharmacy*, 8(3), 59–62. <https://doi.org/10.7897/2277-4343.083144>
- Jois, S. N., Manasa, B., D'Souza, L., & Prasad, K. N. (2017e). Sensation of Pranic energy between hands: An exploratory study. *Indian Journal of Ancient Medicine and Yoga*, 10(1), 5–11. <https://doi.org/10.21088/ijamy.0974.6986.10117.1>
- Jois, S. N., Manasa, B., D'Souza, L., Moulyya, R., & Prasad, K. N. M. (2019a). Exploratory study on experiences during Pranic energy transfer. *Psychology and Education: An Interdisciplinary Journal*, 56(2), 27–35.
- Jois, S. N., Prasad, K. N., & D'Souza, L. (2017g). Morphology of cucumber plants as influenced by Pranic agriculture. *Asian Journal of Agricultural Research*, 11(1), 33–35. <https://doi.org/10.3923/ajar.2017.33.35>
- Jois, S. N., Prasad, K. N., & D'Souza, L. (2020). Superbrain yoga enhances well-being among school students. *Indian Journal of Public Health Research & Development*, 11(1), 629–634. <https://doi.org/10.37506/ijphrd.v11i1.520>
- Jois, S. N., Prasad, K. N., & Shalini, N. S. (2019b). Enhancement of shelf life of brinjal during storage using Pranic agriculture protocol. *Ecology, Environment and Conservation*, 25(3), 1251–1254.
- Jois, S. N., Roohie, K., D'Souza, L., Suma, F., Devaki, C. S., Urooj, A., Krell, R., & Prasad, K. N. (2016). Physico-chemical qualities of tomato fruits as influenced by Pranic treatment – An ancient technique for enhanced crop development. *Indian Journal of Science and Technology*, 9(46), 1–6. <https://doi.org/10.17485/ijst/2016/v9i46/99733>
- Jones, J. P. (2001, November – December). *Neurophysiological measurements of Pranic healing using functional magnetic resonance imaging (fMRI)* [Paper presentation]. Bridging Worlds and Filling Gaps in the Science of Spiritual Healing Conference, Kona, United States. <https://www.energie-institut.com/wp-content/uploads/2015/05/2001-Jones-Accupuncture-Pranic-Healing-MRI.pdf>
- Jones, J. P. (2006, May). *An extensive laboratory study of Pranic healing using contemporary medical imaging and laboratory methods* [Paper presentation]. Seventh World Pranic Healers' Convention, Mumbai, India. <https://equilibrium-e3.com/images/PDF/Jones%20Pranic%20Healing%20Research.pdf>
- Keerthika, T., Devaki, C. S., Suma, F., & Urooj, A. (2016). Studies on the nutritional and quality characteristics of Cucumis Sativus varieties. *Agricultural Science Research Journal*, 6(4), 79–85.
- Korobka, I. E., Yakovleva, E. G., Korotkov, K. G., Belonosov, S. S., & Kolesnichenko, T. V. (2018). Electrophotonic imaging technology in the diagnosis of autonomic nervous system in patients with arterial hypertension. *Journal of Applied Biotechnology & Bioengineering*, 5(1), 20–25. <https://doi.org/10.15406/jabb.2018.05.00112>

