

# Aging Develops a Person's Spiritual Healing Ability for Pain

## - Application of Standard Evaluation Method of Non-contact Healing Using Biophotons -

Hideyuki KOKUBO<sup>1</sup>, Mikio YAMAMOTO<sup>1</sup> and Kimiko KAWANO<sup>2,1</sup>

<sup>1</sup> *Institute for Living Body Measurements, International Research Institute (Chiba, Japan)*

<sup>2</sup> *Centre for Informatics and Sciences, Nippon Medical School (Tokyo, Japan)*

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**Abstract:** We measured effects of non-contact healing for plant samples (cucumber) using biophotons by 10 healers of laying-on-of-hands (5 beginners and 5 veterans). J value, the logarithm of the biophoton intensity ratio of an experimental sample and a control sample, was used as the quantitative index of healing. Moreover, the details of healing of each trial, and the past experience and healer's self-evaluation for his/her abilities were investigated with 186 items in two questionnaires. We found the average of J values of the beginner group was 0.072 and that of the veteran group was 0.166. There was a significant difference between these groups ( $p = 0.025$ , one tail). Since the scores of self-evaluation for healing against pains of shoulder, back, and lumbago were correlated with J values ( $r = 0.57$ ,  $p = 0.043$ , one tail), we considered that the measured healing ability was deeply related to the ability for pain control of other persons. Moreover, healers' ages showed a positive correlation with J values ( $r = 0.63$ ,  $p = 0.049$ , two tails), and the correlation was especially strong in the beginner group;  $r = 0.92$  ( $p = 0.025$ , two tails). J values were approximated by a linear combination model with an age function and a beginner-veteran function. A character trait item "careless-prudent" was considered to be important for ability performance. From the findings, we advocate biological hypotheses for healing ability. (1) In order to control the pain produced as a result with aging, the self-healing ability for pain improves. (2) Non-contact healing to control another person's pain is an external application of self-healing ability.

**Keywords:** aging, pain control, biophotons, cucumber, spiritual healing, laying-on-of-hands, qigong, DMILS, bio PK, character trait, multiple regression analysis

### 1. Introduction

In previous papers, we have studied anomalous effects, so-called bio-PK, direct mental interaction with a living system (DMILS), and laying-on-of-hands, by using external qi by measurements of biophotons emitted from the hands of qigong masters and non-trainees and from plant seeds or the skin of mice<sup>1-5</sup>. Last year, we succeeded in developing a standard method for quantitative evaluation of effects of non-contact healing such as laying-on-of-hands or praying<sup>6-8</sup>.

Characteristic points of the method are as follows.

(1) There is no effect by suggestion or operant conditioning because experimental samples are pieces of plants (cucumber), not humans nor animals. (2)

Subjects (healers) only perform laying-on-of-hands of target samples for 15 to 30 minutes, and there are few burdens for such a short task. (3) Biophotons are measured over a long period (18 h). (4) Cucumbers are inexpensive and readily available. Therefore it is easy to plan experiments.

The present study was done as an operational suitability test of the developed method. We sought volunteer healers through an Internet announcement for the measurements. Practical experience of healers, their self-evaluation, and other items were investigated with two questionnaires covering 186 items. We researched correlations with each item and the healer's healing ability.

### 2. Purposes

1. J value, the logarithm of the biophoton intensity ratio of an experimental sample and a control sample, would be expected to be larger in the veteran group than the beginner group if healing ability can be

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Hideyuki KOKUBO  
Institute for Living Body Measurements, IRI,  
40A, KK Bldg., 1108-2, Sonno, Inage, Chiba 263-0051, JAPAN  
Phone: +81-43-255-8851 FAX: +81-43-255-8852  
kokubo@a-iri.org

improved by training or practice. We examined J values for healers.

2. Generally, it is not easy to keep many good subjects who are famous as strong healers from one study to the next. In case our developed method is retested, it would be expected that researchers seek subjects through Internet announcements. Recruiting subjects this way, not all will be true veterans. For example, there is a possibility that some "expert" subjects are actually beginners. In the present study, we checked validity of subjects who are recruited through the Internet.
3. At the present developmental stage of the method <sup>6)</sup>, a complete measurement needs 4 days for 1 series; i.e. 1 trial (4 pairs of samples) takes 1 day, and 1 series consists of 4 trials. This short period is convenient for measuring many subjects. Therefore, in the present study, J value of each healer was calculated from data of 2 trials (totally 8 sample pairs).
4. For each healing trial, mental and physical conditions of subjects, their way of healing etc. were investigated by a questionnaire. From that we checked correlations between these factors and J values.
5. To find important factors related to a healer's ability,
  - a) basic variables of the subject, such as gender and age,
  - b) quantitative variables, such as monthly average practice hours,
  - c) self-evaluation of the healing effects, and
  - d) character traits were investigated by another questionnaire. We checked correlations between these additional factors and J values.

