

Brain Trauma and the Energy Model: Emergence of a New Paradigm

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Abstract Neuroscience is calling for more research to further our understanding of brain trauma and rehabilitation. Further, Dr. Steven Cramer, Department of Neurology and Anatomy and Neurobiology, University of California while writing on behalf of the 2009 task force notes, "major advances in the understanding of neuroplasticity have to date, yielded few established interventions". The purpose of this paper is two-fold: 1) to present an overview of the energy model as outlined within energy psychology and 2) to discuss trauma, neuroplasticity and chronic trauma encephalopathy from the perspective of an emerging evidenced based paradigm, the energy model.

Keywords Energy Psychology And Brain Trauma

1. Introduction

The current status of treatment has been referred to as a "rest and wait" approach. Dr. Grant Iverson, neuropsychology professor, Department of Psychiatry, University of British Columbia and his colleagues call for more research to uncover the ideal treatment for brain trauma and suggest a need to, "identify the link between the physiological and emotional factors in concussed patients" (MacLeans Magazine, p.62)

Similarly, the development of neuroplasticity interventions seems to have reached an impasse. Twenty seven leading health professionals from a variety of health disciplines participated in a 2009 workshop sponsored by the National Institutes of Health Blueprint for Neuroscience. Their purpose was "to advance the translation of neuroplasticity research towards clinical application." (Cramer et al., p. 1592). Chair of the Task Force was Dr. Steven Cramer from the Department of Neurology and Anatomy and Neurobiology University of California, Irvine. He writes, "Major advances in the understanding of neuroplasticity have, to date, yielded few established interventions.... Integration of information across disciplines should enhance opportunities for the translation of neuroplasticity into effective clinical therapies" (p. 1592).

The energy paradigm was not represented in these discussions.

Neuroscience is calling for more research to further our understanding of brain trauma and rehabilitation. They suggest treatment would be enhanced if efforts were focused. As one psychologist puts it, we are good at measuring and recording the effects of trauma, but little development has been made to improve treatment.

In response to this call, distinguished physician, Nobel prize recipient and health visionary Dr. Albert Szent - Gyorgyi, MD, once again may remind us that "the cell is a machine driven by energy..... In every culture and in every medical tradition before ours, healing was accomplished by moving energy" (Gyorgyi, 1968, p. 4).

The purpose of this paper is twofold: 1) to present an overview of the energy model and 2) to discuss trauma, neuroplasticity and chronic trauma encephalopathy from the perspective of the Energy paradigm.

2. Trauma

Over the past number of years, health scientists have begun to examine trauma in an effort to understand its effect on the body and how it can be treated. Our new understandings suggest trauma is energetically stored within the body and impacts healing processes. There are three interrelated concepts involved in this process: 1) Trauma produces a physical response within the body at the cellular level. 2) This response keeps the body stuck within the stress mode. 3) Sensations and emotions get hijacked by our stress response which potentially can affect the "totality" of the person. Both our psychological and physiological states become vulnerable and are subject to the wear and tear effect of stress.

2.1. Trauma and Physiology

Trauma produces a physical response within the body. The literature suggests there are two ways in which trauma impacts the physical body:

Trauma is energetically encoded and stored within the

body at the cellular level.

Trauma, over an extended period of time, can cause metabolic change within the structures of the brain.

2.1.1. Cellular Effects of Trauma

Dr. Bessel van der Kolk, M.D. has been the Medical Director of the Trauma Center in Boston for the past 26 years, and is a Professor of Psychiatry at Boston University Medical School. He explains it this way:

Emotional pain and traumatic memories can be stored in the body long after exposure to a traumatic situation has ended. Storing traumatic memories and the associated emotional tone, is evolutionarily adaptive. We need to remember dangerous and threatening situations so that we can try to avoid these situations in the future. But holding on to these memories in our bodies in a physical and emotional sense creates discomfort and distress (cited in Emerson and Hopper, 2011 p.21),...our bodies keep the score (p. 253).

Van der Kolk's observations are supported by research. Neuroscientist and pharmacologist, Dr. Candance Pert, PhD, is a former research professor Georgetown University School of Medicine and advisor on brain biochemistry at the Clinical Neuroscience Branch of the National Institute of Mental Health. She agrees with Van der Kolk's explanation. Her research explains how emotions can exist as both energy and matter.

Dr. Pert's research indicates that emotions are experienced by vibrating receptors at the cellular level. She identifies the process of how emotions become encoded and stored within cells. More specifically, she has shown that the body contains an extraordinary system of receptors, tiny sensing devices that receive messages from specific chemicals such as hormones and neurotransmitters. The receptors attach themselves to their intended chemicals by sharing the same, distinct molecular vibration (energy).

The significance of this research cannot be overstated. The idea that chemicals of thought and emotion exist throughout the body, and that they are tangible, constant and open to manipulation, has profound implications for the treatment of trauma. Dr. Pert has linked emotions with biochemistry, and that link is energy.

Dr. Dharma Singh Khalsa, MD. is one of the few individuals who is both a physician and a yogi. As such, he has extensive knowledge in both eastern and western models of health. Khalsa comments on the significance of Pert's work, "[her work gives] credence to the assumption made by ancient yoga masters and modern quantum physicists, that vibration [energy] is integral to biological function (Khalsa and Stauth 2001, p.14). "He speculates, "since thought can exist as a physical entity ...memory too must partly exist as a solid physical entity, rather than just a pattern of electrical firing of neurons as long assumed... this may also account for the phenomena that some researchers call cell memory, the inborn fear, we sometimes acquire" (Khalsa and Stauth, 2001, p.15).

2.1.2. Trauma and Structural Changes

Trauma, over an extended period of time, can cause metabolic change within the structures of the brain. Van der Kolk has examined the neuroanatomical differences in the PTSD brain. He writes:

Researchers have begun to describe the impacts on the traumatized brain and are recognizing some very important neurophysiological and neuroanatomical differences between the brains of people who are suffering from PTSD or other trauma-related symptoms [from] those who are not. For instance, there are structural differences in the brains of individuals with PTSD, such as decreased hippocampal volume in adulthood and differences in multiple frontal limbic structures (cited in Emerson and Hopper, 2011, p. 3-4).