- Korotkov, K. (2002). *Human energy field study with GDV bioelectrography*. Backbone Publishing Co.
- Korotkov, K. (2014). *Energy fields electrophotonic analysis in humans and nature*. CreateSpace Independent Publishing Platform.
- Korotkov, K. (2017). *The energy of health: Understanding the principles of energy field analysis*. CreateSpace Independent Publishing Platform.
- Korotkov, K. (2019). Study of structured water and its biological effects. *International Journal of Complementary & Alternative Medicine*, 12(5), 168–172. <https://doi.org/10.15406/ijcam.2019.12.00468>
- Korotkov, K. G. (2011). *Method for determining the anxiety level of a human being* (U.S. Patent No. 7,869,636 B2). U.S. Patent and Trademark Office. <https://patents.google.com/patent/US7869636B2/en>
- Korotkov, K. G., & Korotkin, D. A. (2001). Concentration dependence of gas discharge around drops of inorganic electrolytes. *Journal of Applied Physics*, 89(9), 4732–4736. <https://doi.org/10.1063/1.1360700>
- Korotkov, K. G., & Yusubov, R. R.-O. (2012). *Method for determining the condition of a biological object and device for making same* (U.S. Patent No. 8,321,010 B2). U.S. Patent and Trademark Office. <https://patents.google.com/patent/US8321010B2/en>
- Korotkov, K. G., Bundzen, P. V., Bronnikov, V. M., & Lognikova, L. U. (2005). Bioelectrographic correlates of the direct vision phenomenon. *Journal of Alternative and Complementary Medicine*, 11(5), 885–893. <https://doi.org/10.1089/acm.2005.11.885>
- Korotkov, K. G., Peshawar, R., & Korotkova, A. K. (2022). Analysis of electrophotonic parameters of ADHD children. *ASEAN Journal of Psychiatry*, 51(2), 1–4. <https://doi.org/10.54615/2231-7805.54947>
- Korotkov, K., & Jakovleva, E. (2013). *Electrophotonic applications in medicine: GDV bioelectrography research*. CreateSpace Independent Publishing Platform.
- Korotkov, K., & Korotkova, A. (2018). Influence of massage with essential oils to human energy. *Open Access Journal of Biomedical Engineering and Biosciences*, 2(2), 144–149. <https://doi.org/10.32474/OAJBEB.2018.02.000131>
- Korotkov, K., & Orlov, D. (2010). Analysis of stimulated electrophotonic glow of liquids. *Water*, 2, 29–43. <https://doi.org/10.14294/WATER.2010.2>
- Korotkov, K., DeVito, D., Arem, K., Madappa, K., Williams, B., & Wisneski, L. (2009). Healing experiments assessed with electrophotonic camera. *Subtle Energies & Energy Medicine*, 20(3), 33–40.
- Korotkov, K., Krizhanovsky, E., Borisova, M., Korotkin, D., Hayes, M., Matravers, P., Momoh, K. S., Peterson, P., Shiozawa, K., & Vainshelboim, A. (2004b). Time dynamics of the gas discharge around drops of liquids. *Journal of Applied Physics*, 95(7), 3334–3338. <https://doi.org/10.1063/1.1651343>
- Korotkov, K. G., Matravers, P., Orlov, D. V., & Williams, B. O. (2010). Application of electrophoton capture (EPC) analysis based on gas discharge visualization (GDV) technique in medicine: A systematic review. *Journal of Alternative and Complementary Medicine*, 16(1), 13–25. <https://doi.org/10.1089/acm.2008.0285>
- Korotkov, K., Orlov, D., & Madappa, K. (2008). New approach for remote detection of human emotions. *Subtle Energies & Energy Medicine*, 19(3), 111–125.

- Korotkov, K., Shelkov, O., Shevtsov, A., Mohov, D., Paoletti, S., Mirosnichenko, D., Labkovskaya, E., & Robertson, L. (2012). Stress reduction with osteopathy assessed with GDV electrophotonic imaging: Effects of osteopathy treatment. *Journal of Alternative and Complementary Medicine*, 18(3), 251–257. <https://doi.org/10.1089/acm.2010.0853>
- Korotkov, K., Williams, B., & Wisneski, L. A. (2004a). Assessing biophysical energy transfer mechanisms in living systems: The basis of life processes. *Journal of Alternative and Complementary Medicine*, 10(1), 49–57. <https://doi.org/10.1089/107555304322848959>
- Kostyuk, N., Cole, P., Meghanathan, N., Isokpehi, R. D., & Cohly, H. H. P. (2011). Gas discharge visualization: An imaging and modeling tool for medical biometrics. *International Journal of Biomedical Imaging*, Article 196460. <https://doi.org/10.1155/2011/196460>
- Kostyuk, N., Meghanathan, N., Isokpehi, R. D., Bell, T., Rajnarayanan, R., Mahecha, O., & Cohly, H. (2010a). Biometric evaluation of anxiety in learning English as a second language. *International Journal of Computer Science and Network Security*, 10(1), 220–229.
- Kostyuk, N., Rajnarayanan, R. V., Isokpehi, R. D., & Cohly, H. H. (2010b). Autism from a biometric perspective. *International Journal of Environmental Research and Public Health*, 7(5), 1984–1995. <https://doi.org/10.3390/ijerph7051984>
- Kostyuk, N., Rajnarayanan, R., Isokpehi, R., Sims, J., Williams, B., Korotkov, K., Howcroft, S., Yeager, M., Mann, H., Bell, T., & Cohly, H. (2009). Bio-electrographic method in detecting heterogeneity and unique features in autism. *International Journal of Environmental Research and Public Health*, 6.
- Koterba, R. (2007). Superbrain yoga in children with autism and ADHD. *Prana World*, 14–17.
- Krippner, S. (1979). Biological applications of Kirlian photography. *Journal of the American Society of Psychosomatic Dentistry and Medicine*, 26(4), 122–128.
- Kumar, P., & Singh, V. (2016). Application of super brain yoga for academic anxiety management in adolescence. *International Journal of Yoga and Allied Sciences*, 5(2), 133–138.
- Kumar, S. K., Srinivasan, T. M., Deo, G., Girikumar, V. P., & Nagendra, H. R. (2016a). Electro-photonic imaging for detecting an intervention (meditation). *International Journal of Current Medical and Pharmaceutical Research*, 2(9), 636–640.
- Kumar, S. K., Srinivasan, T. M., Nagendra, H. R., & Marimuthu, P. (2016b). Electrophotonic imaging based analysis of diabetes. *International Journal of Complementary & Alternative Medicine*, 4(5), Article 00134. <https://doi.org/10.15406/ijcam.2016.04.00134>
- Lee, H. C., Khong, P. W., & Ghista, D. N. (2005). Bioenergy based medical diagnostic application based on gas discharge visualization. *IEEE Engineering in Medicine and Biology 27th Annual Conference*, 1533–1536. <https://doi.org/10.1109/IEMBS.2005.1616725>
- Leigh, G. K., Polonko, K. A., & Leigh, C. D. (2003). A comparison of human energy fields among children, youth, adults, & Dahn masters. *Subtle Energies & Energy Medicine*, 14(1), 77–101.
- Mahesh, P. A., Srikanth, J. N., Ananthakrishna, M. S., Parthasarathi, G., Chaya, S. K., Rajgopal, R., Devi, M. R., D'Souza, L., & Amrutha, D. H. (2017). Amelioration of quality of life and lung function of chronic obstructive pulmonary disease by Pranic healing as adjuvant therapy: A randomised double blind