### 3. Methods

**3-1 Term and Place** Experiments were done at the Institute for Living Body Measurements of the International Research Institute from July to September 2006.

**3-2 Subjects** Using mailing lists, e-mail magazines, web sites and social network service (SNS), we initially recruited 10 subjects in 2 categories.

Group A: 5 healers. Their experience in healing was shorter than 3 years, or they had fewer than 100 healing clients.

Group B: 5 healers. Their experience in healing was 3 or more years, or they had 100 or more healing clients.

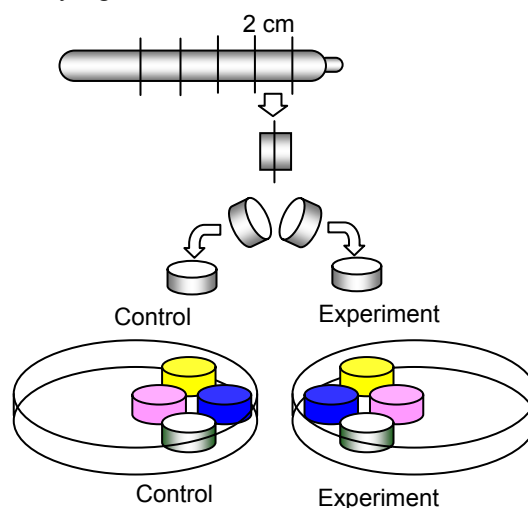
Finally, we measured 6 healers for each group after additional recruiting.

**3-3 Detecting system for biophotons** The detecting system was comprised of a super-sensitive camera (C2400-47, Hamamatsu Photonics) which had an image intensifier (I.I.), a counting system (Argus 20,

Hamamatsu Photonics), and a control program (AquaCosmos, Hamamatsu Photonics).

**3-4 Targets** The targets were paired pieces of cucumber, which was purchased from a vegetable store for each experiment.

The cucumber samples were prepared the same way as in the previous test <sup>6)</sup>. First, a circular slice (thickness: 2 cm) was cut from a cucumber. Then, this slice was cut in 2 slices of 1 cm thickness and each was opened at the center. One of the paired pieces was the experimental sample and the other was the control (**Fig. 1**). Four pairs of targets were made from one cucumber. Controls and experimental samples were placed symmetrically in two glass petri dishes to ensure the distance and angle for the camera lens was equal for each pair sample. Each petri dish was covered by a glass cover.



**Fig. 1 Making Sample Pairs**

**3-5 Procedure of Healing** Before experiments, we explained the details of the study to the subjects and obtained their agreement to participate. Target samples were made just after the subjects finished preparation for healing.

Each subject did laying-on-of-hands on the experimental petri dish for 15–30 min, without touching the dish. The control dish was set 3 m from the experimental dish in the same room, but subjects could not see it directly.

After healing, the covers of the dishes were removed and biophotons were measured. The subjects answered a questionnaire about the day's performance.

**3-6 Instructions** The subjects were given the following instructions by one of the researchers.

*"I just cut this cucumber. A fresh and vital cucumber can be brightened. Please do healing so that cucumber becomes more vital and brighter."*

*"Please do not touch the Petri dish because your*

hand may give heat to the dish or the cucumbers in the dish may shift."

"I will inform you when 15 minutes have passed. You can stop healing if you are tired at that time. But, please do healing for the whole 30 minutes if possible."

**3-7 Measurement of Biophotons** Eleven subjects did 2 trials each. The 12th subject did not attend the second trial.

Photon counting was done for 18 h (every 1 h) at room temperature (24°C). The counting areas for biophotons were sections of each sample and control. Accumulation of photons over the 18-h period was converted to a value per 10000 pixels (approximately 5 cm<sup>2</sup>, nearly equal to the area of the sample or control). The value minus background noise was defined as the intensity of biophotons from a target.

As an index of effect of healing, we used J value which is the logarithm of ratio of biophoton intensity of experiment I<sub>E</sub> to the biophoton intensity of control I<sub>C</sub>.

$$J = \ln(I_E/I_C)$$

**3-8 Non-treatment and Thermal Treatment**

For comparing, the non-treatment test and thermal test were done 4 times each. In the thermal treatment test, experimental samples were stressed at 40°C for 30 min in the same way as the previous study<sup>6)</sup>.

**3-9 Questionnaires** We used two questionnaires for investigation of the day's performance and the healer's individual information. Both questionnaires originated from questionnaires for an international collaborative study on distant healing<sup>9,10)</sup>. The originals were made by Fabio Eduardo da Silva, and their Japanese translations were made by Kokubo, one of the authors. Further, those Japanese questionnaires were modified by Kokubo for the present study.

