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SHORT COMMUNICATION

PHYSIOTHERAPY FOR PUSHER BEHAVIOUR IN A PATIENT WITH POST-STROKE HEMIPLEGIA

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Objective: **This case report describes a specific, literature-based physiotherapy treatment and the outcome for a stroke patient with pusher behaviour. Pusher behaviour is characterized by pushing strongly towards the hemiplegic side in all positions and resisting any attempt at passive correction of posture to bring the weight towards or over the midline of the body.**

Methods: **The patient was a 71-year-old man with clear pusher behaviour due to a stroke. Therapy for the pushing behaviour was performed over a 3-week period. Motor function, mobility, disability, tone anomalies and pusher behaviour were assessed before and after the study period. Immediate effects of a single training session were assessed by clinical observation.**

Results and conclusion: **Immediate effects on the pusher behaviour were observed when using visual and auditory feedback, but not when somatosensory input was used. These results were not maintained to the end of the treatment period. Treatment makes the patient able to use compensatory strategies for functional activities. The long-term effects should be investigated in more depth in the future.**

Key words: pusher syndrome, posture, hemiplegia, rehabilitation.

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INTRODUCTION

Davies reported a peculiar behaviour in stroke patients termed "pusher syndrome", characterized by pushing strongly towards the hemiplegic side in all positions and resisting any attempt at passive correction of posture to bring the weight towards or over the midline of the body (1).

Occurrence of pusher behaviour (PB) is estimated to occur in about 5% of the stroke population and 10% of stroke patients admitted for rehabilitation (2–4) and is considered a negative factor regarding recovery time (3).

Lesion localization and the presence of neuropsychological symptoms related to PB still have to be defined. Some authors suggest that patients with PB have an altered perception of the body's postural orientation in gravitational space (7, 8) and experience their body as oriented upright when it is tilted about 20° to the unaffected side (7). They have typical behaviour when they try to realign their body's centre of gravity with their disturbed internal body reference (9). Other investigations suggest the presence of graviceptive neglect, related to a disrupted processing of somesthetic graviceptive information (8).

Two therapeutic approaches have been suggested based on experience, clinical observation and physiopathological investigations. Some authors consider the role of visual cues to be a basic element (7), others judge somesthetic information (1, 8) to be more important.

This case report, for the first time, describes a specific, literature-based physiotherapy treatment and the outcome for a stroke patient with PB.

METHODS

Case description

The patient was a 71-year-old man, right-handed (height 164 cm, weight 53 kg). He was married, had a son and had worked as a farmer. He was admitted to the Department of Rehabilitation Medicine of Prato Hospital 27 days after his stroke, with a diagnosis of left hemiplegia due to a large right frontotemporal cortical/subcortical infarction.

At admission to the department he had left hemiparesis, sensory loss and depression. He was able to move his extremities in normal patterns, although he showed reduced selective control and weakness, mainly in the upper limb. He was able to maintain the sitting position without help. Standing was not possible because of a clear PB as described by Davies (1).

The patient showed no signs of neglect, assessed using established methods. In addition, the patient was required to draw a man and a house on standard paper. The midline of the man and the vertical lines of the house were tilted about 20° to the left.

Cognitive status, measured by the Pfeiffer test, was not impaired. An orthotic examination reported the presence of left hemianopsia.

Intervention

The patient attended 27 therapy sessions over a 3-week period. The therapy consisted of individual 2-hour physiotherapy twice a day for 5 days a week and a single 1-hour session on Saturdays. General therapy was administered during the study period, based on the Bobath concept (1), aimed at treatment of the upper limb, trunk and lower limb, together with treatment to counteract PB. The specific pushing activities were based on suggestions from literature. All the activities were administered at each session. The specific therapeutic activities were: lateral pelvic tilt in sitting (1); standing with the unaffected arm against a wall or using a table as support, then standing during functional activities using the unaffected upper limb, later learning to stand without a support (1, 10);

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Table I. *Scale for contraversive pushing*

