

# Stroke Rehabilitation in Europe

## What Do Physiotherapists and Occupational Therapists Actually Do?

### 3 Introduction

Stroke can result in life-altering changes to an individual's functional abilities. Stroke rehabilitation includes treatment of these impairments and improves outcome. Rehabilitation involves multidisciplinary teams, in which physiotherapy (PT) and occupational therapy (OT) are key components. However, the content of both therapeutic disciplines is not clearly defined and frequently referred to as a "black box." Several factors contribute to the notion of a "black box": (1) detailed characteristics of the applied interventions are not reported, (2) interventions are complex and diverse, (3) different approaches are used in neurological rehabilitation, (4) therapists often rely on clinical experience rather than on theoretical frameworks, (5) substantial clinical variation exists between patients with an identical diagnostic label, and (6) physiotherapists and occupational therapists function in collaboration with other health care professionals.

In addition, there is some controversy over the uniqueness of each profession. Ballinger et al reported that PT and OT for stroke patients were not homogeneous activities. However, Booth and Hewison revealed that the majority of the therapists experience a role overlap.

In the majority of previous studies, the content of either PT or OT was defined, and patients' specific impairments were not clearly reported. However, to enable a valid identification and comparison of both therapeutic disciplines, both PT and OT should be defined for a well-defined patient group because patients with different lesions may require different interventions. Identification of the content of OT and PT will enable a better understanding of their possible effect on outcome and an authentication or rejection of the uniqueness of both professions.

The primary aims of the present study were to identify the content of individual PT and OT sessions for subacute stroke patients in an inpatient rehabilitation setting and to compare the content of both therapeutic disciplines between the rehabilitation centers involved. We hypothesized that the content of PT and OT was different, and the content of each therapeutic discipline was similar in all centers. The secondary aim was to explore the relationship between the content of therapy and the level of patients' motor impairment. We expected the content of therapy to differ in patients with different levels of motor impairment.

