

NEUROPHYSIOLOGICAL INDICATORS OF EFT TREATMENT OF POST-TRAUMATIC STRESS

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1. ABSTRACT

Clients previously involved in a motor vehicle accident who reported traumatic stress associated with the accident received two sessions of Emotional Freedom Techniques (EFT) treatments. All clients reported improvement immediately following treatment. Brainwave assessments before and after EFT treatment indicated that clients who sustained the benefit of the EFT treatments had increased 13-15 Hz amplitude over the sensory motor cortex, decreased right frontal cortex arousal and an increased 3-7 Hz / 16-25 Hz ratio in the occiput. The benefits of psychoneurological research to reveal the processes of subtle energy healing are discussed.

KEYWORDS: Emotional freedom technique, traumatic stress, EEG

2. INTRODUCTION

2.1. Energy Psychology and Energy Therapies

Psychologist Roger Callahan, a pioneer in the development of energy psychology, was strongly influenced by George Goodheart, the chiropractic physician and developer of applied kinesiology. Goodheart developed muscle testing to diagnose the underlying causes of health problems and found the relationships between muscle groupings and the energy meridian pathways associated with acupuncture therapies. Callahan's experience and training with Goodheart's applied kinesiology formed the nucleus of the Callahan Techniques that subsequently led to the development of Thought Field Therapy (TFT).

The theory of TFT is based on Rupert Sheldrake's hypothesis of formative causation which suggests the presence of individual fields beyond time and space that can influence physical forms. This has been a recurring theme expressed by Plato (ideal forms), Aristotle (external forms), Hans Driesch (entelechy), Harold Saxon Burr (Life Fields) and what Sheldrake refers to as morphogenic or M-Fields. ¹

As new learning or behavior creates a new M-Field through morphic resonance, the causative field is changed, however slightly. TFT assumes that in the case of a phobia or traumatic stress, a perturbation or energy static in the thought field (or M Field) creates a break or disruption in the circuitry of the electrical circulation system -- the Qi circulating in the twelve energy meridians of the body. In other words, any negative emotional condition such as fear, anxiety, guilt, depression, or shame cause disruptions in the body's energy system which gives rise to anxiety, fear responses and higher stress levels.

There are approximately 670 acupuncture points or windows on the body where the electrical resistance on the skin is significantly lower compared to the non-acupuncture points. According to Traditional Chinese Medicine (TCM) this allows the life giving energy or Qi to either exit or enter these windows.

2.2 Development of TFT Treatment Strategy

Within the 670 acupoints of the body there are twelve alarm points which are located in or near the twelve respective meridians. These are diagnostic points with six located along the midline of the body and six alarm points situated bilaterally on the body. There are also fourteen primary treatment points corresponding to each meridian located on the face, upper body and fingers.

Callahan developed the TFT treatments by asking the body whether the treatment point on a meridian could be utilized to reduce the fear or anxiety of the client's specific issue. He used applied kinesiology or energy testing to give vocal chords to the subconscious as the diagnostic tool. ² Callahan then developed a series of algorithms of specific acupoints that when tapped in the proper sequence would reduce the Subjective Units of Distress (SUD) from an eight or nine (high) to a one (low) in minutes. The diagnostic procedures developed by Callahan are described in greater detail by Durlacher in his book *Freedom From Fear Forever*. ³ There are at least twenty different algorithms for psychological problems ranging from simple and complex phobias, posttraumatic stress, panic attacks, anger, physical pain, and depression. Thus, for Callahan, each emotional or physical problem has its own specific algorithm and the sequence of the points is crucial to his treatment order.

2.3. Emotional Freedom Techniques (EFT)

Gary Craig was one of Dr. Callahan's first trainees. He utilized the TFT algorithms successfully with hundreds of people. However, there were many conditions such as bruxism, nightmares, TMJ, dyslexia and insomnia for which there were no specific algorithms. Craig therefore reasoned that if one tapped all fourteen treatment points in sequence one could expand the number of conditions that could be treated without developing or diagnosing new algorithms. Thus, Craig developed one comprehensive algorithm based on the TFT treatment methods and he called this simplified procedure Emotional Freedom Techniques (EFT). ⁴

There are several advantages to EFT. It provides one easily memorizable sequence that is useful for many problems.⁵ It also increases the number of psychological issues that can be treated for which there were no algorithms. The EFT sequence is very easy to memorize and it integrates all the major concepts of TFT into one very simple system for clients to utilize and follow through as needed in the future.

One of the authors (LP) was trained by Callahan and has treated close to 2500 private clients with TFT achieving an 85% to 90% success rate (reduction of the SUD). Subsequently, he began using EFT treating an equal number of clients with comparable diagnoses and achieved a comparable success rate as TFT. It was decided to use EFT for the present study as it was much easier to teach and utilize and the success rate was comparable.

