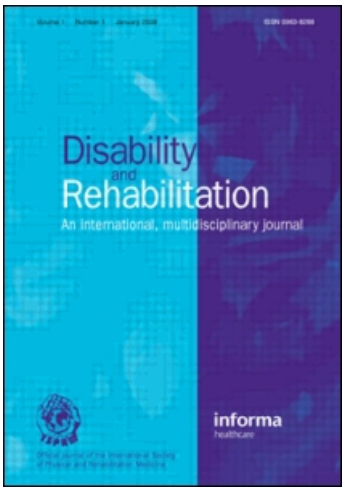
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**ORIGINAL ARTICLE**

# Gait outcome following outpatient physiotherapy based on the Bobath concept in people post stroke

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**Abstract**

*Purpose*. The purpose of this study was to characterize the gait cycle of patients with hemiplegia before and after a period of outpatient physiotherapy based on the Bobath concept.

*Methods*. Nine patients, at least 6 weeks post stroke and recently discharged from a stroke unit, were measured before and after a period of outpatient physiotherapy (mean duration = 17.4 weeks). Therapy was documented using a treatment checklist for each patient. The primary outcome measures were a number of gait variables related to the therapists' treatment hypothesis, recorded during the gait cycle using the CODA motion analysis system. Other secondary outcome measures were the Motor Assessment Scale, Modified Ashworth Scale, subtests of the Sodring Motor Evaluation Scale, the Step test, a 10-m walk test, the Barthel Index and the London Handicap Score.

*Results*. Recovery of more normal gait patterns in the gait cycle (using motion analysis) did not occur. Significant changes in temporal parameters (loading response, single support time) for both legs, in one kinematic (dorsiflexion during stance) and one kinetic variable on the unaffected side (hip flexor moment), and most of the clinical measures of impairment, activity and participation (with the exception of the Modified Ashworth Scale and the 10-m walk) were noted.

*Conclusions*. Study findings did not support the hypothesis that the Bobath approach restored more normal movement patterns to the gait cycle. Further research is required to investigate the treatment techniques that are effective at improving walking ability in people after stroke.

**Keywords:** *Physiotherapy, Bobath, gait, walking, hemiplegia, stroke*

## Introduction

Walking is possible for between 52 – 85% of patients following stroke [1,2,3] but the walking pattern that they adopt rarely returns to normal; the patients' ability to function especially in the wider community remains limited [4,5], therefore gait training is an important area for rehabilitation following stroke.

A recent review by Teasell et al. (2003) suggests that the strength of evidence for gait training techniques varies [5]. There is, therefore, a need to determine which training programmes are effective at improving locomotor capacity post stroke [3]. The Bobath concept is the most widely used treatment approach in the UK [6], yet current evidence does not support the superiority of one treatment approach over another [7,8]. Gait re-education based on the Bobath concept uses techniques aimed at the normalization of tone, facilitation of more normal movement patterns as well as the act of walking to improve walking ability in people post stroke [9, p. 94; 10 p. 441]. This exploratory prospective cohort study aimed to determine if more normal movement patterns were restored to the gait cycle of patients following stroke after outpatient physiotherapy based on the Bobath concept.

## Method

### *Participants*

Ethical approval for the study was obtained from the Research Ethics Committee of the University of Ulster. Patients consecutively admitted to the stroke

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units of three major teaching hospitals for a 12-month period were considered for this study. Inclusion criteria were: a first-ever stroke, at least 6 weeks post-stroke, aged between 50 and 80 years, the ability to follow instructions, a mini mental score of more than 7/10 [11], a star cancellation score of more than 48/52 [12], an ability to walk for 10 m with assistance of one or two people, and referral to an experienced Bobath therapist for gait re-education within the study catchment area. Patients were excluded if they had co-morbid conditions, which affected their rehabilitation potential, as decided by the multidisciplinary team. Suitable patients were recruited to the study having given written informed consent.

*Procedure*

At the start of outpatient therapy, the therapists completed a table for each patient derived from their assessment, which identified the patients' problems, goals and treatment plan. Each therapist also documented the treatment strategies used during each session using a previously published checklist [13]. The duration of outpatient therapy was not pre-determined; discharge was based on the clinical judgement of the physiotherapist.