### 30 Methods

#### Settings and Subjects

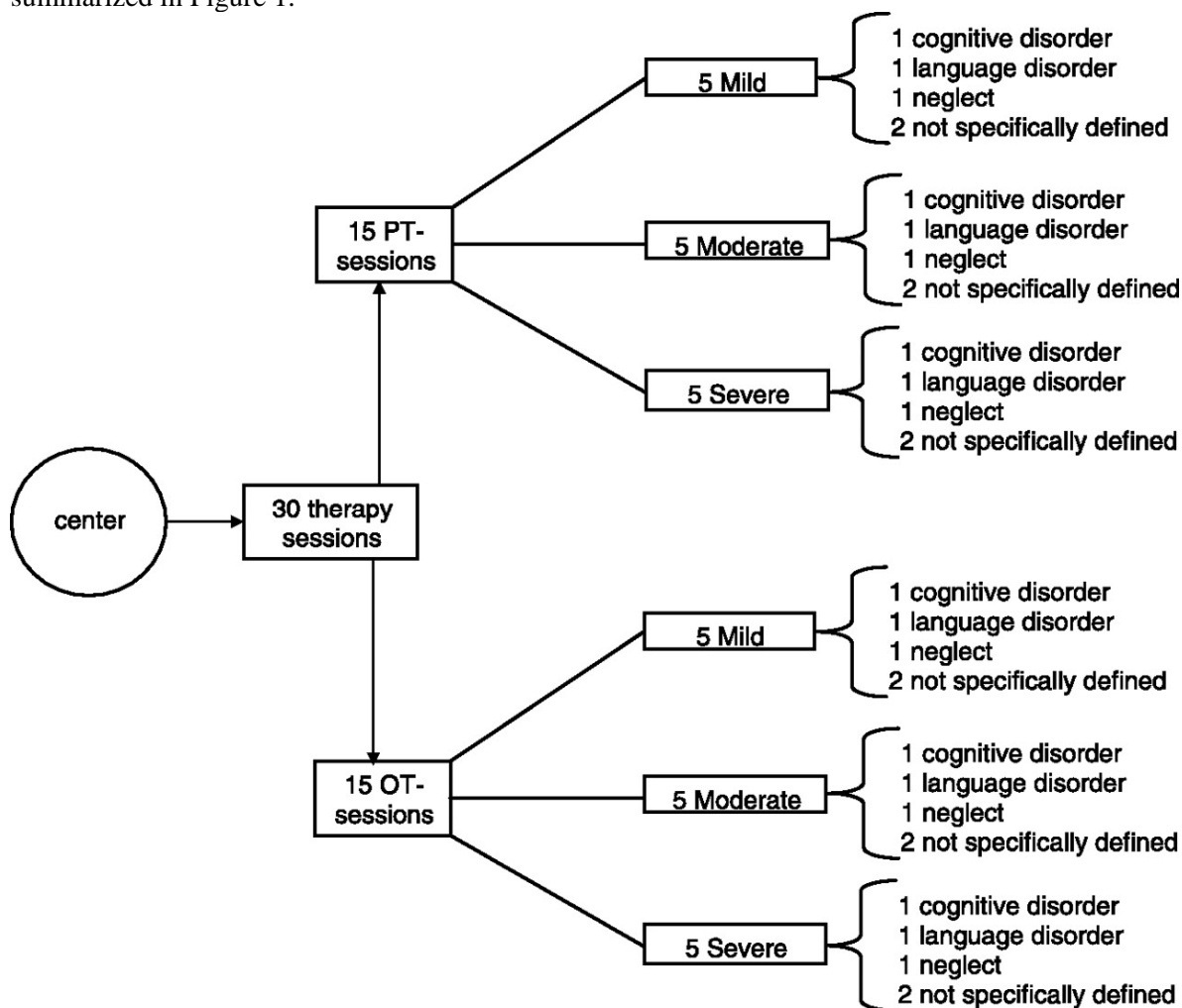
This study was part of Collaborative Evaluation of Rehabilitation in Stroke across Europe (CERISE). In this project, the complete package of stroke rehabilitation was compared between 4 European rehabilitation centers. This study was conducted in the University Hospital, Leuven, Belgium; City Hospital and Queen's Medical Centre, Nottingham, United Kingdom; RehaClinic, Zurzach, Switzerland; and Fachklinik, Herzogenaurach, Germany. These rehabilitation centers each have a well-established reputation in stroke rehabilitation in their respective countries.

Patients' inclusion criteria for the CERISE project were: (1) first-ever stroke as defined by the World Health Organization; (2) 40 to 85 years of age; and (3) score on Gross motor Function of the Rivermead Motor Assessment (RMA-GF) 11, a score on Leg and Trunk function 8, or a score on Arm function 12 on admission to the rehabilitation center. The exclusion criteria were: (1) other neurological impairments with permanent damage; (2) stroke-like symptoms attributable to subdural hematoma, tumor, encephalitis, or trauma; (3) prestroke Barthel index <50; (4) admitted to the rehabilitation center >6 weeks after stroke; and (5) no informed consent. The study was approved by the ethics committee for each center.

#### Design

Between March 2002 and August 2004, researchers recorded 15 individual PT and 15 OT sessions in each center using a mobile camera from the optimal viewing angle. To cover the full spectrum of potential disabilities and to ensure an equivalent patient group in each center, 5 patients were recruited at 3 levels of motor impairment. Therefore, the researcher assessed the RMA-GF the day

before a recording session and categorized the patients as having mild (RMA-GF-score 7 to 13), moderate (RMA-GF-score 4 to 6), or severe (RMA-GF score 0 to 3) motor impairment. Within each subgroup, the aim was to include 1 patient with a language disorder, 1 with cognitive impairment, and 1 with neglect. These characteristics were determined on the basis of specified items of the National Institutes of Health Stroke Scale. When a patient presented with a preset combination of characteristics (eg, severe motor impairment and neglect), the first following PT or OT session was videotaped. If 2 patients fitted a certain combination of characteristics, priority was given to the patient and therapist who had not been videotaped previously. Categorization of patients is summarized in Figure 1.