2.4. Research In Energy Psychology

While there have been thousands of individual case studies, testimonials and anecdotal evidence reported there is very little in the peer review literature to support the energy psychotherapies.^{6,7} Wade in a doctoral dissertation achieved positive results using TFT to increase self-concept with phobic subjects.⁸ Figley and Carbonell, in their Active Ingredients Project, compared TFT to EMDR, Trauma Incident Reduction (TIR) and Visual/Kinesthetic Dissociation (V/KD) and confirmed that TFT worked well, with long-term success to reduce PTS symptoms in fourteen subjects.⁹ Lambrou and Pratt¹⁰ utilized TFT in a pilot study with four claustrophobic subjects and four controls. Based on psychological, physiological and behavioral measures before and after exposure to a small room, a significant reduction in state anxiety was achieved. Wells utilized EFT and a Diaphragmatic Breathing (DB) technique with thirty-five subjects with specific phobias of small animals. Participants were randomly assigned to either EFT (N = 18) or DB (N = 17) and were treated in a single thirty minute session. EFT produced a significantly greater improvement than DB on self-report and behavioral measures. At 6-9 months follow-up EFT participants (N = 12) continued to show significant improvement over pre-test on all measures and the DB subjects on two of the five measures.^{10,11}

The first study to show direct neurophysiological evidence of the efficacy of EFT was reported by Swingle.¹² Clients' brainwave activity was measured before and after a brief EFT repetition. Swingle found that the Sensory Motor Rhythm (SMR), which is brainwave activity in the 13-15 Hz range over the sensory motor cortex (location CZ; 10-20 international EEG site location system) which is approximately in the center of the head over the tips of the ears, increased in amplitude after EFT. This finding of increased SMR amplitude resulting from EFT was extraordinarily important since SMR amplitude enhancement is the focus of neurotherapeutic treatment for epilepsy. The average increase in the SMR amplitude (in microvolts) was 26.9 percent (SD = 14.1, df = 12, P < .01). Swingle also reported a number of case studies in which EFT was very effective in reducing the number of neurotherapy sessions required to increase seizure threshold in epileptic clients. Most encouraging was the finding that if a client had a prodromal, an awareness of an impending seizure, some clients could abort the seizure with self-administration of an EFT routine.

3. METHODS

3.1. Overview of the Experimental Design

The purpose of the present study was to determine the neurophysiological effects of EFT with a group of participants who reported traumatic stress as a result of a recent motor vehicle accident. Subjects who reported having been involved in a motor vehicle accident within the previous twelve months were brain mapped using a Quantitative Electroencephalograph (QEEG). At the time of the initial QEEG the participants also completed questionnaires to assess anxiety, depression, and avoidance of driving/riding in a motor vehicle. After EFT treatment, participants were again brain mapped and completed a second set of questionnaires to assess the same factors as measured on the first questionnaires.

3.2. Subjects

Participants, 8 males and 2 females were recruited from a newspaper advertisement calling for volunteers. Criteria for inclusion were that the volunteer had to be over 18 years of age, had been involved in a motor vehicle accident within the previous twelve months and reported moderate to severe traumatic stress as a result of the accident.

3.3. Procedure

Respondents to the call for subjects, who survived the criteria for inclusion, reported for initial assessment to the office of the first author at which time they completed the Beck Depression Inventory,¹³ the Beck Anxiety Inventory,¹⁴ 10 anger items from the State-Trait Anxiety Inventory¹⁵ and a 10 item questionnaire assessing avoidance of driving and riding in a motor vehicle. At the same visit, an eyes closed QEEG assessment of 19 brain locations was obtained. The EEG was the Lexicor N24, with an Electrocap 19 site harness, and all sites were brought below 5K ohms impedance. Following the initial assessment the participants received two sessions of EFT administered by the second author (LP) at his office. Prior to commencing the EFT treatments, participants were required to provide an estimate of their Subjective Units of Distress (SUD) associated with the traumatic event. The SUD was based on a 1-10 scale with one representing no subjective distress and 10 representing severe distress.¹⁶ Two treatments of EFT, administered by the second author (LP), occurred within 24 days of the initial QEEG ($M = 16.0$, $SD = 4.0$). The second QEEG was administered between 70 and 160 days post treatment ($M = 108.1$, $SD = 43.0$).

