INTRODUCTION

A lot of orthoses are developed recently. The orthosis has a purpose to control some articulations. Therefore it applies technique of the taping and put some stays. However, its technique is not often considered about a joint kinematics. We developed some orthosis in consideration of eversion-inversion rotation axis of ankle joint this time. These orthosis are the ideal form that a rotational axis and a forced ways are perpendicular (Fig. 1). We developed the orthosis which guided an ankle to eversion course for sprain prevention. The purpose of this study was the orthosis effect measurement of during walking.

METHODS

Eight healthy young adults (male 4: age 25.0 ± 8.1 years, height 170.3 ± 2.3 cm, weight 63.0 ± 7.9 kg, and female 4: age 21.7 ± 2.0 years, height 160.3 ± 2.3 cm, weight 50.7 ± 2.9 kg) who had provided written informed consent beforehand participated in this study. We prepared 2 types of braces with different forced ways (Fig. 2,3). The participants were tested in three conditions of the "bare foot" "type A" "type B". The participants walked about 10m on floor reaction plate at each comfortable speed (3.9 km/h, ± 5%). Each participant was required to perform three trials at every type of brace and bare foot. A two axes electro-goniometer was fixed on the lateral ankle joint, and sagittal and frontal angles were measured during walking. The sampling frequency of the floor reaction plate and electro-goniometer was 100 Hz. We knew the heel strike time from a floor reaction plate. We extracted 1 gait cycle and were normalized. We compared the angle every phase.

RESULTS AND DISCUSSION

These are sagittal and frontal angle of one gait cycle (Fig 4,5).

Figure 1: In a general way, the compelling force becomes in parallel with toe line (A). However, the compelling force should be a rotational axis and a right angle (B).

Figure 2: The position of the general derivation belt (A). The position of the belt which we developed (B).

Figure 3: Orthosis wearing. It is guided by figure of eight to eversion course.
Figure 5: Frontal angle of one gait cycle. *: p < 0.05. It was significantly different in “Bare foot” and “type B”.

It followed that the angle measurement of a sagittal plane and the frontal plane resembled angle measurement by Perry’s gait analysis very much. Therefore, this mensuration was very accurate. The significant difference was not found in the sagittal angle between each group. In the frontal plane, it was significantly different from 61% to 73% (gait cycle) and from 89% to 99% in “Bare foot” and “Type B”.

The eversion inductivity of the type B is located in the fifth metatarsal bones basal part, and is right-angled to the rotation axis. There may be the run of the peroneus group of muscles in the very efficient place. We ought to develop the orthosis in consideration of an articular rotation axis in future.

**CONCLUSIONS**

We developed an orthosis in consideration of a rotation axis. We observed the effect of the orthosis by measuring a walking ankle angle. The brace significantly guided a walking ankle to eversion course. We ought to make all orthoses and taping in consideration of an articular rotation axis.

**REFERENCES**