**Figure 1.** Categorization of patients in each center.

12 **Measures**

Before this study, a group of physiotherapists with extensive clinical experience in neurological rehabilitation developed a scoring list of therapeutic activities to define the content of both individual PT and OT sessions for stroke patients. The list of activities was based on literature and videotapes of PT and OT sessions with stroke patients from different European rehabilitation centers. Five experienced physiotherapists and 5 occupational therapists verified that the list contained all activities performed when treating stroke patients. Two members of the group of physiotherapists scored 28 recorded treatment sessions on the basis of this list at exactly 20-second intervals, indicated by a sound signal. The list contained 53 mutually exclusive activities in 12 categories: (1) mobilization includes manual joint mobilization, stretching, palpation (including pain assessment), passive relaxation, and massage; (2) selective movements includes coordination,

strengthening exercises, and active relaxation; (3) exercises and balance in lying includes lying, weight bearing on elbows, positioning, and alignment; (4) exercises and balance in sitting includes sitting, protective reactions, positioning, and alignment; (5) exercises and balance in standing indicates standing, practicing stand, and swing phase; (6) sensory, perceptual training, and cognition; (7) transfers; (8) ambulatory indicates wheelchair handling/driving, walking, climbing stairs (with aid or therapist or independently); (9) personal activities of daily living (ADL); (10) domestic ADL; (11) leisure and work-related activities; and (12) miscellaneous techniques. The complete list and manual are available at request (L.D.W.).

### **Scoring Procedure**

During a workshop, 1 researcher from each center (3 physiotherapists and 1 occupational therapist) was trained to use the scoring list. The researchers scored 3 OT and 3 PT sessions simultaneously. Each tape was watched first and scored during a second viewing so that activities could be scored in the context of the treatment session. The scores of the 4 researchers were compared, and discrepancies were discussed. After the workshop, each researcher scored the 30 treatment sessions recorded in her own center. Five randomly selected PT and 5 OT sessions from each center were also scored by the first author. Her scores were compared with those of the respective researcher.

### **Results**

#### **Comparison of the Content of PT Versus OT**

The content of PT and OT was compared using the 60 PT and 60 OT sessions pooled over the 4 centers. In a 1-hour PT session, the most frequently occurring categories were selective movements, exercises and balance in sitting and standing and ambulatory exercises. Exercises and balance in sitting, ADL, and ambulatory exercises occurred most frequently in a 1-hour OT session. After controlling for the duration of treatment, age, and multiple testing, the categories ambulatory exercises, transfers, exercises and balance in standing and lying occurred significantly more often in the PT sessions, whereas domestic and leisure activities, ADL, and sensory, perceptual training, cognition occurred significantly more often in the OT sessions. No statistically significant differences were found for selective movement, mobilization, and exercises and balance in sitting. The category miscellaneous contained too few observations for statistical analysis.

#### **PT Sessions**

Significant differences were found for 2 of 12 categories: ambulatory exercises occurred significantly more in the PT sessions from the Belgian center compared with the Swiss and German centers. Also in the PT sessions from the British center, ambulatory exercises occurred significantly more than in the German and Swiss centers. Selective movements occurred significantly less in the PT sessions from the British center compared with the Swiss center. No significant differences were found for the other categories. The categories leisure, domestic activities, and miscellaneous contained too few observations for statistical comparison.

#### **OT Sessions**

A significant difference was found for 1 of 12 categories: selective movements occurred significantly less in the OT sessions from the British center compared with the German center. No significant differences were found for the other categories. The categories leisure activities and miscellaneous contained too few observations for statistical comparison.

