

## Effect of Biofield Therapy in the Human Brain

Seiya Uchida, PhD,<sup>1</sup> Takehiko Iha, MD, PhD,<sup>2</sup> Kiyoshi Yamaoka, PhD,<sup>1</sup>  
Kazuo Nitta, MD, PhD,<sup>1</sup> and Hisanobu Sugano, PhD<sup>1</sup>

### Abstract

**Objectives:** The effects of Okada Purifying Therapy (OPT), a form of subtle energy (biofield) therapy that originated in Japan, were investigated. Electroencephalograms and the Profile of Mood States scores were measured using a crossover design during OPT and placebo sessions.

**Participants:** Nineteen (19) healthy Japanese adults (mean age  $\pm$  standard deviation: 40.8  $\pm$  11.2 years; 10 females) with no previous experience of biofield therapy participated in this study.

**Methods:** Each session lasted 15 minutes. A single-blind, randomized design with a protocol consisting of regular cycles with eyes open followed by eyes closed was used. The power spectral value was calculated in  $\theta$  (4.0–7.9 Hz),  $\alpha$  (8.0–12.9 Hz), and  $\beta$  (13.0–29.9 Hz) frequency ranges.

**Results:** The power spectral value of the  $\alpha$  band at F<sub>p1</sub>, F<sub>p2</sub>, F<sub>7</sub>, F<sub>z</sub>, F<sub>8</sub>, C<sub>3</sub>, C<sub>z</sub>, C<sub>4</sub>, and P<sub>z</sub> increased significantly in the OPT session compared with the placebo session. Mood state was improved after both sessions, and no significant difference was found between the two sessions.

**Conclusions:** OPT was more effective in increasing  $\alpha$  waves in the frontal and central cortex than a placebo treatment.

### Introduction

BIOFIELD THERAPIES are considered to be complementary and alternative medicine. These types of therapies consist of practices based on subtle energy fields (also called biofields) and generally reflect the concept that human beings are infused with subtle forms of energy.<sup>1</sup> Examples of biofield therapies include external *qi (chi)* therapy (EQT),<sup>2–5</sup> Reiki,<sup>6</sup> healing touch,<sup>7</sup> Johrei,<sup>8,9</sup> and Okada purifying therapy (OPT).<sup>10–12</sup> One advantage of biofield therapies is that they are inexpensive compared with the costs of other types of therapy. Furthermore, there is evidence that biofield therapies are effective to relieve stress, such as daily life stress and the stress of patients receiving terminal care. The effectiveness of biofield therapies is indicated by reports of reduction in tension, anxiety, and pain.<sup>12</sup> This type of therapy also appears to be useful as a complement to other types of medical care, because side-effects of biofield therapies are rare.

Few studies have examined the effects of biofield therapies on human physiology. Part of the reason for the limited research is that it is difficult to establish the physiologic origin of biofield effects and to distinguish between a biofield effect and possible placebo effects. There have been a small number of electroencephalogram (EEG) studies on the effects of EQT that have compared it with placebo treatments. One (1)

study evaluated differences in  $\alpha$  and  $\beta$  waves and plasma cortisol between EQT and control (placebo) sessions.<sup>2</sup> However, this study only analyzed the EEG for a 3-minute period of EQT, and changes in longer treatment periods were not investigated. Maltez et al.<sup>13</sup> reported that recordings over short time periods significantly biased the estimation of the EEG parameters. They recorded EEG activity of 57 normal participants, with a protocol consisting of regular cycles with eyes open (5 seconds) followed by eyes closed (55 seconds) repeated during a 10-minute period. Neither of these studies of EQT discussed the localization of brain activity or reported whether their participants had received any type of biofield therapy in their past.

The physiologic hypothesis of this study is that biofield activities stimulate specific brain areas, and that the biofield energies are subsequently processed, allowing for differentiation of certain moods. This hypothesis assumes that when humans distinguish between pleasant or unpleasant stimuli, for example, this distinction is based upon biofield information transmitted to the autonomic nervous system, immune system, and the endocrine system. This provides a rationale for anticipating that biofield therapy can exert an influence throughout the entire human body. Based upon this hypothesis, the present study attempted to measure the effects of biofield therapy by using an electroencephalogram.

<sup>1</sup>MOA Health Science Foundation, Sizuoka, Japan.

<sup>2</sup>Korinkai Okinawa Clinic, Okinawa, Japan.

The purpose of the present study was to investigate the effect of biofield therapy on EEG data using a crossover design consisting of therapy and placebo treatments, using a modification of Maltez's protocol. The localization of effects was analyzed with 13-channel EEGs in participants who had no previous experience of biofield therapy.

