Effect of rehabilitation on smile and motor function in Parkinson's disease

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Abstract

We examined the relationship of smile ratio and the effect of five weeks of rehabilitation from the viewpoint of motor and mental function. The arm motor function, the depression scale, and cognitive function were improved by rehabilitation. This tendency was more remarkable than in high smile degree group. The smile degree had a significant equilateral correlation to STEF, the depression scale, cognitive function and UPDRS. The smile has an effect of rehabilitation through maintenance of the motivation of the patients when rehabilitation is received.

Keywords: smile ratio, rehabilitation, UPDRS, STEF, MMSE, SDS

Introduction

Parkinson's disease (PD) is a representative neurodegenerative disease. It is known that the symptoms of this disease worsen in spite of various treatments, year by year. Rehabilitation is provided in addition to medical therapy in our hospital for a period of four years. We noticed that patients demonstrating a favorable effect of rehabilitation smiled more. In this study, the relationship between smiling and the effects of rehabilitation was examined from the viewpoint of motor function and mentation.

Subjects and methods

The subjects were 48 patients with Parkinson's disease, who were hospitalized in Tokushima National Hospital, and who received rehabilitation for five weeks. Their age was 69.2+-7.7 (mean +- SD) years old. The disease duration period was 7.2 years +-5.0 year. Hoehn & Yahr stage was 3.3+-0.4. We performed backward analysis considering the smile degree in patients with Parkinson's disease who received rehabilitation. A smile degree sensor was used for the evaluation of the smile degree. The maximum of 20 seconds was measured. The smile degree was classified in a high group (Group A') and a low group (Group B') after the median. In addition, the groups where A' group, many smiles degrees did not increase in the group where a rate of change to show how long a smile degree improved, Therefore, those whose smile degree increased were classified into the B' group (Figure 1). In addition, we classified patients into two groups; Group A', good response in smile ratio, and Group B', poor response in

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smile ratio. In addition, for clinical evaluation items, a motor usability test, mental status examination, Parkinson's disease severity were used.

Results

As for the grip, a significant change was not found regardless of the smile degree (Figure 1). STEF was not significantly improved in rehabilitation before and after (Figure 2). The SDS was significantly improved in Group B' and Group A' (Figure 3). No significant improvement was found in MMSE (Figure 4).UPDRS part-time job one or two was significantly improved in all groups. Furthermore, it was shown that persons with a high smile degree (Group A') improved more from the beginning (Figure 5). UPDRS Part 3 was significantly improved in all groups. The group with a high smile degree was more improved. A similar tendency was seen in total UPDRS (Figure 6).

Discussion

People with PD are more likely to move to assisted living facilities at an earlier age [1], and falls are among the leading reasons for nursing home admittance [2]. This causes high costs for society [1] and has great consequences for those affected. Despite this, PD studies that have systematically examined home and health dynamics are lacking, and older people are often excluded from PD research [3]. The major cause of disability in people with PD is impaired mobility [4]. Mobility, the ability of a person to move safely in a variety of environments in order to accomplish functional tasks [5], requires dynamic neural control to quickly and effectively adapt locomotion, balance, and postural transitions to changing environmental and task conditions. Such dynamic control requires sensorimotor agility, which involves coordination of complex sequences of movements, ongoing evaluation of environmental cues and contexts, the ability to quickly switch motor programs when environmental conditions change, and the ability to maintain safe mobility during multiple motor and cognitive tasks [6,7]. The types of mobility deficits that are inevitable with the progression of PD suggest that the basal ganglia are critical for sensorimotor agility [8]. Critical aspects of mobility disability in people with PD, such as postural instability, are unresponsive to pharmacological and surgical therapies[9], making preventative exercise an attractive option. As yet, there is no known ongoing exercise program for people diagnosed with PD that focuses on maintaining or improving their agility to slow or reduce their decline in mobility.