*Outcomes*

Patients were assessed at the start of and at discharge from outpatient physiotherapy with the following seven measures (see below) related to impairment, activity, and participation according to the World Health Organization framework for rehabilitation [14]. This battery of tests involved two testing sessions: a session of 1.5 – 2 h to complete the clinical measures and a second session of 1 – 2 h to complete three-dimensional gait analysis. The principal investigator (SL) who was not involved in the patients' care performed all measurements.

*Clinical measures*

The Motor Assessment Scale (MAS) is a brief, easily administered clinical scale of eight categories of motor function of which five categories are specific to functional mobility [15]. Four of the subtests of the Sodring Motor Evaluation Scale (SMES) related to the lower limb were used to monitor motor recovery of the lower limb [16]. The Modified Ashworth Scale [17] was included because normalization of tone is an important treatment aim for Bobath therapists; each body part is scored from 0 (no increase in tone) to 5 (affected parts are rigid in flexion or extension). The Step Test evaluates dynamic single limb stance for each leg; the patient is scored on the number of times he/she can step up and down with the same leg on a 7.5-cm step in 15 sec, independently without support [18]. The 10-m walk test refers to the time it takes the patient to walk a fixed distance of 10 m at his/her usual pace [19]. The Barthel Index (using the 20 point score version), a measure of activity, establishes the patient's degree of independence in self-care on 10 items [19]. The London Handicap Score, a measure of participation, asks six questions related to mobility, physical independence, work and leisure, social integration, orientation and economic self sufficiency [20].

*Gait analysis*

Gait analysis was carried out on each patient using the CODA motion analysis system based in the biomechanics laboratory of the University of Ulster [21]. For each session, patients were dressed in a T-shirt and bicycle shorts; their height and weight were measured; they were videotaped while walking at their preferred speed in their usual footwear, and without a walking aid if possible. A standardized gait lab protocol, which explains data acquisition and processing, is available from the authors. Intrarater reliability of marker placement and data processing has been presented elsewhere [22].

With the markers in place, each subject practised walking up and down the laboratory walkway once or twice in order to identify the best starting position to strike the force plate with the relevant foot, and to get used to the markers. The principal investigator assisted the patient to walk on the opposite side to the scanner and did not facilitate the patient's gait in any way. The assistant ensured that she did not block the markers or touch the force plates embedded in the floor. Patients were instructed to aim for a target at chair height at the opposite end of the walkway on the command: ''Ready, steady, walk.'' Another assistant then activated the CODA scanner, while seated at the computer away from the walkway. Data acquisition was confirmed by the initiation of a bleep. During each session at least two trials for each side of the body were acquired; however it was not always possible to acquire kinetic data, some patients had insufficient step length to strike the force plate cleanly with one foot only.

*Data analysis*

At least two trials for each lower limb were superimposed on the CODA report generator graphs to determine if the trials were reasonably consistent within each test session, prior to selecting a representative trial for each leg in each patient. Data was extracted from the middle 6 m of the walkway, which extended for about 8 m in order to minimize

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acceleration and deceleration periods, and provide a window of steady state [23, p. 132]. Data were analysed using the Statistical Package for the Social Sciences (SPSS-PC-version 9). Non-parametric significance tests were used, because the data were not normally distributed and the level of measurement of the clinical scales was ordinal. Each variable was compared pre- and post-therapy across patients using Wilcoxon tests for related samples.

## Results

### *Patient characteristics*

The study took place over a 12-month period; only 46 patients out of 297 patients (16%) met the entry criteria (Figure 1).

The main reasons for exclusion were: outside the age limits (29%), no rehabilitation potential (22%), and independent gait (26%). Nine out of 11 patients completed the study; one patient was withdrawn during week 4 due to deterioration in his mental status, and one patient refused to attend the gait laboratory following her discharge from outpatient therapy. The baseline characteristics of these nine patients are presented in Table I.