Dr. Karen Johnston, a neurosurgeon at Athletic Edge Sports Medicine and professor at the University of Toronto, suggests the emotional issues that often accompany trauma may be structurally based. After examining brain scans of individuals suffering from trauma, she notes, "the depression we see in a concussed person at six months is very similar to the depression seen in a non concussed, giving a lot of credibility that(trauma) is metabolic " (Mac Leans Magazine , p 60).

Similarly, physical changes within the structure of the brain can fall under the term Chronic Trauma Encephalopathy (CTE). CTE is a condition believed to be caused by repeated brain trauma. Researchers, Costanza, *et al.* write;

Boxers and other contact sport athletes are exposed to repetitive brain trauma that may affect motor functions, cognitive performance, emotional regulation and social awareness, ...the term chronic traumatic encephalopathy was recently introduced to regroup a wide spectrum of symptoms such as cerebellar, pyramidal and extra pyramidal syndromes, impairments in orientation, memory language, attention, information processing and frontal executive functions as well as personality changes and behavioral and psychiatric symptoms (Costanza, *A. et. al*, 2011, p 570).

In essence, CTE is a term used to identify a loss of functioning that appears to be related to deterioration of tissue.

2.2. Trauma and Chronic Stress

Trauma keeps the body stuck with in the stress mode. Sensations and emotions get hijacked by our stress response. Van der Kolk MD explains:

Maybe the most difficult part of having been traumatized is dealing with the triggers that reside inside. The trauma is a thing of the past, but your body keeps reacting as if you are still in imminent

danger. These internal triggers transform your inner world into a mine field. At least the trauma had a beginning a middle and an end, but these triggers may come at anytime, like a thief in the night...you know you should not feel this way, but your body keeps getting hijacked into feeling intolerable sensations and emotions (cited in Emerson and Hopper, 2011 p xxi).

Stephen Cope MSW, trauma therapist and Director of the Kripalu Institute for Extraordinary Living writes, "In trauma, the body's alarm systems turn on and then never quite turn off. We experience the intense suffering of never truly feeling relaxed, always on guard with the primitive brain always scanning for threat" (cited in Emerson and Hopper, 2011, p xv).

2.3. Trauma and Chronic Illness

Trauma affects the totality of the person – both our psychological and physiological states become vulnerable.

As we gain more understanding of the body and our internal systems, we gain a deeper level of appreciation for its interconnections and wholeness. Dr. Khasha MD, speaks about this interdependence; "The basic theory of this relatively new approach (psycho neuroendocrinology) is that the mind, brain, endocrine and immune systems function in concert" (Khalsa and Stauth, 2001, p. 34).

Psychotherapist Thomas Hanna PHD, explains it this way, "hate, anger, love and hope are not psychological states, existing in a vacuum; they are somatic states that exist in the entirety of a living organism... The problem is not what happens inside our minds or even our bodies – trauma affects the totality of our organism."(cited in Emerson and Hopper *et al.*,p. xxi).

As the body is exposed to prolong periods of stress, a "wear and tear" effect begins to occur, creating internal strain. Dr. Dharma Singh Khalsa, MD, offers his perspective on this process:

Over time, the wear and tear effect from the strain on the body will ultimately take its toll, it pulls energy away from your immune system, and away from your various recovery mechanisms, and shifts this energy to the fight-flight organs: the muscles, the heart, the eyes" ... he continues, " when this happens for too long, it destroys the body. Opportunistic illnesses strike. Viruses spread. Bacteria proliferate. The glands and organs of the fight –flight mode become exhausted....The endocrine glands that provide zest and youth degenerate. Muscles begin to ache. Chronic fatigue symptoms may begin to appear. Aging sets in. Illness occurs (Khalsa and Stauth, 2001, p 63).

To summarize, storages of trauma within the body keep the body stuck within the sympathetic, fight flight response. The body is unable to return to parasympathetic functioning. Over time, the inability of the body to access

healing mechanisms results in a breakdown in functioning and tissue.

3. The Energy Model

The Energy paradigm dates back to the old world and is thought to have formed the basis for understandings of health and behavior by ancient cultures as far back as 7000 years ago. Within the Energy model, man is viewed as an energy being, connected with, and synchronized by, universal energies. Man is a part of a whole. Energy psychology has been described as the integration or blending of traditional psychological applications with the healing practices of the old world.

What is this energy? The National Center for Complementary and Alternative Medicine (NCCAM) assembled a Think Tank of medical professionals and research scientists to examine and document the status of energy medicine research. The group consisted of 16 professionals from a variety of backgrounds including the ;Department of Electrical and Computer Engineering, Department of Bioengineering, Department of Molecular Medicine /Center for Thrombosis and Vascular Biology, Institute for Human Genetics, Department of Biological Chemistry and Molecular Pharmacology, Department of Orthopedic Surgery, Department of Mechanical and Aerospace Engineering, Department of Radiological Science, Department of Psychology, Center for Developmental Psychobiology, Department of Psychiatry, Department of Pharmacology and Physiology, Department of Materials Science and Engineering, California Pacific Medical Research Institute, and the Center for Biomedical Physics. They convened March 29-31, 2006.

Overall, the group found it difficult to arrive at a consensus. However, they did acknowledge the emergence of the Energy model and encouraged further research.

The group identifies two types of energy believed to be involved with in Energy medicine. Chairman of the group, Shin Lin, PhD, a professor from Departments of Developmental and Cellular Biology and Biomedical Engineering, University of California, writes ;

Energy medicine is one of the four domains in complementary and alternative medicine classified by NCCAM. Basically, this branch..... deals with the hypothesis that some kinds of energy, veritable (tangible) or putative (intangible), under pin the various therapeutic practices. Veritable energies are those with specific, measurable wavelengths and frequencies, such as mechanical vibrations (eg. sound) electricity, magnetism and other types of radiations from the electromagnetic spectrum. Putative energies, on the other hand, are more difficult to discern. "Vital energy", life force, subtle energy etc. are relatively modern terms used to describe ancient concepts that human beings are

not just flesh and blood but are infused with a certain form of energy. This type of energy is known under different names in different cultures... But the underlying concepts are similar: the energy is believed to flow throughout the body and illness arises as a result of blockages or irregularity of its flow. Energy therapists claim they can sense and use this energy to affect health and healing in themselves and others (Shin Lin 2006, p 1).