In the present study, UPDRS parts 1-3 were improved after rehabilitation. The group which had a high initial smile degree improved more. No significant association of smile ratio with hand grip, STEF and MMSE was found. The SDS improved well in the group with a good improvement in the smile ratio. It was thought that our rehabilitation caused improvement of the depression index along with an improvement of Parkinsonism and smile ratio.

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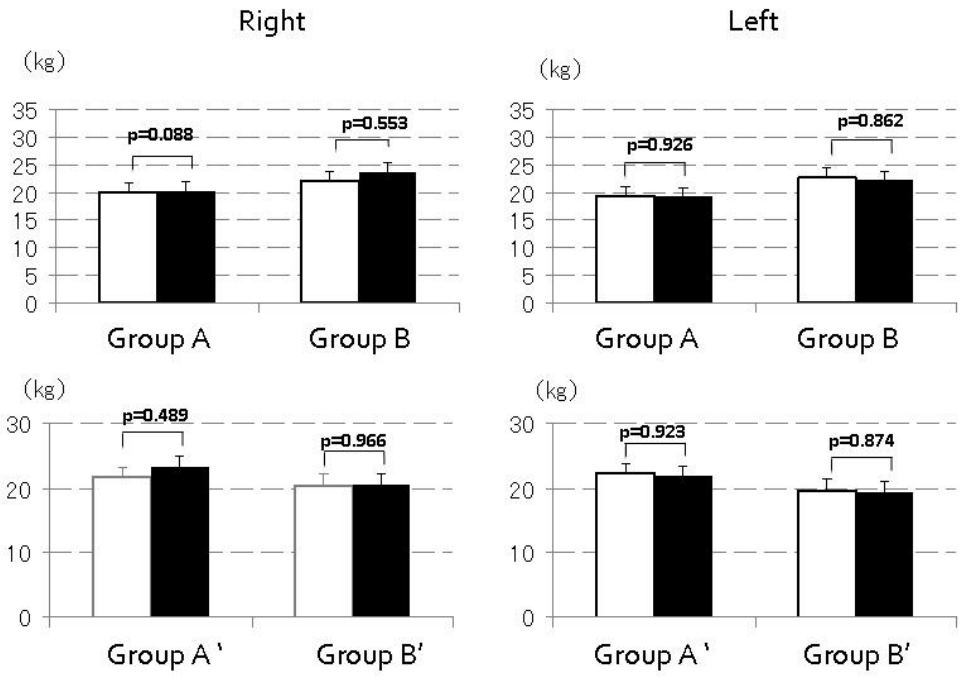