## Materials and Methods

### Participants

Participants were 19 healthy, right-handed Japanese adults (mean age  $\pm$  standard deviation:  $40.8 \pm 11.2$  years; 9 males and 10 females) with no previous experience of biofield therapy. They were tested individually in two experimental sessions (a biofield therapy session and a placebo session). The Institutional Review Board of the MOA Health Science Foundation approved the study. Informed consent was obtained from all participants prior to taking part in the study.

### Biofield therapy

OPT<sup>10-12</sup> was used as the biofield therapy. OPT originated in Japan for the promotion of good health. OPT is similar to EQT,<sup>2-5</sup> Reiki,<sup>6</sup> and Johrei<sup>8,9</sup> in that it appears to enhance patient health using bioenergy or *qi*. In OPT, a practitioner treats a patient using a modality that emits bioenergy, or *qi* through the practitioner's palm, without physically touching the patient. It has been proposed that this technique stimulates natural healing abilities innately possessed by humans. In turn, this enhancement of such abilities results in better psychologic and physical health.<sup>10-12</sup>

Mokichi Okada Association International, a nonprofit organization, has developed a certification system for the practice of OPT. The system enables both the training of OPT instructors and the certification of practitioners. Scientific studies of OPT have been recently reported.<sup>10-12</sup>

In the present study, the therapist was a medical doctor (male, 65 years old) certified in OPT with over 10 years of practice in this field.

### Procedures

Two (2) experimental sessions (OPT session and placebo session) were performed on different days at the same hour. The order of the two sessions was randomized across participants. Participants were not informed as to the type of experimental session, OPT or placebo, that they would be receiving. Prior to each session, the emotional states of the participant were measured using the Japanese language version<sup>14</sup> of the Profile of Mood States (POMS).<sup>15</sup> The POMS consists of 65 self-report questions, which evaluate six emotional states (anxiety-tension, depression, anger-hostility, vitality, fatigue, and confusion).

To ensure that participants were blind to the actions of the therapist, the participant sat on a chair facing a wall at a 1-m distance. The therapist sat on a chair behind the participant at a 1-m distance, such that the participant was unable to see the therapist.

The participant was instructed to open or close his/her eyes by signals from a headset connected to a PC. The therapist was instructed to start OPT or placebo sessions by

signals from a headset connected to the PC. Participants were unable to hear the signals delivered to the therapist.

Both types of sessions began after the participant had been fitted with the EEG apparatus and had rested while seated on the chair with eyes closed for a period of 5 minutes. The experimenters observed the behavior of the therapist and the participant via video camera. The POMS was administered a second time after each session.

### The OPT and placebo sessions

In the OPT session, the therapist conducted OPT to the back of the participant for 15 minutes. After the signal was delivered to his headset, the therapist began OPT by turning his palm toward the participant and concentrating on emitting biofield energy. The therapist was careful not to touch the participant or to make any noise. The participant performed a protocol consisting of regular cycles of opening the eyes (25 seconds) followed by closing the eyes (35 seconds), which were repeated throughout each 15-minute session. When the participant opened his/her eyes, s/he focused on a point on the wall at eye level. When the participant closed his/her eyes, the participant concentrated on receiving the biofield energy.

All conditions in the placebo session were identical to those in the OPT session, except that the therapist directed the OPT at himself for 15 minutes after the signal was received through the headset.

### EEG delate recordings

EEG electrodes (Ag-AgCl, Digitex Institute Co., Japan) were placed at 13 locations on each participant's head (Fp1, Fp2, F7, F8, Fz, C3, C4, Cz, T5, T6, Pz, O1, O2) according to the international 10-20 System.<sup>16</sup> These locations were indicated using a marking cap. Each site was first cleaned with alcohol to reduce skin resistance, and then electrodes were filled with electrode paste (Elefix, Nihon Kohden Co., Japan) and placed on the appropriate sites on the marking cap. The reference electrodes were placed on the earlobe and the ground electrode was attached to the forehead of the participant. These electrodes were connected to a portable electroencephalograph (Plymate Ap100, TEAC Co., Japan). Electrode impedances were less than 50 k $\Omega$ . The EEG signals were collected online with a filter (band pass = 1.5 and 60 Hz, notch = 50 Hz) and digitized at 1 kHz using a Dell computer equipped with AP Monitor software (NoruPuro Light System, Inc., Japan). Data were analyzed offline using AP Viewer software (NoruPuro Light System, Inc., Japan).