- placebo controlled pilot study. *Australasian Medical Journal*, 10(8), 665–673. <https://doi.org/10.21767/AMJ.2017.2953>
- Marino, A. A., Becker, R. O., Ullrich, B., & Hurd, J. (1979). Kirlian photography: Potential for use in diagnosis. *Psychoenergetic Systems*, 3, 47–54.
- Nadig, A., Jois, S. N., Prasad, K. N., & Vinu, V. (2020a). Locomotor activities of adult zebrafish (*Danio Rerio*) under the influence of Pranic energy: Controlled study. *International Journal of Lakes and Rivers*, 13(1), 43–55.
- Nadig, A., Jois, S. N., Prasad, K. N., & Vinu, V. (2020b). Amelioration of anxiety and locomotion during circadian rhythm change of adult zebrafish (*Danio Rerio*) by Pranic energy. *Egyptian Journal of Aquatic Biology and Fisheries*, 24(6), 319–329. <https://doi.org/10.21608/EJABF.2020.117478>
- Nadig, A., Jois, S. N., Prasad, K. N., & Vinu, V. (2021). Impact of Pranic agriculture on germination and protein content of green gram (*Vigna Radiata*). *Indian Journal of Agricultural Research*, 55(3), 369–373. <https://doi.org/10.18805/IJARE.A-5508>
- Narayanan, V. R., & Herswani, I. (2015). Analysis of the concept of Prana described in Ayurveda in light of its clinical application. *International Journal of Applied Ayurved Research*, 2(2), 224–229.
- Nevoit, G. V. (2021). English version: Evaluation of electro-photonic emission analysis indicators in patients with non-communicable diseases – Coronary heart disease. *The Medical and Ecological Problems*, 25(1–2), 19–21. <https://doi.org/10.31718/mep.2021.25.1-2.05>
- Nevoit, G. V., Mintser, O. P., Potiazhenko, M. M., & Babintseva, L. Y. (2021). Electro-photonic emission analysis in functionally health respondents and patients with non-communicable diseases. *Wiadomości Lekarskie*, 74(6), 1439–1444. <https://doi.org/10.36740/WLek202106128>
- Nikhra, M. (2016). A study on the effect of yoga & Pranic healing on psychological disorder. *International Journal of Science and Consciousness*, 2(1), 41–44.
- Nittur, A., & Ganapathi, R. (2020). Pranic healing as a complimentary therapy in stage-4 metastatic cancer – A case study. *Journal of Clinical and Diagnostic Research*, 14(1), XD03–XD04. <https://doi.org/10.7860/JCDR/2020/42423.13432>
- O'Regan, B. (1989). New paradigms in energy medicine: Can they emerge? In The John E. Fetzer Foundation, *Energy fields in medicine: A study of device technology based on acupuncture meridians and Chi energy* (pp. 230–256).
- Pandey, S. K., & Singh, A. P. (2019). A study of super brain yoga on memory enhancement and mental health of adolescence. *Journal of Emerging Technologies and Innovative Research*, 6(6), 435–440.
- Parmar, M., Chitre, R., Upasani, A., & Rathod, K. (2018). Conceptual study on mechanism of Prana. *World Journal of Pharmaceutical and Medical Research*, 4(5), 182–184.
- Polushin, J., Levshankov, A., Shirokov, D., & Korotkov, K. (2009). Monitoring energy levels during treatment with GDV technique. *Journal of the Science of Healing Outcomes*, 2(5), 5–15.
- Poornima, R., Prasad, K. N., Vinu, V., & Jois, S. N. (2021b). Morphological characteristics of hydroponically grown lettuce (*Lactuca Sativa*) treated with Pranic agriculture. *Egyptian Journal of Agricultural*

