Rehabilitation for Parkinson's disease: effect of the smile on motor and mental function

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Abstract

We examined the relationship between the smile ratio and the effect of five weeks of rehabilitation from the viewpoint of motor and mental function. UPDRS parts 1-3 were all improved after rehabilitation. A group which was high in 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 smile ratio. It was thought that our rehabilitation caused improvement of the depression index along with the improvement of Parkinsonism and smile ratio.

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. Original rehabilitation has been provided in addition to medical therapy in our hospital for four years. We noticed that patients showing favorable effects of the rehabilitation displayed a smile. In this study, the relationship between the smile and the effect of the 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 received 5-week rehabilitation. 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 by the degree of the smile in patients with Parkinson's disease who received rehabilitation. A smile degree sensor was used for the evaluation of the smile degree. The smile was measured for a maximum of 20 seconds. The smile degree was used to classify patients into a high group (Group A) and a low group (Group B) relative to the average. 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, patients whose

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smile degree increased were classified into the B' group (Figure 1). In addition, we classified patients into two other groups; Group A', good response in smile ratio, and Group B', poor response in smile ratio. In addition, for evaluation of clinical items, a motor usability test, mental status examination, and Parkinson's disease severity were used.

Results

As for the grip, no significant change was found, regardless of the smile degree (Figure 1). STEF was not significantly improved after rehabilitation (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 rated high in smile degree (Group A) improved more from the beginning (Figure 5). UPDRS Part 3 was significantly improved in all groups. The group which was high in smile degree showed greater improvement. A similar tendency was seen in total UPDRS (Figure 6).

Discussion

People with PD are more likely to move to assisted living facilities and at an earlier age [1], and falls are among the leading reasons for nursing home admittance [2]. This causes high costs to society [1] and serious 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 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 all improved after rehabilitation. The group which was high in the initial smile degree showed greater improvement. 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 smile ratio. It was thought that our rehabilitation caused improvement of the depression index along with an improvement of Parkinsonism and the smile ratio

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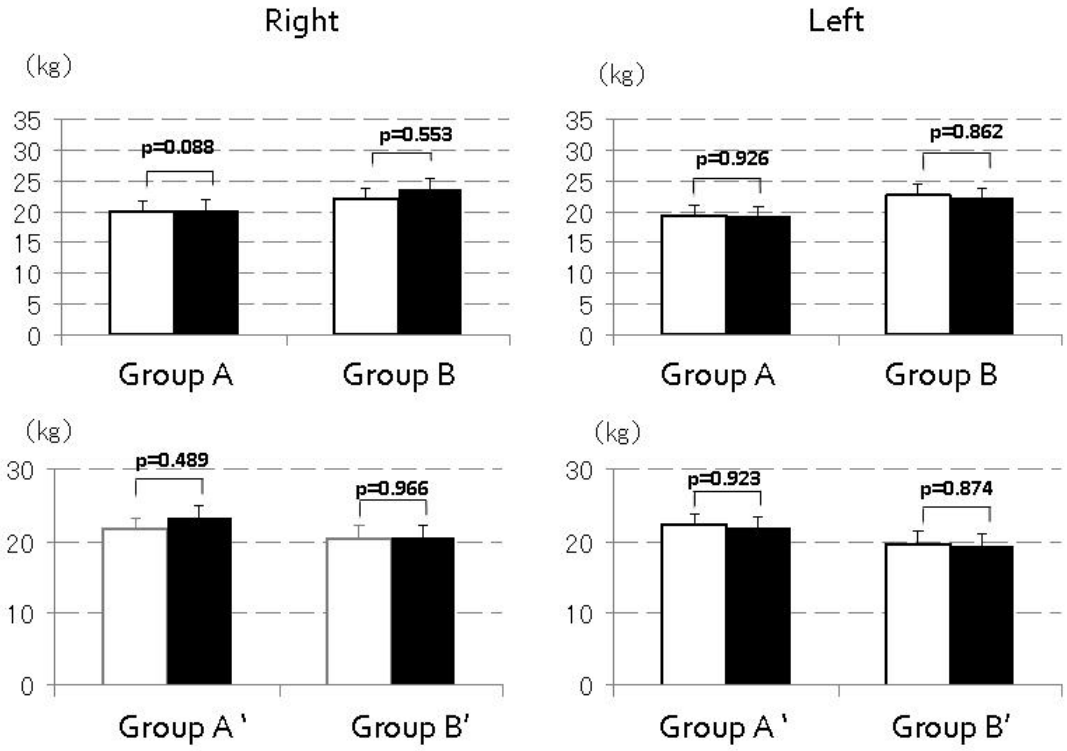

