Experimental

A NEW APPROACH TO THE STUDIES OF SUBTLE ENERGIES

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ABSTRACT

The effects of subtle energies are criticized by many people as nothing but suggestion, and doubts have been cast on their effects on the living body. We have studied the effects of healing using the following parameters. 1. Changes in consciousness by recording EEG; 2. Changes in autonomic functions, such as pulse rate and blood pressure; 3. Changes in meridians; 4. changes in the discharge patterns of leaves under healing using Kirlian photography. It was found that a healer caused changes in the activity of meridians, increase in corona discharges of leaves, and synchronous changes in the EEG of both a healer and receiver during healing. The origin of healing energies has not been elucidated yet, but the existence of subtle energies is demonstrated.

KEYWORDS: Healing, meridians, EEG, blood pressure, heart rate, AMI, Kirlian photography, placebo effects

INTRODUCTION

Although subtle energies such as Qigong and therapeutic touch are attracting public attention, they are not fully understood and recognized by the present sciences. Subtle energy effects as such are criticized by many people as nothing but placebo effects caused by the power of suggestion, and critics deny any possible effects on living bodies.

One of the most important points in the study of subtle energies is to discriminate between any physiological changes caused by some force outside of the body as compared with those caused by self-suggestion. However, from the standpoint that the purpose of healing is to cure patients, it should be recognized that the power of suggestion and that of hypnosis may actually increase the effects of healing with subtle energies.

We have studied the effects of subtle energies by utilizing single blind methods[1,2] that is, receivers were completely unaware of when the healers' treatments started or stopped.

We measured the following physiological parameters:

1. **Changes in consciousness** by EEG recording;

2. **Changes in autonomic functions** such as pulse rate and blood pressure;

3. **Changes in electrical activity of the meridians** using an apparatus for measuring functions of meridians and their related internal organs (AMI),[3] a computerized analysis system; and

4. **Changes in the energy discharge patterns of leaves treated by healers** using Kirlian photography, a common method for measuring this type of phenomenon.[4-11]

Furthermore, we have been successful in making continuous recordings of both AMI data and Kirlian photographs,[12] and actual 'real time' analysis was achieved with both methods.

METHODS USED

HEALERS

Healers consisted of six experts of Qigong, eight experts of Jorei (Medical Art of Japan), and one expert meditator. For the leaf experiments, there were six Qigong experts, 29 Joreishi, and two meditators.

SUBJECTS

Subjects consisted of eighteen healthy subjects (9 females and 9 males, aged 15-68 years), and seven infants (aged 3-6 months).

AMI EXPERIMENTS, BLOOD PRESSURE AND HEART RATE MEASUREMENT

The AMI was developed to measure increases and decreases in the electrical activity of the meridians. Seven active electrodes were attached to the meridians of each hand, and seven on each foot of the receivers of healing energy. A reference electrode was attached to the arm at the earlobe meridian. A pulse of three volts with a duration of 256 usec was applied between each pair of electrodes. The maximum initial current observed is called BP (before polarization) and the study current seen afterward is called AP (after polarization) as seen in Figure 1.[12,14,15] Both BP and AP were measured every second, and each value was recorded in a computer. The values of BP and AP were displayed on a CRT monitor, and plotted on a printer. In order to assure the actual effects were due to subtle energies coming from outside the receiver's body, the reference electrode was placed on a meridian which was determined to have an abnormal value prior to the start of the experiments.

Continuous blood pressure, including systolic, diastolic and mean pressure, and the heart rate were recorded by Finapres (OMEDA) from the third finger.

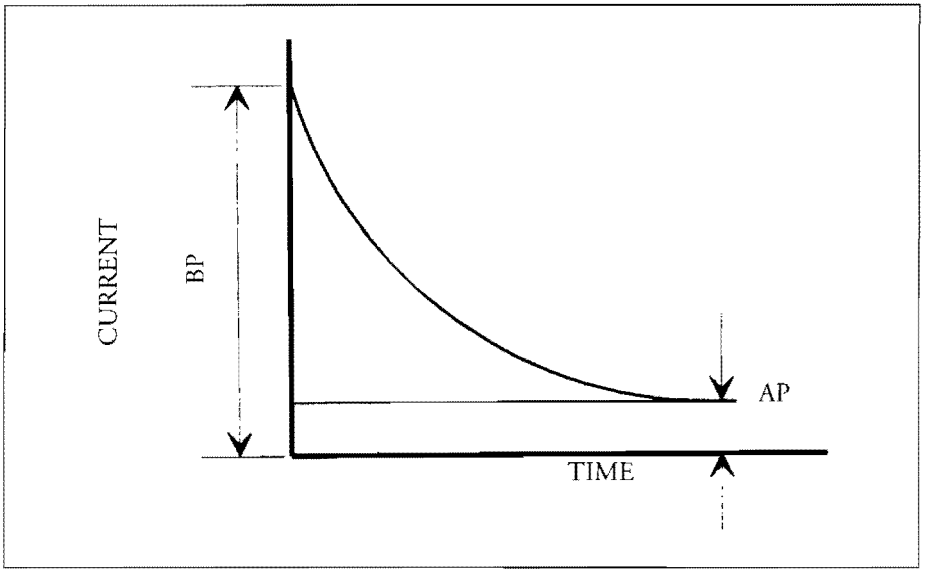


Figure 1. *Definition of BP and AP in AMI measurements*

Measurements Utilizing Kirlian Photography

Kirlian photography apparatus consists of a high voltage generator and a discharge plate as shown in Figure 2. Kodak TMAX 400 film (black and white) is fixed on the discharge plate. The material (in this case a leaf) which is grounded, is placed on the film. A high voltage of 30 kV with a frequency of 4 kHz and a duration of 2 msec is applied between the plate and the material. We chose to use Hong Kong Capoch leaves as a material for the experiments. Two leaves, A and B, were picked from the same branch, with B kept separate for use as a control, and A was treated with subtle energies through Qigong (hand radiated healing) for ten minutes (Figure 3).

Eight photographs of each leaf (A and B, making a total of 16 photographs) were taken, one of each before, and the remaining after the subtle energy treatment. As the photographs were taken consecutively, some slight effect of sequence must be considered as it was impossible to take the photographs at the exact same time. This means that it is possible that some slight change in

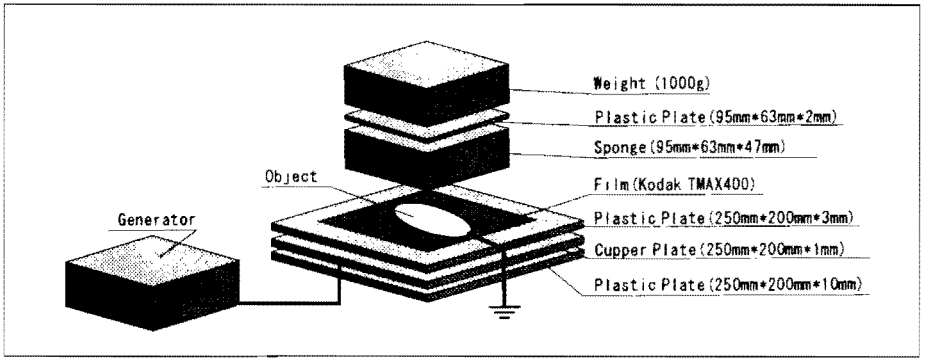


Figure 2. *Apparatus for Kirlian photography. It consists of a high voltage generator and discharge plate. A copper plate (positive electrode) is put between the plastic plates. A film is placed on the plate, and the grounded material under test is balanced on this film. A weight is placed on the sample to keep it flat.*