Figure 1. Hand grip before and after rehabilitation

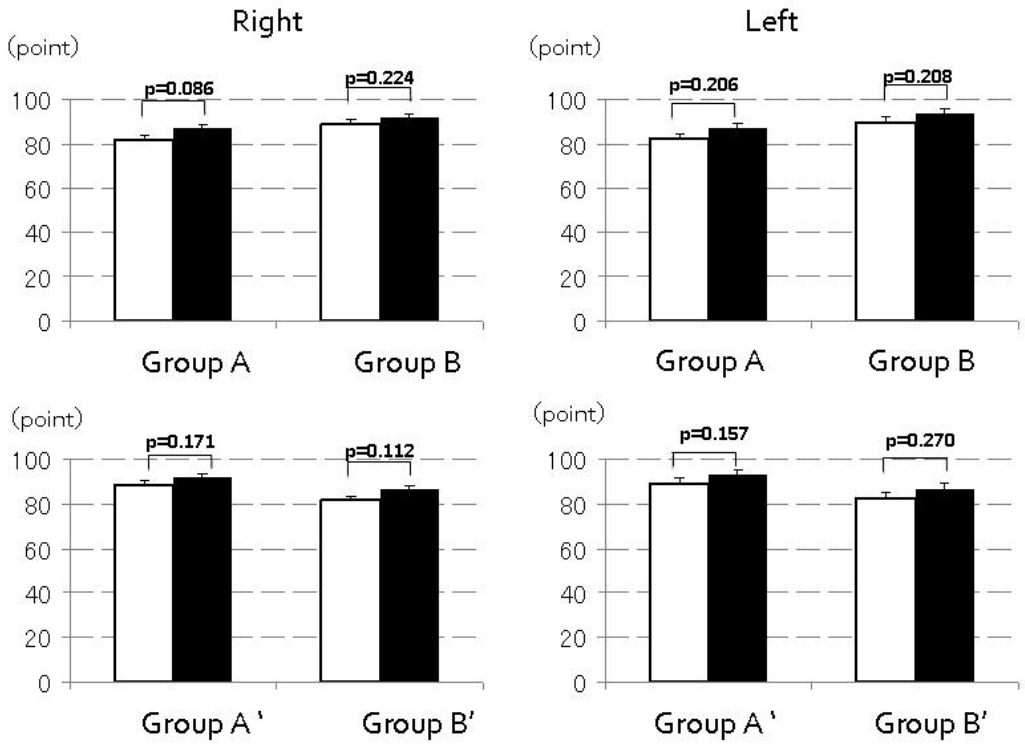

Figure 2. STEF before and after rehabilitation. Open column, before rehabilitation. Closed column, after rehabilitation.

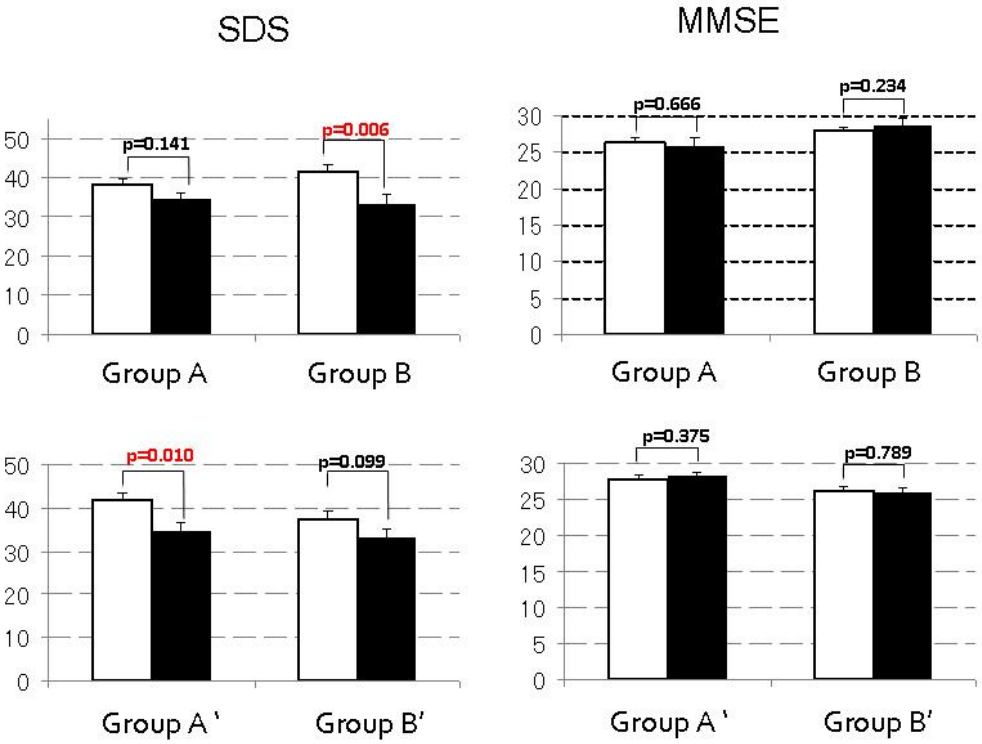

Figure 3 SDS and MMSE before and after rehabilitation. Open column, before rehabilitation. Closed column, after rehabilitation.