The four females and five males ranged in age from 55–78 years old, three presented with a left hemiplegia and six with a right hemiplegia. Five of the six right-sided patients presented with some communication problems (mainly expressive dysphasia) that did not interfere with their rehabilitation. All patients were previously independent, time from stroke varied between 6–30 weeks and all of them had been discharged back to their own homes. Four patients required maximal assistance of two persons to walk for 10 m at the start of outpatient therapy. According to their Barthel Index scores [19] three patients were classified as 'severely disabled' (score: 0–9), five patients as 'moderately disabled' (score: 10–14) and one patient as 'mildly disabled ' (score: 15–19). Two patients were managed by the community stroke scheme in their own homes, two patients attended the young disabled unit on a daily basis for therapy and the others all attended the elderly care day hospital for outpatient rehabilitation. All patients continued having occupational therapy and five patients continued with speech and language therapy.

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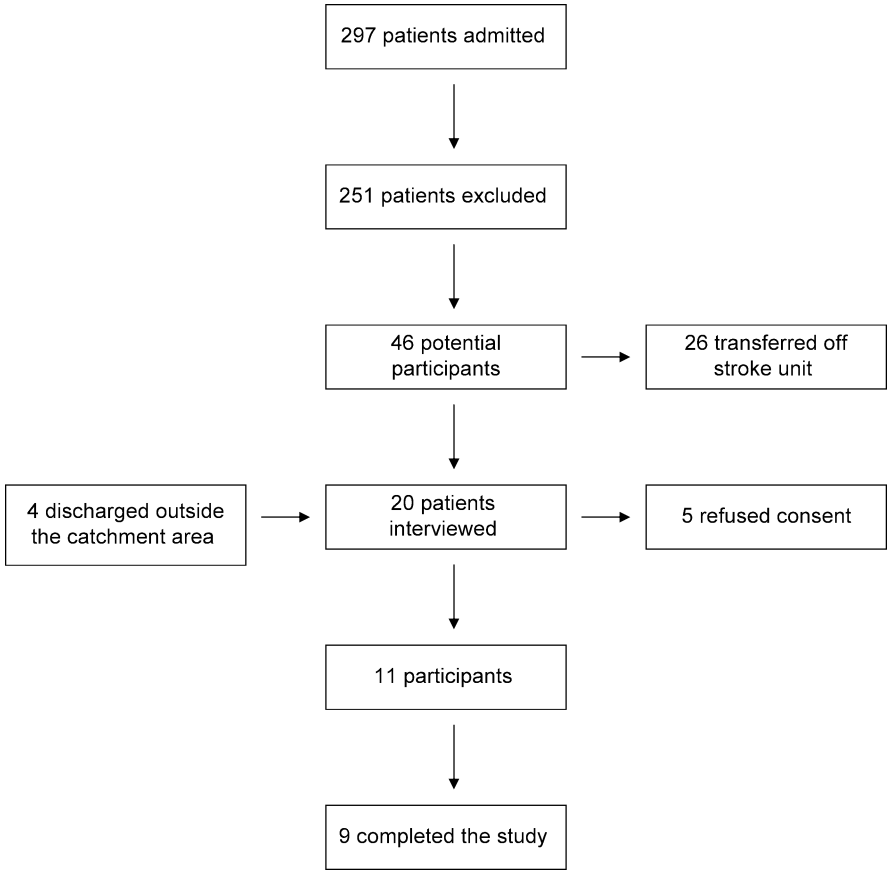



Figure 1. Flow of patients through the study.

*Physiotherapy intervention*

Experience and handling skills are considered to be important elements of the Bobath concept [22]. There were six senior physiotherapists involved in this study; they had all attended a three-week Bobath course and advanced courses; one was a former Bobath tutor. All were more than 14 years qualified with at least 12 years' experience working with stroke patients. Their clinical reasoning was explored by comparing the written problem lists, aims and treatment plan submitted for each patient. The therapists identified two common treatment problems across patients: the inability to accept and transfer weight, and an inability to selectively move the pelvis and the hemiplegic lower limb. Many patients demonstrated difficulty with weight transference to the unaffected side as well as towards the hemiplegic side, this was usually attributed to their inability to release the hemiplegic leg during swing or push off with the hemiplegic foot.

The average number of weeks on treatment was 17.4 weeks (range: 8–35 weeks). The number of sessions per week varied across patients, 2–3 times per week for five patients and daily for the others. Treatment activities categorized according to the therapist's treatment goals of preparation, facilitated movements, and functional tasks including gait specific activities (Figure 2), were extracted from the daily checklist completed by each therapist.