the condition of the leaves could be due to the times of photographing A and B being slightly different. Therefore, a control experiment was conducted (C and D). Photographs of corona discharge of each leaf were taken before and after leaving both leaves in the same place at room temperature for 20 minutes. In each case, the leaf was placed into a separate covered glass box, and kept in a constant room temperature of 25 degrees Celsius (plus or minus 1 degree). Experiments on 45 treated leaves and 55 control leaves were performed. Kirlian photographs were developed by an automatic developer (CPE2, LPL Ltd.). Photographs of A and B were done separately as this developing device cannot develop all photographs at the same time. All changes in the photographs were done comparing treated and untreated leaves (A and B) of the same group, not a total of all A leaves with all B leaves, therefore, any time difference (noted or otherwise on the photographs) in total developing has no influence in the analysis of the photographs. To our knowledge, evaluation of Kirlian photographs hitherto reported has been done by visual inspection. We have developed a quantitative analysis of photographs using image analysis. Each Kirlian photo was scanned using an image scanner (resolution rate 100 dpi, 256 gray tone), and was read into a computer. A part of the corona exposure was analyzed by a gradient level, that is, the number of dots in the corona was counted, and its area was measured.

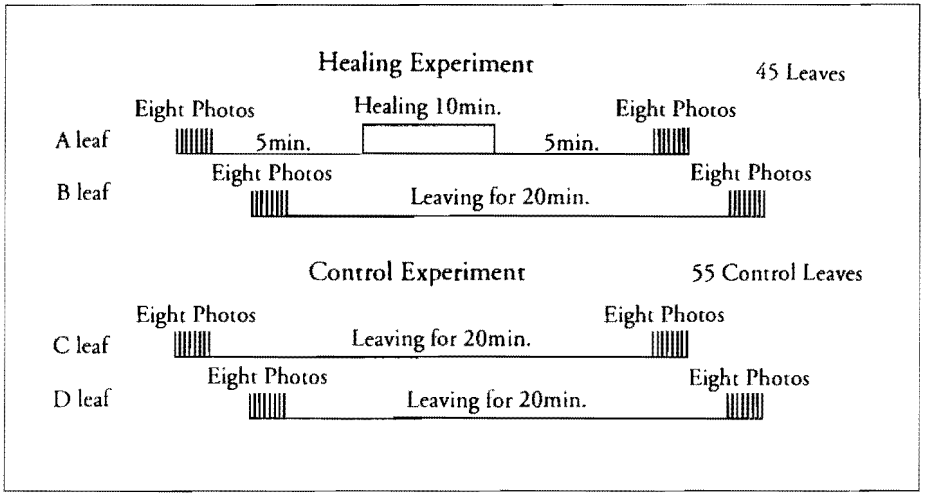


Figure 3. *Experimental protocol in measuring the effects of healing on leaves using corona discharge photography.*

We also developed a continuous method of recording Kirlian photographs. The corona discharge was picked up by an infrared CCD camera and displayed on a CRT screen, and simultaneously recorded by a video recorder. Using this method, the famous so called 'phantom leaf phenomena' was observed, and its cause was suggested.

EEG Measurement

EEGs of both healers and receivers were recorded simultaneously. EEGs were recorded on 12 areas of the brain according to the International 10-20 system. All data was analyzed using Fast Fourier Transform. The EEG was divided into six bands, that is, the delta band: 1.5 to 3.8 Hz; theta band: 4.0 to 7.8 Hz; alpha 1 band: 8.0 to 9.8 Hz; alpha 2 band: 10.0 to 12.8 Hz; beta 1 band: 13.0 to 19.8 Hz; and beta 2 band: 20.0 to 30.0 Hz; and a topographic display of the EEG was made.

Each of the receivers sat in a reclining chair, wearing headphones and eye masks, listening to sounds of sea waves to maintain their consciousness at a constant

level and to completely isolate them both visually and audibly from their surroundings so that they were completely unaware of the starting and stopping of healings. The experimental room is electromagnetically shielded, sound proof, and kept at a constant room temperature of 25 degrees Celsius (plus or minus 0.5 degrees) with a constant humidity of 50% (plus or minus 5%).

The experiments in the sealed room were constantly monitored and simultaneously recorded on a CCD camera. All healers were instructed not to touch the receivers at any time during the experiments. Healings were commenced at a signal from outside of the room.

RESULTS

Studies of Healing Power Using AMI Measures

Changes in the meridians of both hands were measured every 2 minutes (a total of 28 recordings). In 8 of 14 cases, the observed change in the BP level was significant (p = .001).[16] We found that the AP and BP values were not constant due to experimental conditions. Therefore, the factors which influenced these values were studied. The factors are as follows:

1. **Electrodes and Paste.** The BP value gradually increased for approximately 10 to 30 minutes immediately after starting (Figure 4.1). This shows that healing experiments must commence after the value becomes constant.

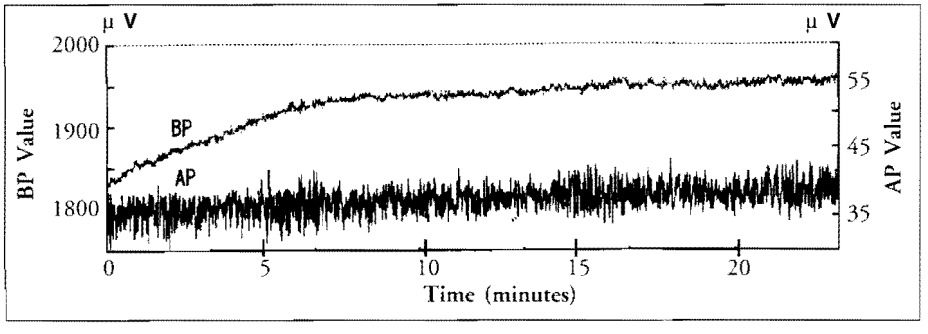


Figure 4.1. *The BP value increases with the time, and becomes stable after 30 minutes.*

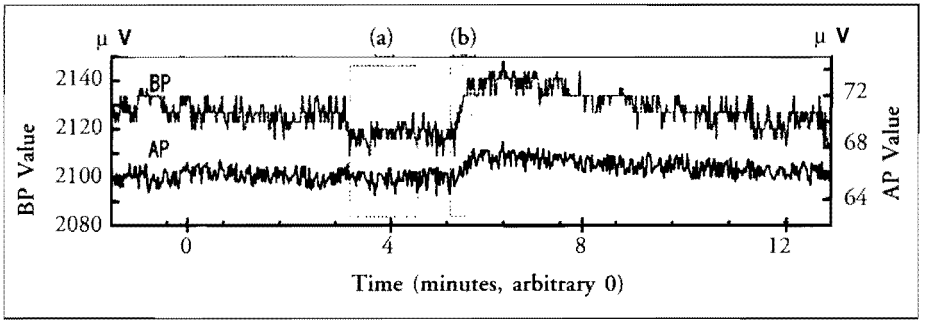


Figure 4.2. *Effects of local temperature on the values. Cooling around the electrode decreases the BP value (a). Warming increases both the BP and AP value (b).*

2. **Temperature.** Both AP and BP values changed with warming or cooling around the electrode (Figure 4.2). As the environmental temperature raised the BP value increased while the AP value decreased (Figure 4.3).

