Clinical Evaluation of a New Type of Walker with a Seat and Two Fore Fleds

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Abstract

We assessed a new type of walker with a seat and fore sleds for use in both faculties and at home. This walker has been named “RAKU walker”, with 4 casters and a pair of sleds besides the front casters. 47 patients were evaluated for this study. Quite an improvement was observed in FIM items (bathing, toilet use, self grooming, transfer and locomotion) in the initial interval. Patients above 75 years and below showed similar improvements. Clinical success of this walker depends on both the analysis of patient needs and proper selection of the patients.

Key words: walker, seat, sleds, FIM, statistical package SAS

1. Introduction

We assessed a new type of walker with a seat and two fore sleds for use in both faculties and at home. (Fig. 1) Users may benefit by improvement in daily activities following usage of this walker. There are many factors involved in improving ADL (activities of daily living), but the most important factor to be considered must be ambulatory voluntary but safety. The Rehabiliaid Company has developed this new type of walker and we have found this walker to be beneficial for patients to get an independent life by longitudinal statistical methods up to 6 months.

Fig. 1 RAKU walker: 4 casters with fore 2 slides

The specific feature of this 4 casters walker is a pair of sleds, in which center the front caster buried. It is compact. So the users can not only walk around in the small house but also go up and down steps of 2-3 cm, and sit and carry something on the seat. (Fig. 1)

2. Method

For this study, 49 patients were evaluated. Twenty-seven and ten cases belonged to the research program sponsored by the Techno-aid association. From 2000 to 2001, 12 cases were added from the first research project for developing this walker, sponsored by NEDO from April to December of 1995. But 2 cases were omitted and the final number of cases studied was 47. The average age was
76.7±13.3 years. Among them over 75 years old are 29 patients, 60%. 32 female and 15 male patients were studied. The patients are listed in (Table 1) according to their disease. Almost all were physically impaired because the severe dementias excluded.

| Disease                              | numbers of cases |
|--------------------------------------|------------------|
| Femoral neck fracture (Post operative) | 15               |
| Orthopedic disease (knee arthritis)  | 14               |
| Spinal compression fracture          | 4                |
| Rheumatoid arthritis                 | 2                |
| CVA Hemiplegia                       | 8                |
| Parkinsonism                         | 3                |
| Other                                | 1                |
| **Total**                            | **47**           |

The 34 examiners consisted of medical doctors, physical therapists and occupational therapists who evaluated the patients for a maximum of 4 times. We have made Modified FIM; Functional Independence Measure\(^1\). (Table 2) The modified items are Communication and Social cognition items discussed and made rules to fit elderly patients.

| FIM (Functional Independence Measure) |
|---------------------------------------|
| Self care                             |
| Eating / Grooming / Bathing / Dressing |
| Upper-body                            |
| Dressing Lower-body / Toileting       |
| Sphincter Control                     |
| Bladder Management / Bowel Management |
| Transfer                              |
| Bed to Chair · Wheel chair / Toilet / Tub or Shower |
| Locomotion                            |
| Walk or wheel chair / Stairs          |
| Communication                         |
| Comprehension / Expression            |
| Self Cognition                        |
| Social Interaction / Problem Solving / Memory |

By FIM we can convert the patient's ADL to digital data to calculate and compare the patient's function, before and after using the walker.

| FIM level | Score |
|-----------|-------|
| Independent complete independent without devices, timely | 7 |
| independent but some support with devices, longer time | 6 |
| Dependent need supervision, preparation, or verbal leading | 5 |
| minimum assist; 75% effort | 4 |
| moderate assist; 50–75% effort | 3 |
| middle of 3 and 1; 25–50% effort | 2 |
| maximum assist; less than 25% effort | 1 |

Dr. Ushizawa, recommended us to use for statistical analysis of data package SAS.
Package SAS
1) t test :parametric data by FIM score
2) Sign test; non-parametric data better/same/worse
3) Sign Rank test (Wilcoxon test) between 1) and 2)

Patients were evaluated for a maximum of 4 times within an interval of 6 months. The number of patients decreased with the passage of time. At starting 17 patients could walk (14 indoors; 3 outdoors). The initial evaluation showed during eating and social cognition, almost 70~80% could do without additional help; FIM score 7 or 6. (Fig. 2)

3. Results

We could get better function of patients’ ADL as shown below.

