Original

The Effect of Outpatient Rehabilitation with the Purpose of Improving Physical Function in Regard to Breast Cancer Patients

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Abstract

Objectives: In Japan, even when a decline in physical function in patients who have undergone breast cancer surgery is observed following discharge from the hospital due to the problem of medical fees, few hospitals offer outpatient rehabilitation, leaving patients to undertake self-training themselves at home. In the present study, an investigation was carried out into whether or not outpatient rehabilitation is useful in improving physical function, with elderly patients following breast cancer surgery as the subjects.

Method: The case pertains to a woman in her seventies with a BMI of 19.2 kg/m^2, who was diagnosed with left breast cancer. The single case design AB method was used. The baseline period of Phase A was the 3rd to 7th outpatient rehabilitation (1 to 5 sessions). The 3rd day of outpatient rehabilitation was 37 days following surgery. During the baseline period, range-of-motion exercises of the left scapulothoracic joint were carried out with the purpose of improving pain in the left shoulder. The intervention period of the 8th to 17th outpatient rehabilitation (6 to 15 sessions) was Phase B.

Results: No adverse events such as lymphedema, pain, numbness, bone fracture, etc., were observed during the intervention period. The amount of physical activity indicated was 17.7 kcal/day at the baseline period and 340.98 kcal/day at the intervention period. Improvement in balance ability was observed compared to the baseline period.

Conclusion: The exercise therapy implemented in the present study did not cause any adverse events. It was useful in enhancing balance ability, and was believed to have had a good effect in increasing the amount of physical activity.

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—Key words—

Balance, exercise, fall

Introduction

It has been reported that a decline in the amount of physical activity following diagnosis and treatment is indicated in breast cancer patients[1], along with a decline in walking ability in breast cancer patients during radiotherapy[2]. Limited range of motion in the shoulder is prone to occur following surgery in breast cancer patients[3)–7)], leaving patients prone to restricted activities of daily living (ADL) such as getting dressed, grooming, etc.[8], and moreover, potentially leading to a decline in muscle strength, balance ability, and walking ability.

A decline in physical function with age is observed in the elderly and it has been reported that falling is caused due to a decline in balance and walking function in 10 to 25% of elderly people[9]. Bone fractures are caused in approximately 5% following falling[10], leading to a decline in ADL following bone fracture, and even

when a bone fracture does not occur, a decline in physical function is caused due to loss of confidence and fear of falling again following falling, thereby causing a decline in the amount of physical activity. In breast cancer patients, patients that underwent surgery at an advanced age are further prone to a decline in physical function due to a decline in the amount of physical activity following surgery, and it is surmised that a decline in ADL will take place along with the occurrence of falling.

In Japan, even when a decline in physical function in patients who have undergone breast cancer surgery is observed following discharge from the hospital due to the problem of medical fees, few hospitals offer outpatient rehabilitation, leaving patients to undertake self-training themselves at home. However, in studies with patients who have undergone breast cancer surgery as the subjects, it has been reported that improvement in physical function was observed by implementing exercise therapy[11], and improvement in physical function may be acquired by implementing outpatient rehabilitation in patients who have undergone breast cancer surgery observed with a decline in physical function.

In the present study, an investigation was carried out into whether or not outpatient rehabilitation is useful in improving physical function, with elderly patients following breast cancer surgery as the subjects.

Subjects

The case pertains to a woman in her seventies with a BMI of 19.2 kg/m^2, who was diagnosed with left breast cancer. Regarding her history of present illness, she underwent resection surgery for left breast cancer 1 month prior at A and stayed in the hospital for 7 days before return home. Regarding the post-operative procedures, she underwent 25 sessions of radiotherapy 1 month following partial resection of the breast cancer, and anticancer drug was commenced after 1 month. Post-operative rehabilitation was not carried out during her hospital stay and although a pamphlet was provided at discharge to promote exercise therapy, it was not carried out at home. She fell down once at home, after discharge from the hospital.

Following discharge, the patient visited the hospital as an outpatient with the purpose of easing pain felt in the left shoulder during continuation of her radiotherapy.

Consent was acquired from the patient in the present case after being given sufficient explanation regarding the purpose of the study and measurement.