Tangible energies are found within the electromagnetic spectrum. The NCCAM report identifies several forms of these energies including; thermo energy, electrical energy, magnetic energy and emission of electromagnetic energy by the body in the form of light (biophotons) [Gurvich, A.G., 1944,1947].

One such energy not identified by the NCCAM group is a microwave frequency believed to be transported through energy pathways. Professor Sergei Sit'ko, Director of the Vidhuk Center in Kiev, Ukraine identified this energy. Sit'ko is a Merit Scientist and a nuclear physicist. His staff number approximately 200, including scientists and medical doctors. Belgian Medical Director Andre de Smul describes Sit'kos' findings. "In 1982, professor Sit'ko and his co-workers found that human beings have energetic channels where a circulation of coherent millimeter microwaves take place. Each individual has [unique] frequencies... situated between 40 -70 GHZ. De Smul 1996; (cited in Swanson, p. 151).

Sit'ko(Jovannovic – Ignatic Z , 2011, Jovannovic – Ignatic Z., Racovic D, 2009, 2005, Shaduri 2005 A) suggests a microwave frequency is transported within energy pathways and plays a vital role in the activation and regulation of healing functions.

Further, the emergence of this concept has led to the development of a treatment referred to as microwave therapy and a patented method of obtaining diagnostic information referred to as BEO-Tomography.

The second type of energy identified by NCCAM is an energy referred to as putative or subtle has been referenced in many cultures. "It has been called *mana* by the Polynesians, *orendo* by the Iroquois, *waken or wakonda* by the Sioux, *baraka* in North Africa and *pneuma* by the ancient Greeks. The Chinese often refer to it as *chi*. In Russia, modern day physicists refer to it as *torsion energy*. Other names include *subtle energy* and *life force* (cited in Swanson 2011, p. 5).

Physicist Claude Swanson Phd, a distinguished scientist from MIT and Princeton universities has examined subtle energy. His PhD thesis involved work in the "gravity group" which focused on experimental cosmetology and astronomy. He has also worked as a consultant with the Aeronautical Research Associates of Princeton, and as a private consultant for such clients as the U S Navy/Army, the CIA and governmental and commercial agencies. He writes:

A scientific revolution is underway as the effects of life force are being demonstrated, documented and measured. It is like no other force

known to science. It responds to consciousness and alters the other basic laws of physics. It is ultimately involved with life processes, and plays a central role in growth and healing. ... In many ancient cultures, manipulating this energy is one of the central arts of medicine (p. 51).

He continues:

Subtle energy is the bridge between current physics and the new physics. It modifies the familiar forces of electromagnetism, gravity and nuclear forces (p. 48)

In NCCAM's review of subtle energy research, Shin Lin supports Swanson's contention that subtle energies, while documented, are not easily explainable by conventional science. Shin Lin (2006, p 25) notes;

Some reported [subtle energy] research represents biofield effects that are most difficult to understand because they are inconsistent with basic principles of classical physics and current concepts of biology. However, such effects might be explainable by advanced theories of modern physics. Prominent in this group of reported phenomena are distance healing effects, effects of intention on physical reality and certain effects on cultured cells.

Shin Lin continues:

If a biofield effect is mediated by electromagnetic energy, one should expect it to have a number of character features. First, the effect should be eliminated if the transmission of the energy is blocked by an appropriate shield. Second, the effect should decrease with increasing distance between the energy transmitter and the target. Third, taking into account for the time lag due to signal transmission, processing and development of a biological response, the effect should occur contemporaneously with the energy emission. Fourth, there should be some sort of dose-response relationship between the level of emitted energy and the magnitude of the effect produced. Some reported biofield effects are difficult to interpret because they do not follow some or all of the predictions described above.

Energy, both tangible and subtle, is believed to play a vital role in health and healing. The Association for Comprehensive Energy Psychology (ACEP) is an international nonprofit organization of mental health professionals and allied health practitioners. ACEP now has approximately 1200 members worldwide and is governed by an advisory board consisting of 24 medical and health professionals, including 5 MD'S, and 15 PhD'S.

This paper introduces the Energy paradigm as described by ACEP. Feinstein, (2004 p 218), summarizes the key points of the model:

Energy medicine recognizes energy as a vital, living force that determines much about health and happiness. In energy medicine, energy is the

medicine and energy is also the patient. You heal the body by activating its natural healing energies; you also heal the body by restoring energies that have become weak, disturbed or out of balance. Energy medicine is both a complement to other approaches of medical care and a complete system for self-care.

[Energy medicine] can address physical illness, emotional illness, mental disorders, or promote high level of wellness and peak performance. The essential principles include:

- 1) Energies [are] both electromagnetic and more subtle form the dynamic infrastructure [within and around] the physical body.
- 2) The health of those energies –in terms of flow, balance, and harmony- is reflected in the health of the body.
- 3) Conversely, when the body is not healthy, corresponding disturbances in its energies can be identified and treated.
- 4) To overcome illness and maintain vibrant health, the body needs its energies to:
 - Move and have space to continue to move –energies may have become blocked due to toxins, muscular or other constriction, prolonged stress, or interference from other energies.
 - Maintain balance with other energies – energy may lose its natural balance due to prolonged stress and other conditions that keep energy systems in survival mode.
- 5) Flow, balance, and harmony can be non-invasively restored and maintained within an energy system (by):
 - tapping massaging, pinching twisting or connecting specific energy points on the skin. [meridian therapy]
 - exercises or postures designed for specific energetic effects [yoga]
 - focused mind to move specific energies [meditation, thought – field effects]

A key concept within the model is the relationship between energy and the sympathetic nervous system. ACEP identify three key understandings in describing this relationship.