3. **Movements.** When a receiver bent the finger which had the electrode placed on the meridian, the BP value raised, and the BP value decreases when the finger is straightened. Also, when the hand was raised, the BP value decreased, and increased when the hand was lowered (Figure 4.4).

4. **Touching the Receiver's Body.** BP values increased when the receiver's body was touched, and AP values also decreased slightly (Figure 4.5).

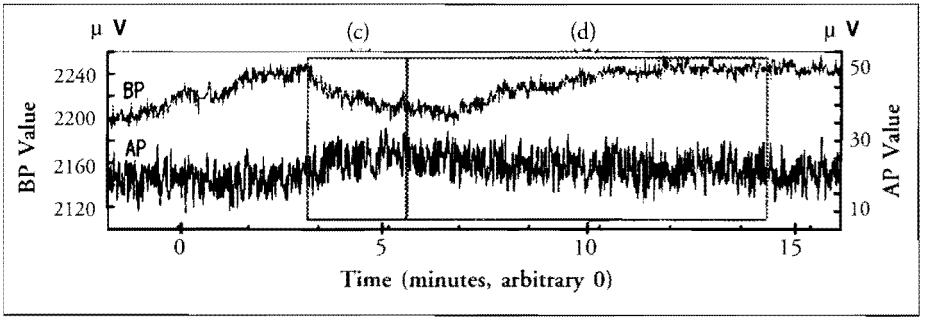


Figure 4.3. *Effects of room temperature on the value. Decrease in room temperature of 25° to 30°C (c) causes a decrease in the AP, and an increase in the BP (d).*

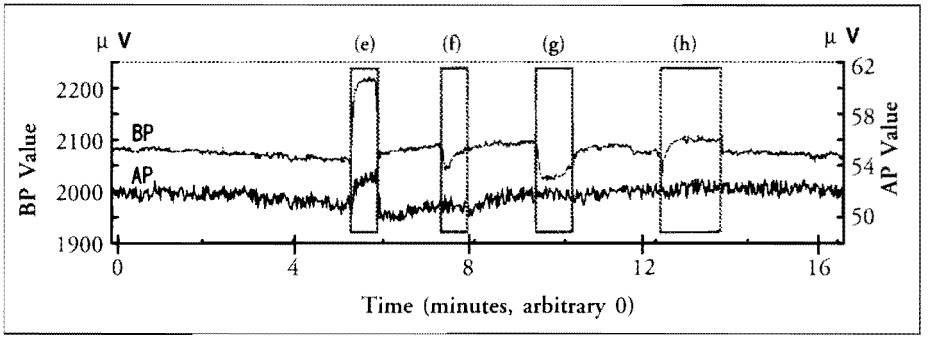


Figure 4.4. *Effects of the movement on value. Bending the reference finger inside increases both the AP and BP values (e); stretching the finger decreases the BP (f); raising the finger decreases the BP (g); lowering the finger increases the BP (h).*

5. **Other Factors Affecting AMI Values.** Neither electromagnetic fields nor contact pressure of the electrode affected the values. These conditions were rectified when the indifferent electrode was placed on the earlobe.

Therefore, in all experiments the above conditions were controlled for, and all AMI experiments were performed in a constant temperature room and the electrodes were fixed to the fingers. In Figure 5, the BP value increased during healing and returned to the initial value after the healing was stopped. In Figure 6, the AP value rapidly increased, fluctuated during healing, and became stable after the healing stopped. Figure 7 shows changes in BP and AP values

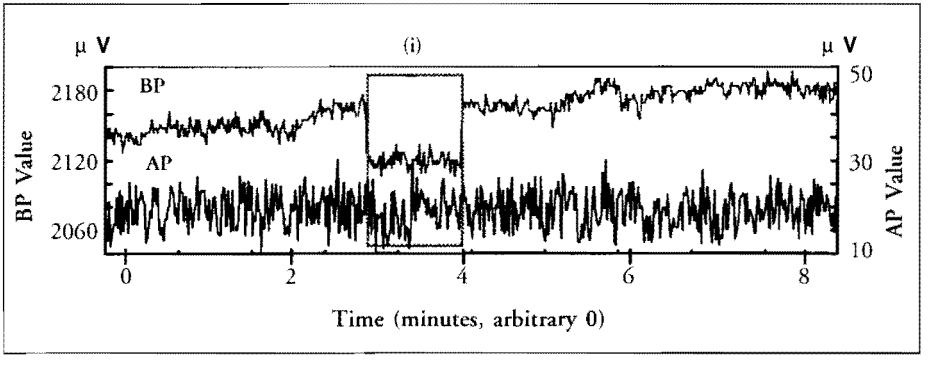


Figure 4.5. *Touching the body decreases the BP (i).*

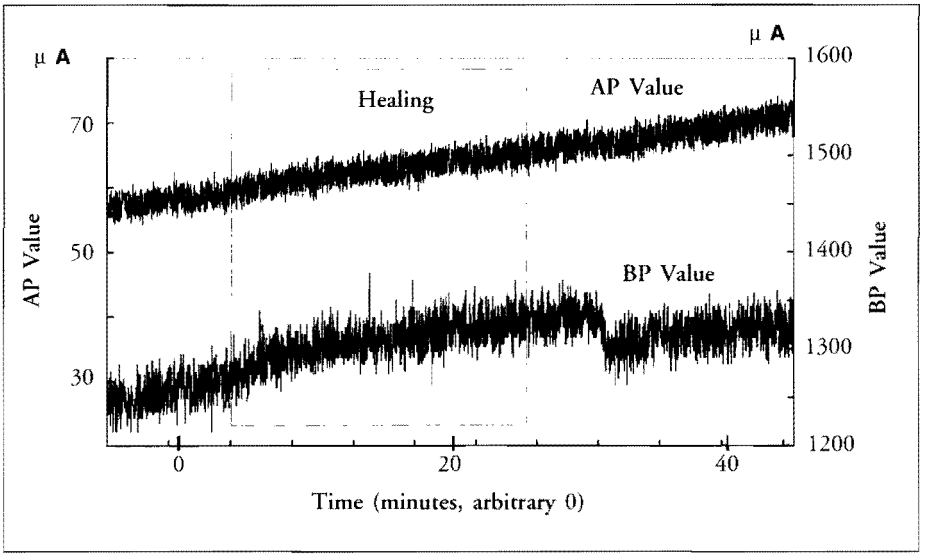


Figure 5. *Changes in AP and BP during healing. The BP value gradually increases during healing. Five minutes after healing, it rapidly decreases and returned to the previous level.*

when remote healing was performed by a healer. A healer "radiated healing energy" from outside of and separated from the electromagnetically shielded room in which the receiver was being tested. During a healing, the BP value raised, and a characteristic periodic change in blood pressure and heart rate were observed. As shown in Figure 8, blood pressure raised, and a periodic change during healing was confirmed. Irregular changes were found after the healing was stopped. Larger or smaller changes were observed during healing experiments although variations of this phenomena were not stable from person to person.

A detailed analysis was made of the changes in blood pressure and heart rate. In Figure 9, fluctuations of blood pressure and heart rate were analyzed using Fast Fourier Transform. As shown in the figure, peaks were seen at a frequency of 14, and 23 Hz in blood pressure before healing.[17,18] The 12, 17, 23 and 64 Hz components of blood pressure increased markedly during healing, while the heart rate 10 Hz component increased during healing.

