

## Beneficial effect of the foot bath on sensory abnormalities of the lower extremities of patients with Parkinson's disease

Eri Morimoto, R.N.<sup>#1</sup>, Yayoi Muramoto, R.N.<sup>#1</sup>, Yuko Ueda, R.N.<sup>#1</sup>

*#1. Department of Nursing, Tokushima National Hospital, National Hospital Organization, 1354 Shikiji, Kamojima, Yoshinogawa, Tokushima 776-8585 Japan*

Received 25 February 2015; received in received from 2 March 2015; accepted 6 March 2015

---

### Abstract

We conducted a foot bath to relieve abnormalities of the lower extremities of patients with Parkinson's disease. After conducting a foot bath on five patients, there was a temporary effect, but not a persistent effect. Also, the neurological symptoms, the activities of daily living, and the exercise capacity were improved partially. All five people's depression symptoms improved.

**Keywords:** Parkinson's disease, Sensory abnormalities of the lower extremities, Foot bath

---

### Introduction

Rehabilitation of Parkinson's disease has been provided in our ward from April, 2009. The length of stay is five weeks. Rehabilitation is provided by means of an original program. Parkinson's disease has symptoms such as dysesthesia, autonomic nervous system disorders and neurological manifestations [1]. The percentage of patients affected by deep seated dysesthesia and superficial dysesthesia is 82.6 % and 47.9 %, respectively. There are many persons who report dysesthesia pain and numbness of the muscle of leg ache state among the patients admitted to our ward. The mechanism of dysesthesia in Parkinson's disease varies [2]. Also, dysesthesia is susceptible to neurological manifestations. This reduces the ADL of patients with Parkinson's disease with motor disorders affecting everyday life, and neurological manifestations are worsened more. Therefore, we thought about using the foot bath for the purpose of the improvement of the letter of abnormal

sensation this time. For pain and numbness of the lower limbs of patients with cancer-related sharp pain and cervical vertebrae symptom, a foot bath aches, and it is reported that it is effective in improvement of the numbness and in improving walking. However, there are no studies that have examined the effect of the foot bath on dysesthesia of patients with Parkinson's disease. A foot bath was used on patients with Parkinson's disease reporting dysesthesia of the lower limbs, and we tested the effect. The evaluation indexes included the Unified Parkinson's Disease Scale (UPDRS), the Self-rating Depression Scale (SDS), and the Numeric Rating Scale (NRS) .

### Subjects and methods

Four patients that were the subject of study had been hospitalized for rehabilitation of Parkinson's disease. They had dysesthesia in the lower limbs. The presence or absence of treatment for dysesthesia is not a problem. Painkilling treatment was not changed

**Correspondence to:** Eri Morimoto, R.N., Tokushima National Hospital, National Hospital Organization, 1354 Shikiji, Kamojima, Yoshinogawa, Tokushima 776-8585 Japan Phone: +81-883-24-2161 Fax : +81-883-24-8661

during this intervention study. The study period was from October 6, 2014 to December 15. UPDRS, SDS were evaluated before and after the foot bath. Measurement of body temperature, and degree of dysesthesia were evaluated before and after the foot bath. The foot bath duration was given for seven days. We gave the foot bath from 14:00 to 15:00. The foot bath method followed a fixed procedure. The data analysis method was as follows. The degree of dysesthesia about the foot bath was compared using the Numeric Rating Scale (NRS). The SDS was compared with the UPDRS before and after the foot bath.

### Ethical consideration

This study received approval from the Ethical Review Board of the regional institution. The information obtained was not used for any purpose except the study. The information was deleted after the study. The anonymity of the subjects was ensured. Participation in the study was voluntary. Subjects could discontinue their participation at any time without suffering any disadvantage. The above-mentioned facts were explained, and we obtained each subject's consent in a document.

### Results

Patient 1 was a woman in her 60s with deep seated dysesthesia. She had sharp muscular-like pain in the right femoral region. Patient 2 was a woman in her 80s with superficial dysesthesia. She had numbness of both soles. Patient 3 was a woman in her 70s with superficial dysesthesia. She had numbness of both soles and toes. Patient 4 was a woman in her 70s with deep seated dysesthesia. She had sharp pain in both toes. Patient 5 was a man in his 40s with total sensory impairment. He had sharp pain throughout both lower extremities. In all patients, dysesthesia was improved by the foot bath. (Figure 1) Furthermore, disease severity rated by UPDRS and the depression scale rated by SDS were also improved by the foot bath.