3.4. EFT Treatment Procedure

Once having met the criteria to qualify for the study, each subject was seen individually for one hour by the second author (LP). An overview of energy psychology, meridian therapy and a detailed description and diagrams of the location of the fourteen acupressure points was provided to each participant. Energy testing or muscle testing was also explained as a means of identifying possible subconscious beliefs as to whether or not the person could succeed in overcoming their PTS symptomatology. A pre-treatment SUD rating was obtained at this time.

Each subject was guided through the EFT algorithm by tapping each of twelve points for approximately seven to ten seconds while focusing on their stress and fear about driving an automobile in traffic. The acupressure points utilized in sequence were Bladder 2, Gallbladder 1, Stomach 1, Governing Vessel 27, Conception Vessel 24, Kidney 27, Spleen 21, Lung 11, Large Intestine 1, Pericardium 9, Heart 9, and Small Intestine 3.

Two more practice treatment sequences followed by asking the subject to raise their SUD as high as possible while thinking about their motor vehicle accident and then reduce the stress by tapping the EFT acupressure algorithm. Take home treatment protocols with diagrams, directions and theory were provided and each subject was asked to practice five times a day for the first week, three times a day for the second week, and then treat themselves accordingly as their SUD and anxiety was reduced.

The identical procedure was employed in the follow-up sessions twelve to fourteen weeks later and a final SUD rating was obtained as a comparison measure.

4. RESULTS

Of the 10 volunteers who began treatment one client was dropped from analysis because of artifact contaminated QEEG on the second assessment. This volunteer responded well to treatment with a final SUD of 1.0. The second QEEG was administered between 70 and 160 days ($M = 122.3$, $SD = 27.6$) after the final EFT treatment. The EFT treatments were administered from 10-24 days after the initial QEEG ($M = 16$, $SD = 4.0$). At the time of the first EFT treatment the average pretreatment SUD's rating was 8.3 ($SD = 1.1$). After the final EFT treatment the average SUD's rating was 2.5 ($SD = 2.3$). This difference in SUD's ratings was statistically significant ($t = 7.25$, $p < .01$) indicating marked improvement in subjective distress after EFT treatment.

At the time of the second QEEG the questionnaires administered at the first QEEG assessment were re-administered. A global index of change was obtained by calculating the percentage change of the sum of responses to all the self-report questionnaires. The range of summated ratings was from 0 to 284 with higher numbers reflecting more negative self-rated states. The percent change in the global index for the entire group of 9 clients was -29.0% ($SD = 44.8$, $t = 1.95$, $p < .05$, 1-tailed). This indicates a positive change for the group as a whole.

The global index revealed an interesting bimodal distribution of scores between clients with substantially improved self-ratings and those with no improvement or worsening of their self-rated condition. Five of the clients global index scores indicated substantial positive change ($M = -68.0$, $SD = 24.0$, $t = 6.36$, $p < .005$, 1-tailed). However, four of the nine clients had negative or no change in self-rating at the time of the second brain mapping session ($M = 10.3$, $SD = 7.7$, $t = 2.71$, $p < .05$, 1-tailed).

This bimodal distribution indicates that EFT treatment was efficacious for a group of clients but may have had negative effects for some clients. It should be noted that these global index changes reflect self-rated changes between 70 and 160 days after the final EFT treatment. Further, the SUD's rating obtained immediately following the final EFT treatment revealed a positive change for every client. The change averaged 5.85 points on a ten point scale ($SD = 1.94$, $t = 9.59$, $p < .001$, 2-tailed).

The second brain map was administered between 70 and 160 days following the last EFT treatment. This difference in time to second global self rating was unrelated to degree of improvement in the global index ($r = .04$ ns). On the other hand, it is interesting to note that the number of days between the first brain map and the final EFT treatment was negatively related to self-rated improvement ($r = -.55$, $p < .07$). The time to complete the EFT treatments then may be important in obtaining positive outcomes, perhaps indicating that EFT is more efficacious with shorter inter-treatment intervals.

The neurological data also reveal some intriguing relationships with self-reported improvements. The brainwave data were analyzed in terms of indicators of depression, cognitive quiescence and body quiescence. A neurological correlate of depressed mood states is frontal lobe asymmetry in

which the right frontal lobe (F4) is more aroused than the left frontal lobe (F3). Cortical activation can be indexed with Alpha (8-12 Hz) amplitude¹⁷ or with Beta (16-25 Hz) amplitude and the Theta (3-7 Hz)/Beta (16-25 Hz) ratio.¹⁸ For the purposes of the present study the Theta/Beta ratio was used as the neurological indicator.