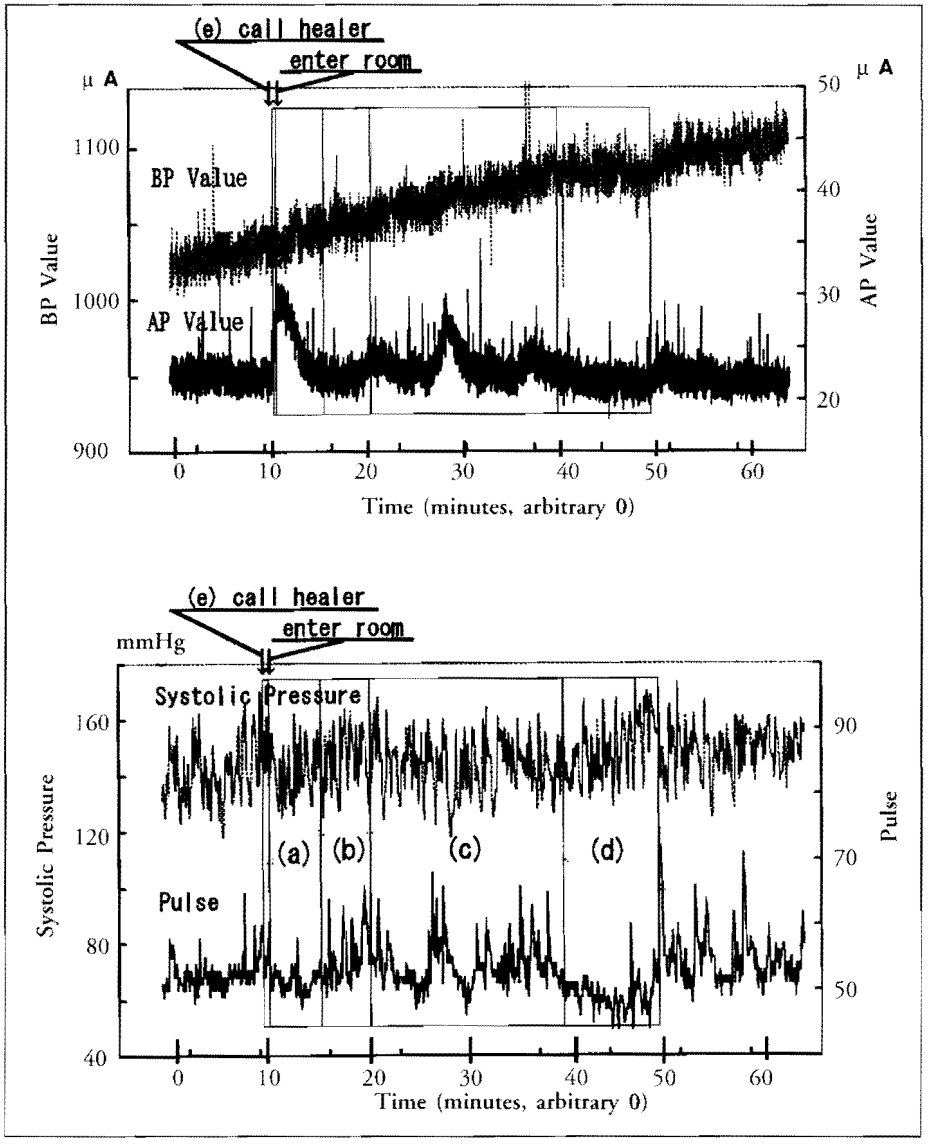


Figure 6. *Changes in AP, BP, systolic pressure and heart rate during healing. Healers stayed outside the experimental room, and then entered the room quietly. The receiver was not aware that a healer approached him. (a): Healer sat on a chair. (b): Healer began healing only mentally. (c): During healing. (d): After healing. (e): AP value rapidly increased when a healer was asked to enter the room, fluctuated during healing, and stopped after healing.*

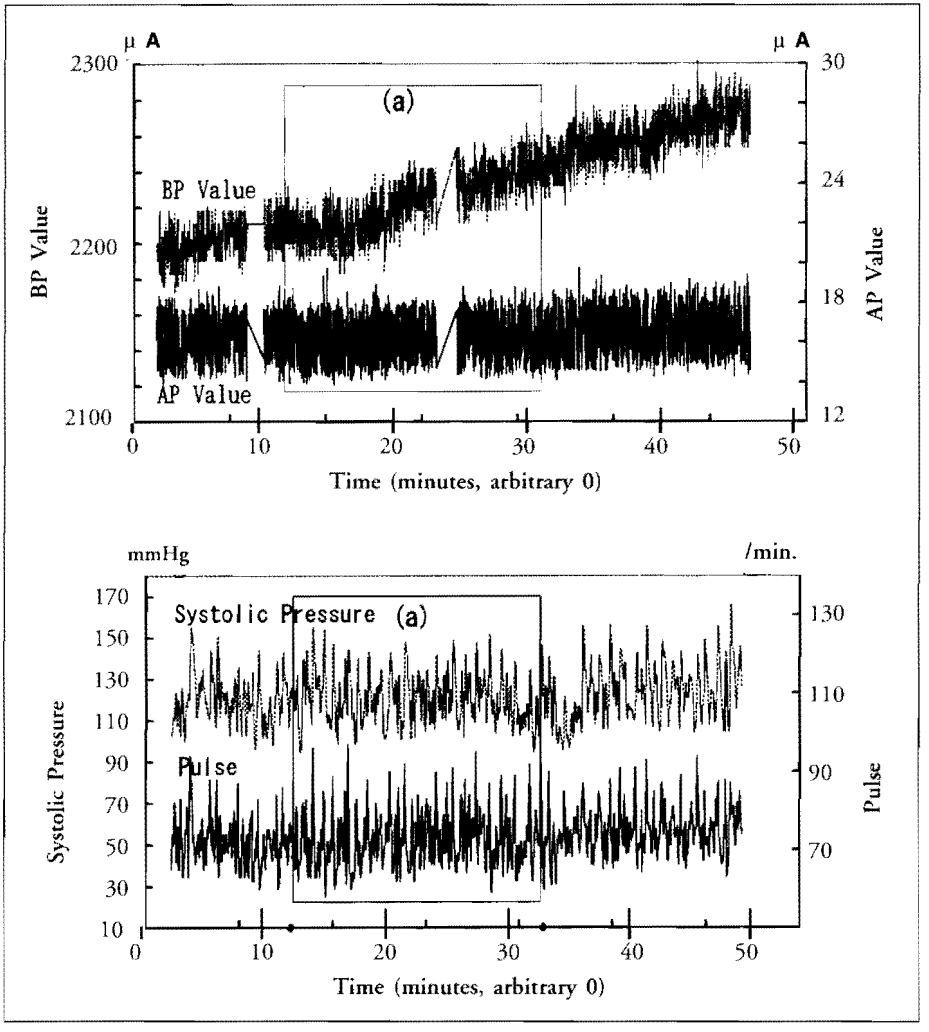
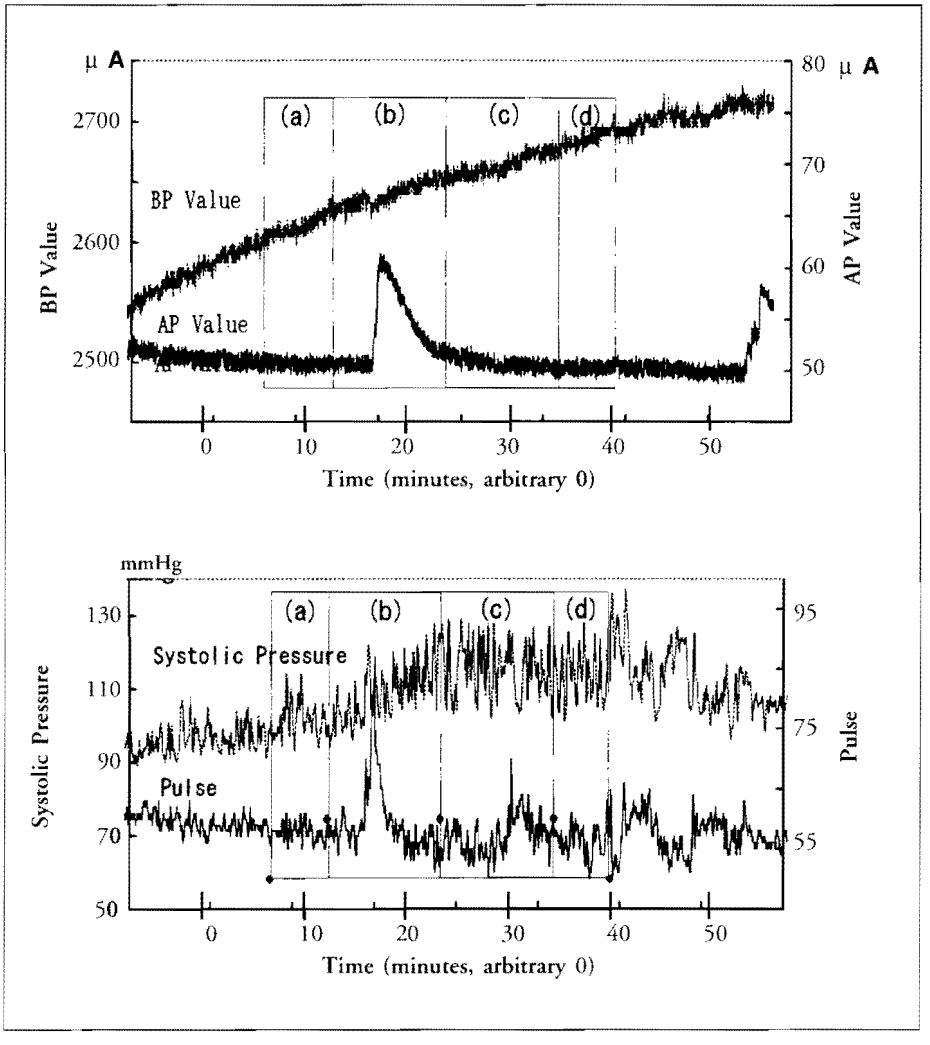