- Research*, 99(4), 391–396. <https://doi.org/10.21608/ejar.2021.98969.1159>
- Poornima, R., Prasad, K. N., Yathindra, H. A., & Jois, S. N. (2020a). Influence of Pranic agriculture on morphological traits, chlorophyll content and genetic polymorphism of ridge gourd (*Luffa Acutangula* L. Roxb.) assessed by RAPD marker analysis. *AGRIVITA Journal of Agricultural Science*, 42(3), 521–532. <https://doi.org/10.17503/agrivita.v42i3.2715>
- Poornima, R., Prasad, K. N., Yathindra, H. A., & Jois, S. N. (2021a). Influence of Pranic agriculture in enhancing growth and yield of chilli (*Capsicum Annuum* L.) and its genetic analysis. *Egyptian Journal of Agricultural Research*, 99(3), 242–247. <https://doi.org/10.21608/EJAR.2021.90527.1135>
- Poornima, R., Yathindra, H. A., Prasad, K. N., & Jois, S. N. (2020b). Influence of Pranic agriculture technique on growth and yield of marigold, *Tagetes Erecta*. *Bioscience Biotechnology Research Communications*, 13(4), 2001–2007. <https://doi.org/10.21786/bbrc/13.4/55>
- Prasad, K. N., & Jois, S. N. (2019). Pranic agriculture improves drumstick (*Moringa Olifera* L.) germination and seedling growth. *Ecology, Environment and Conservation*, 25(4), 1752–1755.
- Prasad, K. N., & Jois, S. N. (2020a). Enhancement of papaya (*Carica Papaya*) seedling growth by Pranic agriculture. *AGRIVITA Journal of Agricultural Science*, 42(1), 191–196. <https://doi.org/10.17503/agrivita.v42i1.2410>
- Prasad, K. N., & Jois, S. N. (2020b). Effect of Pranic agriculture on vegetative growth characteristics of spinach (*Spinacia Oleracea* L.). *Indian Journal of Science and Technology*, 13(24), 2446–2451. <https://doi.org/10.17485/IJST/v13i24.711>
- Prasad, K. N., & Jois, S. N. (2021a). Effect of Pranic agriculture treatment on growth of cluster beans (*Cyamopsis Tetragonoloba* L.). *Indian Journal of Agricultural Research*, 55(3), 359–363. <https://doi.org/10.18805/IJAR.A-5509>
- Prasad, K. N., & Jois, S. N. (2021b). Enhancement of seed germination and seedling vigour of green gram, paddy, and radish by Pranic agriculture. *Advances in BioResearch*, 12(4), 244–248. <https://doi.org/10.15515/abr.0976-4585.12.4.244248>
- Premalatha, B. R., Sudhir, J., Hegde, U., Sreeshyla, H. S., Chandavarkar, V., & Mishra, M. N. (2021). Effectiveness of superbrain asana on the academic performance in dental students — An interventional study. *Journal of Natural Remedies*, 21(4), 291–295. <https://doi.org/10.18311/jnr/2021/25874>
- Priyadarsini, K., Thangam, P., & Gunasekaran, S. (2014). Kirlian images in medical diagnosis: A survey. *International Journal of Computer Applications*, 3, 5–7.
- Rajagopal, R., Jois, S. N., Majgi, S. M., Kumar, M. N. A., & Shashidhar, H. B. (2018). Amelioration of mild and moderate depression through Pranic healing as adjuvant therapy: Randomised double-blind controlled trial. *Australasian Psychiatry*, 26(1), 82–87. <https://doi.org/10.1177/1039856217726449>
- Ramesh, D. (2007). Superbrain yoga: A research study. *Prana World*, 18–22.
- Rao, T. I., Kushwah, K. K., & Srinivasan, T. M. (2014). Effect of Indian devotional music on students and performers measured with electron photonic imaging. *Online International Interdisciplinary Research Journal*, 4(4), 284–291.