A ratio of F3 to F4 Theta/Beta ratio was calculated for the first and second brain assessments. The percent change from the first to the second brain assessments for the improved clients was 11.5% ($SD = 9.9$) and for the clients reporting no change or negative change the average percent change in the frontal Theta/Beta ratio was -9.4% ($SD = 10.4$). This difference in change was significant ($t = 3.07, p < .02$). This indicates that improved clients had greater left frontal lobe arousal; whereas, those clients reporting no or negative change had greater right frontal lobe arousal at the second brain assessment relative to the first assessment.

An indicator of central nervous system quiescence is the Theta/Beta ratio in the occipital region of the brain. Increased Theta amplitude is associated with mental quieting and the therapeutic increasing of Theta amplitude is an extraordinarily effective treatment for certain types of alcoholics and for stress related conditions.^{19,20} For the present study the Theta/Beta ratio as measured in the occipital region of the brain (O1) served as the indicator of mental quiescence. The measure of change was the difference in the Theta/Beta ratio between the first and the second brain assessments. Increases in the Theta/Beta ratio indicate increased mental quieting. For the improved group the change was 33.3% ($SD = 34.8$) and for the group of clients not reporting improvement the change was -33.2% ($SD = 11.8, t = 4.00, p < .01$).

The index of somatic quiescence used in the present study was the Theta/Sensory Motor Rhythm (SMR) ratio. The SMR is 13-15 Hz amplitude measured over the sensory motor cortex (C3, CZ, C4). Increasing the SMR amplitude is an effective treatment for epilepsy and the Theta/SMR ratio has been found to be a significant indicator of various forms of seizure-like behaviors.^{21,22} The percent increase in SMR amplitude between the first and the last brain assessment was 40% ($SD = 85.5$) for the improved group and -71.8% ($SD = 37.7$) for the clients not reporting improvement ($t = 2.62, p < .05$).

5. DISCUSSION

Originally this study was designed to simply determine if EFT gave rise to any changes in the clients EEG. The research to date has been primarily focused on outcome measures such as SUD ratings. Such studies do indicate the therapeutic efficacy of EFT but do not help us to understand the processes by which positive change occurs. The study by the first author (PGS) indicated that at least one immediate beneficial effect of EFT was an increase in the SMR amplitude.¹² This could be associated with the positive effect that EFT has on reduction of phobic reactions. This focus on physiological and neurological indicators has been suggested as a worthwhile avenue of research in the areas of spiritual and distance healing.^{23,24} Shealy, for example, found significant brainwave changes in response to healing energy sent over distances from 100 feet to 160 miles.²⁴ Determining brainwave changes in response to EFT treatment likewise may help researchers to understand the psychoneurophysiological processes underlying EFT and other forms of energy psychology and energy medicine.

Fortunately for the purposes of the present study the group of clients treated with EFT divided almost equally into a group of clients who reported positive change and those who reported no or negative change. Interestingly, all reported positive change immediately after EFT treatment but four of the nine clients reported no or negative changes at the time of the last brain assessment. Those who improved had significantly greater Theta/Beta ratio changes in the occipital region of the brain, increased SMR amplitude over the sensory motor cortex and increased arousal of the left frontal lobe (relative to the right) as compared with the unimproved group of clients.

The immediate hypothesis that comes to mind to explain these effects is that improved clients are compliant with treatment recommendations whereas the unimproved clients are not compliant. The marginally significant correlation between the days to complete the EFT treatment and reported improvement might suggest less commitment to treatment by less improved clients. It could also indicate that less time between treatments facilitates EFT treatment by sustaining subjective feelings of improvement or providing more immediate reinforcement for compliant clients (i.e., less time to get out of the routine of daily self administered treatments). As we did not obtain self-report data on compliance nor assess the accuracy of self administered treatments during office visits (presumably an indicator of systematic practice) the relationship of compliance to sustained positive changes in brainwave activity cannot be determined. We do know, however, that the sustained self-reported benefit of EFT, at least with our very limited sample, was directly related to positive changes in brainwave activity. This further indicated, along with Levin,²³ Shealy²⁴ and others that psychoneurophysiological research can provide important data for understanding the processes involved in subtle energy healing.

The present study and the previous study on the use of EFT with neurotherapy for treatment of seizure disorders reported by Swingle indicates that the combination of the two treatment technologies can be very effective for rapidly and permanently treating many disorders.¹² Neurotherapeutic treatment of disorders such as epilepsy, depression, anxiety, pain, and the like would seem to be potentiated by EFT. The data indicate that the changes in brainwave activity resulting from EFT treatments are consistent with neurological changes that occur with neurotherapy. Although small sample size limits generalization it is plausible that EFT could enhance and/or maintain brainwave changes associated with neurotherapy. That neurotherapy and EFT may be a synergic combined treatment is suggested by the findings of the present study that enduring self-rated improvements occurred only with clients whose brainwave changes were stable over the measurement period.

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