

Physical and Psychological Effects of the Shiatsu Stimulation in the Sitting Position

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Abstract

Purpose: In this study, we investigated physical and psychological effects of the shiatsu (finger pressure) stimulation in a sitting position. **Subjects and Methods:** A crossover test was conducted on 20 subjects (average 34.5 ± 7.6 years old; male = 10, female = 10). First they were randomly divided into two groups: Group A (shiatsu stimulation/control) and group B (control/shiatsu stimulation). They had shiatsu stimulation (*Namikoshi* basic methods in the sitting position, five minutes). At the same time, POMS (profile of mood states), SBP (systolic blood pressure, DBP (diastolic blood pressure) and HR (heart rate) were measured. **Results:** Physical result—Compared to the baseline, the shiatsu stimulation showed statistical decreased SBP and HR while the control (no shiatsu stimulation) did not. Psychological result (POMS)—Compared to the baseline, the stimulation showed significant change in all six mood states (Tension-Anxiety, Depression-Dejection, Fatigue and Confusion decreased while Vigor elevated). Male showed statistical decrease in Tension-Anxiety, Depression-Dejection, Anger, Fatigue and Confusion as well as significant increase in Vigor. Female only showed decrease in Depression-Dejection and Anger. **Discussion and Conclusion:** The shiatsu stimulation in the sitting position could modulate autonomic nerve system and it could affect human body. Gender differences were found in physiological effect.

Keywords

Shiatsu Stimulation, POMS, Blood Pressure, Heart Rate

1. Introduction

Shiatsu therapy, finger pressure stimulation, is the application of manual pressure to the skin. Its origin can be found in traditional Chinese/Japanese medicine and it was established by *Tokujiro Namikoshi* in the first half of last century [1]. Its technique refers to the use of fingers and the palm of one's hands to apply pressure to particular sections on the surface of the body for the purpose of health promotion [2].

There are many evidences on medicine of acupuncture therapy as well as acupuncture-like stimulations. The former is inserted subcutaneously while the latter just give soft pressure on a very small area of the skin (diameter 5.0 mm) [3] [4]. Moreover, shiatsu stimulation, which presses more area (finger diameter), might also be considered effective, though it has not been investigated. Unlike massage or acupuncture, shiatsu stimulation can be given without undressing. In short, shiatsu stimulation is a simple and convenient therapy.

Researchers reported that shiatsu stimulation worked for sleep disorders [5], painless delivery [6] nausea, vomiting of pregnancy [7]. However, there is room or further research because there have been few scientific studies conducted to shed light on effects of shiatsu stimulation. Therefore, we studied physical and psychological effects of shiatsu (finger pressure) stimulation in a sitting position in this study.

2. Methods

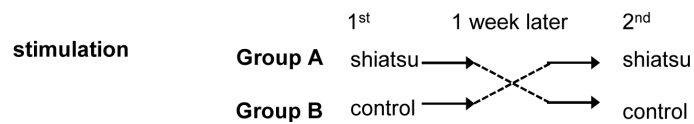
2.1. Subjects

Participants were 20 physically and mentally healthy students. Our subjects were elder than or equal to 20 years old without diseases. Their profile is shown in **Table 1**. This experiment was conducted using a cross over design. They received two kinds of interventions; one was shiatsu stimulation and the other one was control (without shiatsu stimulation) on different days (**Figure 1**). Subjects were randomly divided into two groups Group A and Group B (n=10, 5 male and 5 female, respectively). Group A received shiatsu intervention in the first experiment session and then received no shiatsu intervention in the second session. Group B completed sessions in a reverse sequence. The second experiment was conducted more than one week after the first experiment.

All participants were informed of the purpose and nature of the experiments; then a written consent was obtained from each participant, in compliance with the World Medical Association Declaration of Helsinki. Written informed consent

