FRI-K.201-1-HP-09

TOOLS TO ASSESSING REHABILITATION AFTER STROKE

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Abstract: *The purpose of this report is to present an overview of physical therapy tests used in stroke rehabilitation. Stroke rehabilitation involves a process where the physical therapists, the rehabilitation team and the patient have to discuss goals and what future directions might be considered in view of the stroke event and its consequences. This process often means change, a change from the life one lead before the stroke incidence to a life with a reduced function; this reduction can be varying in degree. The rehabilitation process also involves an evaluation of the clinical condition, planning of a treatment and evaluating the result of treatment.*

Keywords: *outcomes, assessment, stroke.*

INTRODUCTION

Cerebrovascular disease is a global medical, social and economic problem. Every year about 15 million people worldwide receive stroke, with 6 million of them not surviving. About a quarter are under 65. More than a third of the survivors remain with some degree of disability, with more than 30 million people in the world living with varying degrees of disability. People who have experienced a stroke are at an increased risk of having a stroke (Petrova, N., 2015).

Cerebrovascular disease occupies a major place among the socially significant diseases in Bulgaria. Our country is one of the first places of morbidity and mortality in Europe. Many patients experiencing stroke suffer from a reduced function of the affected limbs six months and more after the stroke. Therefore, they require long-term rehabilitation, which is very specific and strictly individual. Rehabilitation is a complicated and prolonged process that begins immediately after control of the comatose condition, especially active in the first year when functional recovery is the fastest but is appropriate to continue after 18-th months as supportive therapy. It aims to restore to the fullest extent the impaired motor function so that the patient is able to move alone or with help and to self-handle. The ultimate goal being the successful resocialization of the individual (Stefanova, Iv., 2018).

EXPOSITION

Compilation of a rehabilitation program for patients with stroke should be based on an overall assessment of their condition. The diagnostic of each disease begins with the anamnesis. The physical therapy needs of important information of the underlying disease, data on past and concomitant disease in order to establish the extent to which the patient's motor function is affected.

Clinical observation is one of the main methods for assessing the patient's condition. It provides information about changes in posture, stereotype and quality of movement, structural deformations, the patient's gait (if it possible), activity of daily living, etc. For this purpose is necessary a good knowledge of the specificity of motor deficiency in hemiparetic syndrome: spastic increased of muscular tone, pathological syncinesia, pathological reflexes, disturbed coordination and balance, sensory disorders, etc.

The preparation of the rehabilitation program requires an accurate assessment of the functional capacity of the patient and the rehabilitation potential. Success is achieved by complying with the fundamental principles of physicaltherapy for individual approach, gradual increase of the load and complexity. Specific of the tests below is that they provide a quantitative assessment than an assessment of the quality of performance of test exercises or activity of daily

living. The assessment is based on a point system that provides information on the patient's functional suitability and individual types of action. This system present the current status on a "can or can not" and does not contain information about whether the patient applies adaptive motor mechanisms (compensatory or substitution movements). On the other hand, this point system of study shows the stage of recovery, the rate of therapeutic effects and the direction of development of the disease process (Mindova, S. et al. 2012). Physical therapists working in stroke rehabilitation develop treatment plans for their patients; this may be in the acute or chronic conditions with short term and long term goals. Outcome measures and tests are important tools in the planning and evaluation of treatment in stroke rehabilitation (fig. 1). This requires the study to be purposefully, thoroughly and correctly performed in order to properly determine the rehabilitation potential of the patient.

Fig 1. Assessment plan. (Langhammer, B., 2014)

Depending on the duration of the treatment, it is necessary to do checkups. They provide information about the patient's tolerability and adaptability to applied physical exercise and, if necessary, correction of the means used in the rehabilitation program.

Measuring the effectiveness of physiotherapy interventions is accepted as being central to good practice. Van der Putten et al. (1999) pointed out that measuring the outcome of health care is a "central component of determining therapeutic effectiveness and, therefore, the provision of evidence-based healthcare," (van der Putten et al. 1999). To improve the clinical relevance of the tests, they can be classified and selected for use on the basis of their measurement index.

This report presents some of the free access tests that are used to investigate motor skills and objectivize treatment outcomes in patients with stroke.

The Canadian Post-Stroke Recovery Association classifies the tests into the following categories (Teasell, R. et al, 2013):

A. Tools to Assess Functional Capacity and Activities of Daily Living

ASSESSMENT TOOL	PURPOSE	INSTRUCTIONS
Functional Independence Measure (*FIM*) Keith et al., 1987	The FIM is an assessment tool for physical and cognitive disability. FIM is a tool for assessing physical and cognitive impairment. It aims to explore the need for help to implement the daily activities.	The test includes 18 indicators, divided into 6 groups. The patient's abilities are evaluated with a 7-point scale. Maximum score is 126, with higher scores indicating greater levels of functional independence.
Barthel Index of Activities of Daily Living (*BI*) Mahoney et al., 1965	The BI is an assessment tool for evaluating independence in self-care activities.	The test consists of 10 common activities of daily living, 8 related to personal care and 2 related to mobility. The index yields a total score out of 100 with higher scores indicating greater functional independence. It is not exhaustive enough. Does not reflect small changes in status.
Frenchay Activities Index (*FAI*)	The FAI is a measure of instrumental activities	The FAI contains 15 items or activities that can be separated into 3 factors; domestic chores,

Holbrook et al., 1983	of daily living (IADL) for use with patients recovering from stroke. The Index provides an assessment of a broad range of activities associated with everyday life.	leisure/work and outdoor activities. Summed scores range from 15-60, with lower scores indicating less frequent activity.
6 Minute Walk Test (*6MWT*) Butland et al., 1982	The 6MWT is an assessment tool for walking capacity and endurance.	The total distance (i.e., meters or feet) walked during the trial period is measured and recorded.