- a. The physiological shift is preceded and regulated by the energetic shift.

In the same manner that a trigger can activate the sympathetic nervous response, the energy system also is activated. This activation happens first at the energetic level. “The energy shift precedes and regulates the physiological responses (Feinstein, 2004, p 114).

- b. The interruption of flow is caused by the body.

Energy imbalances are initiated by the body. This internal process enables the body to redistribute energy flow to accommodate the immediate need of the sympathetic nervous response. More specifically, if the body perceives a threat, the protective mechanisms conscript energy away from the repair functions in an effort to bolster the protective response. “The meridian system often sacrifices its own

energetic balance and coherence in service of the emergency response” (Feinstein 2004, p 154).

- c. Illness and the energy system

The energy paradigm incorporates a fundamental premise borrowed from traditional Chinese medicine, “whatever the presenting problem, it has a counterpart in the client’s energy system and can be treated at that level” (Feinstein, 2004, p 9).

To summarize the Energy model - In energy medicine, energy is both the medicine and the patient. It is both a complement to other approaches of medical care and a complete system for self-care.

Shifts in energy flow precede and regulate biochemical shifts. Further, a key aspect to the model is that a healthy energy system is one that can shift between parasympathetic and sympathetic functioning as required.

3.1. Interventions

There are many different energy modalities currently being used. In describing Energy Psychology applications, psychologist James Lane Phd, DCEP (2009)suggests, “Energy psychology builds on the foundation of research and clinical experience found in exposure therapies and cognitive restructuring, but adds the stimulation of acupoints” (p. 33). Similarly, researcher and energy practitioner John Freedom writes “ Energy psychology modalities combine intentionality with imaginal exposure and energetic stimulation, energetic balancing, or both” (Freedom 2011 p 3).

Interventions tend to involve two processes; a shifting in consciousness and stimulation of the energy system.

3.1.1. Stimulation and Parasympathetic Recovery

The ability of the body to maintain homeostasis and shift from sympathetic to parasympathetic functioning is a key aspect of maintaining health. Proponents of the Energy model suggest that shifts in biochemistry are preceded and regulated by shifts of internal subtle energy (Feinstein 2004, Eden 1998). Neuroimaging (fMRI) studies compiled by psychologist James Lane, PhD, DCEP, supports the notion that acupoint stimulation can assist in the parasympathetic recovery process. “ many neuroimaging studies of acupuncture indicate that midbrain structures, particularly the amygdala, are influenced by acupoint stimulation (Dhond et al 2007; Fang et al 2008 Hui et al 2007, Napadow et al 2007, Napadow et al 2009 “ (cited in lane 2009). Lane continues, “ both studies by Napadow et al showed significant differences occurring in fMRI images resulting from true verses sham acupuncture points, indicating that acupoint stimulation has greater efficacy than other forms of somatic stimulation.” p32.

Lane examined the changes in neurochemistry following meridian therapy interventions. His research has revealed key relationships between acupoint stimulation and the shifting of neurochemistry toward the parasympathetic response. Lane writes, “ manual stimulation [touch] of acupoints produces endogenous opioids, increases production

of neurotransmitters such as serotonin and gamma-aminobutyric acid (GABA) and regulates cortisol, the main stress hormone (Napadow et al., 2007; Akimoto *et al.*; 2003; Lee, Yin, Lee, Tsai and Sim 1982; Ulett, 1992 (as cited in Lane, J., 2009, p.31).

Lane (2009) further notes the process of inducing parasympathetic recovery through the use of stimulating acupoints enhances the counter conditioning process. He writes:

”Energy psychology interventions are observed in a number of studies to reduce affect,” He continues, “counter conditioning of emotionally traumatic memories very rapidly” (Church, 2009; Johnson, Shala, Sejdijaj, Odell, and Kadengjika, 2001; Church and Brooks, in Press; Wells, Polglase, Andrews and Carrington, 2003) (as cited in Lane, J., 2009 p. 33).

Lane (2009) continues, ”Studies of brain EEG patterns of subjects before and after energy psychology treatments find a reduction in the EEG frequencies associated with anxiety (Lambrou, Pratt and Chevalier, 2003; Swingle, Pulos and Swingle, 2004; Diepold and Goldstein 2008). He concludes, ”energy psychology is therefore believed to enhance the effects of cognitive and exposure protocols through use of the stimulation of acupoints” (as cited in Lane 2009, p.33).

Research also indicates energy interventions are effective with fear based disorders. Lane 2009 notes, “Acupoint stimulation is an effective treatment for fear because it terminates the sympathetic nervous system’s alarm or the fight/flight/freeze response and replaces it with the parasympathetic nervous system- relaxation response (Korber et al.; 2002, Napadow *et al.*, 2007 Rudin, 2005)” (as cited in Lane, J. 2009).

Lane further identifies research that indicates acupoint stimulation, whether with needles, tapping, ultrasound, vacuum suction or touch creates the same response within the body. (Jones, 2002; Cherkin et al, 2009, Ulett, 1992; Andrade and Feinstein 2004). As such, he concludes, ”This gives credence to the hypothesis that the findings of acupuncture research apply equally to acupressure [touch] (p 33).

3.1.2. Stimulation and Healing

The Intervention:

One of the first to identify the presence of energy pathways within the body was North Korean professor Dr. Bong Han Kim (Cho, 2004; Lee, 2004a, 2004b, 2004c; Shin, 2005; Lee, 2005). In 1963, he conducted extensive research on pathways referred to as the Bonghan duct system. He reported the presence of an internal duct system connecting all organs and tissue. Further, the researcher identified a liquid consisting of steroids, DNA and adult stem cells was transported through the duct network to areas of injury (Kipper 1973; Rose-Neil 1967). According to Tiller (Kippler 1973) Bong Han Kim conducted over 300 experiments investigating the relationship between adult stem cells and energy pathways.

This research has not been confirmed.