### Data analysis

Only the EEG data for the eyes closed were analyzed. The waveforms were visually inspected on a computer monitor to check for eye blinks and detectable eye movements. Portions of the EEG waveforms containing such artifacts were removed from the analysis. Then 30-second sequences of artifact-free recordings were extracted through a Hanning window for the periods that participants had their eyes closed. The power spectral value in the  $\theta$  (4.0-7.9 Hz),  $\alpha$  (8.0-12.9 Hz), and  $\beta$  (13.0-29.9 Hz) frequency ranges was calculated using Fast Fourier Transformation. The mean of the power spectral values in the baseline condition was

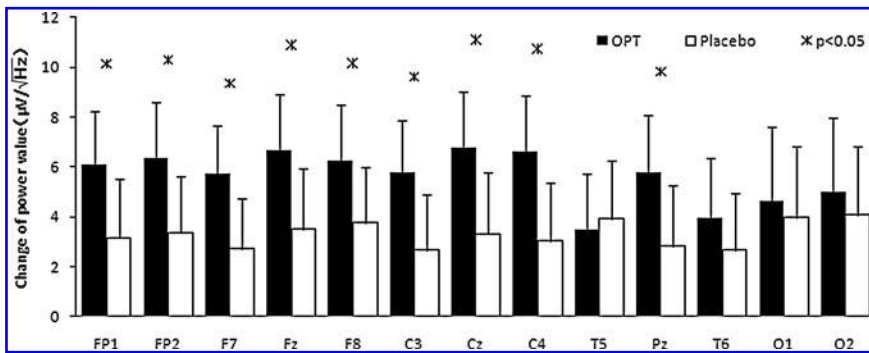


FIG. 1. The mean power spectral values in the  $\alpha$  range at the 13 points for each session for 15 minutes.  $p < 0.05$ , Wilcoxon test. OPT, Okada purifying therapy.

calculated for the 5 minutes before each session. The power values of each session were subtracted from the baseline data.

Statistical analysis

The results were analyzed statistically using SPSS for Windows version 11.01 (SPSS Inc. Chicago, IL). Wilcoxon tests were used for statistical comparisons of group differences between the OPT and placebo sessions.

Results

Figure 1 shows the mean power spectral values in the  $\alpha$  range at the 13 points for each session for 15 minutes. The baseline data indicate the mean power spectral value for the 5 minutes before each session. In the  $\alpha$  range, the power values at  $F_{p1}$ ,  $F_{p2}$ ,  $F_7$ ,  $F_z$ ,  $F_8$ ,  $C_3$ ,  $C_z$ ,  $C_4$ , and  $P_z$  in the OPT session were significantly increased relative to the corresponding values in the placebo session. There were no significant differences for  $\beta$  and  $\theta$  waves between the two sessions.

Figure 2 shows the time course of the power values in the  $\alpha$  range at  $C_z$  between the two sessions for the eyes-closed condition. Relative to the power values in the placebo session, the power values in the OPT session showed a greater increase, beginning after 4 minutes of OPT. Moreover, there was a significant difference in power values between the two sessions at 5 and 9 minutes. There was no difference between the two conditions for power values in the  $\theta$  and  $\beta$  ranges at any point within these sessions.

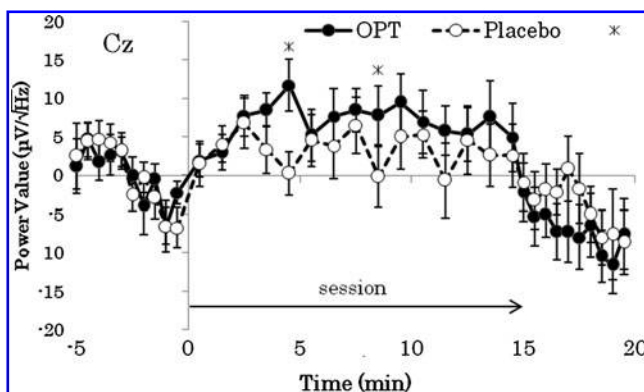


FIG. 2. The time course of the power value in the  $\alpha$  range at  $C_z$  between the two sessions.  $p < 0.05$ , Wilcoxon test. OPT, Okada purifying therapy.

Changes in responses on the POMS between before and after each session are shown in Figure 3. The OPT session showed significant decreases in scores for tension-anxiety (TA), depression (D), anger-hostility, and confusion (C), whereas the scores for vitality (V) increased significantly. In the placebo session, scores for TA, D, and C decreased, and the V score increased significantly. However, none of the emotional states measured by the POMS were significantly different between the OPT and placebo sessions.

When participants were asked about each session after the experiment, no one recognized a difference between the OPT and placebo sessions.