B. Tools to Assess Stroke Severity

ASSESSMENT TOOL	PURPOSE	INSTRUCTIONS
National Institutes of Health Stroke Scale (*NIHSS*) Brott et al., 1989	The NIHSS is an assessment tool for neurological status following a stroke.	The test investigates 11 items which include an assessment of level of consciousness, facial palsy and visual, sensory, motor, language or speech deficits. Items are assess with 3 or 4 point ordinal scale. Maximum score is 42; higher scores indicate a greater level of severity. (1-4 = mild; 5-14= mild to moderate; 15-24=severe; over 25=very severe).

C. Tools to Assess Motor Function

ASSESSMENT TOOL	PURPOSE	INSTRUCTIONS
Fugl-Meyer Assessment of Motor Recovery after Stroke (FMA) Fugl-Meyer et al., 1975	The FMA is an assessment tool for function upper and lower extremity following a stroke.	The test contains 155 items assessing motor function in the upper and lower extremity. The scale comprises motor function, sensory function, balance, joint range of motion and joint pain. The total possible scale score is 226 (66 points for upper and 34 lower extremity, 14 points for balance, 24 for sensation, 44 for joint range of motion and 44 for joint pain). Higher scores indicate greater functional performance.
Rivermead Motor Assessment (*RMA*) Lincoln and Leaditter, 1979	The RMA was designed to assess the type and quality of movement during the course of recovery from hemiplegia.	The RMA comprises 38 items. The test requires patients to complete a series of functional movements in three categories: gross function, leg and trunk, and arm Each item is scored "1" if the patient can perform the activity or "0" if they cannot. The scores can range from 0- inability to perform any of the activities, to 38-patient can perform all of the activities.

D. Tools to Assess Mobility

ASSESSMENT TOOL	PURPOSE	INSTRUCTIONS

Berg Balance Scale (BBS) Berg et al., 1989	The BBS is an assessment tool for balance in older adults.	The test includes 14-items in which patients are asked to maintain positions or complete movement tasks of varying levels of difficulty. All items are common to everyday life. Items receive a score of 0-4 based on ability to meet the specific time and distance requirements of the test. A score of zero represents an inability to complete the item and a score of 4 represents the ability to complete the task independently. Total scores range from 0-56 points.
Rivermead Mobility Index (RMI) Collen et al., 1991	The RMI is an assessment tool for functional mobility.	The RMI is a scale consisting of 15 items. All items generate yes/no response. A "yes" response is given a score of 1. The total scale score ranges from 0 - 15 where a score of 0 would indicate complete inability to perform any of the functional activities included in the assessment.
Timed "Up and Go" Test (TUG) Podsiadlo and Richardson, 1991	The TUG is a screening tool for basic mobility and balance.	Individuals are asked to stand from a seated position, walk 3 meters, turn, walk back to the chair, and reseat themselves.The score consists of the time taken to complete the test activity, in seconds.

E. Tools to Assess the Upper Extremity

ASSESSMENT TOOL	PURPOSE	INSTRUCTIONS
Wolf Motor Function Test (WMFT) Wolf et al., 2001	The WMFT is an assessment tool for upper extremity motor ability.	The test includs 17 items of increasing complexity and progressing from proximal to distal joint involvement. Tasks are performed as quickly as possible and are assessed in terms of time, strength, and movement quality. Scores range from 0 - 75 with higher scores indicating greater motor ability.

F. Tools to Assess Specific Impairments

ASSESSMENT TOOL	PURPOSE	INSTRUCTIONS
Modified Ashworth Scale (*MAS*) Bohannon & Smith, 1987	The MAS is an assessment tool for spasticity. It is used to determine changes in muscle tone for the limbs only.	The scale is used to assign a subjective rating of the amount of resistance or tone perceived by the examiner as a limb is moved through its full range of motion. The original Ashworth scale consiste of 5 grades from 0 - 4. Despite lower levels of reliability, it is widely used and accepted.

CONCLUSIONS

The goal of a physical therapy treatment in stroke is to get functional independence of the patients. Regardless of the stage of the patient, the focus of the rehabilitation team is on improving the functional capacity to perform daily activities tailored to the individual abilities of each patient. It is known that after a course of physiotherapy, patients feel more independent, their level of activity increases. In order to be more objective data that could support this opinion, it is necessary to use appropriate tests before and after treatment.

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