- Rein, G. (1985). Corona discharge photography of human breast tumour biopsies. *Acupuncture & Electro-Therapeutics Research*, 10(4), 305–308. <https://doi.org/10.3727/036012985816714388>
- Rgeusskaja, G. V., & Listopadov, U. I. (2009). Medical technology of electrophotonics – Gas discharge visualization – in evaluation of cognitive functions. *Journal of the Science of Healing Outcomes*, 2(5), 16–19.
- Rubik, B., & Brooks, A. J. (2005). Digital high-voltage electrophotographic measures of the fingertips of subjects pre- and post-Qigong. *Journal of Evidence-Based Integrative Medicine*, 2(4), 245–252. <https://doi.org/10.2165/01197065-200502040-00007>
- Russo, M., Choudhri, A. F., Whitworth, G., Weinberg, A. D., Bickel, W., & Oz, M. C. (2001). Quantitative analysis of reproducible changes in high-voltage electrophotography. *Journal of Alternative and Complementary Medicine*, 7(6), 617–627. <https://doi.org/10.1089/10755530152755162>
- Sankhala, S. S., Nagendra, H. R., & Deepeshwar, S. (2021). Changes in bioenergy field of children with autism following non-pharmacological interventions: A randomized controlled study. *International Journal of Medicine and Public Health*, 11(1), 57–62. <https://doi.org/10.5530/ijmedph.2021.1.11>
- Shaduri, M. (2011). The holographic principle and emergence phenomenon. *IntechOpen*. <https://doi.org/10.5772/14104>
- Shaduri, M., & Bouchoucha, M. (2013). Life-cycling of cancer: New concept. *IntechOpen*. <https://doi.org/10.5772/55385>
- Sharma, B., Hankey, A., & Nagendra, H. R. (2014). Gas discharge visualization characteristics of an Indian diabetes population. *Voice of Research*, 2(4), 28–33.
- Shipko, M. N., Sibirev, A. L., Maslennikova, O. M., Stepovich, M. A., & Nikonorova, V. G. (2021). On the diagnostic features of the gas-discharge visualization for the assessment of medicines. *Journal of Physics: Conference Series*, 1942, Article 012032. <https://doi.org/10.1088/1742-6596/1942/1/012032>
- Siar, K. (2007). Superbrain yoga: A three year study. *Prana World*, 10–12.
- Silva, R., Herrera, A., & Velásquez, H. (2015). Effects of biofield therapy on calcium release in immortalized mouse keratinocyte HaCaT cells. *Public Health Frontier*, 4(2), 18–24. <https://doi.org/10.5963/PHF0402002>
- Singh, J. P. (2014). Review of electro photonic capturing (EPC) method to measure the activity of the autonomous nervous system. *Asian Journal of Pharmaceutical Science & Technology*, 4(4), 212–216.
- Singh, S. P., Mishra, S. P., & Jaiswal, U. (2015). Does Pranic healing predict leadership effectiveness. *Asian Journal of Complementary and Alternative Medicine*, 3(6), 16–23.
- Škarja, M., Berden, M., & Jerman, I. (1998). Influence of ionic composition of water on the corona discharge around water drops. *Journal of Applied Physics*, 84(5), 2436–2442. <https://doi.org/10.1063/1.368369>
- Skuratovskaya, M., Manohina, N., Kobrina, L., Yanovsky, M., & Dzura, S. (2020). GDV as a method of rapid diagnostics and monitoring of the psychophysiological state of schoolchildren. *Innovative Technologies in Science and Education*, 210(E3S Web Conf.), Article 18042. <https://doi.org/10.1051/e3sconf/202021018042>

