

O 05

NEUROCOGNITIVE AND SENSORY MOTOR DEFICITS ARE AN IMPORTANT SUBGROUP OF WHIPLASH-ASSOCIATED DISORDERS***Sean G.T. Gibbons****Neuromuscular Rehabilitation Institute, Mount Pearl, Newfoundland, Canada*

Introduction: Neurocognitive and sensory motor deficits are common in whiplash-associated disorders. These are associated with neurological soft signs, body image disturbances, psychological reactions and a poor ability to learn specific motor control exercise. The Motor Control Abilities Questionnaire is an instrument that was developed as a screening tool to predict if people could learn specific motor control exercise. It has been validated for acute and chronic low back pain, and acute and chronic neck pain following whiplash. **Relevance:** The brain competition hypothesis helps explain some of the findings in chronic pain conditions. There is an overlap in the brain where the processing takes place for: coordination, sensory motor function, neurocognitive function, and psychological function. This creates the potential for competition for resources. In a normal brain, resources are allocated effectively. There is only competition when the system is significantly challenged. When there is a deficit in one of these areas, competition may occur for the limited resources. A deficit will occur in one or more areas depending on the prioritization, what is needed at the moment and initial ability to deal with multiple demands. A deficit could manifest as poor coordination, reduced learning or a psychological reaction. These deficits are relevant for a number of reasons. Patients with neurocognitive and sensory motor deficits are less likely to respond to interventions that require skills such as reading, memory, concentration, problem solving and sensory motor awareness. These deficits and related factors are also associated with reduced central inhibition of pain, therefore these patients are more likely to present with central sensitization. These deficits are also associated with body image disturbances so are more likely to have complex pain presentations. Current standard therapy and recommendations from international guidelines do not adequately address these deficits. Clearly, different therapies are needed for this group of patients and they should be considered as a separate subgroup. Evidence is growing for new types of therapies that aim to more specifically target aspects of the central nervous system that influence body image, neurocognitive function and the pain mechanism. These are derived from treatments of children with learning difficulties and conditions associated with body image disorders or central sensitization. Examples will be given for auditory discrimination, oculomotor techniques and primitive reflex inhibition.

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NEURO-OTOLOGICAL CONSEQUENCES OF WHIPLASH TRAUMA: A PHYSIOTHERAPY PERSPECTIVE***Margaret (Margie) Sharpe****Dizziness & Balance Disorders Centre, Unley, Australia*

Introduction: Vertigo, dizziness and unsteadiness are the most common and distressing symptoms, the sequelae of whiplash injury. The most frequent forms are: traumatic

benign paroxysmal positioning vertigo, phobic postural vertigo, traumatic otolithic vertigo and fistulae. These disorders are well documented in the clinical and scientific literature, reported as early as 1933 by Hasegawa. **Materials and methods:** As physiotherapy clinicians it is very important for us to understand vertigo and dizziness experienced by whiplash-injured patients that may result from peripheral inner ear damage as a consequence of their neck injury – a linear acceleration–deceleration force. Since these patients' vertigo, dizziness and unsteadiness may not be due or only in part due to cervical musculo-skeletal damage and/or psychogenic, a neuro-otological examination is obligatory to exclude peripheral vestibular dysfunction in this clinical population; in particular if the patient is not responding to treatment. **Results:** It is envisaged that by highlighting the neuro-otological consequences of whiplash injury physiotherapists and other health professionals treating these patients will have a broader perspective and understanding of other aetiologies that may be contributing to the patients' dizziness, vertigo and unsteadiness thereby enhancing patient care and reducing the burden of cost to the both the patient and community. **Conclusions:** Dizziness, vertigo and unsteadiness are common sequelae to whiplash injury due to numerous pathologies, some of which are due to peripheral vestibular injury. Therefore, a multi-disciplinary approach is required for the treatment and management of the whiplash-injured patient.

O 07

NECK MUSCLE ACTIVITY AND POSTURAL SWAY DURING DAILY LIKE ACTIVITIES IN PATIENTS WITH CHRONIC NECK PAIN AFTER WHIPLASH TRAUMA COMPARED WITH HEALTHY CONTROLS***Birgit Juul-Kristensen¹; Brian Clausen¹; Inge Ris¹; Rikke Vikær Jensen¹; Rasmus Fischer Steffensen¹; Shady S. Chreiteh¹; Marie Birk Jørgensen²; Karen Søgaard¹****¹University of Southern Denmark, Research Unit of Musculo-skeletal Function and Physiotherapy, Odense, and ²National Research Centre for the Working Environment, Copenhagen Ø, Denmark*

Introduction: Patients with whiplash-associated disorders (WAD) have shown inappropriate patterns of neck muscle activity in response to standardized neck and shoulder–arm tasks, as well as decreased postural balance during static balance. Whether this pattern is found also during more challenging daily like activities, such as unilateral stance and perturbation, is not known. The aim was to investigate neck muscle activity and postural balance, in patients with WAD and healthy controls (CON) during challenging balance tasks. **Materials and Methods:** Ten females (mean age 37.7, SD 13.6) years, with chronic WAD of minimum two years, Neck Disability Index (NDI) above 10, and without brachial neuropathy, and a CON group of 10 age-matched females (mean age 35.9, SD 12.5) years, NDI of maximum five, completed the study. Surface electromyography of the anterior scalene (AS), sternocleidomastoid (SCM), neck extensors (NE) and upper trapezius (UT) muscles was recorded, and for each muscle expressed as % of maximal activity (MVE) recorded during maximum voluntary contraction. Four balance tasks were performed on a force