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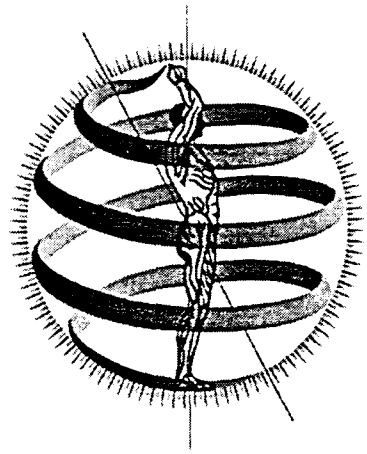

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OBSTACLE CROSSING IN SUBJECTS WITH STROKE AND HEALTHY ELDERLY SUBJECTS

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Introduction An important goal of rehabilitation following stroke is to retrain gait to safely accommodate the complexities of the everyday environment. A study by Forster and Young demonstrated that safety of gait is often compromised in the stroke patient population, with a large proportion (73%) of stroke patients falling at least once. Obstacles were implicated in 10% of these falls. Obstacle crossing has been identified as a task which is frequently performed by stroke patients following discharge from rehabilitation (Kay, 1998). Since little is known about obstacle crossing following stroke, the aim of the study was to compare obstacle crossing ability in stroke patients with a group of healthy elderly subjects.

Method Twenty four stroke patients, who were receiving inpatient rehabilitation and were able to walk 10m unassisted, were tested after a median time interval of 27 days post stroke. A control group of 22 healthy subjects, matched for age, gender and height were also tested. Subjects were tested on two occasions. All subjects were required to step over a small obstacle (1 cm, 4 cm or 8cm) placed in the middle of a 10m walkway. The obstacle was either attached vertically to the floor to represent a high obstacle, or flat on the ground to represent a wide obstacle. Subjects also performed two unobstructed trials, resulting in a total of eight trials in a session. The order of testing was counterbalanced. A rail was positioned on the subject's unaffected side, however subjects were instructed to use it only if they felt unsafe. Subjects wore a safety belt, and were accompanied by a physiotherapist. A single VHS video camera was used to record the trials.
Subjects were rated as 'pass' or 'fail' for each trial, and the leading limb was noted.. The 'Video Distance and Angle Measurer'[11] was used to derive several distance and temporal parameters of gait from the videotape. Comparisons were made between the two groups for each orientation separately, using the Mann Whitney U test. The type 1 error rate was adjusted to .017 to enable three comparisons (1 cm, 4 cm, 8 cm) or to .013 to enable four comparisons (unobstructed 1 cm, 4 cm and 8 cm) between the two groups for each orientation.

Results Thirteen out of the 24 stroke patients recorded one or more fails during the test. In comparison, no fails were recorded by any of the healthy subjects. Stroke subjects did not demonstrate a preference to lead with either the affected limb or the unaffected limb ($p > .05$). Toe clearance was found to be significantly higher for stroke patients compared to the healthy subjects on the 1 cm high, 8 cm high and the 4 cm wide obstacles ($p < .017$). Post obstacle distance was significantly reduced in the stroke patients for the three high obstacles and two (4 cm and 8 cm) of the wide obstacles ($p < .017$). No difference was found between the two groups for the pre-obstacle distance ($p > .017$). Stroke patients also demonstrated significantly longer pre and post obstacle step times and total step time ($p < .017$) than the controls, although the proportion of step time prior to the obstacle was not found to be different ($p > .017$).

Conclusion Higher failure rates and the altered limb trajectory utilised by the stroke subjects demonstrate that obstacle crossing is significantly impaired following stroke. Some changes, such as the increase in toe clearance may reduce the risk of a trip. However, other adaptations, such as the reduced post obstacle distance are likely to threaten gait stability following stroke. Physiotherapists should consider obstacle crossing when assessing and treating stroke subjects with a gait disorder.

References

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Kay, D. (1998). Unpublished Postgraduate Diploma in Health Research Methods, La Trobe University, Melbourne.

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