

## Effects of Traditional Japanese Massage Therapy on Various Symptoms in Patients with Parkinson's Disease: A Case-Series Study

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### Abstract

**Objectives:** Massage therapy is one of the most commonly used complementary therapies for patients with Parkinson's disease (PD). The aim of this preliminary study was to evaluate the effects of traditional Japanese massage therapy on various symptoms of patients with PD.

**Design:** The study design was a case series study.

**Setting:** The study was conducted at the Center for Integrative Medicine, Tsukuba University of Technology, Japan.

**Subjects:** The subjects were 10 patients with idiopathic PD (mean age, 69.6 ± 7.7 years; range, 55–85 years) who presented for consultation with a neurologist between February and April 2009 and who desired massage therapy in conjunction with standard pharmaceutical treatment.

**Intervention:** The intervention comprised a 30-minute session of traditional Japanese massage in conjunction with standard conventional medication.

**Outcome measures:** The outcome measures were as follows: Gait speed in the 20-m walk test (10-m walk and return) for gait disturbance, angular range of shoulder joint motion for frozen shoulder, and a visual analogue scale (VAS) for assessing the severity of each of various symptoms (hypophonia, shoulder stiffness, muscle pain, heaviness or lassitude of a body part, and fatigue), as determined before and after the massage session.

**Results:** (1) Patients with gait disturbance showed improved gait speed, (2) those with frozen shoulder showed improved range of motion of the shoulder joint, and (3) VAS scores for assessing the severity of other subjective symptoms were improved.

**Conclusions:** These results suggest that traditional Japanese massage therapy used in combination with medication is effective for alleviating various symptoms in patients with PD and may contribute to enhancing their health-related quality of life. Larger studies with a control group are required to verify these findings.

### Introduction

ACCORDING TO A SURVEY by the Ministry of Health, Labour, and Welfare, there were approximately 100–150 patients with Parkinson's disease (PD) per 100,000 population in Japan as of 2004,<sup>1</sup> and the number of such patients is expected to increase in today's aging society. In the field of neurology, recent pharmacologic developments have improved the prognosis of PD.<sup>2</sup> Nevertheless, since a causal therapy has not yet been established, patients with PD have a reduced quality of life in old age, and their families often become their long-term caregivers. Thus, efforts must be

made for the preservation of health-related quality of life for patients with PD.<sup>3</sup>

Patients with PD often resort to complementary and alternative medicine (CAM) in the hope of improving their quality of life.<sup>4</sup> Furthermore, patients using CAM hope to improve motor symptoms, fatigue, pain, and constipation.<sup>5</sup> Among CAM users with PD, 40% subjectively reported some improvement of their symptoms.<sup>6</sup> Studies conducted in the United States reported that 40% of patients with PD use at least one form of CAM, with the three most commonly used therapies being vitamins and herbs, massage therapy, and acupuncture.<sup>7</sup> In the United States, 54% of patients with PD have reported the

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use of at least one form of CAM, with massage and aromatherapy being the most common.<sup>4</sup> A survey on CAM conducted among patients with PD and neurologists in Ibaraki Prefecture, Japan revealed that 11.7% of patients with PD were receiving massage therapy and 29.8% of neurologists advocated massage therapy in their usual practice for their patients with PD for alleviation of symptoms.<sup>8</sup>

Despite the support of many patients with PD for massage therapy and the suggestion according to a report on alternative therapies for PD by the Quality Standards Subcommittee of the American Academy of Neurology that a variety of manual therapy techniques are beneficial for motor function, further studies using rigorous scientific methods are required to determine efficacy.<sup>9</sup> In this preliminary study, it was sought to determine whether a 30-minute massage session in conjunction with standard conventional treatment can contribute to improving the various physical symptoms of patients with PD.

**Methods and Participants**

*Participants*

Participants were 10 patients with idiopathic PD (mean age, 69.6±7.7 years; range, 55–85 years) who presented at the Center for Integrative Medicine, Tsukuba University of

Technology, to consult a neurologist between February and April 2009 and who desired massage therapy in conjunction with standard pharmaceutical treatment. Informed consent was obtained from all patients. The demographics and physical conditions of the participants are shown in Table 1.