The questionnaire for the day's performance had 24 items: a) mental and physical conditions, and environmental condition (6 items, 7-point scale); b) the details of performance (free description); c) relationship between subjects and experimental samples (2 items, 7-point scale); d) the details of healing ways (8 items, 7-point scale); e) mental activities, concepts of time and body (7-point scale); and f) others (5 items).

The questionnaire for individual information of the healer consisted of 162 items (9-point, 7-point, 5-point scales and free description) for basic parameters of the healer, quantitative parameters of practice, etc (**Table 1**). Subjects took the questionnaire home with them because it needed time to answer, and they submitted it at the second trial or by postal mail.

**Table 1 Questionnaire Items for Individual Information of Healer**

category	questions	methods
basic parameters I	25 items: name, age, family, religion, etc.	description
basic parameters II	6 items: purpose for participation, when did you know your special ability? kinds of school of healing, etc.	description
quantitative parameters	4 items: average number of clients per day for past 3 years, average minutes for healing, etc.	forced choice / description
others	5 items: Can you control your ability? rewards for healing, etc.	description
diseases, symptoms	58 items: epilepsy, cardiac disease, allergy, renal disease, dementia, anorexia, broken bones, burns, recovery from fatigue and shots, claustrophobia, etc. In addition, self-evaluation for healing effects if the subject had such experience.	7-point
character traits (self recognition)	18 items: Introverted - Extroverted, Communicative - Reserved, Not creative - Creative, etc.	9-point
health	4 items: previous severe diseases, etc.	description
sense of values	3 items: sense of social values for ability, etc.	description
knowledge and experience	39 items: frequency of participation in parapsychological experiments, frequency and kinds of paranormal experiences, etc.	7-point, 9-point, 5-point, description

\* Scales were Likert scales

**4. Results**

One subject of Group A was tested only 1 time, and 1 subject of Group B did not submit the questionnaire of healer's individual information. Therefore, they were excluded and analyses were done for only 10 subjects.

**4-1 Difference of J values between Groups A and B** First, the average of J values (n = 8) of each subject was defined as the representative J value of each subject. **Table 2** shows these J values. The categorization of subjects was based on their claims at recruiting.

Average of J values of Group A (beginners: 4 males, 1 female) was 0.072, and that of Group B (veterans: 4 males, 1 females) was 0.166. The average of J values of Group B was significantly larger than that of Group A (t-test, p = 0.025, one tail).

**Table 2 Difference of J values between Groups**

group	subject	age	J value	average	p value (one tail)
B	T006	37	0.160	0.166	0.025 significant
	K006	44	0.073		
	T005	46	0.181		
	M001	52	0.247		
	K007	66	0.171		
A	N006	23	-0.018	0.072	
	H004	40	0.064		
	N003	44	0.108		
	T007	46	0.045		
	U003	68	0.160		

**4-2 Masses of Practical Experience and J value** Through analyses on the questionnaires of healer's individual information, we estimated masses of practical experience for the past 3 years for each subject, and calculated correlations with J values.

Mass I in **Table 3** is estimated numbers of clients per month. One beginner healer had done healing to his family every day, while 2 veterans did not do healing frequently.

Mass II multiples Mass I by coefficients; coefficient is 1 if one healing treatment is done within 15 minutes, coefficient is 2 if within 30 minutes, coefficient is 3 if within 1 hour, coefficient is 4 if longer than 1 hour. Mass II is the approximate value of cumulative healing time per month. Many healers did healing from 15 to 30 minutes for a person.

Mass III multiples Mass II by coefficients; coefficient is 1 if subject's healing career is shorter

**Table 3 Estimation of Mass of Healing Experience and Correlation with J value**

group	subject	J value	Mass I	Mass II	Mass III
B	T006	0.160	100	200	600
	K006	0.073	60	180	540
	T005	0.181	60	120	360
	M001	0.247	6	6	18
	K007	0.171	5	5	10
	average		46.2	102.2	305.6
	correlation		-0.481	-0.683	-0.680
A	N006	-0.018	4	8	24
	H004	0.064	5	10	20
	N003	0.108	4	4	4
	T007	0.045	20	20	20
	U003	0.160	30	60	60
	average		12.6	20.4	24.0
	correlation		0.584	0.668	0.582
correlation (whole)			0.209	0.139	0.131

Mass I: Number of clients per month

Mass II: Mass I x coefficient of healing minutes

Mass III: Mass II x coefficient of healing years

There was no significant correlation.

than 3 years, coefficient is 2 if 3 to shorter than 6 years, coefficient is 3 if longer than 6 years. Mass III is an estimation of accumulation of healing time for the subject's life to date.

All averages of Masses I, II and III of Group B were larger than those of Group A. Directions of correlations between Masses and J values were opposite in each group. Therefore, for all the results, there was no significant correlation between Masses and J values.