Figure 1. Hand grip before and after rehabilitation

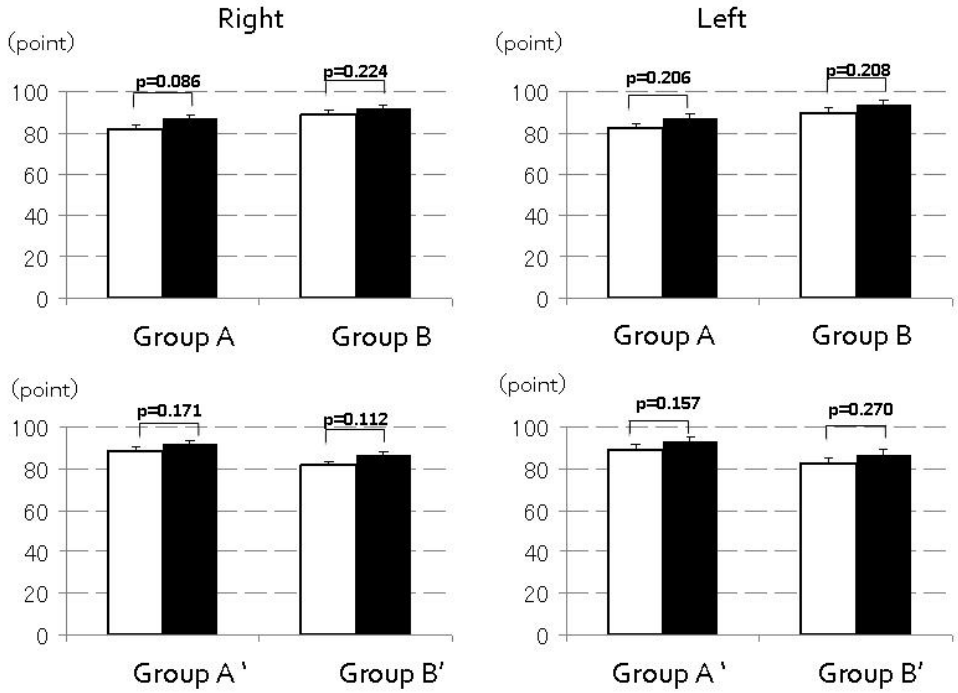

Figure 2. STEF before and after rehabilitation. Open column, before rehabilitation. Closed column, after rehabilitation.