*Procedure*

A 30-minute massage session was provided by a female therapist who has a national massage practitioner license and 20 years of experience. On a massage table, a full-body massage excluding the face, head, and abdomen was performed with focus on the specific locations where patients felt pain and wanted to improve symptoms. First, patients were given a brief massage on their less severe side while lying on their severe side, then their position was reversed and they were given a full massage on their severe side. Table 1 shows the complaints and the locations that were specifically focused on during the massage for each patient.

The massage techniques used were standard versions of traditional Japanese massage therapy, conducted through the clothes, that constitutes mainly kneading, with less stroking and pressing than other techniques, with moderate intensity of stimulation applied within the range of comfort.<sup>10</sup> Table 2 shows the standard procedure used in this study. For patients who were suffering from frozen shoulder,

TABLE 1. CHARACTERISTICS OF STUDY POPULATION

ID	Sex	Age	Onset age	Stage <sup>a</sup>	Complaints	Locations of massage focus (full-body massage plus)	Medication (mg/day)
P1	M	60	55	IV	Gait disturbance, hypophonia, heaviness of lower extremities	Neck, back, lower back, buttocks, and legs	LD/DCI 300, amantadine hydrochloride 150
P2	M	67	58	III	Gait disturbance, hypophonia	Neck, back, lower back, buttocks, and leg	LD/DCI 600, pramipexole 3, amantadine hydrochloride 150, selegiline hydrochloride 5, trihexyphenidyl hydrochloride 6
P3	F	67	57	IV	Heaviness of upper extremities, hypophonia	Neck, shoulders, arms, and back	LD/DCI 600, cabergoline 3, pergolide mesilate 0.5, amantadine hydrochloride 100, trihexyphenidyl hydrochloride 2
P4	M	69	50	III	Gait disturbance, hypophonia	Neck, back, lower back, buttocks, and legs	LD/DCI 300, cabergoline 3, pergolide mesilate 1, amantadine hydrochloride 150, selegiline hydrochloride 7.5
P5	M	77	76	II	Left frozen shoulder, heaviness of left forearm	Left shoulder joint and left arm	LD/DCI 300
P6	F	85	81	IV	Gait disturbance, lassitude of the whole body	Neck, back, lower back, buttocks, and legs	LD/DCI 300
P7	M	63	55	IV	Gait disturbance, fatigue	Neck, back, lower back, buttocks, and legs	Benserazide hydrochloride 200
P8	F	65	64	III	Frozen shoulder, hypophonia, shoulder stiffness	Left shoulder joint and left arm	LD/DCI 300, entacapone 300
P9	M	73	64	IV	Frozen shoulders	Shoulder joints and arms	LD/DCI 600, pramipexole 3, entacapone 600
P10	F	55	50	II	Muscle pain on the right side of the body	Right arm, right leg, and back	LD/DCI 300, ropinirole hydrochloride 0.25

<sup>a</sup>Hoehn and Yahr stage.  
LD/DCI, levodopa/dopa-decarboxylase inhibitor.

