Effect of ankle-foot orthoses on functional balance, weight-bearing and relative contribution of the paretic lower limb to standing balance in stroke patients

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BACKGROUND
Ankle-foot orthoses (AFOs) are often provided to improve walking in stroke patients, although the evidence of effects on walking and balance control is still inconsistent. This inconsistency can possibly be explained by a lack of insight in the influence of AFOs on the underlying impairments. These impairments can be assessed with dual plate posturography to determine the relative contribution of each lower limb to balance control and weight-bearing [1].

OBJECTIVE
Determine the effects of AFOs on functional tests, weight-bearing asymmetry (WBA) and contribution of the paretic lower limb to balance control (CPB) during unperturbed and perturbed stance.

PATIENTS & METHODS
Twenty chronic stroke patients (14 male, 6 female, age 36-78 years, time since stroke 5-127 months) using individually prescribed AFOs were assessed. All tests were performed with and without using an AFO in randomized order.

WBA and CPB were assessed during stance on a movable platform (Figure 1) using a forceplate with 4 six-degrees-of-freedom force sensors and a 3D passive registration system (Vicon). During the perturbation trials the platform moved in unpredictable forward-backward directions with a maximum amplitude of 5 cm (Figure 2).

The Berg Balance Scale (BBS), Timed Up & Go test (TUG), Timed Balance Test (TBT), 10-m walking test (10MWT) and Functional Ambulation Categories (FAC) were performed to assess functional balance.

RESULTS
Mean WBA and CPB with and without AFO of all 20 subjects are shown in (Figure 3). No significant effects of AFO use were found during unperturbed or perturbed stance. In contrast, significant differences in favor of AFO use were found for the BBS, TUG, 10MWT and FAC (Figure 4).

CONCLUSIONS
AFOs had no effect on weight-bearing asymmetry or the relative contribution of the paretic lower limb to balance control. However, functional tests were performed significantly better with an AFO. Apparently, improvements on a functional level cannot readily be attributed to a better functioning of the paretic lower limb. This finding suggests the influence of AFO use on compensatory mechanisms.

REFERENCES