However, a research group from the Biomedical Physics Laboratory, School of Physics, National University, South Korea, examined Kim’s research. Their research did find some support for some of Bong Han Kim’s earlier findings. Dr. Shin Phd (2005) writes:

Bonhan Kim (1963) sought the anatomical basis of acupuncture meridians in humans and animals and found a new circulatory system that was completely different from the vascular nervous and lymphatic systems. The meridians formed an anatomically distinctive system of threadlike ducts that spread under the skin. In addition by tracing the ducts with a staining dye, he discovered the ducts continue to spread onto the surfaces of internal organs and that they existed even inside blood vessels. He also found that a liquid flowed through the Bonghan duct system and that the liquid played a physiological role akin to modern cell therapy by totipotent adult stem cells. The flow of this liquid was correlated with the therapeutic effects resulting from acupuncture treatments of damaged internal organs (p 35).

Shin’s research supports some of the findings of Bong Han Kim;

Until recently, Bonhan Kim’s discovery could not be reproduced. Mainly because his formula of the staining dye, which was essential for identifying the Bonghanducts, was kept secret. ..another step toward the rediscovery of the Bonghansystem was the observation of threadlike structures on the internal organs of rabbits and rats (Cho et al., 2004; Lee B C et al. 2004; Lee K J et al. 2004) ... In addition, according to the Bonghan theory, we expected to observe 1-2um-sized round granules containing DNA flowing through the OSBHDS (Kim, 1965; Baik et al., 2004). Indeed, we detected such granules in the threadlike structures and the existence of DNA in them was demonstrated by using the DNA – specific staining of the Feulgen reaction. Hence we clearly identified the novel threadlike structures as Bonghan ducts (Shin, et. al. 2005p 36).

Lee et al (2005) believes physical evidence does exist that will confirm the existence of energy pathways within the body and calls for more research to identify the composition of the liquid found within these pathways.

According to Kim (1965), some sort of liquid with granules containing DNA (Shin 2005) flows through the ducts, which is similar to microcells and might be somehow related to cell therapy. In addition, the threadlike ducts were considered to be involved with developmental processes and in particular, the lymphatic intravascular threadlike structure was related to immunological and hematopoietic function (Kim 1965). Whatever the eventual outcome of deeper investigation of these

claims, the finding of novel structure inside lymphatic vessels is not a mere curiosity but rather a herald of a breakthrough in establishing the third circulatory system that consists of the Bonghan ducts inside blood vessels, on the organ surfaces and under the skin(Lee et al p 6).

Targeting the Intervention:

A second group of researchers have focused on the practice of using meridians as a mechanism to target brain stimulation to specific regions of the brain. Functional MRI technology makes it possible to see into the brain while the body's energy system is being treated. Research indicates that when a meridian point is stimulated, the connecting portion of the brain is also stimulated (Cho, Z H and Chung S C et al, 1998; Cho Z H and Na C S et al, 2001; Hsieh J C et al 2001; Hui K Ket al.2000; and Wu, M T et al. 1999 , Siedentopf 2002).

An Austrian research team further examined this process. The group consisted of medical scientists from the; Department of Radiology, University Hospital Innsbruck; Department of Neurology, University Hospital of Graz, ; Department of Nuclear Medicine Research Center, Julich, Germany ;Center for Cognitive Science University of Freiburg and the Department of Anesthesiology and Critical Care Medicine, University Hospital, Innsbruck, Austria. The group substituted needle stimulation with laser stimulation.

Results support previous research. Siedentopf writes:

Our results are in agreement with other studies that show the involvement of a corresponding brain area for a specific acupoint.... This preliminary study gives evidence that laser acupuncture can activate a network of cortical and brainstem structures in the human brain and might lead to a modulation of this neuronal network....a further question is how these results in healthy subjects can be generalized and applied to patients with disorders responsive to acupuncture(Siedentopf et al, 2002 p 53) .

To summarize, there may be two mechanisms at work. The first, the stimulation of acupoints assist the body in releasing itself from the grip of the sympathetic response which facilitates the return to parasympathetic functioning. Secondly, targeted stimulation appears to non- invasively activate healing with in specific regions of the brain. Further, there is some research support for the notion that energy pathways transport a healing liquid containing DNA. In addition to this liquid, the research of Russian physicist Sit'ko and his colleagues further suggests the presence of a microwave frequency transported within the energy channels. His research suggests this energy plays a vital role in the activation and maintenance of internal healing processes.

3.1.3. Intentionality -the Thought- field Connection

The thought-field connection is based on the premise that energy follows thought. Intentionality represents the least understood aspect of the Energy model. Advocates of the model maintain that energy can be moved through the

thoughts and intentions of the practitioner (healer) in a manner that can influence the biological functioning of the receiver of the energy. Feinstein writes, "Studies at various centers, the Department of Engineering at Princeton (Radin, 1997),the Department of Science at Stanford (Tiller 1997) have provided impressive empirical evidence that human intention can alter material, electrical and biological processes " (Feinstein 2004,p. 6).

NCCAM would suggest that while such effects might be explainable by advanced theories of modern physics, the phenomenon is not found within the spectrum of conventional science.

Swanson (2011) has identified examples of such research;