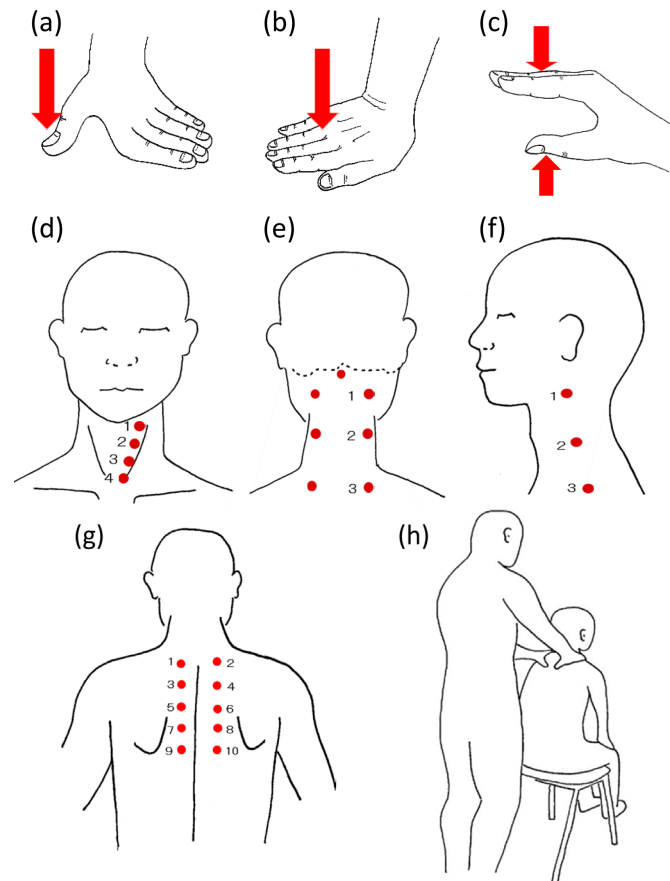
Table 1. Profile of participants.

Subjects (n)	Male (10)	Female (10)	Total (20)
Number (%)	10 (50.0)	10 (50.0)	20 (100.0)
Age	33.4 ± 7.0	35.6 ± 8.7	34.5 ± 7.6
Marriage ±	3/7	5/5	8/12



One group received shiatsu stimulation in the first experiment session and then received no shiatsu stimulation in the second session (Group A). The other group completed sessions in a reverse sequence (Group B).

Figure 1. Experimental design.



(1) internally press sternocleidomastoid with (a) as shown in (d), (2) press from the lower edge of mastoid part of the temporal bone to C6 with (c) (three times), (3) press the hollow of the nape with (a) (three times), (4) press three points (from the middle of mastoid and 3) to the C7 level with (c) (three times) (f), (5) press the center of temporal region with (b), (6) press both shoulders with (a) at the same time (three times), (7) press five points with (a) (from Th 1 level to Th 7 level) (g) (h), (8) stroke shoulders with (b) (two times) and then, (9) stroke the spinal column with (b) (two times).

Figure 2. Shiatsu stimulation (Namikoshi basic methods in the sitting position, five minutes). Three techniques of shiatsu pressure and points/cites of shiatsu stimulation.

was obtained from all subjects and the study was approved by the institutional review board of Tokyo Professional School of Medical and Welfare (Tokyo, Japan).

2.2. Shiatsu Stimulation

The shiatsu stimulation (*Namikoshi* basic methods of shiatsu in the sitting position, five minutes) was conducted as below (**Figure 2**).

The experiments were conducted in a room with the temperature set at 24.4°C

$\pm 1.1^{\circ}\text{C}$ and $57.7\% \pm 12.1\%$ humidity throughout the experimental sessions.

2.3. Physiological Effect—Blood Pressure and Heart Rate

Blood pressure and heart rate were measured at the same time with an arm-cuff blood pressure monitor (HEM-7132, OMRON Corporation, Kyoto, Japan).

2.4. Profile of Mood States (Japanese Version)

To investigate mood states, participants also completed the Profile of Mood States (POMS) [8], a self-rated scale measuring six mood states [T-A (tension-anxiety), D (depression-dejection), A-H (anger-hostility), V (vigor), F (fatigue), and C (confusion)] and total mood disturbance, which is a summary score for the emotional state subscales. The POMS is a widely used, reliable measure of emotional distress [9] [10]. Research shows that the POMS is reliable for Japanese participants [11] [12]; therefore, in this study, we used the Japanese version of the POMS [13] as we studied in advance [14].

2.5. Statistical Analysis

The Wilcoxon signed rank test and Mann-Whitney U test were conducted and the level of significance was set at $p < 0.05$. The values presented here expressed as range as well as mean \pm SD. All statistical analyses were performed using SPSS Statistics for Windows version 20.0 (IBM Corp, Armonk, NY).

3. Results

3.1. Physiological Effects—Blood Pressure and Heart Rate

Compared to the baseline, the shiatsu stimulation showed statistical decreased SBP and HR ($p < 0.01$) while the control (no shiatsu stimulation) did not

And then they were divided into two groups by gender, however, no statistical difference were obtained in each group (Figure 3).

