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<Contents>

［LETTER］

Examination of whether wobbling can be detected from the start of walking to the second step of the elderly

KAGAWA Shota[1], KIYOKAWA Takuma[1], NEMOTO Seiji[1]

< Abstract >

Individual walking characteristics are likely to appear at the beginning of walking, and obtaining that information is important for maintaining safe daily walking. We developed a measuring device for the detection of the decrease in equilibrium function, which is the cause, and measured it. From this result, it was suggested that the wobbling, which is one of the causes of falls, could be detected by the second step by examining the step-on contact time.

Key words: elderly　wobbling　walking

1 Introduction

Falling in the elderly sometimes results in severe quality of life declines such as bedridden. Individual walking characteristics are likely to appear at the beginning of walking, and obtaining that information is important for maintaining safe daily walking. Currently, there are various methods for assessing the risk of walking, but we have considered a simpler and more practical method.

In this study, we focused on fluctuations in stepping contact time, opposite foot contact time (unit: millisecond), stepping distance, opposite foot contact distance (unit: cm), and walking speed (unit: m / s) for elderly people. We developed a measuring device for the detection of the decrease in equilibrium function, which is the cause, and measured it.

Ⅱ Method

Twenty-eight elderly people who used the elderly day care and were able to walk independently for 10 m (9 men, 19 women, average 79.25 years old (SD ± 7.86)) were included in the subjects. Five measurements were taken using a gait measuring device jointly developed by Miyazaki University and Sanwa

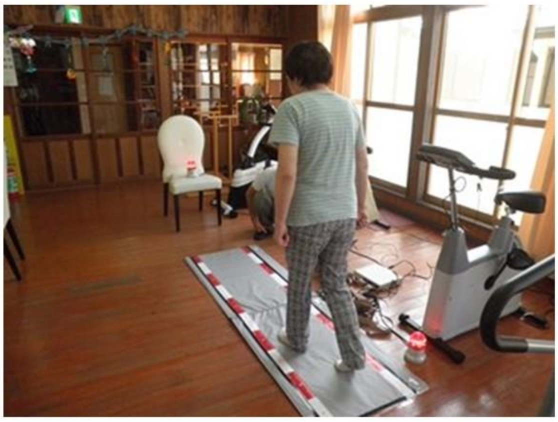

Figure 1） State of the experiment

1 TOHTO University : 1-1, Hibino, Mihama-ku, Chiba-shi, Chiba-ken,261-0021 / shota.kagawa@tohto.ac.jp

New Tech Co., Ltd. In the 5 measurements, the intraclass correlation coefficient ICC (1,1) was calculated from the first measurement, and then 4 measurements. (Figure 1)

After that, all the measured values were corrected to the ratio with the first value, and an estimated value model was created from the average value of all the subjects. Then, each subject was compared with the estimated value model to investigate the relationship with the wobble symptom.

Ⅲ Result

The single measurement value of ICC (1,1) was .423 for the stepping contact time, .880 for the stepping distance, and .813 for the walking speed. The ICC (1,1) was recalculated from the average value measured three times at the beginning for the step-out contact time, and it was 0.765. At that time, the Cronbach α coefficient was 0.779. During the measurement period, 4 subjects complained that they felt a stronger gait abnormality (wobbling) than usual. (Figure 2) Except for one person, there was a coincidence between the day when the outliers (the standard at which the residual value is more than twice the standard deviation) were measured and the day when the wobble was felt.

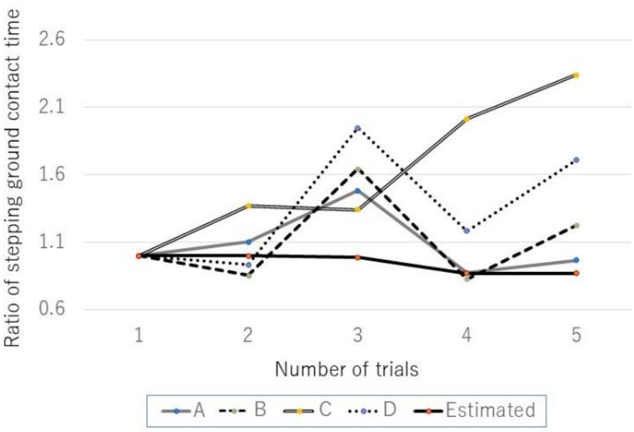

Figure 2) Comparison between the estimated model and the subject: Excerpt (stepping down time)

Ⅳ Consideration

The reason why the ICC (1,1) value of the stepping contact time was low is considered to be that the sensorimotor processing process performed in the central nervous system before stepping was affected by aging and hypokinetic function. Elderly people tend to feel nervous and anxious about their first experience. It is speculated that some subjects became somewhat psychologically unstable by participating in unknown measurements.

In addition, the day when the outliers were measured and the day when the wobble was felt coincided with each other, depending on whether the person was cautious as a coping behavior or whether he / she actually felt wobble during the measurement and could not move his / her legs. It is thought that it was a result. For those who did not match, the first measurement was slightly larger than normal.

From this result, it was suggested that the wobbling, which is one of the causes of falls, could be detected by the second step by examining the step-on contact time. It is considered possible to detect changes in motor function by safely measuring between two steps using a newly developed gait measuring device.