Preparation and facilitation of movement activities were used the most frequently in all but three patients, where there was also a strong emphasis placed on task specific activities. With regard to re-educating gait, the frequency of techniques devoted to gait specific activities across sessions varied from 16–39% with actual walking practice varying from 7–12% (Figure 3).

## Results

*Changes in kinematics of the gait cycle*

The therapists in this study hypothesised that improving selective control of the pelvis would improve weight transference over the hemiplegic leg, thus improving the movement patterns (both proximally at the hip and distally at the knee and foot) in both the stance and the swing phases of the gait cycle. Seven kinematic variables were selected to monitor whether change towards a more normal movement pattern had occurred: pelvic motion (peak pelvic tilt during midstance), hip motion (peak hip extension during stance, and peak hip flexion during swing),

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Table I. Patient characteristics.

| Background information | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| Side of hemiplegia | L | R | L | R | L | R | R | R | R |
| Gender | F | M | F | M | F | F | M | M | M |
| Age (years) | 75 | 56 | 66 | 72 | 68 | 55 | 78 | 53 | 56 |
| Time since stroke onset (weeks) | 29 | 7 | 6 | 29 | 7 | 8 | 14 | 19 | 30 |
| Walking ability (Level of assistance) | +1 | +1 | +2 | +2 | +1 | +1 | +2 | +1 | +2 |
| Barthel Index (Level of severity) | 15 Mild | 11 Mod | 9 Severe | 5 Severe | 11 Mod | 12 Mod | 6 Severe | 12 Mod | 14 Mod |

Walking ability: +1 = assisted by one person; +2 = assisted by two people.

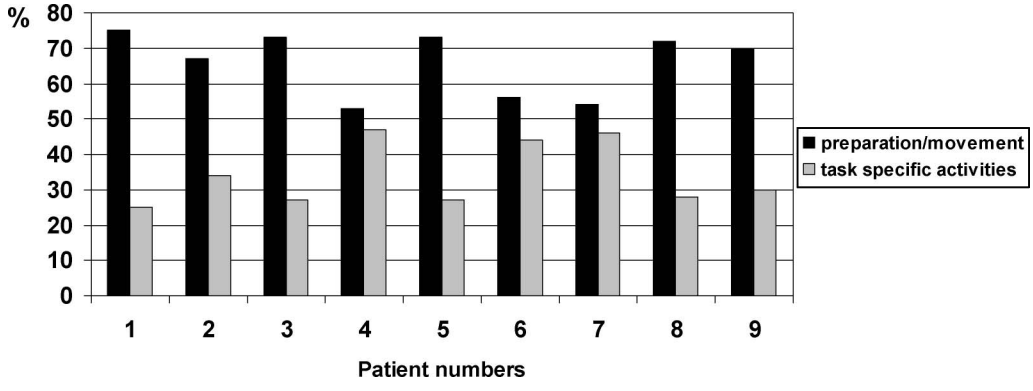



Figure 2. Breakdown of treatment activities per patient. (Percentages were calculated by dividing the number of times a specific technique was used by the total number sessions.)

knee motion (peak knee flexion during swing) and ankle motion (peak dorsiflexion during mid stance and swing, and plantarflexion during terminal stance). Values remained abnormal; none of the changes noted following therapy were statistically significant on the hemiplegic side (Table II). On the unaffected side only one of the above variables measured had changed significantly, peak dorsiflexion was significantly increased during stance (17° pre vs. 22° post; Wilcoxen test: $p = 0.051$).

