

# Quantitative Evaluation of Walking Ability using the Forward, side, and Backward Walk on the Force Plate

Hajime TAKADA

Faculty of Engineering, Yokohama National University  
79-5, Tokiwadai, Hodogaya, Yokohama 240-8501 Japan

Key words: motivative exercise, walking ability, health management

## 1. Introduction

It is necessary to evaluate elderly's walking ability correctly to execute rehabilitation effectively, and to do appropriate training. However, a walking ability is usually judged qualitatively by physical therapists. Moreover, a manpower shortage and an increase of senior citizen is an issue. In this paper, it aims at the construction of the system that can quantitatively judge a walking ability by choosing the evaluation item with a high correlation between the walking ability and parameters obtained from measurement results.

## 2. Experiment

The walking feature was measured with a force plate. We set two force plates under parallel bars. The total length is two meters.

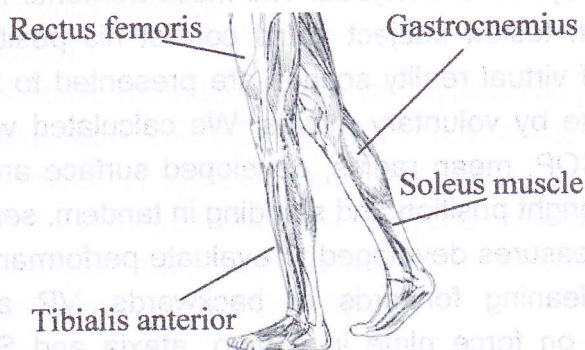


Fig.1 Measured muscles

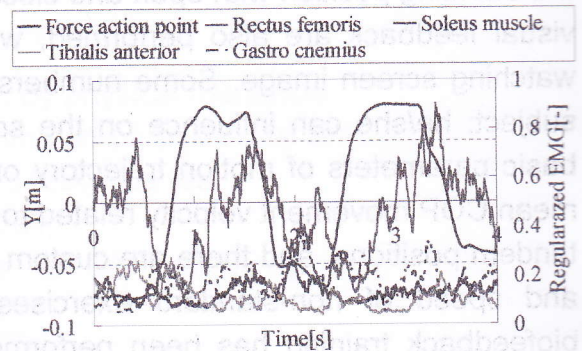


Fig.2 Forth walking

Tracks of center of gravity are calculated from the measured force values. The positions on the plate and the pace etc. are calculated from the extracted characteristics.

The subjects were graded by the physical therapist to seven scores per three items which are Rhythm, Foot off and Support. We searched the relation between the walking ability and the movements by comparing those scores with parameters.

## 3. Results

At first, in non-paralytic subjects, there were strong relations between the distance parameters and the score. The walking stride means a distance of one cycle of walking. Next, in paralytic subjects, there were strong relations with parameters of the affected side and the score. The height single stance ration shows that the time a subject stands with one leg is long and the time a subject stands with both legs is short. In a word, it is thought that it is important to support the body firmly by the leg on the affected side in the paralytic subject.

## 4. Conclusions

Some parameters which have a high relation with the walking ability score were found. As a result, the possibility that the walking ability is able to be judged quantitatively has been shown. In addition, it has been understood that motor function on the affected side is important for paralytic subjects.