TABLE 2. TRADITIONAL JAPANESE MASSAGE PROCEDURE

## Lying down on one side

- A. The back including the shoulder, the back, and the lower back
1. Stroking starts at the base of the neck along the upper shoulder to the shoulder joint
  2. Downward strokes along the full length of the back, starting at the base of the neck down to the waist
  3. Thumb kneading by circular or linear (back and forth) movement: the upper shoulder from the side of the 7th cervical vertebra (Cv7) to the *acromion* along the *trapezius*
  4. Thumb kneading by circular or linear movement: from Cv7 via the superior angle of the *scapula* and the *supraspinous fossa* to the *acromion*, on the *levator scapulae*, *rhomboid*, and *supraspinatus*.
  5. Thumb kneading by linear movement along the spine: from the side of Cv7 to the side of the 5th lumbar vertebrae (Lv5) on the *erector spinae* and the *quadratus lumborum*
  6. Thumb or other four-finger kneading by circular or linear movement on the *medial* and *lateral border of scapula*
  7. Heel of the hand kneading by circular movement on the *infraspinous fossa*
  8. Downward strokes again along the length of the back, starting at the base of the neck down to the waist
  9. Stroking again starting at the base of the neck along the upper shoulder to the shoulder joint
- B. The upper limb and the hand
1. Stroking down from the shoulder to the fingertips
  2. Palm grasp kneading over the upper limb on the *deltoid*
  3. Palm grasp kneading over the upper front limb on the *biceps brachii*
  4. Palm grasp kneading over the back of the upper limb on the *triceps brachii*
  5. Thumb kneading on the back of the forearm
  6. Palm grasp kneading on the front and the side of the forearm
  7. Thumb kneading on the hand
  8. Knead and squeeze each finger along the full length using the thumb and the index
  9. Stroking down from the shoulder to the fingertips
- C. The neck
1. Stroking starting at the superior nuchal line along the neck to the base of the neck
  2. Thumb kneading over the back of the neck on the *semispinal capitis*, the *splenius capitis*, and the *trapezius* descending part
  3. Thumb, two-finger (thumb and index), or four-finger kneading to the side of the neck, on the *sternocleidomastoid*
  4. Apply four-finger kneading to the front of the neck
  5. Thumb kneading and pressure along the superior nuchal line
  6. Stroking again starting at the superior nuchal line along the neck to the base of the neck
- D. The lower limb and the foot
1. Stroking from the buttock to the toes
  2. Kneading over the buttock with the heel of the hand
  3. Palm kneading on the front thigh, on the *quadriceps femoris* muscle
  4. Palm grasp kneading to the back thigh or hamstrings
  5. Palm grasp kneading on the *patella*
  6. Thumb kneading on the front lower leg
  7. Palm grasp kneading on the calf muscles
  8. Palm grasp kneading of the Achilles tendon
  9. Finger kneading over the top of the foot
  10. Thumb kneading and pressure on the sole
  11. Knead and squeeze each toe along the length using thumb and index finger
  12. Intermittent palm pressure on the entire leg
  13. Stroking again from the buttock to the toes

Order of given massage: less severe side (A → B → C → D) → severe side (A → B → C → D)

## Notes:

1. First, patients were given a brief massage on their less severe side while lying on their severe side, and then given a full massage on their severe side while lying on their less severe side.  
The full massage focused on specific locations where patients felt pain and wanted symptom relief.
2. For patients who were suffering from frozen shoulder, the following massage method for a diseased shoulder joint was added into the sequence.

## Shoulder joint method

1. Stroking around the shoulder joint
2. Thumb kneading or four-finger kneading by circular or linear movement along the shoulder joint
3. Palm grasp kneading on muscles anterior to the *fossa axillaris*
4. Palm grasp kneading on muscles posterior to the *fossa axillaris*
5. Passive muscle stretching exercises and joint mobility to extend the range of motion of the frozen shoulder joint
6. Stroking around the shoulder joint again

TABLE 3. CHANGE IN GAIT SPEED BETWEEN BEFORE AND AFTER THE MASSAGE SESSION

ID	Before (sec.)	After (sec.)
P1	23.2	22.0
P2	18.2	16.3
P4	21.4	19.7
P7	95.0	21.5
P6	Walked with an assistant (experienced frozen gait)	Walked unassisted

Distance: 10 m walk and return.

massage therapy for a diseased shoulder joint was added into the sequence (Table 2).

Measures

For the various symptoms presented by the patients, the following indicators were measured before and after the single massage session and the changes were evaluated.

**Gait disturbance.** Five patients with PD complained of gait disturbance, including frozen gait (inability to move the feet, which may worsen in tight, cluttered spaces or when attempting to initiate gait). For 4 of the 5 patients who were able to walk unassisted before the massage session, gait speed was measured in the 20-m walk test (10-m walk and return).

**Frozen shoulder.** For 3 patients with PD who complained of frozen shoulder (inability to fully move the shoulder joint through a normal range of motion), the range of angles for motion of the shoulder joint was measured.

**Other symptoms.** Five (5) patients with PD complained of hypophonia, a condition characterized by difficulty in vocalizing or speaking loudly or clearly, and 7 patients with PD experienced physical symptoms such as shoulder stiffness, muscle pain, heaviness or lassitude of a body part, and fatigue. To assess the feeling of severity of each of these symptoms, a visual analogue scale (VAS) was used before

and after the massage session. A sheet of paper (width 100 mm x height 40 mm) was given to the patient, and it was explained that the left edge of the paper represented no symptom and the right edge represented the most serious degree of the symptom that the patient could imagine. The patient was then asked to indicate the severity of their symptom at that particular moment by placing a tick on the paper. The length from the left edge of the paper to the tick was measured and taken as the VAS score.