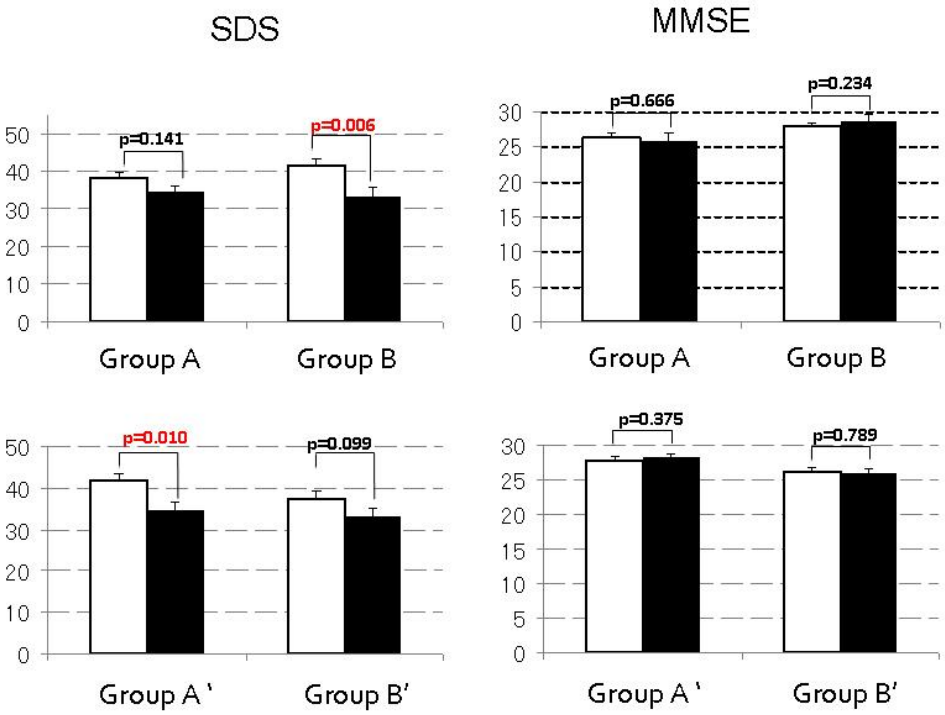

Figure 3 SDS and MMSE before and after rehabilitation. Open column, before rehabilitation. Closed column, after rehabilitation.

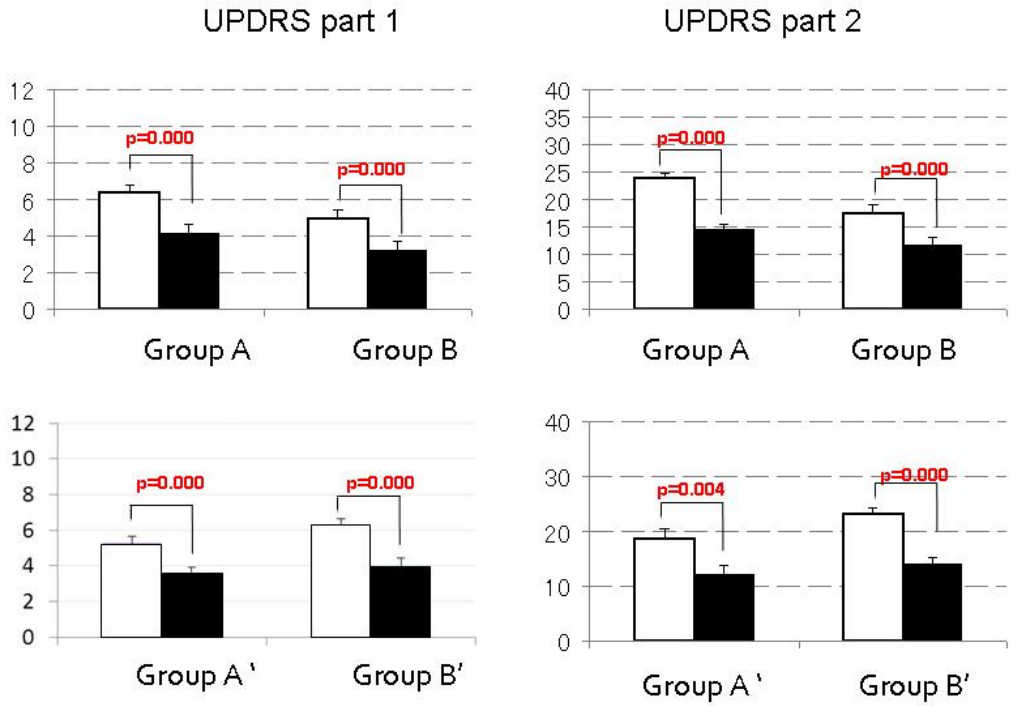

Figure 4. UPDRS parts 1 and 2 before and after rehabilitation. Open column, before rehabilitation. Closed column, after rehabilitation.