*Changes in kinetics of the gait cycle*

This data must be interpretated with caution as all patients required assistance to walk and force data collection was incomplete. Some of the patients had great difficulty in hitting the force plate cleanly with their foot; it was impossible to complete the force data collection for two patients (7,8) on the hemiplegic side (Table III), and three patients (4,5,7) on the unaffected side (Table III). Therapists aimed to

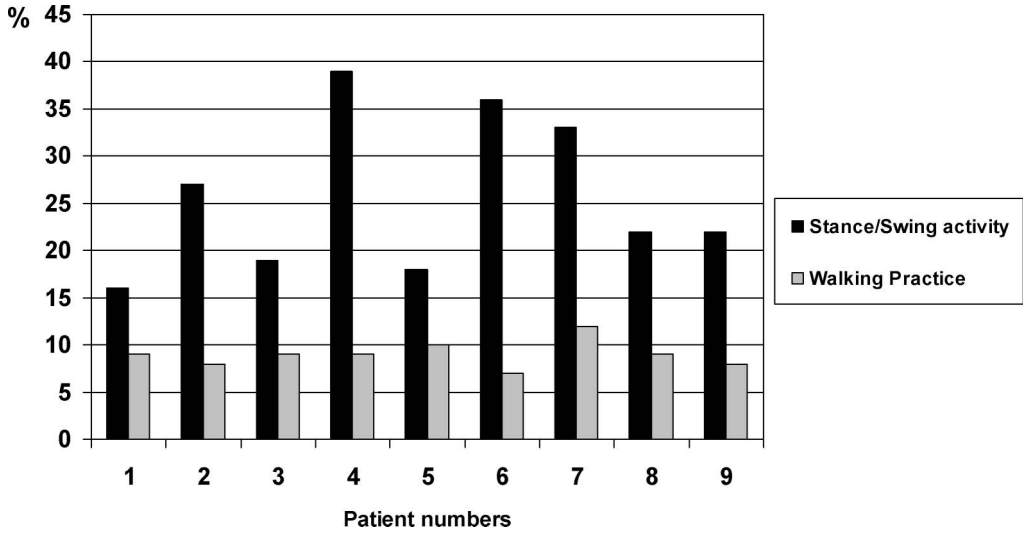



Figure 3. Breakdown of gait specific activities per patient.

Table II. Mean kinematic values for the hemiplegic leg.

| Angle (degrees) | Pre-therapy Mean (SD) | Post-therapy Mean (SD) | *p* values | Normal Values (degrees) |
|---|---|---|---|---|
| Peak PT (midstance) | 14.62 (8.94) | 15.93 (7.16) | 0.678 | 4 |
| Peak hip extension (stance) | 3.55 (13.91) | 3.88 (7.14) | 0.953 | −6 |
| Peak hip flexion (swing) | 25.95 (9.67) | 27.26 (7.18) | 0.678 | 40 |
| Peak knee flexion (swing) | 35.95 (11.04) | 33.02 (10.50) | 0.086 | 65 |
| Peak dorsiflexion (midstance) | 15.10 (5.92) | 14.40 (3.88) | 0.674 | 12 |
| Peak plantarflexion (terminal stance) | −6.35 (10.82) | −3.56 (4.27) | 0.859 | −17 |
| Peak dorsiflexion (swing) | −2.50 (10.82) | −0.15 (7.28) | 0.139 | 3 |

A positive value indicates anterior pelvic tilt, hip flexion, knee flexion, dorsiflexion; A negative value indicates plantarflexion; Normal values are derived from Winter (1991) and Judge et al. (1996); SD: standard deviations.

Table III. Mean kinetic changes in the hemiplegic leg.

| Moments (N-m/kg) Powers (W/kg) | Pre-therapy Mean (SD) | Post-therapy Mean (SD) | *p* values | Normal Values |
|---|---|---|---|---|
| Hip abd. moment | 0.77 (0.36) | 0.78 (0.23) | 0.99 | 1–1.5 |
| Hip ext. moment | 0.17 (0.24) | 0.23 (0.18) | 0.237 | 0.69 |
| Hip flex. moment | −0.18 (0.38) | −0.46 (0.05) | 0.176 | −0.59 |
| Hip power | 0.09 (0.03) | 0.15 (0.01) | 0.446 | 0.85 |
| Knee ext. moment | −0.06 (0.27) | 0.05 (0.40) | 0.091 | 0.55 |
| Ankle plantarflexor Moment | 0.86 (0.34) | 0.97 (0.14) | 0.498 | 1.44 |
| Ankle power | 0.56 (0.55) | 0.83 (0.35) | 0.176 | 2.1 |

A positive value indicates anterior pelvic tilt, hip flexion, knee flexion, dorsiflexion; A negative value indicates plantarflexion; SD: standard deviations.