- 1) In a laboratory directed by Dr. Josie Jones, Professor of Radiological Sciences at the University of California, Irvine, studies continue, investigating the effect of healing energy on cells exposed to lethal dose of gamma radiation (Jones 2008). Arranged in rows of petri dishes, half of them will be allowed to die, the other half are receiving healing energy through the thought- field connection. Dr. Jones has been working in energy research for the past 10 years and completed more than 100 such experiments. Swanson PHD summarizes, "The best results occurred when the cells were treated with energy, both before and after radiation exposure. Treatment of the cells both before and after exposure increased the survival rate from 50% to about 88% "(p 2).
- 2) Emitted energy has been shown to either accelerate or retard the growth of cells or bacteria. Feng demonstrated this with E-coli. Growth or inhibition could be varied depending on the intent of the practitioner. When the intent was to destroy the bacteria, the growth rate decreased between 44% and 91% compared to the control group. When acceleration of bacteria growth was desired, the growth rate increased to between 2.3 and 6.9 times the growth of the control group. "(p 59).
- 3) Interventions for cancer, Dr. L. D. Feng, "at the Chinese Immunology Research Center (Beijing), has conducted numerous studies on the effect of emitted Qigong (energy) on cancer cells(Feng LD, 1994 ,1988 ,1990). His group found, for example, that heLa cancer cells which were exposed to Qigong energy survived 69.5% as long as untreated cells. He continues," Electron microscope studies revealed that under Qigong the cancers rapidly degenerated and some of them swelled up under a 20 minute Qigong exposure, 41 experiments with Qigong on stomach cancer cells, found that one hour exposure to Qigong from a Qigong master killed more than 25% of the cells (p<.01)" (p 61) .
- 4) In another study, Dr. X .J. Chen and his colleagues at the Zhongshan, University of Medicine, (Chen XJ, 1990) conducted many studies on the effects of energy on cancer cells. In one set of studies, Qigong was found to inhibit the growth of these cells by 43%, 33%,

60 % and 36% ($p < 0.5$) in four separate experiments.” p61. In other experiments at the Zhongshan University of Medicine, Chen and his associates tested the ability of energy (Qigong)Masters to affect the growth of liver cancer in mice. They injected hepatic cancer cells into mice, and then randomly assigned the mice to one of three groups. A control group, a group that received a sham intervention (a person untrained in energy healing went through the motions, appearing to give an energy (Qigong) treatment. The third group received an energy intervention from a master. “ Tumor inhibitory rates, comparing the Qigong case to the control case were found to be, 70.3%, 79.7%, 78.7% in the three repeated experiments ($p < 0.0001$)”P 61 .

Similarly, physicist, William Tiller Phd , Professor Emeritus , Department of Materials Science and Engineering, Stanford University has worked with intentions and the thought-field since the early 1990’s. His work supports the concept that a non- conventional energy can be transferred through intention in a manner that falls outside the parameters of conventional science. Shin Lin PhD, summarizes Tillers’ research;

[Tillers’] intention target experiments were to :
 (1) to increase the pH of highly purified water in equilibrium with air by + 1 pH units with no chemical additions,(2) to decrease the pH of the same type of purified in equilibrium with air by– 1pH units with no chemical additions, (3) to increase the *in vitro* thermodynamic activity of the liver enzyme , alkaline phosphates, and (4) to significantly increase the *in vitro* [ATP] [ADP] ratio in the cells of fruit fly larvae , so that they would be more physically fit and thus have a reduced larval development time , $t_{1/2}$ to adult fly stage. All four target experiments were robustly successful with (3) and (4) attaining ~ 20% at $p < 0.001$ (Shin Lin 2006 p 13).

Dr. Norm Shealey MD, PhD, examined the effect of subtle energy on the physiology of the receiver of energy during a healing session. EEG measures were recorded. He found that during a healing interaction, there was a move toward synchronization in brainwave patterns between the sender and receiver of energy. His research demonstrated that during the healing process the brainwave patterns of the recipient and sender of energy began to resemble each other. Six healers and 110 recipients were used. The recipient did not know when the healing session began. Brain wave patterns were measured for resting and baseline periods as well as before and after healing sessions.

Shealy concludes “In all instances, there were moderate to quite striking changes in the subjects EEG usually occurring within the first five minutes of the sending of healing energy, but sometimes appearing most dramatic twenty minutes after the completion of healing. Almost always there was a marked increase in delta activity in all areas of the brain with less significant increases in theta and alpha activity”

(Shealey et al,2001 p 247).

In his review of this literature, Physicist Claude Swanson summarizes the phenomena.“The findings show that when healing is occurring, physiological parameters such as pulse rate, blood pressure, brain waves patterns and acupuncture meridian resistance all change in a strong and measurable way..Even in blind tests where there is no way for the recipient to know when he is being healed “(p 77).

3.2. Energy and Trauma -Empirical Support

Research supports the use of energy principles as a way to facilitate the healing of psychological trauma.

Dr. Bessel van der Kolk MD., the medical director of a trauma center in Boston, presented his unpublished research at the Association of Comprehensive Energy Psychology, ACEP conference, in Reston, Virginia,June 2011.Van der Kolk’s research clearly demonstrated increased benefits when energy and body based interventions were used as treatment with psychologically traumatized individuals. Further, these benefits continued at the 6 month interval, indicating almost no relapse had occurred. He strongly encouraged the use of energy and body based interventions suggesting these interventions should become the treatment of choice for those working with psychological trauma(Van der Kolk , 2011, unpublished research).

Other investigators examined the effects of energy interventions with trauma and found similar results. Rowe (2005, p 104) found “significant decreases in all measures of psychological distress ... which held up at the 6 months follow up.”Church (2010) concludes his research noting, “After the [energy] intervention, the group no longer scored positive for PTSD, the severity and breadth of psychological distress decreased significantly, and most of their gains held over time. He further notes, “the intervention was an effective treatment. ”(p 45).Stone (2009) found similar results writing, “participants demonstrated an average reduction in symptoms of 18.8% ($p < .001$).Seven students (21%) dropped below the clinical cut off point for PTSD, with average score reductions of 53.7% ($p < .001$)” (p. 73).

In summarizing her research, Kirsten Schulz, PhD writes:

Energy Psychology has shown to normalize abnormal EEG patterns associated with the recall of traumatic memories (Diepold and Goldstein, 2008, Lambrou, Pratt and Chevalier,2005).She continues,” An analysis of energy psychology studies, published to date found that, in all studies that included long-term follow-up,...[interventions] held over time, making energy psychology treatment of durable benefit to clients (as cited in Journal of Energy Psychology, vol 1, (1)p 15).

4. Summary and Integration

4.1. Trauma, Neuroplasticity and Chronic Trauma Encephalopathy

Within the energy paradigm, flow of subtle energy is considered vital to healing processes. Reporting to NCCAM, Shin Lin writes; “Energy is believed to flow throughout the body and illness arises as a result of blockages or irregularity of its flow” (Shin Lin 2006, p 1). Similarly, Feinstein writes, “In energy medicine, energy is the medicine and energy is also the patient. You heal the body by activating its natural healing energies; you also heal the body by restoring energies that have become weak, disturbed or out of balance” (Feinstein, 2004, p 218).