3.2. Psychological Effects—POMS

Compared to the baseline shiatsu stimulation showed significant change in all six mood states (T-A, D, A-H, F and C, $p < 0.01$; V, $p < 0.05$). At that time, the control (without shiatsu stimulation) did not indicate such changes except in the A-H ($p < 0.01$) (Figure 4).

Next gender differences were examined. Male (blue color) showed the same changes as above mentioned (T-A, D, V, F and C; $p < 0.01$; A-H, $p < 0.05$). At that time, female (red color) indicated nominal decrease in only in two areas of D and A-H ($p < 0.01$). Thus, gender differences were observed in psychological effect (POMS).

4. Discussion

4.1. Physiological Effects—Blood Pressure and Heart Rate

Our result indicated that the shiatsu stimulation decreased SBP and HR. Our

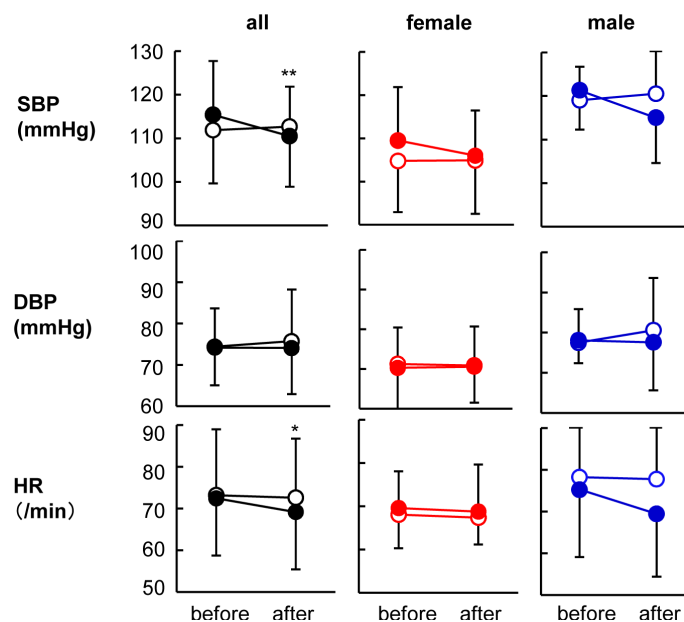
result indicated that the shiatsu stimulation decreased SBP and HR.

First, we may find one reason in the baroreceptor reflex (via glossopharyngeal nerve IX—solitary nucleus in the medulla—vagal nerve X). It provides a rapid negative feedback to hypertension and modulates blood pressure and heart rate induced by excessive sympathetic nerve dominance [15] [16] [17]. The carotid sinus is the reflex center. Our shiatsu stimulation on the inside of sternocleidomastoid muscle could also affect carotid sinus in the internal carotid artery because they are located near each other.

4.2. Psychological Effects—POMS

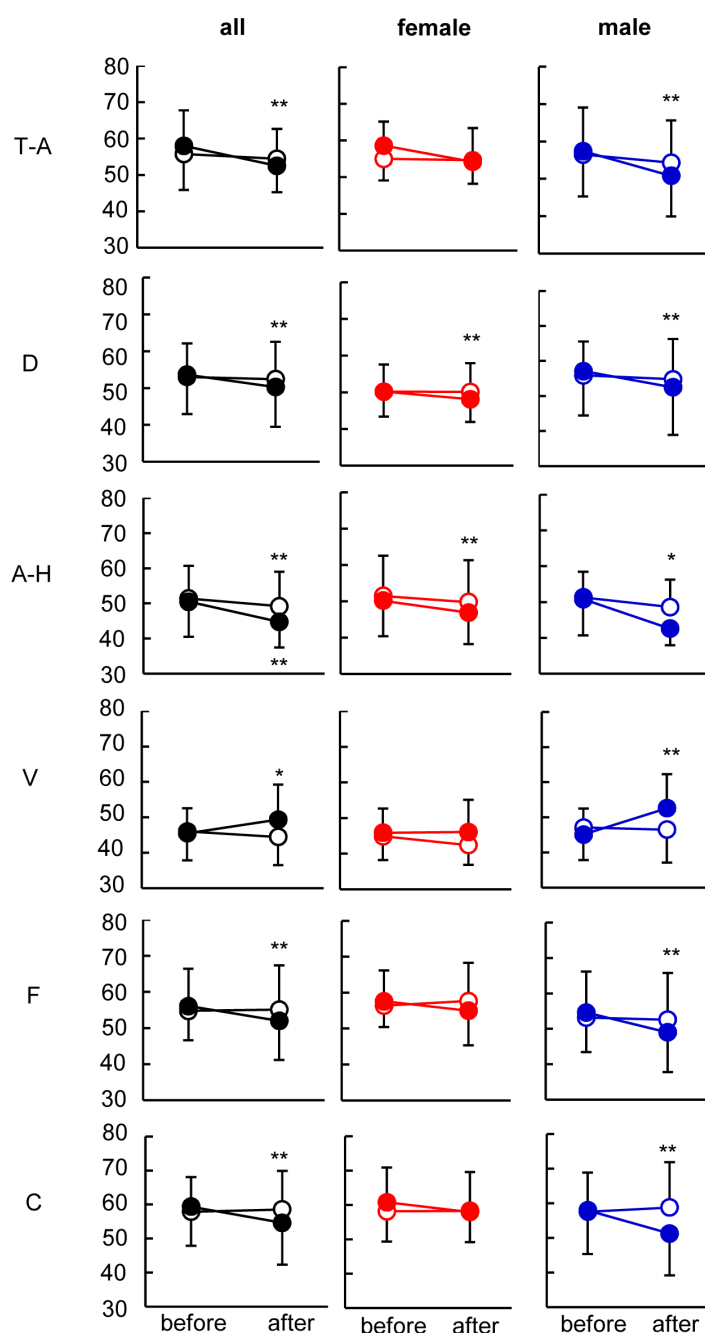
Our result indicated that the shiatsu stimulation influenced on POMS, a psychological test. After the shiatsu stimulation the results of all and male showed that negative mood states (T-A, D, A-H, F and C) while the positive state (V) increase. The former states were mainly controlled by sympathetic nervous system (SN) while the latter state was largely influenced by parasympathetic nerve system (PN).