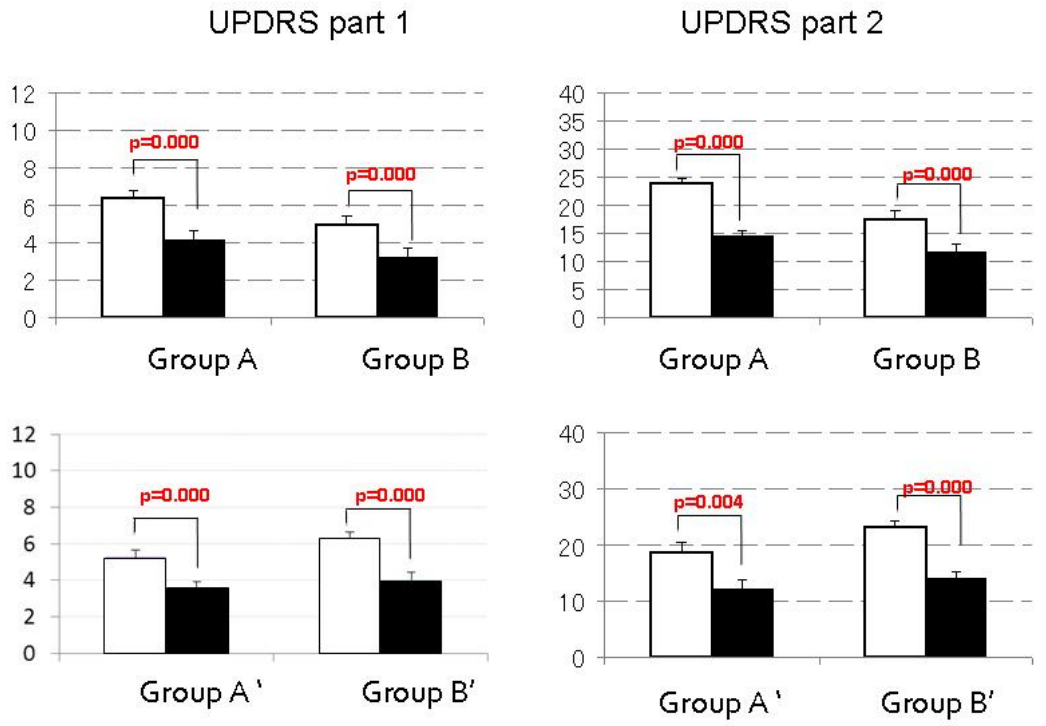

Figure 4. UPDRS parts 1 and 2 before and after rehabilitation. Open column, before rehabilitation. Closed column, after rehabilitation.