Method

The single case design AB method was used. The baseline period of Phase A was the 3rd to 7th outpatient rehabilitation (1 to 5 sessions). The 3rd day of outpatient rehabilitation was 37 days following surgery. During the baseline period, range-of-motion exercises of the left scapulothoracic joint were carried out with the purpose of improving pain in the left shoulder. The intervention period of the 8th to 17th outpatient rehabilitation (6 to 15 sessions) was Phase B. Regarding the intervention method, a self-training schedule was created for exercises that can be done at home, and the patient was to do these exercises at home. Exercises including heel lifting exercises, pelvic exercises, frontal stair climbing, and lateral stair climbing were to be carried out 20 times each, at least once a day. Furthermore, a self-training chart was made for checking whether or not self-training was continuously carried out, and the date, time, and number of times the patient did each exercise was recorded. During outpatient rehabilitation, whether or not the patient is exercising using the appropriate techniques, whether or not adverse events such as lymphedema, pain, etc. occur, and whether or not exercise is continuously carried out every day were evaluated and revisions and encouragement were provided.

Regarding evaluation of the effect, balance ability was measured at the baseline period (3rd to 7th outpatient rehabilitation) and intervention period (8th to 17th visit as an outpatient). Circumference, shoulder joint flexion and abduction were measured by passive range of motion testing (ROM-T), and the amount of physical activity, depression, and maladjustment were measured at the baseline period (1 session) and intervention period (15 sessions).

FDM (zebris) was used for evaluating balance ability and gravimetric testing was used to measure quiet standing and standing on one leg. When taking measurements for gravimetric testing when quiet standing, subjects were asked to look at a mark in front of them with their eyes opened, legs slightly opened, and the in-

ner soles of the feet separated in parallel by 10 cm for 10 seconds to measure the total trajectory length. Standing on one leg was measured in a state with arms crossed in front of the chest while standing still and from the moment the sole of the leg left the ground. Gravimetric testing while standing on one leg was measured for 10 seconds, and regarding the time standing on one leg, the posture was maintained as much as possible after 10 seconds of gravimetric testing and the maintained time was measured.

The circumference of the upper limbs was measured by tap measurement at 10 cm central from the cubital fossa joint and 5 cm peripheral from the cubital fossa joint, along with the wrist joint circumference and the 2nd to 5th middle finger joint.

The amount of physical activity was evaluated using IPAQ (international physical activity questionnaire).

A distress and impact thermometer questionnaire was used to evaluate depression and maladjustment.

2SD-band analysis with the standard value ± 2 × standard deviation (2-standard deviation: 2SD) of each piece of evaluation data at the baseline period was used for statistical processing, and the baseline period and intervention period were compared and investigated.

Results

The upper limb circumference was 22.2 cm on the left and 22 cm on the right at 10 cm central from the cubital fossa joint, and 22 cm on the left and 21.8 cm on the right at 5 cm peripheral from the cubital fossa joint, while the wrist joint circumference was 14.9 cm on the left and 14.8 cm on the right and the 2nd to 5th finger joint was 17.6 cm on the left and 17.5 cm on the right, with no change observed in the intervention period. The shoulder joint ROM-T indicated a left shoulder joint flexion of 140°, abduction of 100°, and right shoulder joint flexion of 160° and 120° at the baseline period, with no change observed in intervention period. The amount of physical activity indicated was 17.7 kcal/day at the baseline period and 340.98 kcal/day at the intervention period. The revised Frenchay Activities Index was 36/45.

Depression and maladjustment were indicated as having a distress level of 10 points and impact level of 9 points at the baseline period and a distress level of 5 points and impact level of 6 points at the intervention period.

No adverse events such as lymphedema, pain, numbness, bone fracture, etc., were observed during the intervention period.

Regarding self-training at home, all scheduled activities instructed to the patient during the intervention period were carried out every day.

Quiet standing was 104.5 ± 39.9 mm at the baseline period and 39.4 ± 9.8 mm at the intervention period, with significant improvement observed (Fig. 1). Gravimetric testing for standing on one leg was 325.6 ± 65.7 mm at the baseline period and 258.2 ± 30.6 mm at the intervention period for the right and 381.2 ± 114.0 mm at the baseline period and 282.8 ± 42.1 mm at the intervention period for the left, with significant improvement observed for both feet (Fig. 2, 3).

The time standing on one leg was 21.9 ± 6.5 seconds at the baseline period and 23.8 ± 8.5 seconds at the intervention period for the right leg, while it was 14.3 ± 1.1 seconds at the baseline period and 18.1 ± 2.9 seconds at the intervention period for the left leg (Fig. 4, 5).

Discussion

In the present study, outpatient rehabilitation and self-training at home were concomitantly used to investigate whether they are useful in improving physical function, with patients who have undergone breast cancer surgery as the subjects. As a result, improvement in balance ability was observed compared to the baseline period.