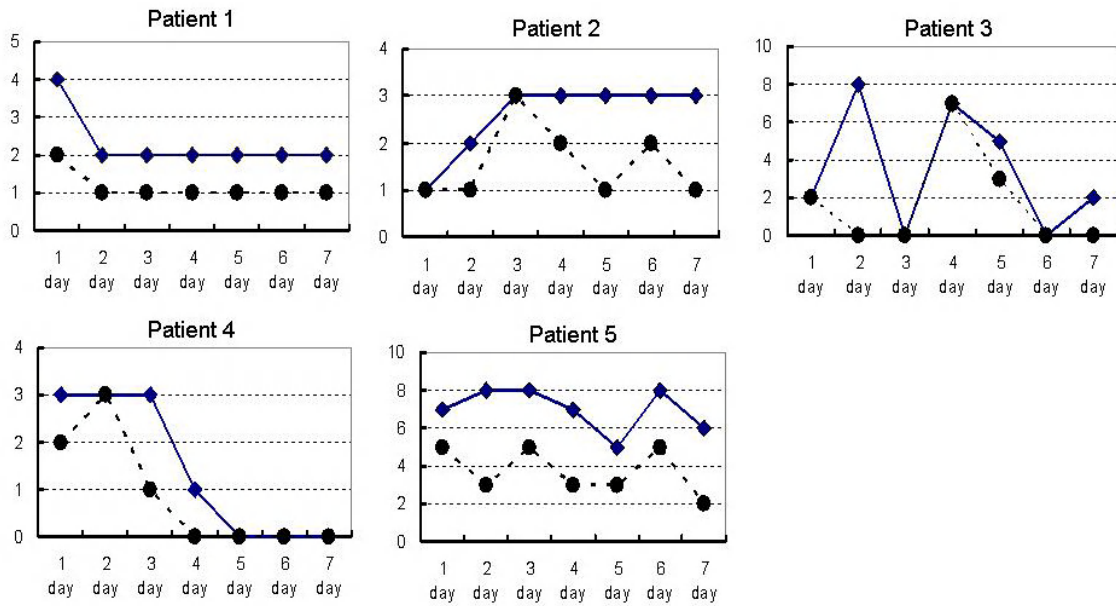
(Figure 2).

### Discussion

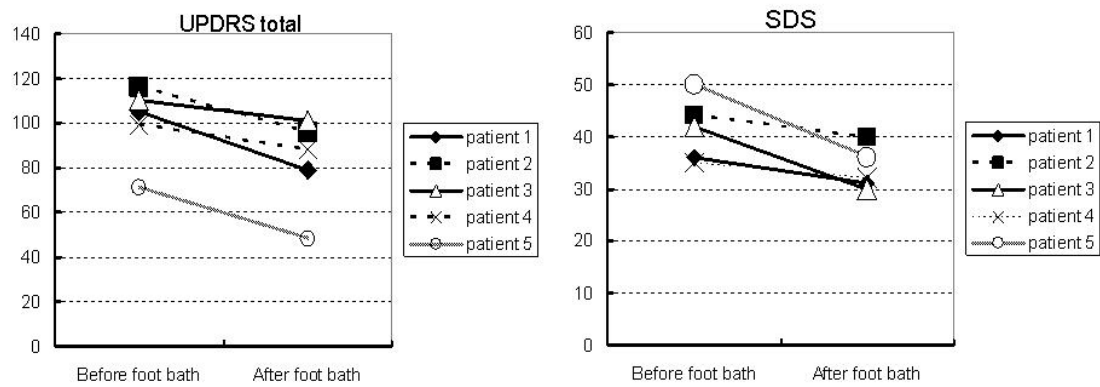
All five patients noticed a decrease of dysesthesia after the foot bath. A symptom was relieved only two patients continuously. The reduction of the symptoms was more remarkable in patients with deep dysesthesia than in patients with superficial dysesthesia. Causes are various as mechanism of the pains of patients with Parkinson's disease, including peripheral factor and the central factor. There is a possibility that promotion of the blood circulation of lower limbs reduced muscular strain, which improved dysesthesia after the foot bath. The parkinsonism was improved in all five patients, too. This suggests that the foot bath affects not only dysesthesia but also the motor function. One patient said "My feet are light, and it's easy to walk". Circulation promotion and muscular relaxation seem to have occurred due to the warm temperature effect of the foot bath. Improvement of depression symptoms was found in all five people. Depression is found with 40-50% of frequency in patients with Parkinson's disease. Because a foot bath stimulates the parasympathetic nerve, a relaxation state seems to be induced. The relaxed state brought a change and stress relief, and led to improvement of depression and uneasiness. Also the patients talked about their problems with the disease and their future life to a nurse during the study period. This led to an improvement of the relationship, based on mutual trust. The number of study patients should be increased and the study developed further in future.

### Reference

1. Tysnes OB, Müller B, Larsen JP. Are dysautonomic and sensory symptoms present in early Parkinson's disease? *Acta Neurol Scand Suppl.* 2010;(190):72-7.
2. Juri C, Rodriguez-Oroz M, Obeso JA. The pathophysiological basis of sensory disturbances in Parkinson's disease. *J Neurol Sci.* 2010; 289: 60-65.



**Figure 1.** Numeric Rating Scale (NRS) during foot bath treatment. In all patients, dysesthesia was improved by the foot bath.



**Figure 2.** Disease severity rated by UPDRS, and the depression scale rated by SDS before and after the foot bath treatment