Figure 7. *Changes in AP, BP, systolic pressure and heart rate during remote healing (a).*

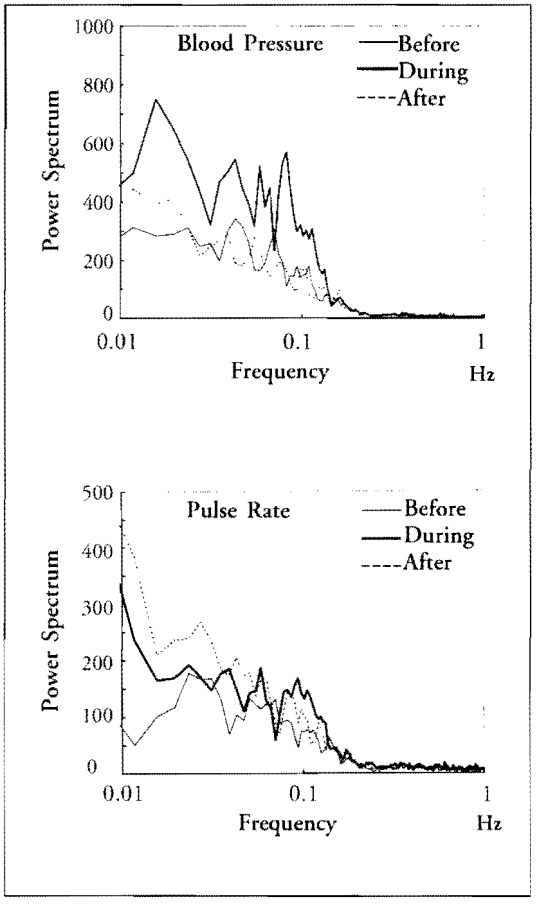
Studies of Healing Power Using EEG Measurements

Figure 10 shows the topographic display of alpha 2 band in both a healer and a receiver. The upper trace shows the EEG before healing, followed by EEG recordings during healing, and after healing was stopped. The left row is the



Figures 8. *Changes in AP, BP systolic pressure and heart rate (see Figure 6 for periods.)*

EEG of the healer, and the right is that of the receiver. The component of alpha 2 band in the healer was not observed before healing. However, when healing was started it rapidly increased across the whole brain. After healing was stopped, the alpha 2 component in the healer returned to the prior level, but remained markedly increased in the frontal area of the receiver. Figure 11



Figures 9. *Fluctuations of pulse rate and blood pressure analyzed by FFT.*

shows an example of EEG changes in another healer. This healer showed alpha 1 dominance in the frontal area before healing. During healing, alpha waves decreased in the left hemisphere, whereas the EEG of the receiver became alpha dominant during healing. In Figure 12, an asymmetrical distribution of alpha waves around the parietal regions was observed during healing. This shows that this healer activated the right hemisphere during healing.

Differences of healing abilities between effective healers and ineffective healers were studied by observing changes in EEG.[19] The EEG at Pz was divided into 6 frequency bands, and principal component analysis was made. Table I shows the amount of factor loading, first principal component factors and second component factors. Although these factors varied among expert healers, amount of variation increased during healing. On the contrary, amount of variation was small in ineffective healers, although EEG changes were also observed as seen with the expert healers (Figure 13). This suggests that differences in healing ability may depend on larger EEG changes between resting and healing conditions. It is difficult to maintain a constant EEG in receivers, since they are prone to become drowsy during healings. In a drowsy state, slow wave components appear and it is difficult