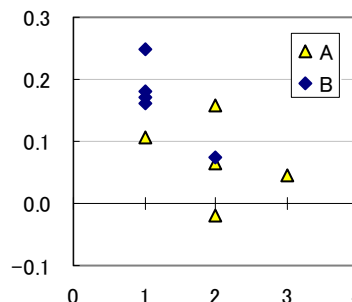
**4-3 Techniques and Schools of Healing** Many subjects had experienced training in plural techniques or schools of healing, for example, various schools of qigong, Nishino breathing method, Kiatsu breathing, Shintoic laying-on-of-hands, hypnotic therapy, etc.

If we limited them to the technique which the subject practiced mainly at the time of experiments, among 10 subjects, the types were: laying-on-of-hands, 3 persons; qigong, 2 persons; and Reiki, external qi therapy, Quantum touch, TDE (Perfect Harmony), Johrei (Mokichi Okada Association), 1 person for each. Thus, there was no extreme deviation in subjects' healing techniques and schools.

**4-4 Technique/School Diversity Score and J value** Ten items including "Others" were listed on the questionnaire of healer's individual information. Then, the variation of techniques/schools of healing was scored as every item was 1 point.

Average of technique/school diversity score was 1.6 (SD = 0.7). Moreover, there was a significant negative correlation with J values ( $r = -0.697$ ,  $p = 0.025$ , two tails). In other words, rather than subjects who experienced two or more different schools and techniques, subjects who were devoted to only one school or technique showed higher J values.

**Fig. 2** shows a distribution of technique/school diversity scores and J values. Many veteran healers (Group B) used only one technique/school, while many beginner healers (Group A) had learned plural techniques or schools of healing.



**Fig. 2 Technique/School Diversity Score and J value**

#### 4-6 Characteristics of Subjects and J value

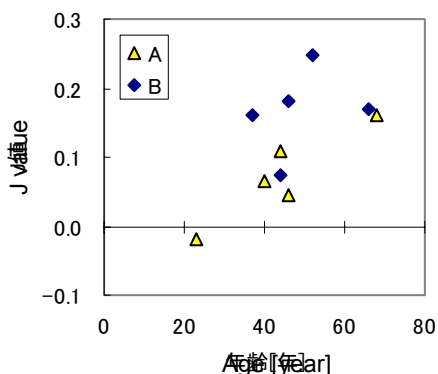
Among characteristics of subjects, there were two items which correlated significantly with J values. One of two was the basic parameter "age", and the other was a character trait item "careless – prudent" (Table 4).

Fig. 3 shows correlation between ages of subjects and J values. The correlation was especially strong in Group A ( $r = 0.923$ ,  $p = 0.025$ , two tails).

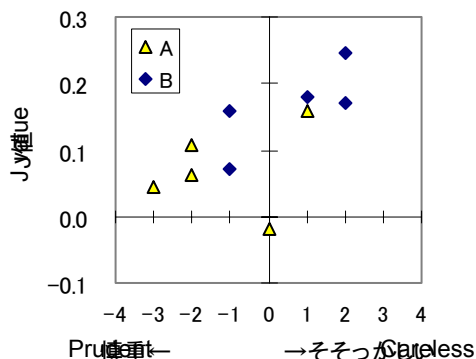
Fig. 4 shows the correlation between the character trait item "careless – prudent" (9-point scale). More careless subjects had higher J values. If we omit data at  $x = 0$  as non-available, the correlation coefficient was  $r = 0.877$  ( $p = 0.002$ , two tails). Moreover, Group B was more careless than Group A.

**Table 4 Subjects' Characteristics Which Correlated Significantly with J values**

subjects' characteristics	n	r	p value (two tails)
age	10	0.633	0.036
character trait item "careless – prudent"	10	0.656	0.039



**Fig. 3 Age and J value**

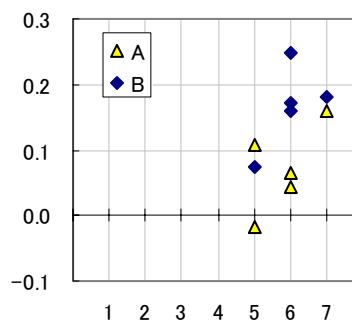


**Fig. 4 Score of "careless – prudent" and J value**

#### 4-7 Self-evaluation for Healing Effect and J value

Among 58 items regarding diseases or symptoms, there was only one item for which all subjects had done healing. It was pain of shoulder, back and lumbago.

Fig. 5 shows J values and scores of self-evaluation of healing effects for pain. The scores correlated with J values ( $r = 0.568$ ,  $p = 0.043$ , one tail).



**Fig. 5 Self-evaluation of Healing Effects for Pain and J value**

Table 5 shows items which more than 5 subjects had done healing for. Only the item "pain" correlated significantly with J values, and its average of scores was 5.9, the largest in Table 5.