It has been reported that when resistance exercises of the upper and lower body and balance exercises including toe-stand and heel-stands were carried out with breast cancer patients living at home as subjects for 32 weeks and then resistance exercises using machines were carried out at a nearby fitness center for 24 months, muscle strength in the upper and lower limbs increased and improvement in balance ability was achieved[12]. In the present study, exercise therapy requiring static and dynamic balance ability such as heel lift-

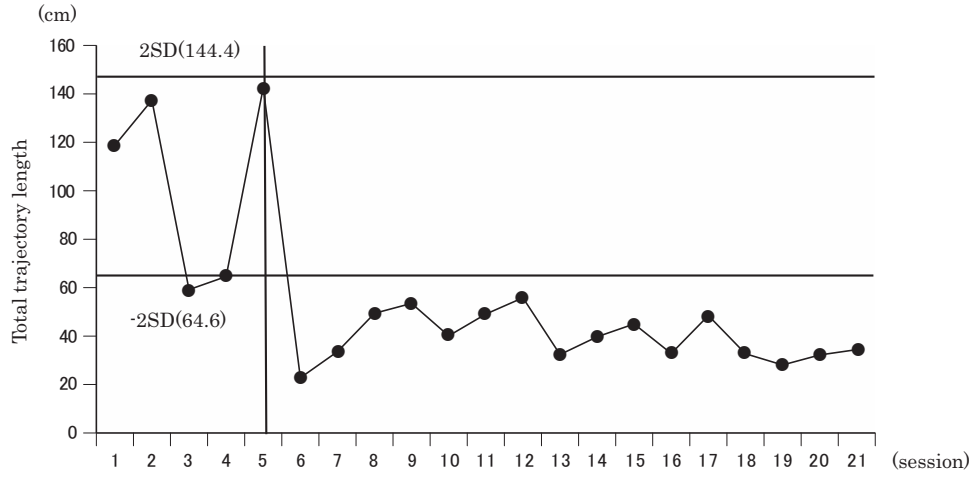

Fig. 1 Changes in outcome of gravimetric testing for quiet standing
SD = standard deviation

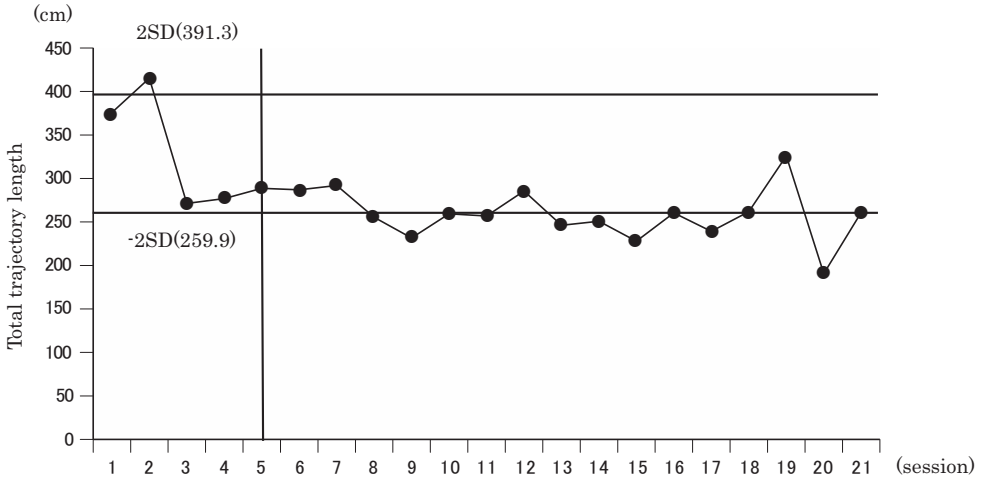

Fig. 2 Changes in outcome of gravimetric testing for standing on right leg
SD = standard deviation