Fig. 10

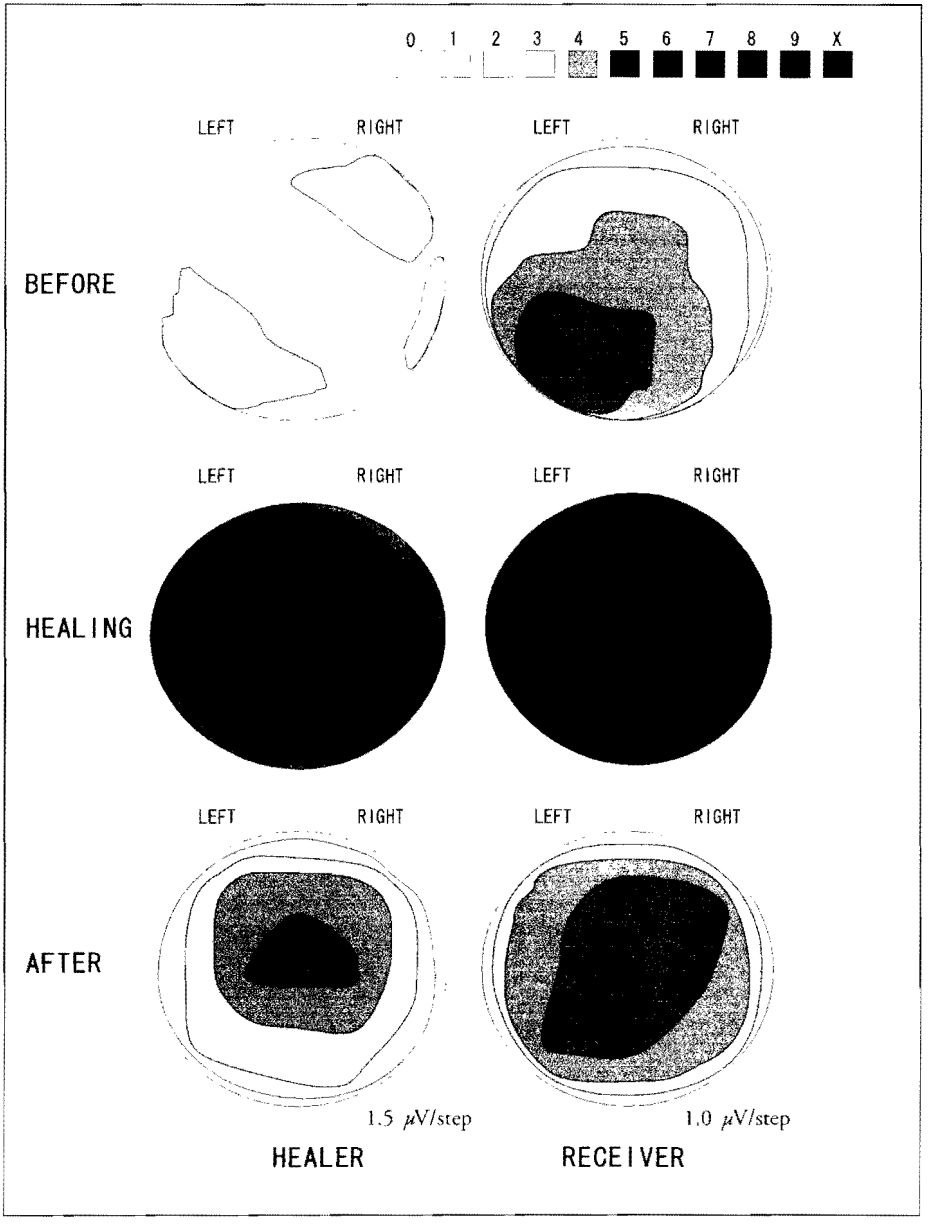
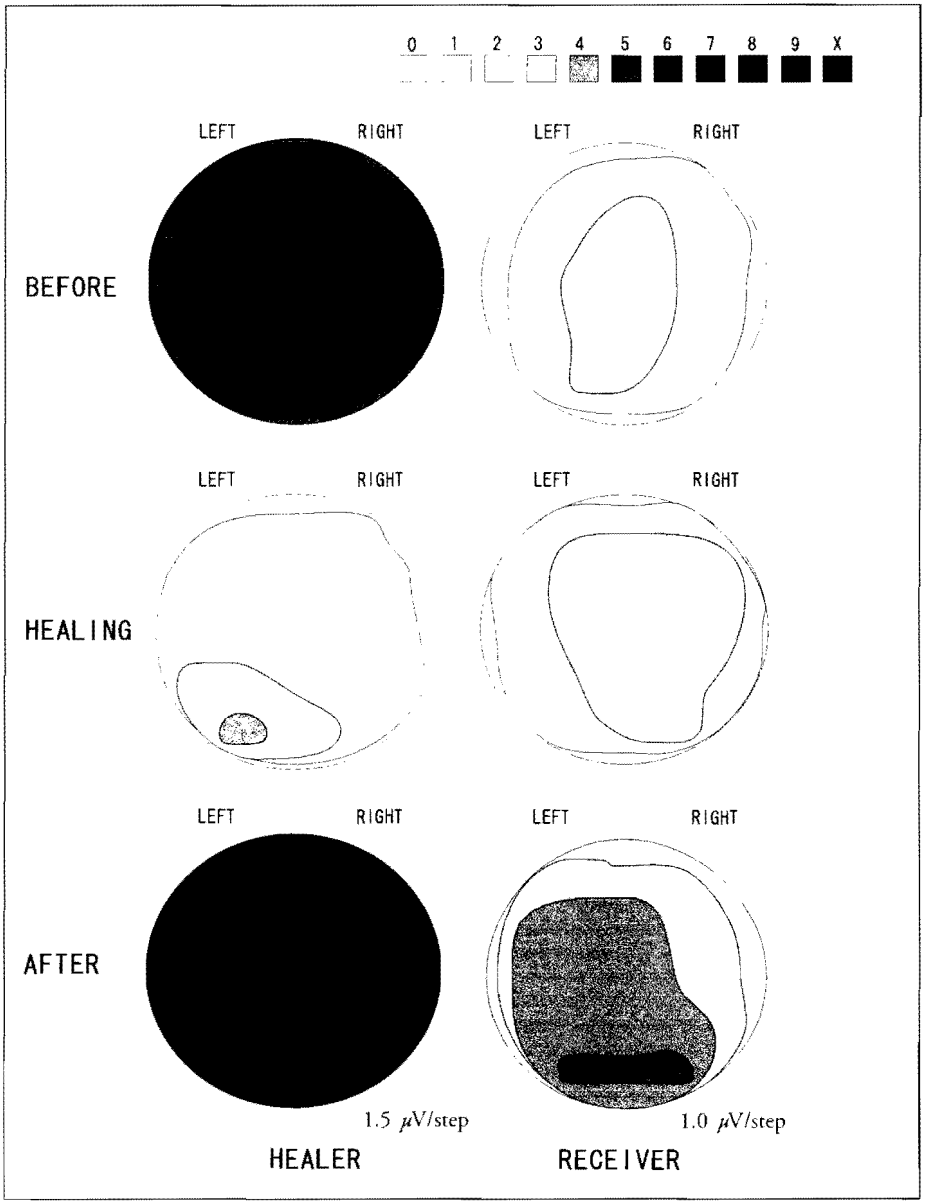


Figure 10. *Changes in the alpha 2 band of a healer and a receiver during healing. Left row is the EEG of a healer and the right is that of receiver.*



Figures 11. *Changes in the alpha 1 band of a healer and a receiver. The alpha wave in a healer decreased during healing, whereas that in a receiver increased. The alpha wave remained in the left occiptial area, and those in the right area were blocked.*