**Table 5 Self-evaluation of Healing Effects and J values**

item	n	7-point		r	p value (one tail)
		mean	SD		
pain of shoulder, back and lumbago	10	5.9	0.7	0.568	0.043
fatigue	9	5.9	0.9	-0.198	0.304
insomnia	8	5.5	0.8	0.314	0.225
migraines	7	4.0	0.8	-0.128	0.392
blow	6	5.5	0.5	-0.458	0.180
wound	5	5.6	0.5	-0.362	0.275
digestive disorder	5	5.8	0.8	0.522	0.183
sprain	5	5.7	0.8	-0.506	0.192
hypertonia	5	5.2	0.8	0.101	0.436

#### 4-8 Parameters of Day's Performance and J value

In this section, we also used J(4) values which were the average of 1 trial (average of 4 data) to analyze the relationship with parameters of the day's performance.

There was a weak positive correlation between physical condition and J(4) values ( $r = 0.449$ ,  $p = 0.047$ , two tails). Namely, J(4) values were large when physical condition was fine (Fig. 6).

Moreover, regarding sense of body during practice (4-point scale), scores of "Organic, with many body sensations" correlated weak-negatively with J(4) values ( $r = -0.466$ ,  $p = 0.049$ , two tails)(Fig. 7). This correlation was obvious in Group A ( $r = -0.639$ ,  $p = 0.047$ , two tails).

Only Group A had scores of "Emotional / sentimental, with strong emotions and feelings" (7-point scale) that correlated strong-negatively with J(4) values ( $r = -0.860$ ,  $p = 0.001$ , two tails)(Fig. 8).

However, these correlations of Figs. 6-8 became non significant when averaged for 2 trials. The largest correlation coefficient with J(8) was the change (loss) of sense of body during practice, and it was  $r = 0.464$  ( $p = 0.177$ , n.s.)(Fig. 9).

J(4) or J(8) did not correlate significantly with the other items of the day's performance, for example, motivation for the practices, sense of success, "spiritual" state, sense of linkage to targets, sense of perception of vital power from targets, numbers or degrees of use of skills (visualization, concentration of attention, etc.).

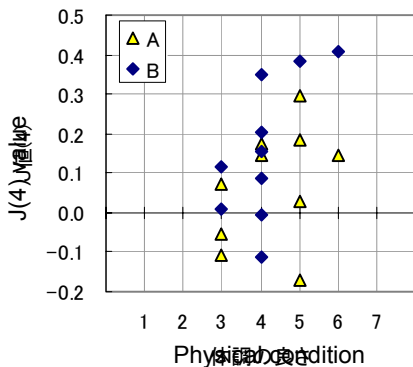


Fig. 6 Physical Condition at Each Practice and J(4) value

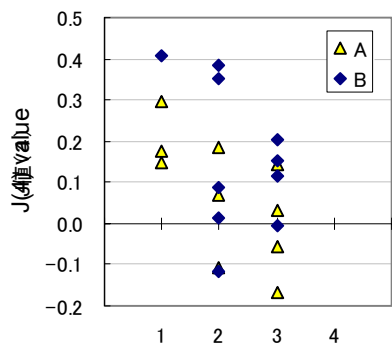


Fig. 7 Organic Body Sense at Each Practice and J(4) value

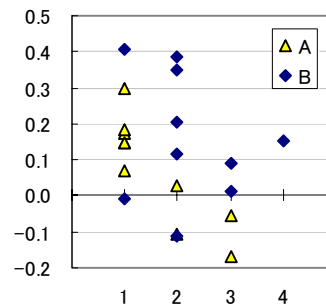


Fig. 8 Strong Emotions/Feeling at Each Practice and J(4) value

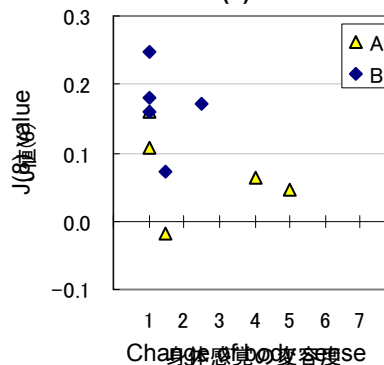


Fig. 9 Change of Body Sense and J(8) value

4-9 Comparison with Thermal and Non-treatment

For comparison, Fig. 10 shows all data and their 95% confidential intervals. Thermal condition had 16 data, non-treatment condition had 16 data, and healing condition had 91 data including previously omitted data of 2 healers.

Average J value of healing was far from  $J = 0$  although both thermal and non-treatment conditions were nearly equal to  $J = 0$ . Moreover, there were significant differences between healing and non-treatment (t-test,  $p = 0.001$ , one tail), healing and thermal (t-test,  $p = 0.026$ , one tail).