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[SHORT NOTE]

The effect of snoring and speaking when lying down

KIYOKAWA Takuma[2], MIYAMOTO Koki[3], HAMADA Sho[4]

〈 Abstract 〉
Snoring and human speech were heard from the subjects who were bed-rested, their brain waves were compared, and the effect on sleep was considered. It is predicted that sound stimulation can often be a factor that inhibits falling asleep for inpatients whose daily living environment changes. It was suggested that meaningful sounds such as spoken voices are more likely to interfere with sleep than sudden sounds and meaningless sounds.
Key words: snoring speaking EEG

1 Introduction

By sleeping, a person can rest his / her mind and body and rest his / her brain. Sleeping is an essential activity in human life and is very important, especially for those with illness or who are being treated. And many will want to get a better night's sleep than just sleep.

However, it is difficult for patients who live in hospital to get good quality sleep. This is because there are too many factors that interfere with sleep, such as unusual environments, snoring of others, and the sound of the toilet.
Above all, snoring and people's voices are representative of things that are easy to feel uncomfortable.

In this study, we listened to snoring and human speech to subjects who were bed-rested, compared their brain waves, and considered the effects on sleep.

Ⅱ Method

The subjects were 14 healthy Japanese men and women (22-29 years old). The environmental sound was kept at about 30 dB, and the sound source was installed 1.5 m from the subject's bedside. In the experimental environment, we had them rest and close their eyes for 20 minutes. The sound was reproduced twice within the time, and the electroencephalogram was measured. This trial was performed twice, and each trial was (1) snoring and (2) speaking.

Ⅲ Result

During the first regeneration of snoring, arousal tendencies were observed in 12 patients. Sleeping EEG was observed in 11 cases during the second regeneration of snoring. (Figure 1)

At the time of the first reproduction of the voice, arousal tendency was observed in 8 cases. At the time of the second reproduction of the voice, 11 cases immediately shifted to the suppression tendency. (Figure 1)

[2] TOHTO University : 1-1, Hibino, Mihama-ku, Chiba-shi, Chiba-ken,261-0021 / takuma.kiyokawa@tohto.ac.jp
[3] The University of Tokyo Hospital
[4] MIYAKONOJO City Fire Bureau

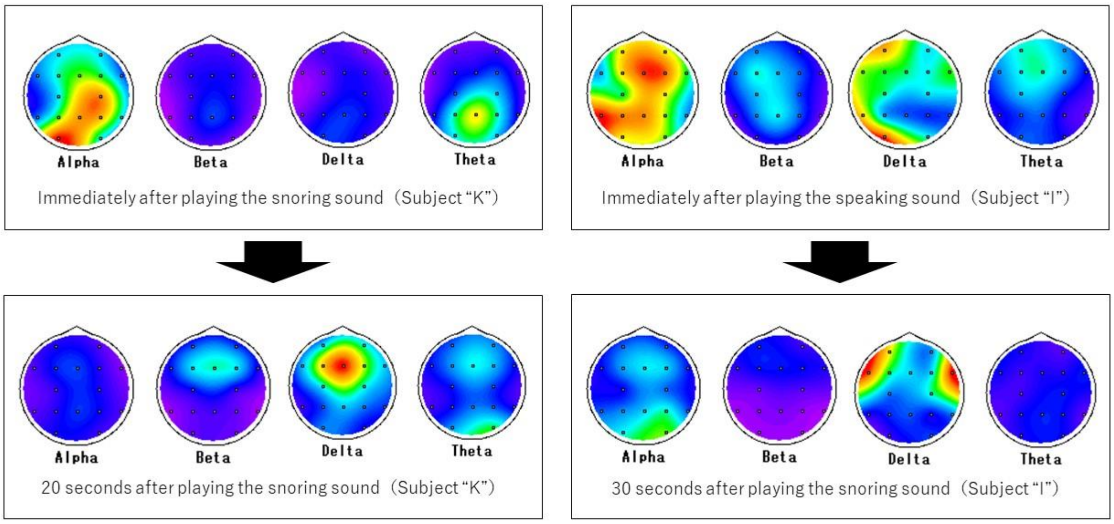

Figure 1） Topography of brain waves when listening to the first sound

Ⅳ Consideration

It is probable that the sound environment similar to the sound environment during normal sleep promoted the subject's falling asleep. In addition, since most of the subjects showed a wakefulness tendency when snoring and speaking voices were reproduced, it is predicted that sound stimulation can often be a factor that inhibits falling asleep for inpatients whose normal living environment changes. It is said that whether or not noise is generated depends on the tone color, the situation in which the sound is emitted, and the physiological and psychological conditions of the recipient1).

After the first stimulation of snoring and speaking voice, after awakening on the brain wave, the average value of snoring sound is 1 minute 34 seconds and the average value of speaking voice is 2 minutes 28 seconds, respectively. There was a difference. It can be considered that the influence on falling asleep was greater in the environment where the voice was heard. However, when comparing the second time, the snoring sound was 47 seconds and the speaking voice was 15 seconds, respectively.

It is considered that this is due to the type of sound of sleep disorders, changes in consciousness level with the passage of time, and "familiarity" with the sound2). It was suggested that meaningful sounds such as spoken voices are more likely to interfere with sleep than sudden sounds and meaningless sounds.

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MIT, 1-1, hibino, mihama-ku, Chiba-shi, Chiba-ken, Japan, 261-0021 〒261-0021 千葉県千葉市美浜区ひび野 1-1 幕張国際研修センター

Contact 連絡先： biofunctional.finding.org@gmail.com

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