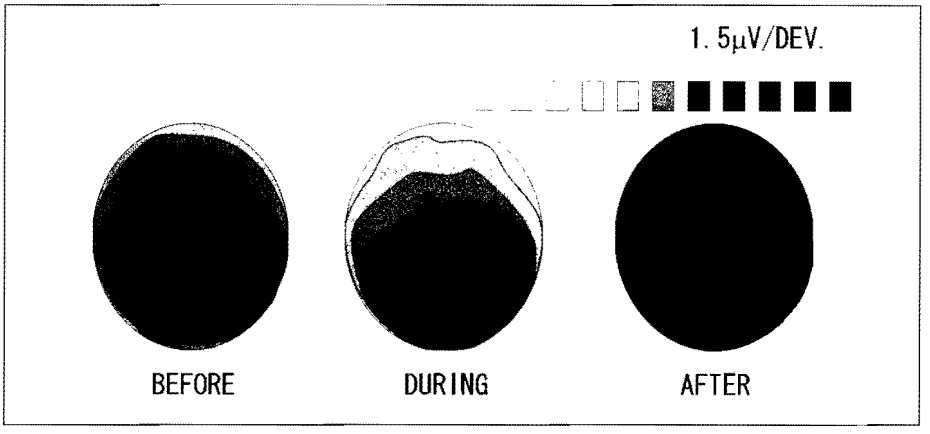


Figure 12. *An example of topographical changes in the alpha 1 band in the healer. During healing, an increase in alpha wave in the right occipital region was seen.*

	First Principal component	Second Principal component	Third Principal component
δ	0.9478	-0.0851	-0.1127
θ	0.7747	-0.4954	-0.3369
$\alpha 1$	-0.9649	-0.1117	0.0066
$\alpha 2$	-0.8630	0.1340	-0.0760
$\beta 1$	0.2787	0.8915	-0.3426
$\beta 2$	0.8043	0.2783	0.5023
Eigenvalue	3.8989	1.1552	0.5017
Coeff. of Determination	0.6498	0.1925	0.0836
Coeff. of Cumulative Determination	0.6498	0.8424	0.9260

Table 1. *Factor loading value, eigen value, coefficient of determination and cumulative determination in EEG principle component analysis at Pz. Principle component analysis of EEG frequencies at Pz was done. First component was 64% in the determination. The alpha 1 and 2 were negative, while the delta, theta and beta 1 showed positive. The first principle component is the characteristic of change in the alpha band. When it is negative, this means increase in the alpha band. If it is positive, it indicates decrease in the alpha. In the second principle component, the determination rae is 19.25%, the beta 1 is positive, it means increase in the beta band. If it is negative, it shows an increase in the slow wave.*

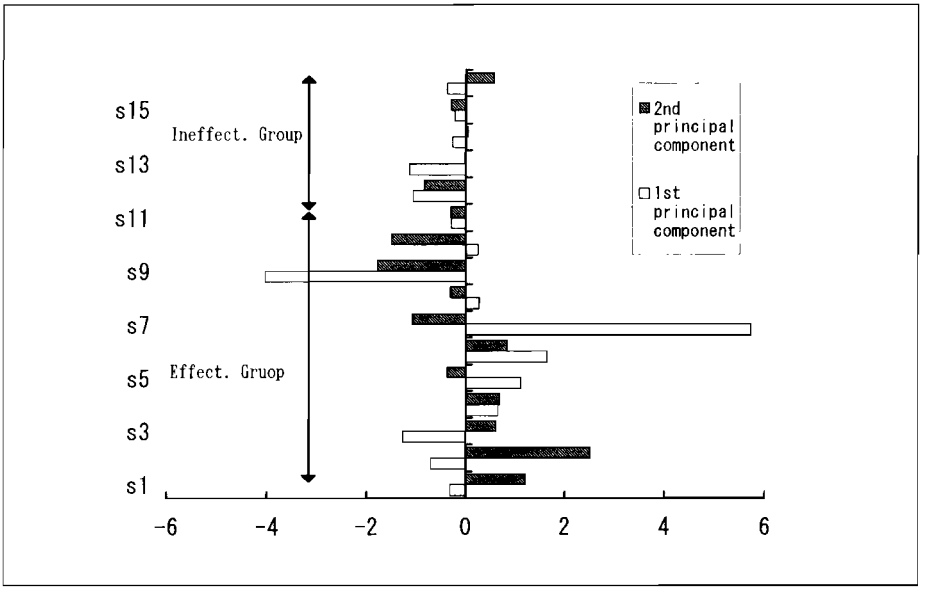


Figure 13. *A principle component analysis of the EEG at Pz in effective (10 subjects) and ineffective healers (6 subjects). As shown in the figure, the changes are different from person to person, but the amount of change is larger in experienced healers than in poor ones. Among effective groups, two types, that is, an increase in first component toward negative (s9, increase in alpha wave) and positive (s7, decrease in alpha wave) and an increase in second component toward positive, that is, an increase in beta component and decrease in the theta one were seen.*

to discriminate whether this change is caused by the healing or due to the drowsy state of the receiver. Other EEG studies were performed on sleeping infants to minimize or avoid any placebo or power of suggestion effects.[20] Figure 14 shows the sleeping patterns of infants ranging from 1 to 8 months of age. EEG changes were observed in stage 2 sleep, since this state was found to be the most stable, and continued for the longest time. Healings were performed immediately after the infants fell into stage 2 sleep. The EEGs were compared for 30 seconds immediately prior to and immediately after healing. Increases in alpha bands were observed in the frontal and parietal regions (Figure 15). These results demonstrate that these effects were not caused by placebo effect, or the power of suggestion, but were in fact caused by the healer.