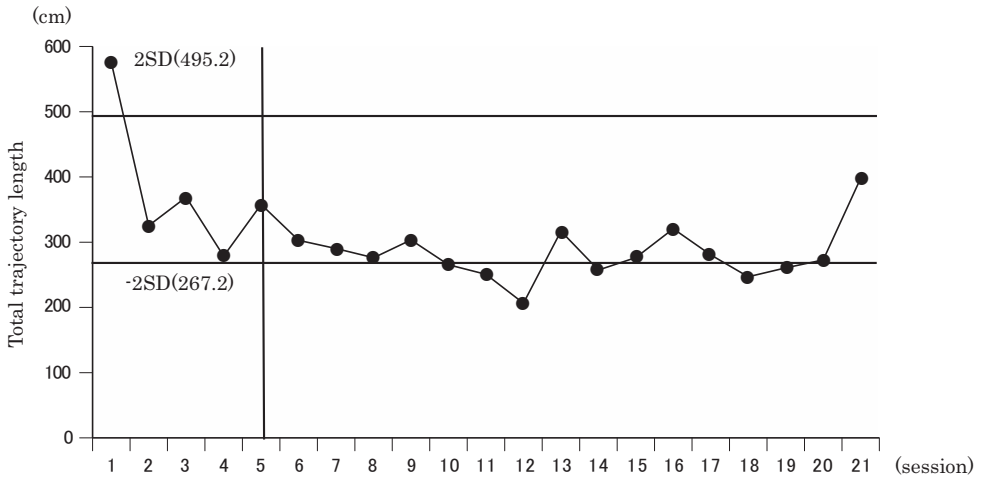

Fig. 3 Changes in outcome of gravimetric testing for standing on left leg
SD = standard deviation

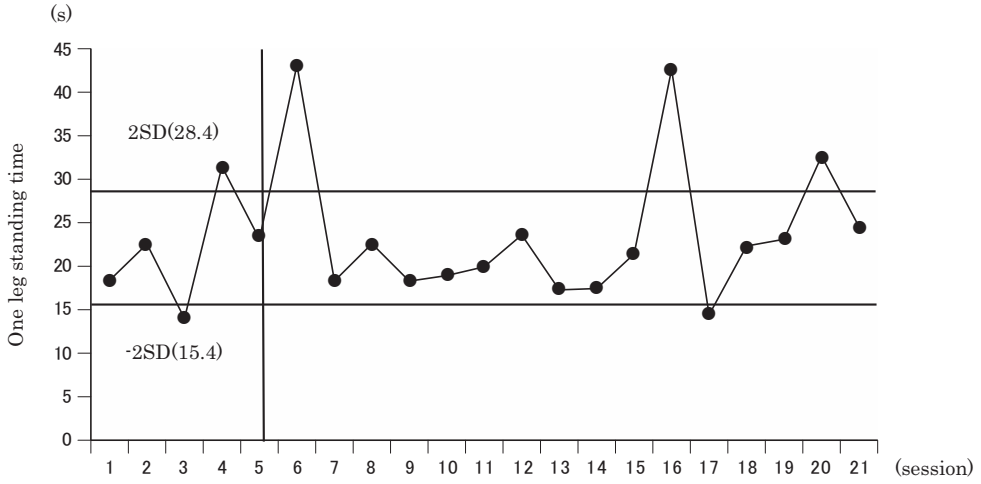

Fig. 4 Changes in outcome of standing on the right leg
SD = standard deviation

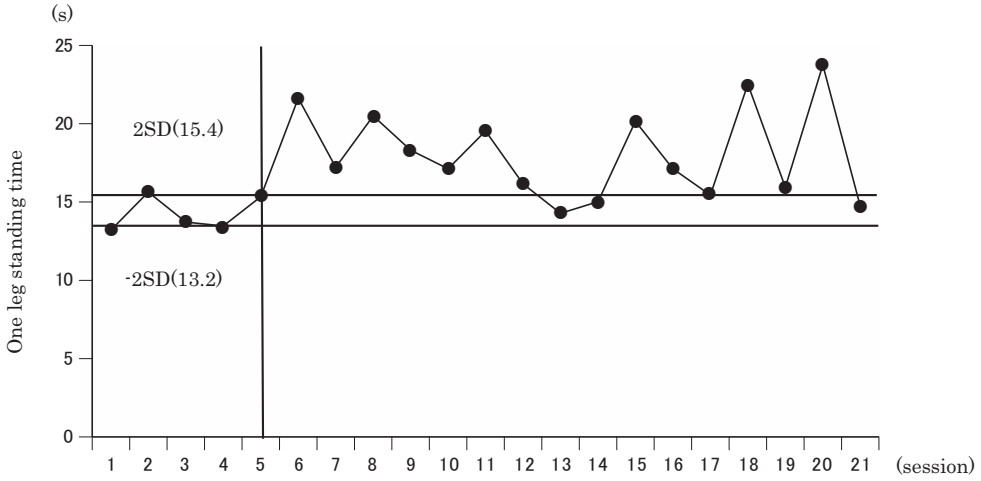

Fig. 5 Changes in outcome of standing on the left leg
SD = standard deviation

ing exercises, pelvic exercises, frontal stair climbing, lateral stair climbing, etc. were carried out during outpatient rehabilitation along with self-training at home for 76 days. As a result, upon gravimetric testing, the results of quiet standing: 104 mm, standing on the left leg: 381 mm, standing on the right leg: 325.6 mm, and time standing on the left leg: 14.3 seconds at the baseline period improved to 41.8 mm, 274.4 mm, 262.7 mm, and 17.8 seconds, respectively. The intervention period of the present study was 76 days, and although this was short compared to prior studies, the patient of the present case did not carry out the exercises in the pamphlet provided at the hospital following surgery and did not undergo active rehabilitation. Therefore, it was easy to see results with this intervention. At the same time, although no improvement was observed in the time standing on the left leg during the intervention period, from the fact that the average baseline period was 21 seconds, with relatively good balance ability, it was surmised that no improvement was seen with short-term intervention.

