International Bobath Instructors Training Association
An international association for adult neurological rehabilitation

I B I T A

FROM THE EDUCATION COMMITTEE – April 2008

RECENT ARTICLES OF INTEREST

Ryerson S, Byl NN, Brown DA, Wong RA, Hidler JM (2008)
Altered trunk position sense and its relation to balance functions in people post-stroke.
Journal of Neurological Physical Therapy 32: 14-20.

ABSTRACT

Objective: To determine whether trunk position sense is impaired in people with poststroke hemiparesis.

Background: Good trunk stability is essential for balance and extremity use during daily functional activities and higher level tasks. Dynamic stability of the trunk requires adequate flexibility, muscle strength, neural control, and proprioception. While deficits of trunk muscle strength have been identified in people post-stroke, it is not clear whether they have adequate postural control and proprioception to ensure a stable foundation of balance to enable skilled extremity use. Trunk position sense is an essential element of trunk postural control. Even a small impairment in trunk position sense may contribute to trunk instability. However, a specific impairment of trunk position sense has not been reported in people post-stroke.

Subjects: Twenty subjects with chronic stroke and 21 nonneurologically impaired subjects participated in the study.

Main outcome measures: Trunk repositioning error during sitting forward flexion movements was assessed using an electromagnetic movement analysis system, Flock of Birds. Subjects post-stroke were also evaluated with clinical measures of balance (Berg Balance Scale), postural control (Postural Assessment Scale for Stroke), and extremity motor impairment severity (Fugl-Meyer Assessment Motor Score).

Results: There were significant differences in absolute trunk repositioning error between stroke and control groups in both the sagittal (P = 0.0001) and transverse (P = 0.0012) planes. Mean sagittal plane error: post-stroke: 6.9 ± 3.1 degrees, control: 3.2 ± 1.8 degrees; mean transverse plane error: post-stroke 2.1 ± 1.3 degrees, control: 1.0 ± 0.6 degrees. There was a significant negative correlation between sagittal plane absolute repositioning error and the Berg Balance Scale score (r = - 0.49, P = 0.03), transverse plane absolute repositioning error and Berg Balance Scale score (r= - 0.48, P= 0.03), and transverse plane repositioning error and the Postural Assessment Scale for Stroke score (r= -o.52, P= 0.02).

Conclusions: Subjects with poststroke hemiparesis exhibit greater trunk repositioning error than age-matched controls. Trunk position sense retraining, emphasizing sagittal and transverse movements, should be further investigated as a potential poststroke intervention strategy to improve trunk balance and control.

COMMENT

Although the importance of trunk stability (sometimes called core stability) for both balance and extremity use has been emphasized in many studies over the last decade, most of these studies have focused on the working of the postural muscles of the trunk in normal individuals and in persons with musculoskeletal problems. More recently, studies have appeared that investigate trunk position sense, but these have also related to orthopaedic problems.

The relatively few studies on trunk postural control post-stroke have identified problems on both sides of the body, but have not investigated the underlying impairments that may be responsible for these defects in postural control. This article is the first to look at trunk position sense post-stroke. Trunk repositioning error has been shown to be a reliable and valid way of measuring trunk position sense, and this was the method chosen for this study.

Exclusion criteria were strict and the inclusion criteria ensured that, in all probability, the subjects had sufficient motor control to execute the task. Visual input was eliminated by blindfolding and tactile input was reduced by wearing minimal clothing and limiting changing contact between body parts and between the body and the supporting surface. The conclusion that trunk position sense is impaired post-stroke is valid, and has implications for clinical practice.

The authors acknowledge that the study cannot differentiate between the possible causes of the defect in trunk position sense. Although this may be presumed to be due to the defect in CNS integration and processing of incoming information, it is possible that decreased input from muscle and joint receptors secondary to trunk muscle weakness may have contributed. This is especially so as the participants were in the chronic stage post-stroke.

It is perhaps a pity that the functional implications were only mentioned in the last two paragraphs of the article. Had these been analysed further, even as a hypothesis to be tested in future research, the authors could have counteracted the impression that intervention needs to be solely impairment-based.

Van Peppen RPS
International collaboration in physiotherapy management of people with stroke
(Guest editorial) (2008)
Physiotherapy Research International 13(1): 3-8.

This editorial promotes the need for more global physiotherapy collaboration in stroke care and ways of sharing developments and gaps in our knowledge of stroke management. The emphasis is on evidence-based practice (EBP) but acknowledges that there are still areas that have not been covered. The author cites the well-known article of Pollock *et al* (2007) which concluded that no evidence exists that any one physiotherapy approach is superior in promoting recovery of disability after stroke. The main evidence seems to be in favour of intensity of treatment. We would all agree that physiotherapists should be encouraged to take notice of these findings.

Unfortunately, Van Peppen then makes an illogical jump in asserting that although, in many countries, up to 80% of therapists treat stroke according to an “NDT” approach, they should be focused on existing evidence “rather than these now outdated philosophies, many of which focus only on impairment”. At that point in his editorial he does not identified which philosophies he regards as being outdated, but when one analyses what he has written they appear to include “Bobath/neurodevelopmental therapy (NDT), Brunnstrom, Proprioceptive Neuromuscular Facilitation and Motor Relearning Programme” as well as (later in the editorial) “Bobath, Johnstone and Affolter”. It is difficult to find much in common between these different approaches!