- Soni, G. S., Soni, R., & Sharma, S. (2013). A randomized study to assess effect of 'Pranic' healing in chronic musculoskeletal pain. *Biological Forum – An International Journal*, 5(1), 62–67.
- Srivastava, S., Patel, A. K., Tiwari, S. K., & Gupta, K. (2019). Effectiveness of Pranic healing on mental health. *Journal of Psychosocial Research*, 14(1), 163–168. <https://doi.org/10.32381/JPR.2019.14.01.18>
- Stepanov, R. (n.d.). Discharges are diagnosed. In Central Intelligence Agency (1998), *Articles X and Y from unidentified journal*. <https://www.cia.gov/readingroom/docs/CIA-RDP96-00787R000500090001-9.pdf>
- Stepovich, M. A., Maslennikova, O. M., Shipko, M. N., Sibirev, A. L., & Chrishtop, V. V. (2018). The use of gas discharge visualization for identifying structured peculiarities of blood components: Plasma, platelets, and erythrocytes. *Journal of Cardiology & Cardiovascular Therapy*, 9(4), 71–74. <https://doi.org/10.19080/JOCCT.2018.09.555770>
- Sui, C. K. (2010). *Superbrain yoga*. Institute for Inner Studies Publishing Foundation, Inc.
- Sui, C. K. (2012a). *Miracles through Pranic healing*. Institute for Inner Studies Publishing Foundation, Inc.
- Sui, C. K. (2012b). *Pranic psychotherapy*. Institute for Inner Studies Publishing Foundation, Inc.
- Sushrutha, S., Madappa, K., & Nagendra, H. R. (2014). Effect of Bhaishajya Maha Yajna on human energy field and environment. *International Journal of Innovative Research in Science & Engineering*. <https://ijirse.in/docs/Sep14/IJIRSE140910.pdf>
- Thomas, J. I., & Venkatesh, D. (2017). A comparative study of the effects of superbrain yoga and aerobic exercise on cognitive functions. *National Journal of Physiology, Pharmacy and Pharmacology*, 7(9), 895–900. <https://doi.org/10.5455/njppp.2017.7.0309126062017>
- Tretyak, T., Dregval, I., & Severynovska, O. (2016). Psycho-emotional and functional state in the process of intuitive thinking. *International Letters of Natural Sciences*, 55, 17–24. <https://doi.org/10.18052/www.scipress.com/ILNS.55.17>
- Treugut, H., Görner, C., Lüdtke, R., Schmid, P., & Füss, R. (1998). Reliabilität der energetischen terminalpunkt-diagnose (ETD) nach Mandel bei Kranken. *Forschende Komplementärmedizin*, 5(5), 224–229. <https://doi.org/10.1159/000021115>
- Treugut, H., Köppen, M., Nickolay, B., Füss, R., & Schmid, P. (2000). Kirlian-Fotografie: Zufälliges oder personenspezifisches Entladungsmuster? *Forschende Komplementärmedizin*, 7(1), 12–16. <https://doi.org/10.1159/000057163>
- Tsubouchi, S., Uchida, H., Yamamoto, A., & Shimizu, N. (2018). Fluctuations in human bioenergy during the day as observed from the evoked photon. *Health*, 10(10), 1309–1320. <https://doi.org/10.4236/health.2018.1010101>
- Tsuchiya, K., & Motoyama, H. (2009). Study of body's energy changes in non-touch energy healing 1. Pranic healing protocol applied for a breast cancer subject. *Subtle Energies & Energy Medicine*, 20(2), 15–29.
- Vainshelboim, A., Momoh, K. S., Hayes, M. T., & Korotkov, K. (2005, September). *Electric and magnetic fields and electron channeling in human hair* [Paper presentation]. World Wide Wellness International Conference, Florence, Italy. <https://iumab.club/assets/files/papers/Textiles/2005%20Hair%20paper%20Florence.pdf>

- Vinu, V., & Jois, S.N. (2021). Complementary therapy of Pranic healing in managing moderate panic disorder with mild agoraphobia during COVID-19 pandemic: A case report. *Journal of Clinical and Diagnostic Research*, 15(10), KD01–KD03. <https://doi.org/10.7860/JCDR/2021/50299.15495>
- Vinu, V., Jois, S.N., Moulya, R., Meena, M., Prasad, K.N., & D'Souza, L. (2022). Longitudinal evaluation of superbrain yoga practice on academic performance among adolescents. *Health Education and Health Promotion*, 10(2), 271–276.
- Vinushree, M.K.S. (2021). Pranic healing as a complementary therapy in managing fibromyalgia: A case report. *Journal of Clinical and Diagnostic Research*, 15(9), KD01–KD02. <https://doi.org/10.7860/JCDR/2021/50854.15436>
- Watkins, A. J., & Bickel, W.S. (1986). A study of the Kirlian effect: The Kirlian technique makes interesting photos, but the effects seen have natural explanations. *The Skeptical Inquirer*, 10, 244–257.
- Xu, W., Kumar, I.R., & Srinivasan, T.M. (2021). Effects of Yama and Niyama on body energy systems: Evidence from electro photonic imaging – A randomised controlled trial. *Indian Journal of Science and Technology*, 14(7), 610–617. <https://doi.org/10.17485/IJST/v14i7.66>
- Yakovleva, E. G., Korotkov, K. G., Fedorov, E. D., Ivanova, E. V., Plahov, R. V., & Belonosov, S.S. (2016). Engineering approach to identifying patients with colon tumors on the basis of electrophotonic imaging technique data. *The Open Biomedical Engineering Journal*, 10(1), 72–80. <https://doi.org/10.2174/1874120701610010072>
- Yathindra, H. A., Jois, S.N., & D'Souza, L. (2017b). Enhancement of seed germination, fruit set and yield of pole beans (*Phaseolus Vulgaris* L.) by Pranic healing. *Ecology, Environment and Conservation*, 23(2), 812–814.
- Yathindra, H. A., Jois, S.N., Prasad, K.N., & D'Souza, L. (2017a). Influence of Pranic agriculture on germination, flowering and yield of European cucumber. *Ecology, Environment and Conservation*, 23(3), 535–538.
- Yeh, C.J., Hunter, C.D., Madan-Bahel, A., Chiang, L., & Arora, A.K. (2004). Indigenous and interdependent perspectives of healing: Implications for counseling and research. *Journal of Counseling & Development*, 82(4), 410–419. <https://doi.org/10.1002/j.1556-6678.2004.tb00328.x>