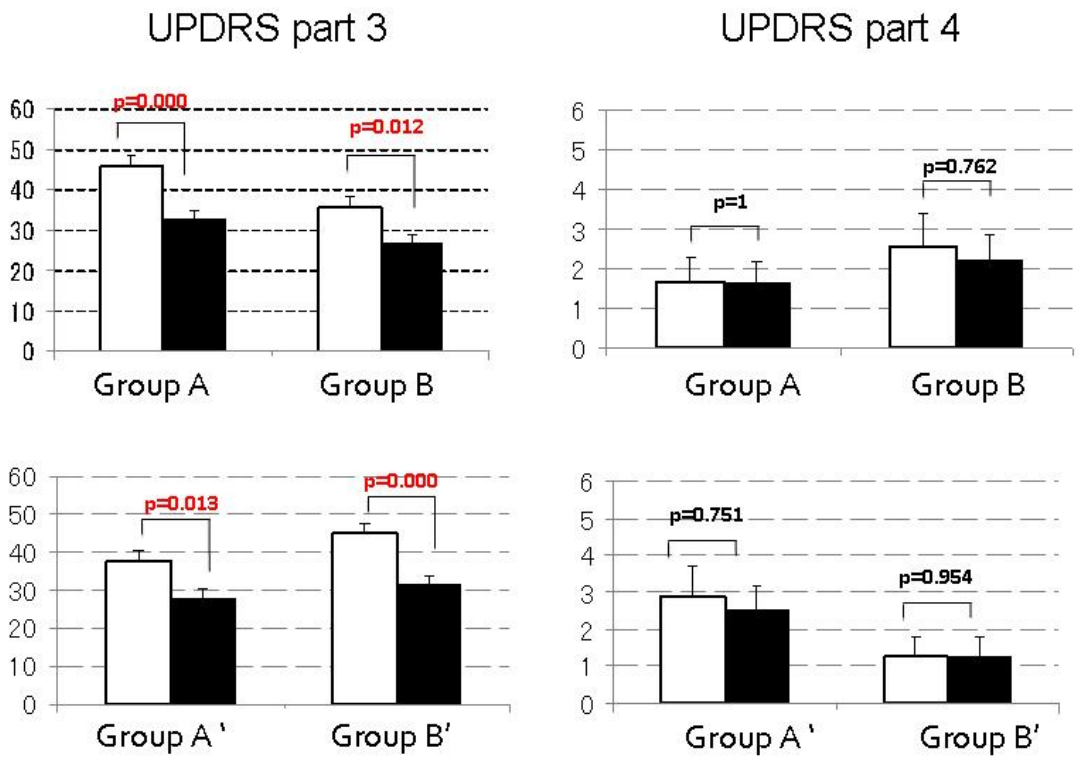

Figure 5 UPDRS parts 3 and 4 before and after rehabilitation. Open column, before rehabilitation. Closed column, after rehabilitation.

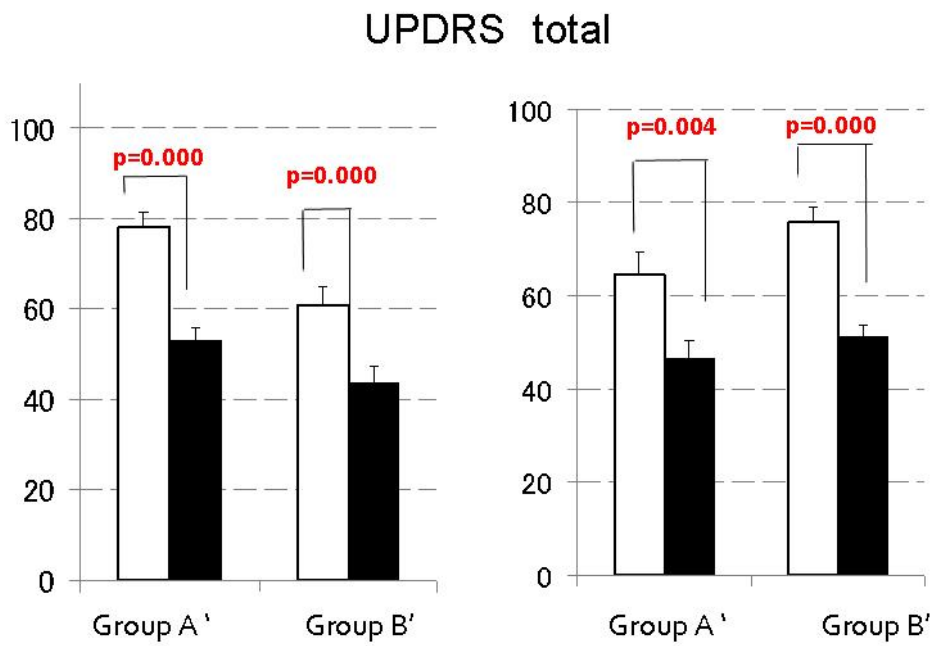

Figure 6. Total UPDRS before and after rehabilitation. Open column, before rehabilitation. Closed column, after rehabilitation.