Proponents of the model suggest that parasympathetic and sympathetic nervous systems each have a distinctive pattern of flow. A balanced energy flow is associated with parasympathetic functioning. The balance ensures all systems are connected to the energy source. This enables healing and restoration processes remain functional.

The flow pattern for the sympathetic nervous system is different as the goal is protection, not healing. In order to bolster its protective mechanisms, the body pulls energy away from its repair functions to enhance the protective mechanisms. This creates an imbalance within the flow. Once the threat is over, parasympathetic recovery needs to occur so that healing and regeneration can resume. A healthy system requires the internal energy be free to shift between the parasympathetic and sympathetic flow patterns.

Trauma is believed to restrict parasympathetic recovery. Trauma is thought to lock the body into the sympathetic response, preventing parasympathetic recovery. As Van der Kolk notes, “Maybe the most difficult part of having been traumatized is dealing with the triggers that reside inside” (cited in Emerson et al. 2011 p. xxi). He continues, “the trauma is stored in somatic memory and expressed as changes in the biological stress response... our bodies keep the score” (Van der Kolk, 1994 p. 253).

As such, we carry our trauma within us. Over time, the reduced energy flow to the repair functions diminishes the body’s ability to heal. Dr. Dharma Singh Khalsa, MD writes:

Over time, the wear and tear effect from the strain on the body will ultimately take its toll, it pulls energy away from your immune system, and away from your various recovery mechanisms, and shifts this energy to the fight-flight organs: the muscles, the heart, the eyes” ... he continues, “when this happens for too long, it destroys the body. Opportunistic illnesses strike. Viruses spread. Bacteria proliferate. The glands and organs of the fight – flight mode become exhausted... The endocrine glands that provide zest and youth degenerate. Muscles begin to ache. Chronic fatigue symptoms may begin to appear. Aging sets in. Illness occurs (Khalsa and Stauth, 2001, p. 63).

Health professionals recognize the need to include integrative and energy interventions to more effectively

assist their clients restore energetic balance. Van der Kolk, notes, “most [talk] therapies downplay or ignore the shifts in people’s inner sensory world ... yet that is the level on which trauma continues to be played out, in the theater of the body” (cited in Emerson and Hopper, 2011 p. xxiv).

Traumatology professionals Ogden and Minton agree noting:

while traditional psychotherapy addresses the cognitive and emotional aspects of trauma, it lacks the mechanisms to work with the inner physiological elements associated with trauma, [as] many symptoms are somatically based ... those of uninformed in helping trauma survivors need to broaden our methodology beyond talk therapy and bring the body into the healing milieu (cited in Emerson and Hopper, 2011, p.5).

Energetic interventions assist the body shift from sympathetic to parasympathetic functioning. Neuroimaging (fMRI) studies compiled by psychologist James Lane, PhD, DCEP, supports the notion that acupoint stimulation can assist in the parasympathetic recovery process. “many neuroimaging studies of acupuncture indicate that midbrain structures, particularly the amygdala, are influenced by acupoint stimulation (Dhond et al 2007; Fang et al 2008 Hui et al 2007, Napadow et al 2007, Napadow et al 2009 “(cited in lane 2009).

In 1963, the research of Bong Han Kim suggests energy pathways may carry an enriched fluid that is thought by some to activate healing processes. Bong Han Kim suggests this fluid is transported through the energy pathway system to injured areas (Kipper et al 1973; Rose – Neil 1967). While most of Bong Han Kim research has not been confirmed, some research does exist to support the notion that DNA may be transported through the energy channels (Shin 2005).

Research from Sit’ko and his colleagues, suggest a microwave frequency is transported through the energy pathways. They further contend that this energy plays a vital role in the body’s ability to activate and regulate healing processes (Sit’ko 1994, Jovannovic – Ignatic Z., 2011, Jovannovic – Ignatic Z., Racovic D, 2009, 2005, Shaduri 2005 A).

As the boundaries of physics expand, we continue to deepen our appreciation for the energy system and the role it plays within the healing structures of the body.

4.2. Chronic Trauma Encephalopathy, Neuroplasticity and the Energy Paradigm

In addition to emerging research supporting the energy paradigm as a treatment model, there is an intuitive connection between the concepts of growth of tissue and its access to energy flow. Evidence of this connection is documented.

More specifically, healthy brain tissue grows as a natural response to stimulation. (Chenet *et al.* 2010, p. 306, Davidson and Lutz, 2007, Davidson and Kabat - Zinn PhD *et al.* 2003,;

Lazar et. al. 2005; and Lutz A , et.al. 2004) .Chen 2010 writes, “ Natural plasticity occurs with (1) the proliferation of dendrites and axons during cyto-genesis and histogenesis (2) the formation of synapses and cellular differentiation during migration and (3) apoptotic phenomena” (p 306).Chen presents evidence of natural occurring plasticity;

Structural magnetic resonance imaging has shown activity- dependent responses in brain structure; for instance, in London taxi drivers, increased hippocampal volume, thought to be related to spatial navigation correlated with the amount of time that drivers spent navigating the streets of London. Draganski found that individuals who learned to juggle for limited period of time showed transient selective structural expansion in gray matter in the mid-temporal area and left posterior intra parietal sulcus, areas associated with processing and storage of complex visual motion. Functional magnetic imaging studies suggest that subjects learning sequential finger movements demonstrate changes in the motor cortex, cerebellum and basal ganglia(Chenet. al. 2010, p. 306).

Further, Stager suggests that both functional and structural changes within the brain have been observed as a function of experience. Stager 2011 writes;

One of the most salient findings is perhaps the observation that the adult brain can still change significantly in both structure and function as a result of experience. (p. 1)... He continues, research has convincingly shown that mental training using motor imagery, like physical practice, can produce changes in brain structure and function that are associated with improved subsequent performance of a motor skill.... In a seminal study, Pascual –Leone *et al.* (1995), showed that mental practice alone is sufficient to promote the modulation of neural circuits involved in the early stages of motor skill learning” (Stager 2011, *et al.* p. 2).