(Improvement Item from 1st to 2nd; the first month)

We observed quite an improvement in the initial interval duration 1 month (Table 4).

Table 4 Improvement Item (1st to 2nd)

| Item                  | significant (p < 0.05) |
|-----------------------|------------------------|
| Self care             | *Bathing, *Toilet, Self Grooming, Dressing-Upper body |
| Transfer              | *Bed/Chair/Wheel chair, *Toilet |
| Locomotion            | *Walk/Wheelchair, *Stairs |
| Social cognition      | Memory |

* (p<0.01): more significantly improved than (p < 0.05)

9 items showed improvement significantly (p<0.05), 4 in self care, 2 in transfer, 2 in locomotion, 1 in social cognition. Among them these statistic methods evidenced the result that * mark items such as bathing, toilet activities, transfer bed to and from chair and also toilet, locomotion significantly improved (p<0.01), more significant level than 5%.

(Improvement Item from 1st. to 2nd; the second month)

We were able to observe slight improvements in transfer and locomotion items in the following 2 months.

(The relation between Age and the degree of improvements)

When 29 cases over 75 years and 42 cases over 65 were compared, improvements were seen in
both. In the more elderly group showed 5% significant improvements in self-grooming, dressing upper body, 1% significant in bathing, toilet, transfer (bed/chair, toilet) locomotion (walk, use wheelchair). So we can expect similar improvements in the elderly as well as the younger patients. 

(Inspection of the parameter)

1) No differences were observed between male and female patients in types of disease, duration of using the walker except in sphincter control. Male patients showed a better tendency than female patients.

2) Improvements appeared soon after using the walker and maximum improvement was observed in the first month.

(Relation between the motor and psychological items)

It seems that the 18 items in FIM are inter-related, for example self-care and transfer or transfer and locomotion. However, the motor and the psychological groups do not appear to be so.

(Clinical examples)

(Case 1) Postoperative femoral neck fractured patient (Fig. 3)

A postoperative femoral neck fractured patient: He can sit on the walker and walk with it. He can push the RAKU walker and walk independently in the rehab-ward and sit on the walker’s seat to take rest just as a chair.

Fig. 3 Using RAKU walker in the Rehab-ward (1)

(Case 2) Left hemiplegia patient  (Fig. 4)

He can carry his tray by himself safely in the rehab ward.

Fig. 4 Using RAKU walker in the Rehab-ward (2)
(Case 3)  Postoperative hip fractured RA (rheumatoid arthritis)

4. Discussion

In the hospital wards or faculties they can use this product as a walker, carrier or a chair for taking rest. It appears very convenient. Not only senior patients but also patients with neurological disease, hemiplegia and parkinsonism, can use this walker to help take care of themselves. In Japanese houses, there are many low 2-3 steps called "Shikii". With the help of this walker the users can push and bring it by the front sleds over the steps up and down, even with something on the seat. Some patients using this walker need not require help from healthcare workers. They can spend their lives independently with the aid of this walker. In Japanese "RAKU" (楽) means joy, easy, convenience, fun, comfort and so on. These meanings just fit the function of "RAKU Walker". This walker is compact of width 52 cm, length 70 cm and height 44 cm. It is very important to push this walker to walk around inside the house on the flat wooden floor, carpet, Tatami (Japanese straw mat) and even 2-3 cm steps. The users can sit and also carry something on the seat. In addition, they can use it as a shower chair. But to use this walker correctly, some advice and adjustments are needed for sleds and casters from medical specialists. In FIM items (Self care, Sphincter control, Transfer, Locomotion) we were able to get significant improvements. Male and female patients did not differ in duration of using the walker and the kinds of disease but male patients seem to get better sphincter control than females. But I must declare to find some difficulties in FIM evaluations. Some might have no doubt to use FIM to get digital data to convert the patient's ADL. But I think a big pit fall for examiners to differentiate the level between each rank, especially dependent level, 1 and 2, 2 and 3, 3 and 4, even 1 and 4 because too subjective to define the border. I'm also afraid a judgment between another examiners might make same mistakes by many reasons. We have still unsolved problems to exchange human living to digital data.

Even elderly patients over 75 years can benefit equally from this walker as patients over 65 years of age.
There seemed to be no interaction between motor and psychological items. Clinical success of this walker depends on the good selection of the patients by analysis of their living needs.

Reference

1) Kimura T. (supervision) (2002). From care reliance to independence (the first roll). CIVIL Publishing.

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