The fact that Van Peppen regards treatment along Bobath principles as being purely impairment oriented is disturbing, particularly in view of the fact that he has worked (and published) with several IBITA members, including a senior instructor. The assumption that our approach to treatment “could result in a longer length of stay for individuals with stroke, as the physiotherapist endeavours to gain a certain quality of movement prior to functional mobility training” is not supported by any evidence that this is so. Already in the 1970’s, the Bobaths were stressing that movement acquired in therapy must be incorporated in functional activities in order to ensure meaningful change. The statement that NDT teachers in the Netherlands now “are educated how to apply the evidence-based guidelines into practice, how to measure change and how to estimate prognosis in persons with stroke” is condescending in the extreme. It implies the assumption that IBITA instructors in both the Netherlands and other countries are not capable of doing this for themselves, whereas most of us have been doing so for some years!

These deficiencies early in the editorial have the effect of reducing the main impact of his message. Maybe future aspirant authors should remember that if you put your readers off at the beginning, they will not bother to read the rest of your article! In this case, that would be a pity as there is much useful information and some very relevant challenges to therapists in this editorial. The information includes reference to published clinical practice guidelines, although a notable omission is the Canadian EBRSR.

The challenges to therapists include the following:

- To gain more understanding of the underlying mechanisms of recovery after stroke
- To gain more insight as to how a person learns to move following stroke
- To make informed clinical decisions regarding functional prognosis, effective intervention and measurement of outcome

Personally, I welcome the debate about normal motor behaviour. The concept of normal movement is controversial as even normal infants have different movement strategies. The concept of normal movement in individuals with movement disorders is even more debatable, as we all have to make compensatory adjustments (conscious control of movement being not the least of these). However, I have to point out that in the IBITA theoretical assumptions we have already agreed (2006) that “effective” motor behaviour is more appropriate.

Sometimes it seems that our opponents are trying to keep up with us!

Van Peppen concludes by acknowledging differences in cultural and national needs, and gives information regarding the proposed sub-group of the WCPT, which has the preliminary title of the International Neurosci-

ence Physiotherapy Association. Therapists in Australia, Canada, South Africa, the Netherlands, the United Kingdom and the USA initiated this group, and during 2008 it is hoped that the final name, vision, mission and objectives will be formulated and circulated.

Esquenazi A, Mayer N, Garreta R (2008)
Influence of botulinum toxin type A treatment of elbow flexor spasticity on hemiparetic gait.
American Journal of Physical Medicine and Rehabilitation 87: 305-311

ABSTRACT

Objective: To assess whether walking velocity could be improved in patients with disorders related to upper-motor neuron syndrome (UMNS) by treating elbow flexor spasticity with botulinum toxin type A (BoNTA).

Design: This was a prospective, open-label, multicenter, interventional evaluation. The study group of 15 patients (mean age 51.3 yrs; ten men, five women) were independent ambulators with residual hemiparesis attributable to stroke or traumatic brain injury of at least 18-mo duration.
Patients were injected with 120–200 units of BoNTA (BOTOX, Allergan, Inc., Irvine, CA) to the affected biceps, brachialis, and/or brachioradialis.Modified Ashworth scores and gait velocity were assessed before and after BoNTA treatment. An untreated control group was employed to assess the potential impact of time on test–retest reliability of the selected temporal spatial gait parameters.

Results: The BoNTA group demonstrated a statistically significant increase in walking velocity from 0.56 m/sec before treatment to 0.63 m/sec after treatment (P = 0.037). The mean modified Ashworth score was significantly reduced from 2.6 before BoNTA treatment to 1.4 after treatment (P = 0.00003).

Conclusions: Treatment of upper-limb spasticity may be an important adjuvant treatment for patients with gait disturbance related to the UMNS.

COMMENT

The authors are working from the knowledge that movements of the upper and lower limbs are coupled during normal walking. Normal arm swing patterns influence postural control of the body and therefore affect the efficiency of gait. Deliberate changes in arm swing patterns have been shown to result in significant gait disturbances. Increased walking velocity is associated with increase stride length and increased arm swing. Persons with hemiparesis have limited arm movement and reduced arm swing and it can be postulated that this may influence gait.

Patients admitted to the trial had UMNS and elbow flexor muscle overactivity as a result of CVA or TBI. At least 18 months had to have elapsed since the incident, and they had to have achieved independent walking, with or without assistive devices. The primary outcome measures were self-selected comfortable walking speed and self-selected fast as possible walking speed on the Gait Mat, which gives objective measurement. Increases in these walking speeds represent functionally significant changes for the subjects, and increase in walking speed has been shown in many studies to reflect improved gait parameters. Changes in elbow spasticity were measured using the modified Ashworth scale. The follow-up measurements were done in the period during which the maximum effect of BoNTA can be expected. A matched control group of ten patients was included to ensure that changes in the experimental group were not due to the time interval or increased familiarity with the Gait Mat. The statistical analysis was sound.

Although the modified Ashworth scale measures the combined effect of all factors that cause increased resistance to passive stretch, patients were only included in the study when traditional testing of the elbow flexors by passive stretch at different velocities had, in fact, demonstrated spasticity. It can therefore be assumed, since Botox blocks conduction at the neuromuscular junction, that the subsequent changes in the modified Ashworth scale scores did represent a reduction in spasticity. Although there were no significant changes in the fastest possible walking speed, there was a significant increase in the comfortable walking speed – enough to increase the safety of crossing a road.

The authors identify several limitations in the interpretation of the results; in fact they are rather strict in their criticism of the study. Nevertheless, the results show some support for their hypothesis and there was a clinical change which was meaningful to the patients. As therapists we have long recognized the interaction between trunk and limbs and the interaction between lower and upper limbs. It will be interesting to see the results of a larger study in which some of the limitations are addressed. It would also be interesting to conduct a study which looks at changes in postural control of the trunk related to reduction of spasticity in the arm.