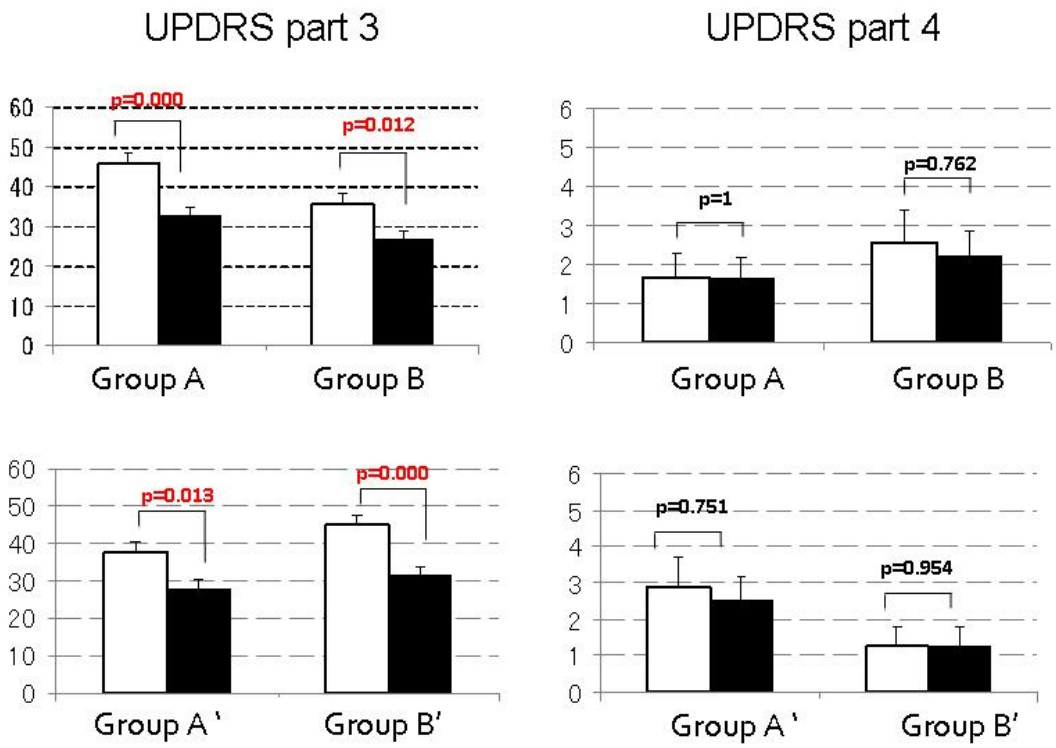

Figure 5 UPDRS parts 3 and 4 before and after rehabilitation. Open column, before rehabilitation. Closed column, after rehabilitation.

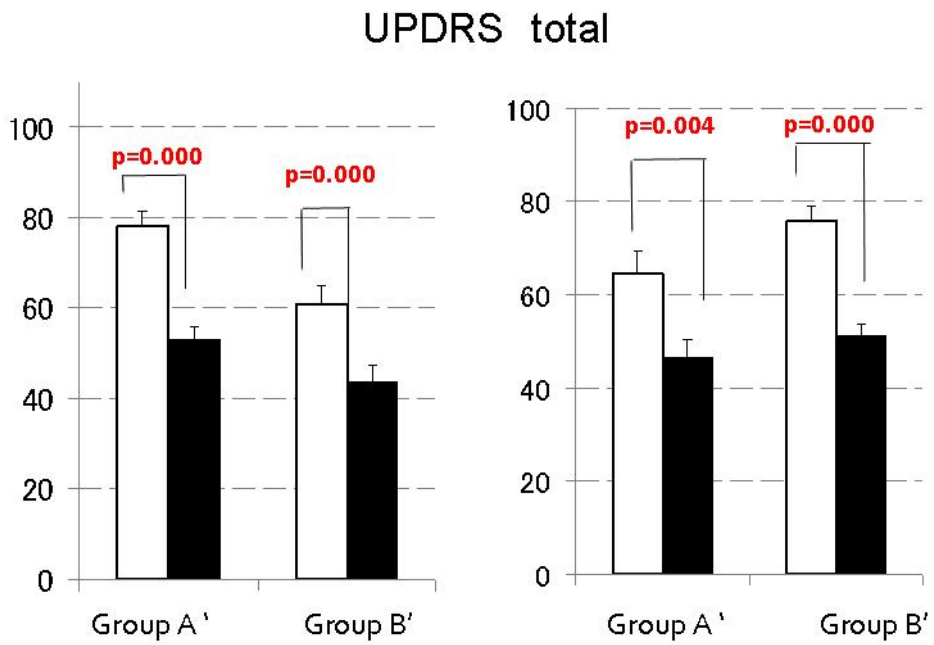

Figure 6. Total UPDRS before and after rehabilitation. Open column, before rehabilitation. Closed column, after rehabilitation.