

GROUND REACTION FORCE DURING FREE “WALKING”: EFFECTS OF WALK SPEED AND CARRYING WEIGHT

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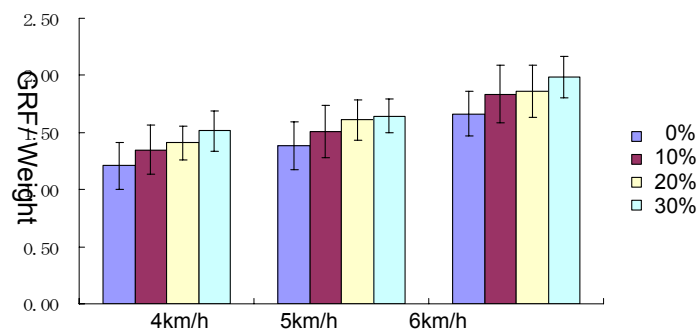
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INTRODUCTION: The “Walking” became popular now in Japan. Many people recognize the “walking” as one of the sports and benefit for health and physical fitness (especially for middle and elderly people). The present study has performed to check the mechanical stress to the body during walking. Because the bone needs mechanical stress to increase the stiffness or density, but there are few reports of research study on the stress level during the “walking”.

METHOD: The subjects were 7 healthy young adults (male: 4, female: 5). Age: 28.7 ± 5.0 yrs. The four experimental conditions were given to the subjects as follows:

- 1 Treadmill walking at the speeds of 4km/h, 5km/h and 6km/h
 - 2 Treadmill walking at the speeds of 4km/h, 5km/h and 6km/h with carrying the weight of 0%, 10%, 20% and 30% of each subject’s body mass
 - 3 Upstairs and downstairs walking as a laboratory test with and without carrying the weight.
 - 4 Upstair and downstair walking in the university walking course with and without weight.
- The foot pressures were measured continuously during walking using an F-Scan system (Nitta Co Ltd). The insole type of force sensor was set inside of each shoes of the subjects.

RESULTS AND DISCUSSION: The peak values of foot pressures were measured. The peak 1 (heel contact) and peak 2 (toe contact) of the foot pressure during walking were measured. The peak 1 produced the foot pressure more clearly in case of higher walking speed. The walking speed effects more clearly increase the foot pressure than the carrying weight.



Enough foot pressure was obtained in case of walking on the upstairs and downstairs. It is estimated that more than 150% of body weight is needed for bone stress.

In case of more than 6 km/h of walking speed, the foot pressure was demonstrated as more than 150% even a case of without carrying the weight. In case of upstairs or downstairs conditions, the foot pressure produced more than 150% of body weight. The walking has a practical merit of giving a mechanical stress (impact) to the body in case of enough walking speed, carrying weight or walking using up-downstairs.

REFERENCES:

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