THE EFFECTS OF ANTERIOR AND POSTERIOR ANKLE-FOOT-ORTHOSIS ON POSTURAL STABILITY IN STROKE PATIENTS

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INTRODUCTION
Alterations of postural stability are common among patients with hemiplegia following stroke.1 The impairments of postural stability in poststroke patients include an increase of postural sway during quiet stance1 and limited weight transfer in both frontal and sagittal plane. Various designs of ankle-foot-orthoses (AFOs) have been found to be able to resolve those impairments but the rationale to choose among different types of AFOs is not yet formulated. The purpose of this study is to compare the effects of different types of AFOs, anterior AFOs vs. posterior AFOs, on postural stability in patients following stroke.

METHODS
The postural stability of 7 patients post 1st and single stroke was measured under the following experiment conditions: (1) quiet stance, shoulder width stance, and tandem stance with eyes open and/or closed; (2) maximal voluntary weight shifts in anterior-posterior (AP) and medial-lateral (ML) directions. Center of pressure (CoP) shifts was measured while standing on the Rsscan pressure mat with no footwear on, with regular shoes on, with shoes and Anterior AFOs (AAFO) on, and with shoes and posterior AFO (PAFO). There were a total of 24 experiment conditions (4x6). The parameters representing postural stability were CoP maximal shift in AP and ML plane and total CoP excursion (normalized to body height). Repeated measure two-way analysis of variance was used to compare the effects of different footwear conditions on maximal voluntary weight shifts and on static postural stability. The SPSS 10.0 software package for window was used and the statistical significance level was set at the level of \( p < .05 \).

RESULTS AND DISCUSSION
Non-significant footwear and postural stability interaction effects were found (Table 1, \( p = .899 \)). The main effects of footwear conditions were non-significant (Table 1, \( p = .09 \)). The post hoc pairwise comparison indicated that wearing regular shoes and wearing AAFO can affect the postural stability significantly (Figure 1 & 2, \( p = .04, .03 \)). The main effects of postural stability was significant (Table 1, \( p < .001 \)), indicating that the maximal voluntary weight shift and static postural stability was different among experiment conditions no matter which footwear conditions the patients were at. The post hoc pairwise comparison showed that closing the eyes and tandem stance induced significantly more postural sway in stroke patients no matter which footwear conditions the patients were under (Figure 1~2). This result is in congruent with previous studies.2 Reducing the visual cues and narrowing the BoS increased the postural demands for the stroke patients.

As shown in Figure 1 and Figure 2, although the footwear conditions failed to affect postural stability significantly, possibly due to the small sample size in this study, the patients wearing the AAFO and PAFO tended to increase their maximal voluntary weight shifts and postural sway during quiet stance. The posture sway was decreased only when the patients wear the PAFOs with shoulder width stance and eyes closed.

Table 1. Repeated measure ANOVA summary

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<th>F</th>
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\*\( p < .05 \); \# \( p \) approaches 0.5; FW: footwear, PS: postural stability.

CONCLUSIONS
The different types of AFO failed to influence the postural stability differently due to small sample size. The posterior AFO could increase the static postural stability more effectively than the anterior AFO.

REFERENCES