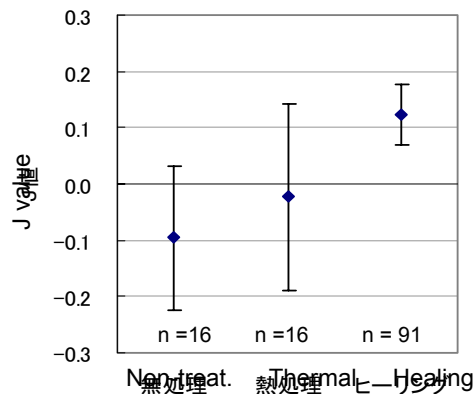


Fig. 10 All Data Including Previously Omitted Data and 95% Confidential Interval

## 5. Discussion

**5-1 Practicality of the Measuring Method** In the present study, we succeeded in replicating the results of the previous study<sup>6)</sup> (Fig. 10). Moreover, we confirmed significant differences for J values between beginners and veterans (Table 2). Therefore, our developed method is considered to have enough sensitivity and reliability even for small samples such as 10 subjects and even for few measurements such as 2 trails per subject.

In future, it should be possible to classify healers' abilities such as  $J < 0.1$  is Novice class (Class N),  $J = 0.1-0.2$  is Middle class (Class B) and  $J > 0.2$  is Expert class (Class A).

**5-2 Detective Abilities of Healing** The present study showed, at least, that the measuring method could measure ability of healing for pain. However, we did not test healers' abilities with actual clients. Our study was an indirect test based on healers' self-evaluations. Therefore, the details of effects remain unknown, for example, kinds and placements of pains and degrees of reduction of pains are unknown.

Other self-evaluations for diseases/symptoms except pain were not correlated significantly with J values. There are some possible explanations for this. 1) This method can measure only specific ability for pain control, and can not measure other abilities. 2) Healers did not have healing abilities for others except pain (i.e. their self-evaluations did not reflect actual effects). 3) Healers' self-evaluations did not have enough reliability because they had few chance to correct their self-evaluations regarding treating rare cases not if they were very famous or if they were not visited by many different clients every day. As such, data are still insufficient for drawing conclusions, and further studies are needed.

In order to cure people, the skills and the knowledge for using the abilities stably and acting suitably for suitable parts are needed at least, not only having abilities. Even if this measuring method proves that a healer has abilities of bio-psychokinesis (bio-PK), it cannot be said that the healer has the ability to cure people. What can be said is the possibility "A human body will not be affected, either, if a vegetable sample is not affected." At the present stage of development, if we apply this measuring method to certifying examination of healers, it might serve as a screening test which checks the existence of abilities indispensable as a healer, for example, an affecting ability which gives some effects to other living bodies.

**5-3 Discussion with Partial Correlation Coefficient** The present study shows that J values of veteran healers were larger than those of beginners.

What are reasons for the difference between beginners and veterans?

Categorization of Groups A and B was based on subjects' claims at recruiting. If we give Group A 0 point and Group B 1 point, scores of AB point correlate significantly with J values ( $r = 0.633$ ,  $p = 0.049$ , two tails). Otherwise, estimated values of Masses of experiences of practice were not correlated significantly with J values. However, the correlation directions were opposite in Groups A and B. There is a possibility that Masses of experiences will correlate with J values for beginners if sample population is large enough.

Here, we discuss a partial correlation coefficient<sup>11)</sup> about correlated items. Six items were targeted. 1) Subjects' basic parameters: age. 2) Basic parameter: technique/school diversity score (Tec score). 3) Self-evaluation: pain. 4) Character trait item: "careless-prudent". 5) Day's performance: change of body sense. 6) Degree of beginner-veteran: AB point.

Table 6 shows correlation coefficients of J value and the above 6 items. For 5 items except the change of body sense, correlation coefficients with J values were the largest. The change of body sense had a positive significant correlation with Tec score. And, Tec score had tendencies of correlation with AB point and "careless". Moreover, age had a tendency of correlation with pain control.

Table 7 shows partial correlation coefficients with J value when affection by other items was cancelled. Although the interpretation of partial correlation coefficient is not decided uniquely, we try to discuss them between explanations.

First, Tec score always showed a medium-strong negative correlation with J value when any affections of others were cancelled. We considered that the learning of two or more techniques/schools prohibited improvement in healing ability. Moreover, the pattern of coefficients when affection of Tec score was cancelled was similar to the pattern when affection of AB point was cancelled. Correlation between body sense and J value disappeared when affection of Tec score was cancelled.

Coefficients of age and pain control became nearly equal to each other when other affections were cancelled. In addition, the patterns when their affections were cancelled were similar to each other.

All coefficients became small when affection of "careless – prudent" was cancelled, and coefficient of "careless – prudent" also became small when other affections were cancelled.

From the above considerations, we thought possible interpretations were as follows.

