Report on the beginning of our joint study and its details -
Development of a walker with sleds and validation of evaluation devise

Hajime TAKADA¹ · TAKIZAWA, Shigeo²
¹College of Engineering, Chubu University (E-mail : takada@isc.chubu.ac.jp)
²Biophilia Institute

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Abstract
We present the history of the joint study since 2002 and the critical two kinds in the numerous researches.

Introduction
In retrospect, the welfare study at the National Institute of Advanced Industrial Science and Technology (AIST) was organized as a team in 2002, and I attended the task. Professor Takizawa also did and shared the table with together. Until then, He had been working on developing a walker by the grant of the New Energy and Industrial Technology Development Organization (NEDO). I had already listened to his presentation and remembered that he had mentioned the possibility of reducing social welfare costs by a considerable amount just by using the developed walker by more independent life in walking.
He described the research problems at the table, which I thought could be solved through the collaborative study on the engineering side. So I asked him about the possibility of joint research at the meeting. He visited my laboratory in a couple of days and said that he would love to collaborate with me and need my help to develop it. I agreed, and we started the joint study.
After that, we had a series of research meetings within our research progressed, and we were able to conduct joint studies by the Kaken grant and obtained a patent.

We shared the concern for the sustainability of our coming aging society.
From his background, I felt it was odd to be engaged in the development of a walker and welfare equipment. During our frequent meetings, we discussed the background of his involvement in the research. Hearing that the only way to start the studies was to give up political activities, which he aspired from young age in order to get information from his mother, I said to him, "The hardest part of your research was the first six years", which made a strong impression on him, and I heard that the plaque of my words is still displayed in his laboratory still now.
There were 27.46 million elderly and 4.38 million elderly in need of long-term care (16% of the elderly) in 2007; the number of them had risen to more than 6 million by 2015, and today the number is 6.72 million:18.9% of the elderly (35.64 million elderly). The Japanese Long-term care insurance, introduced in 2000, has become difficult to sustain. And it has been made several revisions. We anticipated this situation and recognized that there would inevitably be a shortage of caregivers (i.e., family members, caregivers, helpers, therapists, etc.). It was also argued that we would have to rely on foreigners to take care of the elderly in the future.
Therefore, since it was also necessary to develop rehabilitation methods for the elderly and means to prevent deterioration.
We could improve previously developed devices and obtained a patent. We have conducted a lot of research, and the following studies will be introduced here.

Clarification of our research
The studies following will be presented in detail and results;
Title: Research on the prevention of falling of the elderly with using a walker

Abstract: When the friction on the floor is reduced, it is not possible to brake at the same time after the walker accelerates. Therefore, as when moving from carpet to flooring, the decrease in friction causes users' falling. We devised an automatic braking mechanism that responded to changes in the floor surface and developed a walker that always receives a constant load.

Title: A study of the relationship between muscles and sitting positions using a rehabilitation device

Abstract: Because of a growing elderly population and a declining birthrate, more elderly are needing nursing care, and the workload for doctors is growing heavier. Therefore, it’s necessary to save labor by using an at-home device to aid nursing. We focus on a device called Patakoro that can stretch and flex the knee joint, and plantar flex and dorsiflex the ankle joint. With electromyography and the Patakoro device, we constructed a system that can increase people’s walking abilities in motivation exercise. This motivation exercise can help paralytic people to strengthen their paralytic side by practicing with the non-paralytic side leg. As a result, we found that there is a significant difference in muscle activity within three sitting positions in which the height of the chair is placed at different levels.

Developing Device for Motivative Exercise -The Research and Development of the Motivative Exercise Rehabilitation Supporting System of the Leg - Using Remote Sensing by the Advanced Communication ICT towards the Approach of Ahead sick (Pre-symptomatic) Industrial Creation of Kanagawa Prefecture

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