Appendix A

A summary of the literature review on Pranic Healing is reported in Table 1. All references can be found in the bibliography of the main article.

Pranic Healing Map		
Topics	Studies	Findings
Prana Perception	(Jois et al., 2015, 2017a, 2017b, 2017c, 2017d, 2017e, 2019a)	Perception of Prana in different forms and through different senses
Physical Health	<ul style="list-style-type: none"> • Cancer (Nittur & Ganapathi, 2020; Tsuchiya & Motoyama, 2009) • Chronic obstructive pulmonary disease (Mahesh et al., 2017) • Musculoskeletal conditions (Gangmei & Upendra, 2020; Soni et al., 2013) • Fibromyalgia (Vinushree, 2021) • Visual impairment (Jois & Prasad, 2018) • Condition of inmates (Jois et al., 2018c) 	Symptom reduction and improvement, positive changes, and relief, through Pranic Healing
Mental Health	<ul style="list-style-type: none"> • Sleep disturbances (Aithal et al., 2018; Amritha & Shalini, 2020; Dewi et al., 2022) • Depression (Rajagopal et al., 2018) • Panic disorder with agoraphobia (Vinu & Jois, 2021) • Daily work and activities of university students (Srivastava et al., 2019) • Superbrain Yoga for students with ADD, ADHD, autism, down syndrome, and other cognitive delays (Aniruddha et al., 2020; Chakrabarty & Krishna, 2022; Farahani et al., 2019; Janagap & Janagap, 2022; Jois & D'Souza, 2018a, 2018b; Jois et al., 2017f, 2018a, 2020; Koterba, 2007; Kumar & Singh, 2016; Pandey & Singh, 2019; Premalatha et al., 2021; Ramesh, 2007; Siar, 2007; Sui, 2010; Thomas & Venkatesh, 2017; Vinu et al., 2022) • Leadership effectiveness of organization managers (Singh et al., 2015) • Quality of life of factory employees (Jois et al., 2018b) • Condition of inmates (Jois et al., 2018c) 	Symptom reduction and improvement, enhancement of inner wellbeing and capacities, through Pranic Healing

Biophysics	<ul style="list-style-type: none"> • Surface tension and wettability of water (Ananthakeshava et al., 2021) • Survival rates of irradiated HeLa cells (Jones, 2006) • Calcium concentration in mouse keratinocyte HaCaT cells (Silva et al., 2015) • Locomotion and anxiety of zebrafish (Nadig et al., 2020a, 2020b) • Acupoint-brain connection, assessed with fMRI (Jones, 2001) • Stress of university students practicing Twin-Heart meditation, assessed with EEG (Nikhra, 2016) • HRV of healers practicing deep relaxed meditation (Jaisri et al., 2011) 	Significant and beneficial effects on living and non-living things, through Pranic Healing
Agronomics	<ul style="list-style-type: none"> • Tomato (Jois et al., 2016) • Cucumber (Jois et al., 2017g; Keerthika et al., 2016; Yathindra et al., 2017a) • Pole bean (Yathindra et al., 2017b) • Drumstick (Prasad & Jois, 2019) • Brinjal (Jois et al., 2019b) • Papaya (Prasad & Jois, 2020a) • Spinach (Prasad & Jois, 2020b) • Ridge gourd (Poornima et al., 2020a) • Marigold (Poornima et al., 2020b) • Cluster bean (Prasad & Jois, 2021a) • Green gram, paddy, and radish (Nadig et al., 2021; Prasad & Jois, 2021b) • Chilli (Poornima et al., 2021a) • Lettuce (Poornima et al., 2021b) 	Enhancement of crop growth, development, and storage, through Pranic Healing

Table 1. Summary map of Pranic Healing studies and findings about various topics.

Appendix B

A summary of the literature review on Kirlian photography is reported in Table 2. All references can be found in the bibliography of the main article.