Discussion

The results of this study indicated that the mean spectral power of  $\alpha$  waves increased during OPT relative to placebo treatment. There was not a difference for  $\theta$  and  $\beta$  waves. There were no significant differences in emotional states measured on the POMS following OPT relative to placebo treatment.

In a previous study of EQT, Lee<sup>2</sup> reported that EQT affected  $\alpha$  and  $\beta$  waves, plasma cortisol concentrations, and emotional states compared to placebo-treated controls. The increased  $\alpha$  waves after OPT observed in the present study are consistent with Lee's findings, although the specific brain regions involved were not in agreement with his recordings. Specifically, the following locations ( $F_{p1}$ ,  $F_{p2}$ ,  $F_7$ ,  $F_z$ ,  $F_8$ ,  $C_3$ ,  $C_z$ ,  $C_4$ , and  $P_z$ ) of increased  $\alpha$  output differed from Lee's previous study ( $F_3$ ,  $F_4$ ,  $O_1$ ,  $O_2$ ) for EQT. The current study

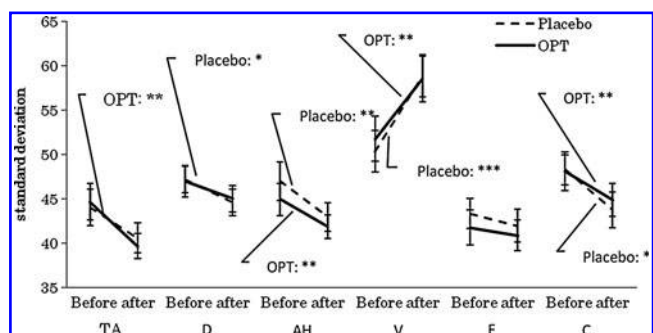


FIG. 3. Changes in responses to Profile of Mood States for each session.  $*p < 0.05$ ,  $**p < 0.02$ ,  $***p < 0.01$ , Wilcoxon test between before and after each session. OPT, Okada purifying therapy. TA, tension-anxiety; D, depression; AH, anger-hostility; C, confusion; V, vitality.

also found no significant impact on  $\beta$  waves as a function of the OPT session relative to the placebo session, which is not in agreement with Lee's findings.

In this study, the EEG was analyzed over 15 minutes at 1-minute intervals when participants had their eyes closed. A significant difference in  $\alpha$  waves between the OPT and placebo treatments was found 4 minutes after starting each session, indicating that the OPT affected  $\alpha$  waves with a delay of about 4 minutes. In Lee's study of EQT,  $\alpha$  waves were only measured for a period of 3 minutes. Therefore, it is possible that the time course of the recording period in Lee's study was too short for  $\alpha$  waves to increase during EQT. Maltez<sup>13</sup> et al. reported that this type of delay is particularly relevant for studies where short recordings are used, thus significantly biasing the estimation of the EEG parameters.<sup>9</sup> The length of the analyzed segment in the present study was longer than in Lee's study, and therefore, the authors consider that a sustained effect of OPT on  $\alpha$  waves was reliably demonstrated.

Both OPT and placebo treatment significantly improved positive emotional states. However, there was no significant difference in emotions assessed on the POMS between the OPT and placebo treated groups, suggesting that the participants could not distinguish between the two treatments in their self-report data. Therefore, it can be concluded that the participants were truly blind to the two procedures. By contrast, other studies have reported that EQT improves these kinds of psychologic states compared with placebo treatments.<sup>3,4</sup> This study's results are not consistent with these EQT studies.

The area where the  $\alpha$  power was increased by OPT was the central and frontal hemisphere. The authors propose that the central and frontal cortical brain regions may be related to the processing of OPT. In addition, it is suggested that humans receive biofield energies with the whole body, and then this information is transmitted to the frontal cortex through the somatosensory cortex. It is believed that this is the reason for the increased power of the  $\alpha$  waves in the frontal and central cortex recorded during OPT.

One limitation of the current study is that the protocol consisting of regular cycles of open and closed eyes might have reduced the effect of OPT. The authors plan to study the benefit of the protocol with additional measurement of other physiologic parameters, such as autonomic nervous function and endocrine function.

A multivariate analysis was not performed between electrodes in the OPT session and the placebo session to examine the synchronicity of responses in the cortex area. With additional participants, a multivariate analysis between electrodes in the OPT and placebo sessions could be performed.