The interest was that the control group nominally showed decrease in the negative mood state of A-H. Nowadays half of Japanese people suffer from stress [18]. Subjects in control group might also have stress though they took 5 minutes rest before the experiment. And then, when subjects in shiatsu group had stimulation of 5 minutes, control subjects could enjoy more 5 minutes as rest time. In this way, A-H mood state showed decrease both in both groups. Needless to say, our result showed that more than 5 minutes rest time is needed before experiments.



The shiatsu group showed statistical decreased SBP (systolic blood pressure) and HR (heart rate) after the shiatsu stimulation ($p < 0.01$) while the other group did not. DBP (diastolic blood pressure) did not show such difference. ○: control, ●: shiatsu stimulation, data are mean \pm SEM. * $p < 0.05$, ** $p < 0.01$.

Figure 3. Physiological effects—blood pressure and heart rate.



The shiatsu group showed significant change in all six mood states [T-A (tension–anxiety), D (depression–dejection), A-H (anger–hostility), V (vigor), F (fatigue), and C (confusion)]. (T-A, D, A-H, F and C, $p < 0.01$; V, $p < 0.05$). At that time, the control group did not indicate such changes except in the A-H. Male (blue color) showed statistic changes (T-A, D, V, F and C; $p < 0.01$; A-H, $p < 0.05$). Female (red color) indicated nominal decrease only in D and A-H ($p < 0.01$). ○: control, ●: shiatsu stimulation, data are mean \pm SEM. * $p < 0.05$, ** $p < 0.01$.

Figure 4. Psychological effects—POMS (the Profile of Mood States).

4.3. Gender Difference

Our results also indicated gender differences because female indicated differences only in D and A-H. As those negative mood states were possibly caused by sympathetic nerve dominance which was induced by stress [19]. It is widely

known that stress, affect various hormones, such as adrenaline, cortisol, dopamine and so on [20] [21] [22]. Moreover, gender differences are found in those hormones and the number and subsets of leucocytes and male are basically more SN dominance [23]. As for gender difference in psychological field, Shichiri K reported in detail [14] [24].

In this way, the effects of shiatsu stimulation have gender differences on subject. In further study, we have to also discuss on gender difference of therapists.

Thus, our results showed that the shiatsu stimulation in the sitting position for five minutes indicated both physiological and psychological effects.

However, there are limitations. Our application was given in the sitting position. Nishijyo reported, different in efficiencies were observed in the different positions [25]. Therefore, we have to discuss shiatsu stimulation in other positions in larger scale with wider range of age as well as repetitive stimulation after an appropriate time points (e.g. days, weeks) to see if individual subjects respond similarly.

5. Conclusion

The shiatsu stimulation indicated both physiological and psychological effects. The pathway of those effects might be induced by decreasing SN/increasing PN. Gender differences were found in physiological effect.

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