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improve pelvic tilt and hip activity, knee and ankle control during both stance and swing phases of gait. Seven kinetic variables were selected to evaluate change: hip abductor, extensor and flexor moments during stance, the hip flexor power burst, the knee extensor moment during stance, the ankle plantarflexor moment during terminal stance, and the ankle plantarflexor power burst during terminal stance. In general smaller moments and powers than normal were generated with the hemiplegic leg. None of the changes noted following therapy were statistically significant on the hemiplegic side. There was a significant increase in the hip flexor moment post therapy on the unaffected side ($-0.41$ Nm/kg pre vs. $-0.62$ Nm/kg post; Wilcoxen test: $p = 0.028$).

*Changes in temporal distance parameters of the gait cycle*

Therapists aimed to improve the patient's ability to transfer his/her weight onto the affected leg; therefore the timing of three key events related to improved weight bearing through the affected limb were chosen: loading response time; single support time; and stance time (Table IV). There were significant improvements in the patient's ability to accept weight onto the hemiplegic leg during loading response (Wilcoxon test: $p = 0.046$), and single limb support (Wilcoxon test: $p = 0.046$). Patients were also spending significantly longer in single limb support (Wilcoxon test: $p = 0.046$), and spending significantly less time overall in stance on the unaffected leg (Wilcoxon test: $p = 0.017$). Changes to stride length and velocity were not significant.

*Changes in clinical scales across the group*

Figure 4 illustrates the mean group scores for the impairment related clinical scales [Wilcoxen test: MAS-$p = 0.008$; SMES-$p = 0.008$; Step test (hemiplegic leg)-$p = 0.008$; Step test (unaffected leg)-$p = 0.007$]. Improvement is denoted by an increase post therapy in all scales apart from the 10-m walk and the London Handicap Score where improvement is denoted by a decrease post therapy. Significant changes were reported in all but two measures; one related to tone (Modified Ashworth Scale; Wilcoxon test: $p = 0.719$) and one related to walking speed (10-m walk; Wilcoxon test: $p = 0.344$).

At the activity level, there was a significant difference in the overall score of the Barthel Index (Wilcoxon test: $p = 0.011$). Three patients moved from the 'severely disabled' category into the 'moderately disabled' category; the other five patients moved into the 'mildly disabled' category. At the participation level, patients improved significantly in their overall London Handicap Scores (Wilcoxon test: $p = 0.007$). This score was marked out of five instead of six

Table IV. Mean temporal and distance changes for selected key events in gait cycle.

| Key events in the gait cycle | Pre-therapy Mean | Post-therapy Mean | $p$ values | Normal Values |
|---|---|---|---|---|
| Loading response (hemiplegic leg) | 27% | 24% | 0.046 | 13% |
| Single support time (hemiplegic leg) | 15% | 23% | 0.046 | 37% |
| Stance time (unaffected leg) | 81% | 75% | 0.017 | 75% |
| Stride length (hemiplegic leg) | 0.59 m | 0.63 m | NS | 1.38 m |
| Velocity | 0.34 m/sec | 0.37 m/sec | NS | 1.03 m/sec |

% of the gait cycle.

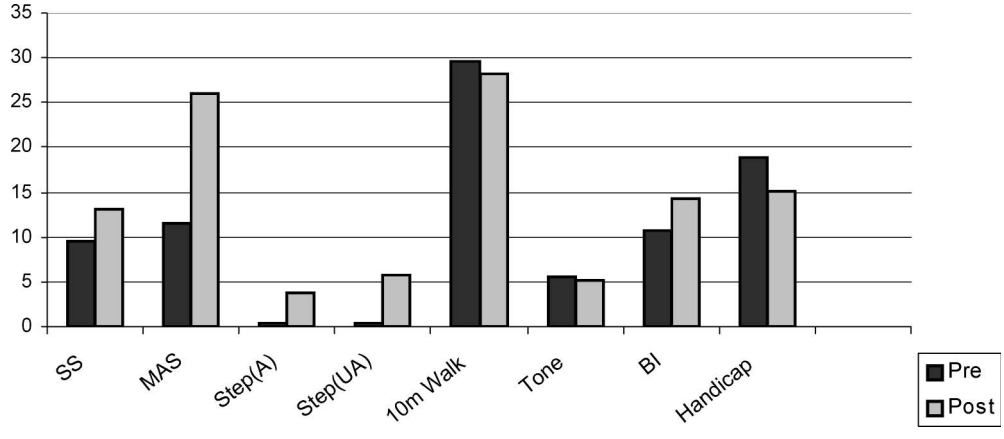



Figure 4. Mean group values in clinical scales pre- and post-intervention.