	Admission	Discharge
Spontaneous body posture		
Sitting	0.25	0.25
Standing	1	1
Use of the non-paretic extremities (abduction and extension)		
Sitting	0.5	0
Standing	1	0.5
Resistance to passive correction of tilted posture		
Sitting	1	0
Standing	1	1
Total	4.75	2.75

vocal feedback from the therapist, and visual feedback from a mirror with a drawn midline (12), use of back support as a table (10); single leg activities, such as stepping with the affected and unaffected leg forward, and weight-bearing on the paretic and non-paretic leg (4), striking a ball or using a stair (step position) (1); weight transfer from the unaffected to the affected side and vice versa when sitting (1); standing up from sitting and transferring from bed to wheelchair; walking with a quad cane and stair climbing.

Outcome measures

Motor function, mobility and disability were assessed using respectively: the Fugl-Meyer Assessment Scale (FMA); the mobility part of the motor assessment chart according to Lindmark (MA); and the Barthel Index (BI). The modified Ashworth scale (MAS) applied to the knee and wrist was used to assess tone anomalies.

PB was assessed using the Scale for Contraversive Pushing (SCP) (9). The scale considers 3 conditions: (i) spontaneous body posture; (ii) use of the non-paretic extremities (abduction and extension) to push away from the non-affected side of the body; and (iii) resistance to passive correction of posture. Patients are diagnosed as having PB if all 3 conditions are present and they have a score of at least 1 (maximum = 2, sitting plus standing). No reliability or validity data on SCP is available. Immediate effects of a single training session were assessed through clinical observations, according to Davies' criteria (1).

RESULTS

The scores in the outcome measures were: FMA: 123, BI: 30, MA: 18, MAS: 0, at admission, FMA: 137, BI: 60, MA: 20, MAS: 0, at discharge. The changes in SCP scores are listed in Table I. Motor and functional recovery had occurred during the study period. Somatosensory inputs, such as single leg activities and weight bearing on the paretic and non-paretic leg had no immediate effects on pusher behaviour. In contrast, treatment sessions using visual or auditory feedback had positive immediate effects, obtaining an independent standing position. However, these results were not maintained at the end of the treatment period. PB was reduced only partially, in fact spontaneous body posture was not improved, while the patient was able to control limb extension and resistance to passive correction. After 2 weeks, the patient walked using a quad cane, was able to make transfers autonomously and to climb stairs under supervision.

DISCUSSION

PB remains a poorly understood phenomenon. This is probably due to the low incidence of the behaviour, the lack of studies and the inconsistency in reported findings.

Based on clinical experience, Davies (1) proposes several activities to guide the body axis into the correct position, to develop the patient's internal reference system and to extend the paretic leg when standing. According to the Bobath concept, Davies suggests the use of manual guidance and of limiting visual and verbal feedback. On the contrary, Karnath et al. (7) consider visual cues a suitable method to help the ability to realign the body, because the orientation perception of the visual world is not impaired. Visual information should be used because without this, the pusher patients are not able to realign their body axis (12). Besides visual input, some investigators (8) emphasize the role of cutaneous information to control body verticality, considering PB an expression of graviceptive neglect with a disturbed ability to process somesthetic information. Other researchers (4) confirm the correlation between PB and attention disorders, such as personal neglect, reinforcing the indication of somesthetic information. An integrated approach, which includes facilitation using tactile-somatosensory, auditory and visual information, was used in this case study. Vestibular stimulations were not taken into account because all previous investigations excluded the vestibular system as an origin of PB.

Treatment results were not quite maintained to the end of the treatment period. The long-term effects should be investigated in more depth in the future. In any case, an effective specific physiotherapeutic treatment should be sought. In fact, PB seems to have a positive prognosis (12) and a negative impact on recovery time, but not on functional outcome (3). This case report does not clarify the role of each approach on outcomes and the possible effects of spontaneous recovery. This should be investigated in a larger population, using controlled trials.

The treatment did not reduce the leaning towards the affected side, but on the other hand the patient learned to use compensatory strategies for activities like walking or transferring from bed to wheelchair.

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