Physiotherapy for patients with mobility problems more than 1 year after stroke: a randomised controlled trial.


Abstract
Background: Community physiotherapy is often prescribed for stroke patients with long-term mobility problems. We aimed to assess the effectiveness of this treatment in patients who had mobility problems 1 year after stroke.

Methods. We screened 359 patients older than 50 years for a single-masked, randomised controlled trial to assess the effects of community physiotherapy. Assessments were made at baseline, 3, 6, and 9 months in 170 eligible patients assigned treatment or no intervention. The primary outcome measure was mobility measured by the Rivermead mobility index. Secondary outcome measures were gait speed, number of falls, daily activity (Barthel index scores), social activity (Frenchay activities index), hospital anxiety and depression scale, and emotional stress of carers (general health questionnaire 28). Analyses were by intention to treat.

Findings. Follow-up was available for 146 patients (86%). Changes in scores on the Rivermead mobility index (score range 0-15) differed significantly between treatment and control groups at 3 months (p=0.018), but only by a median of 1 point (95% CI 0-1), with an interpolated value of 0.55 (0.08-1.04). Gait speed was 2.6 m/min (0.30-4.95) higher in the treatment group at 3 months. Neither treatment effect persisted at 6-months’ and 9-months’ follow-up. Treatment had no effect on patients’ daily activity, social activity, anxiety, depression, and number of falls, or on emotional stress of carers.

Interpretation. Community physiotherapy treatment for patients with mobility problems 1 year after stroke leads to significant, but clinically small, improvements in mobility and gait speed that are not sustained after treatment ends.

Commentary
It’s good to see a robust RCT evaluating physiotherapy intervention, even if the results are negative. In this study the authors reported a difference of one point only on the Rivermead Mobility Index (the primary outcome) between controls and intervention, and a negligible difference in walking speed. These results do not support earlier randomised controlled trials that suggest a benefit from physiotherapy for mobility late after stroke (eg Dean, 2000; Duncan 1998). The median number of treatments in Green’s study was three (IQR 2-7, range 0-22), which may have been insufficient to impact on a cohort of people with stroke who, although living at home, had poor mobility. The baseline gait speed of both intervention and control groups was only 23-24 m/min, which conforms to Perry’s (1995) definition of ‘the most limited community walker’. Intensity of input has been recognised for some time as an important component of physiotherapy for stroke (for those people most likely to benefit), and there is growing evidence of a dose-response relationship between amount of therapy and outcome. The results of this trial support that evidence. A comparison is surely only useful when the physiotherapy offered is sufficiently intense to procure a long-term change in community mobility status, rather than the physiotherapy dose determined by funding constraints and resource allocation.

Knee joint movements in subjects without knee pathology and subjects with injured anterior cruciate ligaments.


**Design.** Cross sectional group comparison. Fifteen subjects with ACL deficiency were compared to fifteen non injured subjects who were age and gender matched.

**Setting.** Laboratory based study.

**Purpose.** To compare across the groups, rolling and gliding motion of the knee joint together with EMG activity from selected lower limb muscles during non weight bearing and weight bearing exercises.

**Background.** The instantaneous centre of rotation is known to shift at the knee joint during flexion and extension exercises. This shift occurs as a result of gliding and rolling occurring simultaneously. There is some evidence to suggest that the motion of the centre of rotation is different when non-weight bearing compared to weight bearing activity is undertaken, and this aspect has not been explored in ACL deficient individuals. As EMG activity can influence the amount of gliding and rolling occurring in the joint, and EMG activity has been shown to change following ACL injury, the authors examined the relationship between muscle activity and gliding at the joint. They hypothesized that gliding would be increased in ACL subjects when muscle activity did not counteract this increased motion.

**Measures.** Skin mounted markers were videoed as subjects either extended the knee from 100 degrees to full extension or performed a 2-legged sit to stand exercise. The video data were digitised and used in a mathematical model of the knee joint to establish the instantaneous centre of rotation. Surface EMG activity was recorded from the vastus lateralis, medial hamstring, medial gastrocnemius and gluteus maximus and subsequently normalised to a maximal voluntary isometric contraction from these muscles, thus EMG activity during the exercises could be expressed as a percentage of maximal effort EMG activity.

**Results.** The main findings were that increased gliding was observed in ACL deficient knees. This finding was apparent across the range of motion in the weight bearing exercise, and only at 10 degrees knee flexion in the non weight bearing exercise. No differences were observed in the EMG activity across groups.

**Conclusions.** The authors concluded that the ACL has a role in regulating rolling and gliding movement at the knee joint. They also noted that even in weight bearing conditions, increased gliding is observed in ACL deficient subjects, and hence their was a need for further research examining the efficacy of weight bearing exercises for ACL deficient individuals.

**Commentary**

This work sought to increase our knowledge of knee joint mechanics during exercise. However, it has a number of limitations and the authors acknowledge many of them. Most of these limitations relate to the calculations used in the model to establish the instantaneous centre of rotation and subsequently the amount of gliding. The authors also note that the use of skin markers may introduce additional errors in their calculations, as skin motion may not reflect the motion of the underlying bones. A further limitation is that the authors did not test a homogenous group. They choose to include both acute (some with swelling) and chronic ACL deficient subjects, as well as subjects with additional ligamentous damage in some cases. Due to the small numbers involved, any changes to sub groups could not be appraised. A final limitation is that during the weight-bearing exercise, the authors did not determine whether the subjects maintained weight-bearing through the ACL deficient knee during the exercise.

Although the authors state that the ability to quantify rolling and gliding movements may help in identifying levels of functional ability in subjects, the authors did not examine the relationship between these variables in the current study. Furthermore, it seems unlikely that the technique would be used in the clinical setting. Overall, the limitations significantly affect what we can learn from this study. The idea had merit; however, the methodology needed considerable improvement.

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