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categories; the category of economic self-sufficiency was not applicable in the majority of patients, as only three were employed prior to their stroke; five patients were retired and one was long-term unemployed.

## Discussion

The aim of this study was to determine if more normal movement patterns were restored to the gait cycle of patients following stroke, by using therapy based on the Bobath concept. The treating therapists hypothesized that more normal movement patterns would be restored; working proximally would improve distal control; and the weight-bearing ability of the hemiplegic leg would increase. The first two statements were refuted. The biomechanical data from the gait laboratory highlighted only two significant changes from all kinematic and kinetic variables; dorsiflexion during stance and the hip flexor moment were exaggerated on the unaffected side. One explanation for the hip flexor finding could be that the patient adopts this change in order to shorten the so called '*uninvolved limb*' to compensate for problems of either increased tone or increased length. Likewise increased dorsiflexion of the unaffected side during stance will compensate for decreased push off of the hemiplegic ankle plantarflexors, and also give the patient more time to gain stance phase stability with the hemiplegic limb. This lends support to those clinicians, who believe that the patients' gait pattern may improve because patients become better at compensating with the unaffected side.

In spite of the lack of effects upon these kinematic and kinetic variables, the clinical scales highlighted significant recovery in the motor ability of the lower limbs, the performance of functional mobility and dynamic standing balance. These findings support the views of other authors that although instrumented gait analysis is a useful adjunct for determining the outcome of intervention, it needs to be used in conjunction with a range of other outcome tools [24,25]. It also highlights the importance of selecting appropriate outcome tools to evaluate therapy. The clinical scales related to impairment, activity and participation all showed significant change following outpatient therapy (with the exception of the Modified Ashworth Scale and 10-m walk), whereas the kinematic and kinetic variables, derived from instrumented gait analysis, did not show any significant changes on the hemiplegic side. One explanation for this may be that motion analysis was too demanding an outcome measure to be used at this more acute stage of locomotor recovery following stroke in this group of patients. Richards and colleagues [26] have suggested that gait velocity should only be used as a key measure of outcome in patients who are already able to walk at moderate velocities ($> 0.34$ m/s); only three of the nine patients in this study were able to walk at moderate velocities prior to outpatient physiotherapy.

The therapists' last hypothesis was supported. There was a significant change in transferring the weight from the unaffected limb to the hemiplegic limb. However this improvement in the ability to load the hemiplegic leg did not correspond to an improved ability to activate the leg muscles as measured by calculating joint moments and powers throughout the gait cycle. There was a trend for the majority of patients to generate more activity with the hemiplegic side, but this was not significant across the group; the magnitude of these changes was small. This leads to the question of whether increasing loading of the hemiplegic side is a worthwhile therapeutic goal, if this change does not lead to the restoration of more normal movement patterns during gait.

Therapy achieved its objective of improving the selective control of the lower limb and functional mobility in bedside tests as measured by the SMES and MAS, however more normal movement patterns were not restored to the gait cycle. This was disappointing, as Bobath therapy aims to restore more normal movement patterns [9,10,27]. It may be that the therapist's understandings of the causes underlying each patient's gait pattern were inaccurate, for example it could be that reduced push-off during stance was secondary to ankle plantarflexor weakness as opposed to spasticity. Therefore focusing on normalizing tone and mobilizing soft tissues would not be as beneficial as strength training to improve ankle kinematics and kinetics. These findings may also be attributed to the type of treatment activities practised, for example, it may be that too much attention was devoted to working on pelvic control using weight transference in standing, with too little time devoted to generating hip extensor and abductor activity during gait. Bobath therapists may need to spend more time on obtaining optimal movement patterns within the functional activity that is impaired, and less time on facilitating normal movement patterns.