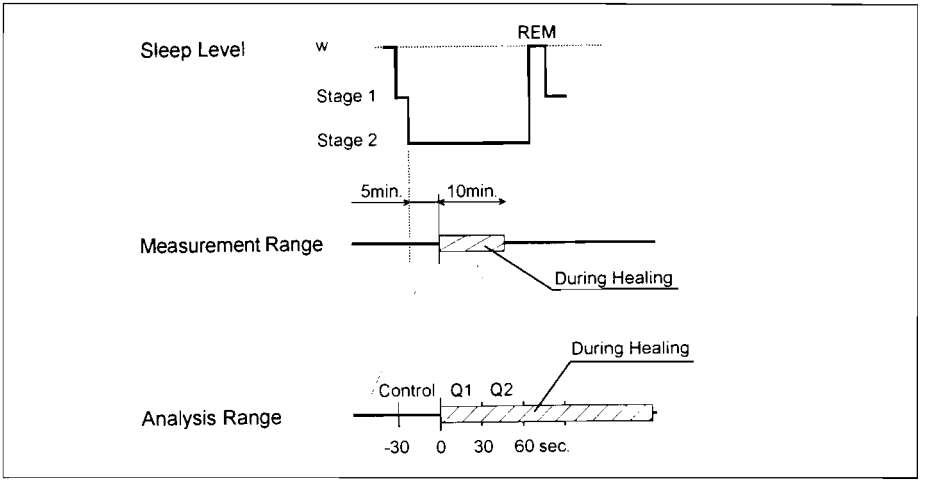


Figure 14. *Sleep patterns of infant and experimental procedure.*

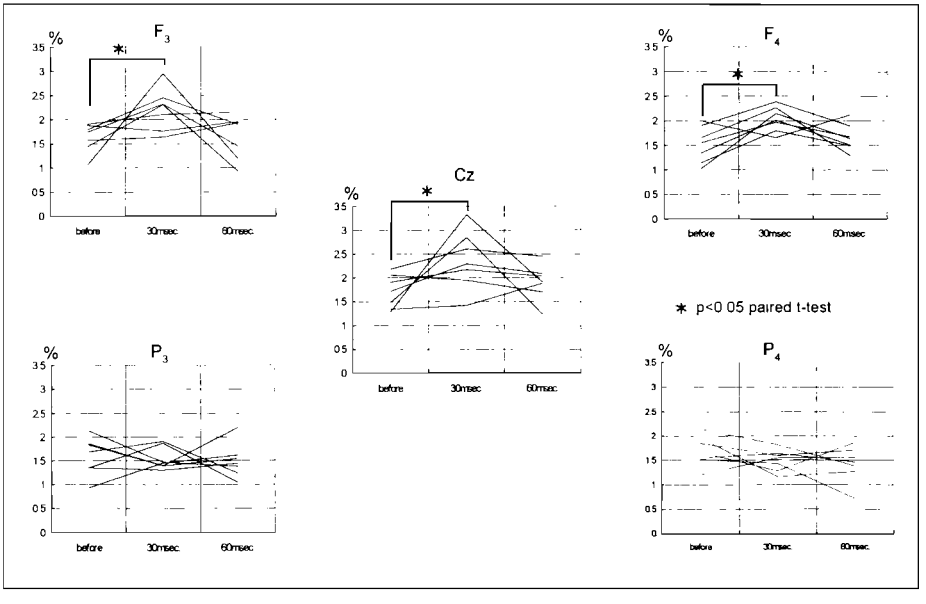


Figure 15. *Changes in the EEG of seven infants (4-7 months old) during healing. Changes in the EEG before and immediately after healing for 30 and 60 seconds. Healing was performed during sleep stage 2. Increase in the alpha band was seen at Cz, F3 and F4. Bold line indicates the comparison of EEG before healing with during healing.*

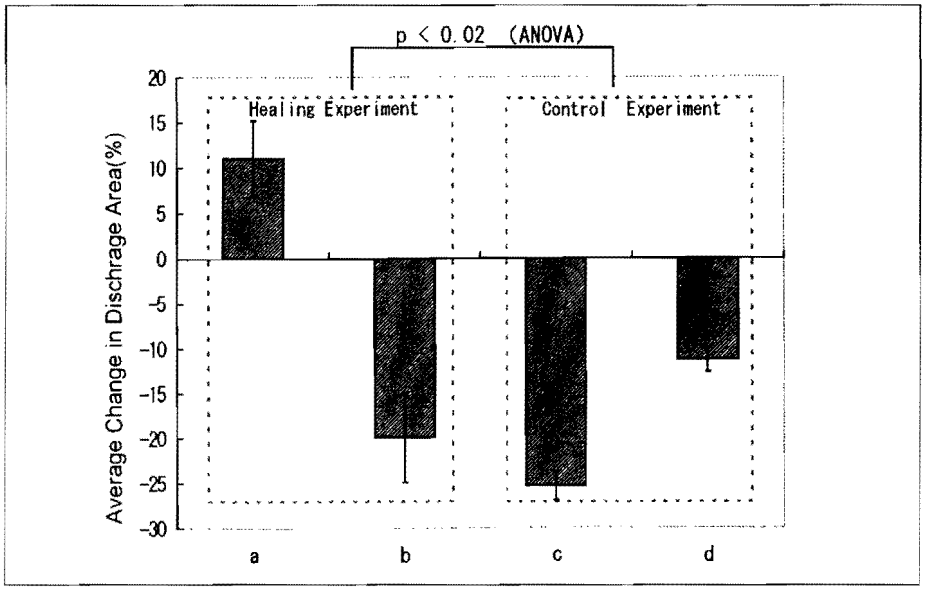


Figure 16. *Changes in the total areas of corona discharge of leaves before and after healing. Analysis of variance (ANOVA) indicates the significance level of changes ($p < 0.02$).*

Studies of Healing Power Using Kirlian Photographs

As mentioned previously, it is difficult to maintain constant consciousness levels in receivers. Therefore, leaves were chosen as a material for these experiments. Figure 16 shows the effect of healing of leaves in 45 cases and 55 control cases using Kirlian photographs. The leaves A and B were used in these healing experiments (A being the leaf treated by a healer, and B the control), while C and D were used as controls for the time of exposure. As shown in the figure, the amount of discharge in leaves B, C, and D decreased 20 minutes after being left in the room. On the contrary, the discharge increased significantly in the leaf A which received the treatment by the healer.

DISCUSSION

Before conducting any experiments on the effects of subtle energies, experimental conditions must first be firmly established. Controls must be applied

for all placebo and power-of-suggestion effects. In addition, it must be ascertained that the healer uses no 'trick' or 'magic' during experiments. As subtle energies are in fact subtle, all external 'noise' which may affect the experiments must be avoided. Also, all experimental results must be reproducible under normal laboratory conditions.

Numerous experiments have been made in attempts to ascertain the existence of effects of subtle energies. Machi,[21] using thermography, reported that the healer radiated infrared light during healing. He suggests that the information causing healing power effects seems to be included within this light, and to propagate into space. Matsueda[22] and Usa,[23] using the photomultiplier, reported that infrared luminescence from optical light to ultraviolet was observed during healing. Seto,[24] using the photomultiplier and a magnetic sensor, reported a decrease in the dark current in the photomultiplier and production of a magnetic field during healing. He suggests that consciousness has the healing power, and that it produces this field in space, and thus affects materials. This field seems to decrease the entropy of the material, and to cause decrease in the dark current. Our studies using Kirlian photography suggests the existence of subtle energies. As for the changes in the discharges of leaves the following factors are considered,

a. Changes in the surface of the subject material,

b. Changes in the space around the subject.

Increase in the discharge patterns may be caused by: 1. Increase in the conductivity of the leaves, or 2. Increase in excited molecules around the subject. As for factor 1, the water content in leaves will decrease with time, reducing discharge. The weight of all leaves decreased over time, and no increase in discharge was observed except in those leaves treated by healers. Is the increase in discharge caused by activation of the leaf by the healer? One explanation may be that infrared light emitted from the healer's hand increases evaporation of water from within the leaf. As for factor 2, does the healing power excite the field around the subject? If so, an elucidation of subtle energy will be achieved by quantum physics. As seen in the EEG experiments, subtle energies are not influenced by shielding nor distance. *This fact presently cannot be explained by the traditional sciences.*

Our studies, which excluded any placebo or power of suggestion effects, revealed that healing subtle energies affect both humans and plants. However, these effects were not stable, and no regularity of effects was established. This may be caused by the physiological and mental states of either the healer and/or the receiver.

Furthermore, we were able to record the 'phantom leaf' effect by the continuous recording of Kirlian photographs. We found that it appeared only in juicy leaves, and was nothing but water evaporation from the end that was cut out.

SUMMARY

1. EEG changes observed in healers during healing are predominately an increase of alpha waves across the brain. Increased changes of brain waves from baseline to healing periods are recorded in experienced (effective or expert) healers compared to those less effective. Healers also tend to evidence increased activation of the right hemisphere during healing.

   Receivers show increased synchronicity of alpha waves as well as increased EEG amplitude in the frontal areas. Finally, increase in EEG 8 - 13 Hz activity was observed in infants treated by healers during stage 2 sleep suggesting the observed EEG changes cannot simply be attributed to increased drowsiness or placebo effects during healing.

2. Changes in BP and AP values of meridians were observed during healing, and a periodic fluctuation of blood pressure and heart rate were observed during healing.

3. An increase in coronal discharge patterns was observed in leaves treated by healers using Kirlian photography.

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