

Weight-bearing Shifts of Hemiparetic and Healthy Adults upon Stepping on Stairs of Various Heights

Y. Laufer¹, R. Dickstein², S. Resnick³, E. Marcovitz¹

1. Physical Therapy Services, Flieman Geriatric Rehabilitation Hospital, Haifa, Israel

2. Department of Physical Therapy, Sackler Faculty of Medicine, Tel Aviv University, Tel Aviv, Israel

3. Maccabi Clinic, Rishon Lezion, Israel

Objective

To examine and compare the effect of stepping on stairs of various heights on lower extremity weight bearing in hemiparetic patients.

Setting

Flieman Geriatric Rehabilitation Hospital, Haifa, Israel.

Subjects

Fifteen ambulatory hemiparetic patients following an acute cerebrovascular accident, and 16 age-matched healthy controls.

Interventions

Each subject was tested twice on two consecutive days in five weight-bearing positions which included level stance and stepping with either leg on 10-cm- and 17-cm-high steps. Data concerning weight distribution on the lower extremities was collected by two computerized forceplates.

Main outcome measure

Weight borne by each foot expressed as a percentage of overall body weight.

Results

In the attempted symmetrical level stance, the percentage of body weight borne by the paretic limb of the stroke patients was significantly lower than that of the nonparetic limb. Placing one foot on a step induced a weight shift to the foot placed on the floor regardless of step height. Weight shifting to the paretic limb was, however, significantly lower than to the nonparetic limb. Weight shifting to the nonparetic limb was significantly lower than to the corresponding limb of healthy individuals. Step height had not significant effect on weight distributions on the feet.

Conclusions

Raising a foot on a step appears to be an appropriate strategy for weight shift training of stroke patients. Since weight shifting to both the paretic and nonparetic limb of stroke patients is impaired, treatment strategies should include training in weight shifting to both lower extremities.