- 1) Veterans train in a specific technique or school



**Table 6 Correlation Coefficient between 6 Items and J value (n = 10)**

	J value	Tec score	AB point	Age	Pain	Careless
Tec score	-0.697 **					
AB point	0.633 **	-0.603 *				
Age	0.633 **	-0.152	0.192			
Pain control	0.568 *	-0.086	0.143	0.565 *		
Careless	0.656 **	-0.558 *	0.537	0.489	0.401	
Change of body sense	-0.464	0.694 **	-0.402	-0.036	-0.005	-0.551

\*\* p < 0.05 (two tails) \* p < 0.10 (two tails)

**Table 7 Partial Correlation Coefficient with J value**

Partial correlation coefficient	Item which affection is cancelled.					
	Tec score	AB point	Age	Pain	Careless	Change of body sense
Tec score	/	-0.511	-0.786	-0.791	-0.529	-0.588
AB point	0.372	/	0.674	0.677	0.441	0.550
Age	0.745	0.674	/	0.460	0.475	0.697
Pain control	0.711	0.623	0.329	/	0.441	0.638
Careless	0.449	0.484	0.513	0.568	/	0.541
Change of body sense	0.038	-0.296	-0.571	-0.560	-0.163	/

■ shows large absolutes which are more than 0.6.

deeply, and then their abilities are improved. However, beginners who try various different techniques/schools can not improve their abilities.

- 2) The change of body sense during practice is a side effect as a result of learning different techniques/schools. And it suppressed healing abilities in the present study.
- 3) There is a close relation among age, pain control and J value.
- 4) Character trait item "careless – prudent" relates to all other items. It is an important factor for suppression and exertion of healing abilities.

**5-4 Role of "Careless-Prudent"** The role of character trait item "careless – prudent" is unknown at present. We have no idea how the character trait relates to the processes of suppression/exertion of healing abilities. Since the word "careless person" gives us an image of someone who is bright, comfortable and who seldom frets, such a person may be able to concentrate on healing without mind disturbance.

**5-5 Hypothesis: Relation among Age, Pain Control and J value** There are many studies on mind or physiological states during ESP, qigong and healing tasks. Moreover, many researchers have

studied effects of training or learning. However, there are relatively few studies which suggest that the subject's biological age relates to strength of abilities directly.

For example, in this research field, it is well known that psi abilities (psychic abilities) are strong when young and training of young children is easier than adults<sup>12-22</sup>.

Also the present study showed a relationship between age and healing ability. However, the relationship was that an older person had stronger ability than a young person. This relation was more obvious in beginners (**Fig. 3**). It suggested the existence of biological reasons other than reinforcement by learning or training.

Here, we advocate the following biological hypotheses of healing which can be interpreted from results of the present study.

**Hypotheses:**

- (1) In order to control the pain produced as a result with aging, the self-healing ability of pain improves.
- (2) Non-contact healing to control other persons' pains is an external application of self-healing ability.



**Sub-hypotheses:**

- (a) Self-healing ability is improved with aging in the range from 20 to 70 years of age.
- (b) This ability can be controlled consciously.
- (c) Character traits have important roles in the control process of the ability.
- (d) Performance of the ability is barred by specific mind-physical states in which the person feels the change of body sense caused by learning different kinds of techniques/schools.

These hypotheses are also a biological answer for "Why do many people claim that they have healing abilities?" and "Why do they claim that everyone can develop their own abilities through easy training?"

**5-6 Discussion Using Multiple Regression Analysis**

**Analysis** Here, functional models of healing ability are discussed using multiple regression analysis<sup>23)</sup>. Major candidates for explanatory variables are age, Tec score and character trait item "careless – prudent". It is difficult to decide a model because the sample population of the present study was too small, only 10. Therefore, as a trial, 2-variable and 3-variable models were examined mainly. Analyses were done using Excel Toukei 2002.

**Table 8** shows example analyses. We considered that the measured J values could be approximated by a 2-variable model (Model II) which consisted of an age function A(x) and a beginner-veteran function B(y) which relates to the difference between a beginner and a veteran.

$$\hat{J} = \beta_0 + \beta_1A(x) + \beta_2B(y)$$

$$\hat{J} = -0.380 + 0.329 \log(\text{age}) - 0.261 \log(\text{Tec score})$$

Here,  $\beta_0$  is a constant, and  $\beta_1, \beta_2$  are partial correlation coefficients.

Model II had the smallest value of Akaike's Information Criterion (AIC) among 2- or 3-variable models, and its theoretical values fit measured values very much (**Fig. 11**).

In Model II, A(x) is approximated by log(age) because the rate of improvement of healing ability falls gradually when the age grows. Moreover, B(y) is approximated temporarily by log(Tec score). Log(Tec score) should be replaced with a more suitable function which can present degrees of veteran (or beginner).