Since 5 patients had the same symptom of hypophonia, VAS scores for the degree of difficulty of vocalization were compared statistically using Student's *t*-test and the Mann-Whitney *U*-test, which were performed because of the small sample size and the possibility of nonparametric data. The *t*-test was two-tailed, and statistical significance was set at  $p < 0.05$ . Statistical analysis was performed using SPSS for Windows (version 16.0).

Results

In the 4 patients with gait disturbance who could walk unassisted before the massage session, gait speed assessed by the 20-m walk test (10-m walk and return) was faster after the 30-minute massage session than before it (Table 3). In particular, 1 patient (P7), who took considerable time to accomplish the turn, took 95.0 seconds before the massage, but could turn smoothly and took only 21.5 seconds after the massage. Furthermore, another patient (P6), who was not able to walk without the aid of her daughter and used a wheelchair before the massage session, was able to walk unassisted after the massage session to her wheelchair, which was 10 m away (Table 3).

For the four frozen shoulders (3 patients), the angular range of motion of the shoulder joint was expanded after the massage session as follows: 10-25 degrees for flexion and 5-35 degrees for abduction. All of the diseased shoulders achieved almost the full range of motion (55 degrees for extension and 50-60 degrees for lateral rotation; Table 4).

For the 5 patients with hypophonia, the postmassage VAS score of 34.2 was significantly smaller than the premassage score of 53.0 ( $t(df\ 4) = 5.09, p = 0.005; z = 2.02, p = 0.046$ ; Table 5). In addition, VAS scores after the massage session

TABLE 4. CHANGE IN RANGE OF MOTION OF THE SHOULDER JOINT BETWEEN BEFORE AND AFTER THE MASSAGE SESSION

	ID							
	P5		P8		P9			
	Affected side							
	Left		Left		Left		Right	
Before	After	Before	After	Before	After	Before	After	
Flexion	150	168	145	168	100	125	145	155
Abduction	158	168	158	163	80	105	145	180
Extension	35	53	40	52	45	50	55	55
Lateral rotation	60	60	60	60	50	50	40	50
Medial rotation <sup>b</sup>	T10	T8	T7	T7	T10	T10	T11	T11

Degrees of angles were measured.

<sup>a</sup>Due to fatigue after the massage session, it was difficult to lift the arm actively.

<sup>b</sup>With the back of the hand reaching around the back, the level of the spine to which the tip of the thumb reached was measured.

TABLE 5. CHANGES IN HYPOPHONIA BETWEEN BEFORE AND AFTER THE MASSAGE SESSION

ID	Before	After	Test
P1	62	40	
P2	35	28	
P3	69	51	
P4	49	21	
P8	50	31	
Mean $\pm$ SD	53.0 $\pm$ 13.1	34.2 $\pm$ 11.6	$t=5.09^{**}$ $z=2.02^*$

Measurement: Visual analogue scale.

Both Student's *t*-test and the Mann-Whitney *U*-test were done due to the very small sample size and the possibility of nonparametric data.

\* $p < 0.05$ ; \*\* $p < 0.01$ .

were greatly decreased for other physical symptoms: heaviness of lower extremities, heaviness of upper extremities, heaviness of the left forearm, lassitude of the whole body, fatigue, shoulder stiffness, and muscle pain on the right side of the body (Table 6).

### Discussion

The gait speed of the 4 patients with gait disturbance improved after the 30-minute massage session, which is in agreement with the results of interview data in a previous study.<sup>11</sup> In that study, after a course of eight 1-hour sessions of deep whole-body massage given over a period of 8 weeks, patients with PD showed improvement in walking; 1 of the participants even stated that "massage relaxed muscles" and "walking gradually improved." During the transmission of tactile and pressure stimuli applied to the skin, soft tissues, muscles, and fascias during massage therapy, it is possible that the somatosensory stimulation impacts on the motor function of the central nervous system to induce modulation of walking.