In previous studies of OPT, about 70% of the participants report improvement for pain, autonomic nervous conditions, and emotional conditions.<sup>12</sup> Also, OPT increases parasympathetic nervous activity.<sup>17</sup> Therefore, it is considered that OPT provides benefits for improvement of diseases involving pain control, autonomic nervous conditions, and emotional conditions in a program of management using integrative medicine. The authors plan to study the benefits of OPT as part of integrative medicine in a variety of clinical sites, such as terminal care, rehabilitation, mental diseases, and chronic diseases.

## Conclusions

OPT, a biofield therapy that originated in Japan, was more effective in increasing  $\alpha$  waves in the frontal and central cortex than a placebo treatment.

## Acknowledgments

We are deeply grateful to Kiyoshi Suzuki, PhD, the president of the MOA Health Science Foundation, for his contribution to this project, as well as his continuing help and support. We would also like to thank Tomoaki Kimura, PhD, researcher, Mr. Koji Toshimi, and the staff of the MOA Health Science Foundation. In addition, we would like to thank Mr. Naoto Ichinose, Ms. Hitomi Tokimoto, nurse, and the staff of the Korinkai Okinawa Clinic for their help with the data collection for this research.

## Disclosure Statement

No financial conflicts exist.

## References

1. What Is Complementary and Alternative Medicine. <http://nccam.nih.gov/health/whatiscam/> Accessed July 2011.
2. Lee MS, Rim YH, Kang CW. Effects of external *Qi*-therapy on emotions, electroencephalograms, and plasma cortisol. *Intern J Neurosci* 2004;114:1493–1502.
3. Lee MS, Jang JW, Jang HS, Moon SR. Effects of *Qi*-therapy on blood pressure, pain and psychological symptoms in the elderly: A randomized controlled pilot trial. *Complement Ther Med* 2003;11:159–164.
4. Lee MS, Huh HJ, Hong SS, et al. Psychoneuroimmunological effects of *Qi*-therapy: Preliminary study on the changes of level of anxiety, mood, cortisol and melatonin and cellular function of neutrophil and natural killer cells. *Stress and Health* 2001;17:17–24.
5. Lee MS, Kim MK, Lee YH. Effect of *Qi*-therapy (external *Qigong*) on cardiac autonomic tone: A randomized placebo controlled study. *J Neurosci* 2005;115:1345–1350.
6. Mackay N, Hansen S, McFarlane O. Autonomic nervous system changes during Reiki treatment: A preliminary study. *J Altern Complement Med* 2004;10:1077–1081.
7. Umbreit AW. Healing touch: Applications in the acute care setting. *AACN Clin Issues* 2000;11:105–119.
8. Naito A, Laidlaw TM, Henderson DC, et al. The impact of self-hypnosis and Johrei on lymphocyte subpopulations at exam time: A controlled study. *Brain Res Bull* 2003;62:241–253.
9. Laidlaw TM, Naito A, Dwivedi P, et al. The influence of 10 min of the Johrei healing method on laboratory stress. *Complement Ther Med* 2006;14:127–132.
10. Nitta K. Complementary and alternative medicine. *Biotherapy* 2005;19:167–179.
11. Suzuki K, Nitta K, Katamura H. Clinical application of Bio-energy medicine in integrative medicine: From background to clinical practice. *Biotherapy* 2007;21:407–413.
12. Suzuki K, Uchida S, Kimura T, et al. Safety and efficacy of biofield therapy in Japan. *Soc Integr Med Jpn* 2009;2:37–43.
13. Maltez J, Hyllienmark L, Nikulin VV, Brismar T. Time course and variability of power in different frequency bands of EEG during resting conditions. *Neurophysiol Clin* 2004;34:195–202.
14. McNair DM, Lorr M, Droppleman LF. Profile of Mood States. San Diego: Educational and Industrial Testing Service, 1992.

15. Yokoyama K, Araki S. POMS Guide. Tokyo: Kaneko Syobo, 2000.
16. Jasper HH. The 10–20 electrode system of the international federation. *Electroencephalogr Clin Neurophysiol* 1958;10:371–375.
17. Uchida S, Tsuda Y, Kimura T, et al. Assessing perceived shoulder stiffness using hardness meters. *Jpn J Psychosom Med* 2011;51:1120–1132.

Address correspondence to:  
*Seiya Uchida, PhD*  
*MOA Health Science Foundation*  
*1-1-60 Nishiatami*  
*Atami-shi, Sizuoka 413-0038*  
*Japan*  
  
*E-mail: seiya-u@mhs.or.jp*

**This article has been cited by:**

1. Ann Linda Baldwin, Richard Hammerschlag. 2014. Biofield-Based Therapies: A Systematic Review of Physiological Effects on Practitioners During Healing. *EXPLORE: The Journal of Science and Healing* . [[CrossRef](#)]