



OUTCOME ASSESSMENT FOR SPASTICITY MANAGEMENT IN PATIENTS WITH TRAUMATIC BRAIN INJURY

Spasticity Research Abstract

The Brain Injury Association of America collaborates with the nation's leading brain injury research centers, such as the TBI Model Systems, to abstract the findings published in professional journals and create brief, easy-to-read articles. The abstracts here are based on research conducted by the National Institute on Disability and Rehabilitation Research TBI Model Systems of Care. Each abstract reports on a single research study concerning spasticity. To view other abstracts, visit <http://www.biausa.org/brain-injury-abstracts.htm>.

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The Question: Can the effects of spasticity management in patients with Traumatic Brain Injury (TBI) be measured?

Past Studies have assessed interventions to treat spasticity (a term used to describe a condition that causes muscles to be stiff and resistant to stretching) using objective and/or subjective measures. These outcome measures might reflect improvement in spasticity but may not reflect improvement in the performance of daily activity functioning that individuals may expect from treatment. In rehabilitation, measuring the effects on specific impairments is also often assessed. There has been a push and there is a need for developing outcome measures that reflect overall functional improvement from interventions. Insurance companies and medical centers have been some of the driving forces behind the development of objective, functional measures and development of more specific metrics to assess outcomes. Previous studies have suggested that the goal for treatment should be improvement in the individual's ability to be active and to participate in the life he/she wishes to have; i.e., patient-oriented outcomes.

The World Health Organization, in addressing overall health and disability of the general population, states that diagnosis alone is not enough to predict length of hospital stay, work performance, service needs, or social integration. There is the need to look at the individual's level of functioning as a measure of outcome.

The question arises as to what constitutes a useful outcome measure. Research suggests that it should be one that is likely to cause a change/improvement in an individual's abilities as a result of treatment intervention. It is evident that patients, families, companies, rehabilitation clinicians, engineers, and insurance companies have varying priorities for different outcome goals, making across the board comparisons of patients' outcomes difficult.

Numerous articles are available showing how spasticity outcomes have been viewed in

the past. The Ashworth Scale, and other measurements of spasticity remain in common use today, despite their functional limitations. Assessment of spasticity outcomes continues to be problematic. The majority of studies do not report a functional outcome measure; however, researchers continue to re-evaluate rehabilitation methods to ensure they improve not only motor impairment, but also show an improved performance in daily living activities.

This Study attempts to identify an organized approach to spasticity outcomes and proposes a set of appropriate goals for treatment interventions. A literature review (1966-2003) was conducted with over 500 articles, textbooks, websites and books reviewed to assess methods currently used to assess the outcome of spasticity treatments. The authors grouped goals into one of five categories: physiological measurements (such as changes in electrical signals in the brain, spinal cord or muscles), measures of passive activity (ability to stretch the person's muscle tone and passive Range of Motion), measures of voluntary activity (ability to extend and retract limbs), functional measures (daily activities such as walking ability) and quality of life measures (over-all satisfaction with life). Ideally, all of these goals should be addressed but this can sometimes be difficult. Assessment of interventions for spasticity is complicated; therefore, goal setting must be realistic and reflect other factors which may impact outcomes. The categories mentioned above should be viewed as general guidelines.

Types of tools and assessment methods used in this study include subjective and objective classifications (qualitative and quantitative). Subjective methods 'judge' resistance to movement and look at severity of spasticity. Objective methods (real, observable, factual) were used to evaluate spasticity when appropriate. Authors listed 43 examples of outcome measures for the assessment of spasticity, which included testing assessment tools (e.g., Ashworth Scales, Emory Functional Ambulation Profiles, Craig Handicap Assessment and Reporting Technique (CHART) and ability of the individual to perform certain tasks (e.g., ability to perform self-catheterization, sitting balance, timed toe-tapping). Categories included physiological measures, measures of passive activity (muscle tone), measures of voluntary activity (deliberate movements), functional measures (daily living skills) and quality of life measures. Twenty of these categories were objective, 19 were subjective and four were 'Either.' Passive activity included measurement of muscle tone using the Ashworth Scale and Tardieu Scale. They measured range of motion, stiffness and muscle tone, stretch and stretch reflexes. Tests were given to measure voluntary activity and the ability of the individual to perform motor tasks and movements. Foot pressure was measured using Pedobarographs, a tool which looks at foot pressure patterns. It is not just enough to be able to move a joint.

Controlling an extremity requires the ability to change speeds and direction. Use of measurement devices (special equipment) allows clinicians and scientists to develop a better understanding of what is required for individuals with spasticity difficulties to perform certain passive and active functions. It allows treatment professionals and engineers to make better outcome predictions and plan for necessary interventions. Technology has the potential to increase understanding of motor control, before treatment and following, and evaluate gait activities (manner of walking or running), motor abilities (motion) and balance. Usefulness of this in spasticity management has not been explored.

A wide range of methods can be used to assess functional performance. Particularly useful is the fact that real-life activities can be studied rather than artificial movements. An objective way to measure mobility is timed ambulation (six-minute walk over level surfaces, steps, curbs, looking for balance and watching for falls). Subjective methods might include the Likert Scale, which can focus on a specific function and the difficulty with which the individual performs the daily living task.

Quality of (QOL) Life improvement is sometimes difficult to measure for rehabilitation interventions. However, achieving quality of life is very important. The Satisfaction with Life Scale is a questionnaire, which includes a short-form health survey and a survey of an individual's satisfaction with life (QOL). This form has not been used for evaluating spasticity outcomes in the TBI population, but has been used when doing an overall assessment of recovery post-injury.

Who May Be Affected By These Findings: People with brain injury, caregivers, researchers, health professionals, community providers, scientists and engineers working on devices for spasticity.

Caveats: Further work is needed to develop measures that have clinical significance for clinicians and individuals being treated. Lack of objectivity continues as a problem, as well as the lack of communication between clinicians and engineers working to provide services to people with TBI having spasticity problems. Authors call for more clinically relevant information about treatment effects which realistically assess functional recovery.

Bottom Line: Authors found mixed results measuring the amount of improvement using new techniques with previous standards of measurement. They found the equipment used to determine outcomes was bulky, heavy and the results were of

limited value . These tests, which assess amount of improvement in an individual's functioning, are time-consuming and require a large test space, making places such as clinics and small offices unacceptable for testing. There is lack of communication between clinicians and scientists, which reflects a limited relationship to traditional and/or functional outcomes of spasticity. Positive progress is being made in the development of assessment devices. Authors recommend a new test of spasticity that includes discussing questions that identify the goal of the test and develops qualitative and quantitative (quality and quantity) outcome measures.

Find This Study: Elovic, E.P., Simone, L.K., Zafonte, R. (2004). Outcome Assessment for Spasticity Management in the Patient with Traumatic Brain Injury. *Journal of Head Trauma Rehabilitation*, 19, 155-177.