Regarding the continuation of exercise at home in the present case, exercise schedules were carried out every day during the intervention period. It has been indicated that elderly people and fear of falling, etc. can be extracted as factors for reducing exercise, while for promoting continuation, the usefulness of repeatedly explaining the necessity of exercise therapy by phone counselling, particularly to elderly people, has been reported[13]. In the present study, after the patient was provided with an explanation on the importance of exercise, she used a calendar at home to record the content of exercises when she did them and the patient herself

managed the exercises. When she visited the hospital as an outpatient, her therapist confirmed the contents recorded in the calendar. In the present case, the patient was old and had a history of falling, so it was possible that the patient was struggling to continue exercising; however, it was suggested that the intervention method implemented in the present study was useful in helping her continue to exercise.

With regard to physical activity, it has been indicated that walking ability declines due to radiotherapy and chemotherapy in breast cancer patients[2)14)]. The patient in the present case was undergoing radiotherapy following surgery, but falling due to a decline in balance ability occurred during the baseline period. During the intervention period, it was believed that stability during walking improved due to enhanced balance ability, indicating an increasing trend in her amount of physical activity. Accordingly, improvement in physical function leads to an increase in the amount of physical activity; therefore, exercise therapy in regard to the improvement of physical function including balance ability is important for patients indicated with a decline in physical function.

When implementing exercise therapy, it is necessary to prevent adverse events from occurring and in the present case, adverse events such as pain, lymphedema, etc. did not occur during intervention. The patient in the present case periodically visited the hospital as an outpatient, allowing therapists to evaluate the presence of pain, lymphedema, etc., and confirm whether or not the load from exercise therapy was appropriate, which was surmised as the reason no adverse events occurred. The exercise therapy implemented in the present study did not cause any adverse events, was useful in enhancing balance ability, and was believed to have had good effect in increasing the amount of physical activity.

Finally, there are some limitations associated with the present study. In this study, the patient did not suffer from lymphedema as a complication and was limited to a decline in physical function, which made intervention possible without causing adverse events during the intervention; however, when lymphedema occurs, the concomitant use of complex physical therapy, etc., must be considered and it may be believed that simply carrying out the intervention method of the present case would be insufficient. Moreover, this was a single case study and so it is not clear whether or not the same outcome would be acquired by carrying out the intervention of the present case with other patients. Therefore going forward, it will be necessary to accumulate and analyze more cases.

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乳癌患者における身体機能改善を目的とした外来リハビリテーションの効果

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—キーワード—
バランス，運動，転倒

目的：本邦において，病院退院後の乳癌術後患者は，身体機能の低下を認めた場合でも，診療報酬上の問題から外来リハビリテーションを実施している病院は少なく，自宅で患者自身が自主トレーニングを実施しているのが現状である．本研究では，乳癌術後の高齢患者を対象として，外来リハビリテーションが身体機能の向上に有用であるか検討した．

方法：症例は 70 歳代，女性，BMI19.2kg/m^2，診断名は左乳癌であった．シングルケースデザインの AB 法を用いた．Phase A として，外来リハビリテーション 3〜7 回目（1〜5 セッション）をベースライン期とした．外来リハビリテーション 3 回目は術後 37 日であった．ベースライン期では，左肩の疼痛改善目的に左肩甲胸郭関節の可動域訓練を実施した．Phase B として，外来リハビリテーション 8〜17 回目（6〜15 セッション）を介入期とした．

結果：介入期間中において，リンパ浮腫，疼痛，しびれの出現，骨折など有害事象は認めなかった．身体活動量は，ベースライン期に 17.7kcal/day，介入期には 340.98kcal/day を示した．ベースライン期と比較してバランス能力の改善を認めた．

結論：本研究で実施した運動療法は，有害事象を生じることなく，バランス能力を高める上で有用であり，また身体活動量の増加にも好影響を及ぼしたことが考えられた．

利益相反：利益相反基準に該当無し

（日職災医誌，65：125—131，2017）