The literature suggests that training needs to be both task and context specific [1,28,29]. In this current study, therapists did work on gait specific practice, but in the majority of cases there was more emphasis on preparation and facilitating movement components (see Figures 2 and 3). Task specific practice was a key feature of therapy, however it was only used for a small proportion of therapy activity across sessions. There have been some trials focusing on task specific training in both acute [30] and chronic stroke patients [31], which have

demonstrated improvements in hip flexor and ankle plantarflexor power bursts. Other studies using six weeks of treadmill training with partial body weight support (up to 40%) have demonstrated improvements in lower limb kinematics, walking speed and endurance [32,33] in comparison to conventional physiotherapy based on the Bobath concept. This would appear to justify the view that some treatment techniques are more effective than others in specific areas of practice. This finding must be interpreted with caution as these additional techniques have usually been evaluated only as an adjunct to conventional physiotherapy. Emerging evidence suggests that there is no difference in outcome between different treatment approaches; therefore any treatment approach may be adopted [7,8,34]. This may be due in part to the fact that there are many common components across treatment approaches [35,36]. Future research needs to identify which components of training programmes are effective rather than the label attached to the programme delivered [37, p. 377].

The literature reports mixed findings in relation to the temporal and distance parameters, two studies support our findings of an increase in stance duration [38,39]; Wall and Turnbull (1987) support our findings of an increase in single limb support [40]. Our study found that walking speed did not always improve, some patients actually walked more slowly following therapy. This could be related to the fact that the patients were now walking independently without the assistance of the therapist, often using a walking aid; therefore they actually walked more slowly, but independently. This finding is challenged by Barbeau et al. (1998) in their review of 20 studies comparing different therapies and techniques; a gain in walking speed was not achieved by therapy focused on normalizing tone and improving movement patterns, yet most other interventions were associated with a positive change in walking speed [28]. Bobath therapists perhaps need to think more about specifically retraining walking speed.

### *Limitations of this study*

This study attempted to determine whether normal movement patterns were restored in patients following Bobath therapy, under optimal conditions of clinical practice, using treatment that reflected current Bobath practice by experienced physiotherapists. It was not possible to have a control group without Bobath therapy as this study was conducted in Northern Ireland, where most patients are normally offered physiotherapy based on the Bobath concept [41]. It could also be argued that the therapists demonstrated different levels of skill; however all six therapists had completed an advanced Bobath course with at least 12 years' experience in stroke care. A large number of patients were excluded from the study, which selectively recruited people with good rehabilitation potential under the management of trained, experienced Bobath therapists, but even under these best practice conditions, more normal gait patterns were not facilitated. Although the assessor was not involved in the treatment of these patients, she was not blind to the type of therapy being provided. Due to the small size investigated, these findings cannot be generalized to all patients after acute stroke. It is clear that randomized controlled trials with the assessor blinded to the treatment received by trial participants are essential to provide a strong evidence base for physiotherapy practice.

## Conclusions

This study cannot attribute changes in mobility specifically to physiotherapy, as there was no control group, therefore observed treatment effects could be due either to placebo effect or spontaneous recovery. The therapists did not achieve their aim of restoring more normal walking patterns in all patients at the biomechanical level; they did achieve their aims of both motor recovery and functional ability when using selected temporal and distance parameters from instrumented gait analysis and other clinical indices. Walking ability in everyday life improved in all patients. Current evidence suggests that the practice of motor skills needs to be both task and context-specific [29,42,43], therefore therapy should enable patients to perform everyday activities in real-life situations. Therapists in this study did not work on functional tasks as much as they did on preparation and facilitating movement; they did not give patients many activities to practice outside therapy. The treatment approach in this study represented best practice by highly skilled therapists experienced in the Bobath concept. These findings suggest that therapists may need to consider whether the way in which Bobath therapy is delivered needs to change, for example, is there within current Bobath practice an overemphasis on preparation for task performance, as opposed to the practice of functional tasks in appropriate contexts? As current evidence does not favour the promotion of one treatment approach over another [7,8,44], perhaps it is now time to stop asking the question which treatment approach is more effective and start investigating the actual combination of treatment techniques that are employed within gait training programmes. Further research comparing the different treatment strategies delivered within therapy programmes is required.

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