In addition, stimulation of the muscle spindle afferents via neck muscle stimulation has been shown to influence the velocity and direction of gait in asymptomatic healthy individuals.<sup>12,13</sup> In the present study, stimulation of the neck muscles was performed in the full-body massage for all participants with PD, regardless of whether they had neck problems, because such massage might facilitate the improvement of gait speed.

Rigidity might be associated with pain, and a painful shoulder is one of the most frequent initial manifestations of PD.<sup>14</sup> Clinical features of rigidity suggest a complex patho-

physiologic origin where increased muscle tone at rest and augmented resistance to passive displacement of the joint readily evoke different mechanisms.<sup>15,16</sup> On the one hand, results suggest the facilitation of spinal cord motor neuron activity, most likely related to increased supraspinal driving or facilitation. On the other hand, the fundamental role of the stretch reflex must be considered. In traditional Japanese massage therapy, stimulation is frequently applied to muscles and fascias. Massaged muscles are extended passively, and the muscle spindles are simultaneously extended. Then, the stretch reflex, which modulates muscle tone, follows. These working mechanisms induced by traditional Japanese massage therapy may be effective for alleviating frozen shoulder caused by rigidity.

The postmassage VAS scores for the degree of hypophonia in 5 patients and the other physical symptoms (heaviness, lassitude, fatigue, shoulder stiffness, and muscle pain) in 7 patients were improved after the massage session. In a previous study on deep whole-body massage, some of the common problems of patients with PD were found to be tiredness, difficulty in walking, stiff and clumsy hand and arm movements, and difficulties with writing and speech, and most of the patients mentioned in an interview that they were hopeful that massage therapy would improve their symptoms and consequently their quality of life.<sup>11</sup> In a different study in which 30-minute massage therapy was given twice a week for 5 weeks, patients with PD showed improvement in daily living activities, slept well, and had lower levels of norepinephrine and epinephrine (stress hormones) in urine samples, suggesting they were less stressed.<sup>17</sup> Taken together, the results of these previous studies and the present study indicate that massage therapy has the potential to alleviate a number of symptoms related to PD. A study by Birgitta and Birgitta (2004) reported that patients with PD required additional treatment regarding activities of daily living in order to improve their health-related quality of life.<sup>18</sup> The findings of this study and others on PD suggest that massage therapy may prove effective for fulfilling this role.

In the case of Patient P6, who was not able to walk by herself without assistance from her daughter and used a wheelchair before the massage session, she was able to walk unassisted for 10 minutes after the session. This implies that massage therapy may offer benefits not only for patients but also their families by reducing the burden of care. In addition, frozen gait is associated with substantial social and clinical consequences for patients and is particularly a common cause of falls.<sup>19</sup> This in turn suggests that massage therapy can contribute to an improved quality of life in Japan's aging society.

Some limitations in this study should be discussed. This was a preliminary study conducted in a daily clinical setting, and the protocol was decided with reference to some previous studies<sup>9,11,17</sup> and anecdotal information that various symptoms in patients with PD could be alleviated by massage provided by massage therapists. Additionally, since the study was conducted in one medical facility in a small local city, historical matched controls could not be prepared simultaneously. Thus, the results of this preliminary study are not generalizable to the population with PD as a whole. Further studies with larger samples recruited from multi-center or peer support groups and designed as randomized

TABLE 6. CHANGES IN OTHER SYMPTOMS BETWEEN BEFORE AND AFTER THE MASSAGE SESSION

ID	Symptom	Before	After
P1	Heaviness of lower extremities	58	12
P3	Heaviness of upper extremities	73	60
P5	Heaviness of the left forearm	44	15
P6	Lassitude of the whole body	96	24
P7	Fatigue	52	27
P8	Shoulder stiffness	55	32
P10	Muscle pain on the right side of the body	67	37

Measurement: Visual analogue scale.

controlled clinical trials should be conducted to verify the findings.

**Conclusions**

The results of the present study suggest that traditional Japanese massage therapy can impart beneficial effects after one session for patients with PD, and may also benefit family members by reducing the burden of care. The developmental studies with a control group should be conducted in the near future.

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**Disclosure Statement**

No competing financial interests exist.

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