

Development of Motivative Exercise and Lifting Aid Dual (MELAD) Device accessible by elderly caregivers

Hajime TAKADA¹ Dr. of Eng. (takada@ynu.ac.jp), TAKIZAWA, Shigeo²
¹ Faculty of Engineering, Yokohama National University
² Biophilia Institute of Rehabiliaid Inc

Key words: *lifting aid movable device, motivative exercise, elderly care by elderly, health management*

Abstract

This research explains the structure of MELAD DEVICE, which is convenient for in-home use and also helps patients, who need nursing care, to be independent through motivative exercise. The sled, which is attached to the leg of the device, enables the user to cross doorsills and bumps without difficulty when moving. A management system is provided with the device. This system sends the results of the motivative exercise to management center. This contributes to the user's health management and the independence of both the caregiver and the disabled person.

We strongly believe that disabled people can improve their body functions and reacquire walking due to the development of rehabilitation generated by this device. We also hope that this will contribute to the achievement of our social and economic goals, which are to reduce financial strain, to look after elderly people who are physically weak, and to ease the anxiety of Japanese citizens.

Characteristics

This research pays close attention to the safety of the device that the elderly caregivers can use by themselves, as well as the reliability of the functions of the device. We believe that this lift is very accessible for the elderly people. In particular, the device is provided with ①actuator and guide, ②hook for the upper extremity training device, ③movement and training detection device, ④running-pulling arm, ⑤power assist system, ⑥braking system, ⑦casters for the MEALAD device, ⑧safety drive sensor ((3a, 3b) which have casters (2), a hardware box (4), wheels (5), a guide (6) that attached to the hardware box, a hoisting part (7), a running-pulling arm (8), a hoisting driving part (9) that make the hoisting part go up and down and a hoisting controller (10) that controls the hoisting driving part?) and the weight of the device is under 20kg. Therefore, the device will aid in preventing injury to the caregivers and protect the nursing staff and caregivers from injury. When an elderly person cares for another elderly person, this device aids the situation.

Specification

We developed the device with a four wheeled base, an actuator and guide, a power assist device, which is conservable. The cover is made with reinforced plastic, the grip is made of either stay-press fabric or fabric that contains stay-press metal. The running-pulling arm is made with aluminum or fortified plastic. The power assist system is totally mechanized, the motor is installed close to the wheel base, the control socket including engine unit is designed to be compact. The size of the power assist system is 10cm². A safety sensor is installed to the brake in order to prevent the device from slipping while using the device and the friction coefficient decreases.

There has been numerous testing of the sled section at the Kanagawa Industrial Technology Research Institute and no defect has been reported; deflection testing, testing for the legs to cross over the gaps, testing for the rear wheel to cross over the gaps, and weight testing, placing 70kg in the middle of the leg section, have been performed. We have also confirmed that the device can sustain the load of the hook and pulley adjustment as suspension devices for the components for motivative exercise. A rotary encoder is stalled to the pulley of the suspension device to detect the rotation frequency and rotation velocity. The device can send the data through the Internet to the management center and the patient's health management is monitored.

Summary

This research is to create a lift device that is suitable for rental use through nursing care insurance, user friendly, and helps users to move freely. Also we hope this research contributes to the development of rehabilitation by using the motivative exercise device and the ability reacquire walking. Several tests have already been done and we are planning to design MELAD device, according to the results of the tests. We strongly believe that the diffusion of this device contributes to the reduction of the financial strain involved in looking after elderly people who are physically weak, as well as to ease the anxiety of Japanese citizens.