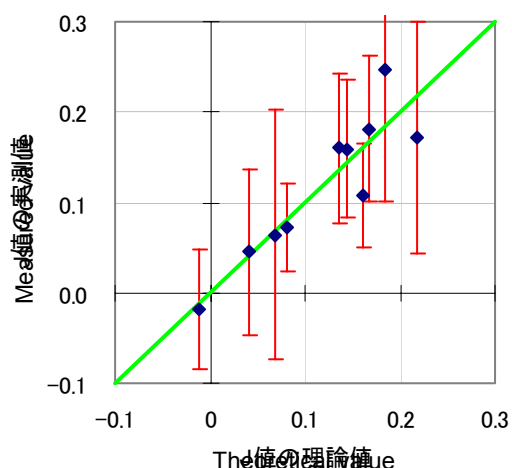
**Table 8 Results of Multiple Regression Analysis**

About 50 models including non-linear models were analyzed. This table shows 5 linear models.

model	Model I	Model II	Model III	Model IV	Model V
number of parameters	2	2	2	3	3
coefficient of determination	0.6380	0.8179	0.4943	0.8371	0.8221
corrected coefficient of determination	0.5345	0.7659	0.3498	0.7556	0.7331
multiple correlation coefficient	0.7987	0.9044	0.7031	0.9149	0.9067
corrected multiple correlation coefficient	0.7311	0.8751	0.5915	0.8693	0.8562
Durbin-Watson ratio	1.6799	2.4534	1.4228	2.0878	2.0026
AIC	-25.6312	-32.5031	-22.2893	-31.6168	-30.7361
explanatory variables	log(age)	log(age)	log(age)	log(age)	log(age)
		log(Tec score)		log(Tec score)	Tec score
	degree of careless		Mass II	log(degree of careless)	degree of careless

**Table 9 Partial Regression Coefficient (Model II)**

parameter	partial regression coefficient	standard partial regression coefficient	F value	t value	p value	SD	partial correlation	correlation	lower limit	upper limit
log(Tec score)	-0.26146	-0.6126	13.8498	3.7215	0.0074	0.070256	-0.8150	-0.7235	-0.42759	-0.09533
log(age)	0.328783	0.5538	11.3180	3.3642	0.0120	0.097729	0.7860	0.6765	0.097691	0.559876
constant	-0.37999		5.3300	2.3087	0.0543	0.164591			-0.76918	0.009209



**Fig. 11 Theoretical and Measured Values of J by Model II**  
Error bars are standard errors.

As a matter of fact, compatibility of the models can be changed by accuracy of  $B(y)$ ; how much it is reflecting subjects' experience values. However, it is difficult to estimate subjects' experience values, especially, specific experience values relating skills of self-healing to external healing. Therefore, it is better to estimate experience values by models with  $J$  value and age, and then discuss compatibility of models.

Here, healer's experience value is  $z$ , and its function is defined as  $V(z)$ .  $V(z)$  is a function of the degree of veteran. Instantly,  $V(z) = -B(y)$  because the sign of  $\beta_2$  is minus in Model II.

**Table 10** shows values of  $V(z)$  calculated by Model II.  $V(z) > 0$  means someone who has an ability more than expected level from his age. Three subjects of Group B have  $V(z) > 0$ .  $V(z) < 0$  means someone who can be expected to improve his ability by further training or practice. The veteran function  $V(z)$  is estimated possibly by measurement of the change of  $J$  value after training or practice. Moreover, at last, we can judge compatibility of models.

It is difficult to discuss advanced models which have parameters of character trait items because the degree of affection of character trait item is relatively weaker than age or degree of beginner-veteran. Compatibility of models was not good if we use scores of the character trait item "careless-prudent". However, there is a promising way to use principal components as explanatory variables after principal component analysis for character trait items.

It may be possible to construct models having parameters of age, experience value and character trait in further studies with large sample population.

**Table 10 Estimated Values of  $V(z)$  in Model II**

	subject	J	age	$V(z)$	$\beta_2 V(z)$
B	T006	0.160	37	0.093	0.024
	K006	0.073	44	-0.336	-0.088
	T005	0.181	46	0.055	0.014
	M001	0.247	52	0.241	0.063
	K007	0.171	66	-0.181	-0.047
A	N006	-0.018	23	-0.329	-0.086
	H004	0.064	40	-0.317	-0.083
	N003	0.108	44	-0.201	-0.052
	T007	0.045	46	-0.465	-0.122
	U003	0.160	68	-0.240	-0.063

## 6. Conclusions

We measured effects of non-contact healing for plant samples (cucumber) using biophotons generated by 10 healers of laying-on-of-hands. Moreover, a questionnaire investigation with 186 items was done. We found the veteran healers showed larger effects than beginners.

Those healing abilities related deeply to pain control, and older healers had higher abilities. Additionally, a character trait item "careless-prudent" was considered to be important for ability performance.

From the acquired knowledge, we advocated biological hypotheses of healing ability. Hypotheses: (1) In order to control the pain produced as a result with aging, the self-healing ability for pain improves. (2) Non-contact healing to control other persons' pains is an external application of self-healing ability.

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