### **Discussion**

The aim of the present study was to compare the content of PT and OT for subacute stroke patients admitted to an inpatient rehabilitation setting. Additionally, the content of each therapeutic discipline was compared across the 4 European centers. The relationship between content of therapy and patients' level of motor impairment was explored.

After pooling the PT and OT sessions from the 4 centers, the content of both therapeutic disciplines was compared. Selective movements, exercises and balance in sitting and standing, and ambulatory exercises were the most frequently recorded categories in the PT sessions. This was comparable with Ballinger et al who reported "standing balance" and "walking" as the most frequently practiced PT activities. Also, Jette et al reported "gait" as the most frequently practiced. In the OT sessions,

we found that exercises and balance in sitting, ADL, and ambulatory exercises were the 3 most practiced categories. Ballinger et al reported "physical function" and "social and leisure activities" as the most frequently recorded OT activities. These differences are probably attributable to the exclusion of group sessions in our study because social and leisure activities are often practiced in groups rather than individually.

The comparison between the content of PT and OT sessions revealed a different emphasis of each profession. The frequency of occurrence of 8 of the 12 categories was significantly different between PT and OT. Exercises and balance in standing and lying seemed to be typical PT activities, whereas sensory, perceptual training, and cognition and domestic activities were typical OT activities. These findings reflect an implicit task division. Physiotherapists focus on mobility activities and occupational therapists on ADL and domestic training. Our results are similar to those of Gladman et al, who reported that gait re-education was practiced significantly more by physiotherapists, whereas ADL was practiced more by occupational therapists. The occurrence of selective movements, mobilization, and exercises and balance in sitting was similar in PT and OT. These activities are probably an essential preparation to a "higher level" profession-specific activity, such as ambulatory exercises and domestic activities. These findings also indicate the existence of role overlap between PT and OT, as reported by Booth and Hewison. Ballinger et al stated that PT and OT for stroke patients are not homogeneous activities. In our study, differences in patient characteristics were controlled for, and only 1 scoring list was used to define the content of both professions. Our findings are in line with Ballinger et al, but we also found some minor overlap between the 2 professions.

Few differences existed in the content of PT and OT between the centers. Ambulatory exercises occurred more often in the PT sessions in the Belgian and British centers, and relearning selective movements occurred less in the PT and OT sessions in the British center. Although only 1 significant difference existed in the content of OT between centers, there was a great variety within the centers.

To our knowledge, no studies exist that have explored the relationship between the content of therapy and the patients' level of motor functioning. We found low correlations for 2 of 12 categories. In treatment sessions for patients with a severe motor impairment, slightly more time was spent on exercises and balance in sitting and transfers, possibly to improve trunk stability. It may be that the categories were not sufficiently detailed to detect differences in therapy for patients with different degrees of motor impairment.

The recorded treatment sessions were scored by trained researchers who were therapists and had 2 years of experience in stroke rehabilitation. Additionally, they were familiar with the current practice of the rehabilitation center in which they recorded the therapy sessions, and scoring was done in the context of the entire treatment session. One may argue that the therapist involved may be the most appropriate person to record the therapeutic activities because the researchers may not always reflect the intentions of the treating therapist during the scoring process. However, if therapists score their own therapy sessions, they may score what is desirable and not what was actually done. A further consideration is that the recorded treatment sessions, 120 in total, represent only a snapshot of individual OT and PT. It remains unknown what recording of consecutive group or home treatments would reveal. Great attention was given to the patient characteristics to cover a wide range of disabilities after a stroke and to ensure comparable groups between centers. However, we have not covered for all potential impairments that may follow a stroke. We believe that because of the combination of the large number of treatment sessions and the detailed statistical analysis, the results of this study reflect the content of individual PT and OT for the selected group of stroke patients in the participating centers.

#### **Conclusion**

PT and OT are distinct professions, with clear demarcation of roles. The content of each therapeutic discipline proved consistent between the 4 centers. We believe that the results of this study offer an important insight in the "black box" of PT and OT in stroke rehabilitation.