This research appears to suggest that brain growth is a function of the stimulation it receives and offers promise to rehabilitation workers. However, this promise, to date, remains unfulfilled as rehabilitation specialists struggle to make advances within the area of neuroplasticity.

Dr. Steven Cramer MD, was the Chairman of a 2009 Task Force designed to investigate and document the status of neuroplasticity. The purpose of the group was “ to advance the translation of neuroplasticity research towards clinical application , [as]major advances in the understanding of neuroplasticity [had] to date yielded few established interventions.” (Cramer 2009, et al., p. 1592).

While neuroplasticity is a natural occurring phenomena, the overall impression left by the 2009 Task Force was that it does not easily translate to rehabilitation. Cramer MD suggests efforts to integrate concepts of plasticity into

rehabilitation results in a great deal of inconsistency and unpredictability. Concepts of maladaptive plasticity, spontaneous intra- hemispheric changes result in unpredictable treatment outcomes and make it difficult to arrive at any definitive conclusions. As Cramer et al. writes;

Restorative and rehabilitative post –stroke therapies produce a range of brain events (Buma et al., 2010). In some cases, the behavioral significance is understood.. In other cases, the exact behavioral significance of a pattern of post –stroke plasticity remains unclear (cited in Cramer et.al. 2011 p. 1593).

Cramer continues:

Other factors suggest the need for cautious interpretation of brain plasticity. In some cases, a stroke can affect brain function in ways outside of the study hypotheses (cited in Cramer et.al. 2011 p.1593).

Cramer goes on:

Another principle is that not all plasticity has a positive impact on clinical status – in some cases, plasticity might have a negative consequence. For example new onset epilepsy is a common complication of cerebral trauma, often arising months to years after insult. Other examples, suggestive of maladaptive plasticity include chronic pain and allodynia following injury to a limb (such as amputation) or to CNS (dorsal spinal cord or thalamus), dystonia after various CNS injuries... Thus recovery from a trauma or disease may reflect both adaptive and maladaptive neuroplasticity, which can occur simultaneously (cited in Cramer et.al. 2011 p 1594 - 1595).

There is an apparent inconsistency within the literature. On one hand, research conducted with healthy individuals indicates brain growth is a function of stimulation. At the same time, those working with traumatized and injured brains are obtaining inconsistent and unpredictable results.

This inconsistency could be due to the diversity within the populations being examined. Traumatized individuals have trauma stored within. According to the Energy paradigm, the storage of trauma creates an imbalance of internal flow, restricting parasympathetic recovery and compromising healing. As such, neuroplasticity is compromised and healing unpredictable.

4.2.1. Chronic Traumatic Encephalopathy

This same working theory can be extended to the phenomena known as Chronic Traumatic Encephalopathy. The Energy paradigm would suggest that naturally occurring plasticity and the deterioration associated with CTE may represent two sides of the same coin.

More specifically, a working theory may be that when cells have access to energy flow, growth will take place. This is a natural occurrence of a healthy body. However, when flow is reduced, cells are deprived of energetic nourishment. Growth mechanisms become compromised. This starvation

of energy may account for the lack of healing observed within neuroplasticity literature for traumatized individuals. Over time, the lack of access to flow will result in the deterioration of tissue observed in CTE.

The growth of neuroplasticity and the decay of Chronic Traumatic Encephalopathy may represent both sides of the same concept.

4.2.2. Neuroplasticity Research and the Energy Model

The 2009 Neuroplasticity Task Force [Cramer] identified specific interventions that supported and enhanced neuroplasticity efforts. Identified were brain stimulation and neuropharmacology as interventions that stimulate brain growth. A passing reference was also made regarding the benefits of stem cell activation.

Research suggests these interventions are naturally occurring outcomes found within energetic interventions.

More specifically;

- 1) Functional MRI research indicates that when a meridian point is stimulated, the connecting portion of the brain is also stimulated. (Cho, Z H and Chung S C et al, 1998 ;Cho Z H and Na C S et al, 2001;Hsieh J C et al 2001;Hui K Ket al.2000; and Wu, M T et al. 1999 ,Siedentopf 2002).
- 2) Acupoint stimulation is a means of naturally shifting neurochemistry toward the parasympathetic response. “Manual stimulation of acupoints produces endogenous opioids, increases production of neurotransmitters such as serotonin and gamma-aminobutyric acid(GABA) and regulates cortisol, the main stress hormone “(Lane 2009, p.34).He further notes, “acupoint stimulation is an effective treatment for fear because it terminates the sympathetic nervous system’s alarm or the fight/flight/freeze response and replaces it with the parasympathetic nervous system- relaxation response (cited in Lane, 2009, p 35).

So, while the 2009 Task Force recommends brain stimulation and shifting of neurochemistry as interventions to enhance neuroplasticity, they fail to connect these processes to the Energy paradigm. As such, the energy model may be a well- deserved addition to their recommended interventions.

5. The Call for Research

In conclusion, Dr. Grant Iverson, neuropsychology professor, Department of Psychiatry, University of British Columbia and his colleagues call for more research to uncover the ideal treatment for brain trauma and suggest a need to, ‘identify the link between the physiological and emotional factors in concussed patients” (MacLeans Magazine , p.62)

The wait and rest approach outlined within the conventional treatment may not be the best option. The energy model, a research based model, may provide new

insights and understandings for those wanting to assist victims of brain trauma. Given the increase in the occurrence of brain trauma, coupled with the lack of advancements with in the current treatment model, it may be time to explore an alternative direction.

Final words come from Nobel prize recipient and health visionary Dr. Albert Szent - Gyorgyi, MD,“ the cell is a machine driven by energy .. In every culture and in every medical tradition before ours, healing was accomplished by moving energy” (Gyorgyi, 1968, p. 4).

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