Kirlian Photography Map		
Topics	Studies	Findings
Validation of Complementary and Alternative Medicine (CAM) modalities	<ul style="list-style-type: none"> • Osteopathy (Korotkov et al., 2012) • Massage therapy (Haun et al., 2015; Korotkov & Korotkova, 2018) • Qigong (Rubik & Brooks, 2005) • Yoga (Xu et al., 2021) • Yoga and naturopathy (Sankhala et al., 2021) • Dahn yoga (Leigh et al., 2003) • Musicotherapy (Rao et al., 2014) • Spiritual ceremony (Sushrutha et al., 2014) • Pranic Healing (Astuti et al., 2019) • Meditation (Deo et al., 2016; Kumar et al., 2016a) • Reconnective Healing, group meditation, sound therapy (Korotkov et al., 2009) • Energy healing (Russo et al., 2001) • Bioelectromagnetic therapeutic influence on visual acuity (Ignatov et al., 2021a) • Review (Grozdeva & Dikova, 2018) 	Biofield expansion, energization, regulation, harmonization, and changes due to these interventions, assessed with Kirlian photography
Assessment of disease and health status	<ul style="list-style-type: none"> • Tumors and cancer (Rein, 1985; Shaduri & Bouchoucha, 2013; Stepanov, n. d.; Yakovleva et al., 2016) • Heart disease (Nevoit, 2021; Nevoit et al., 2021) • Diabetes (Bhat et al., 2017; Kumar et al., 2016b; Sharma et al., 2014) • Smokers (Anitha et al., 2019; Cohly et al., 2009) • Stroke (Lee et al., 2005) • Arterial hypertension (Aleksandrova et al., 2015; Korobka et al., 2018) • Thyroid hyperactivity (Cohly et al., 2009) • Chronic abdominal pathology (Polushin et al., 2009) • Geopathic stress (Hacker et al., 2005) 	Correct identification and consistent evaluations of these psychophysical states, through Kirlian photography

Assessment of disease and health status	<ul style="list-style-type: none"> • Mobile-phone induced electromagnetic stress (Bhargav et al., 2016, 2017) • Student psychophysical stress (Basarab et al., 2021) • Student learning anxiety (Kostyuk et al., 2010a) • Children autism (Kostyuk et al., 2009, 2010b) • Children ADHD (Korotkov et al., 2022) • Children speech disorders and therapies (Skuratovskaya et al., 2020) • Effects of an anti-depressant drug on patients' cognitive functions (Rgeusskaja & Listopadov, 2009) • Immune status (Babelyuk et al., 2021a, 2021b) • Neuroendocrine factors of adaptation (Babelyuk et al., 2017) • Biorhythmic fluctuations (Tsubouchi et al., 2018) • Psycho-energetic functional reserves of athletes (Bundzen et al., 2005) • Individual-specific signature of the testee's electromagnetic field (Ignatov et al., 2021b; Treugut et al., 2000) • Review (Korotkov et al., 2010; Kostyuk et al., 2011; Singh, 2014) 	Correct identification and consistent evaluations of these psychophysical states, through Kirlian photography
Study of consciousness and psi phenomena	<ul style="list-style-type: none"> • Altered states of consciousness (Bundzen et al., 2002) • Direct vision (Korotkov et al., 2005) • Intuitive thinking (Tretyak et al., 2016) • Emotional gatherings (Korotkov et al., 2008) 	Bioenergetic features and variations reflective of these experiences, assessed with Kirlian photography
Analysis of liquids	<ul style="list-style-type: none"> • Different types of water, as well as foods, influenced by a water-structuring bio-disc (Korotkov, 2019) • Water in different containers (Abella et al., 2017) • Homeopathic remedies (Bell et al., 2003) • Salt solutions and essential oils (Korotkov & Korotkin, 2001; Korotkov et al., 2004b; Škarja et al., 1998) • Medicines (Shipko et al., 2021) • Blood oxidative stress (Stepovich et al., 2018) • Wines produced with different methods (Bigler et al., 2009) • Review (Korotkov & Orlov, 2010) 	Characterization and distinction of these liquids, through Kirlian photography

Other experiments	<ul style="list-style-type: none"> • Human hair testing (Vainshelboim et al., 2005) • Influence of different fabrics on the body (Ciesielska, 2009; Ciesielska & Masajtis, 2007) 	Interesting and consistent results in different fields of life science, through Kirlian photography
Critiques	Boyers & Tiller (1973, 1976)	Large variability, poor repeatability, low reliability, and natural explanations of Kirlian photography
	Dakin (1975)	
	Gadsby (1993)	
	Jessel-Kenyon et al. (1998)	
	Krippner (1979)	
	Marino et al. (1979)	
	O'Regan (1989)	
	Shaduri (2011)	
Treugut et al. (1998)		
Watkins & Bickel (1986)		

Table 2. Summary map of Kirlian photography studies and findings about various topics.