

CERVICOCEPHALIC KINESTHETIC SENSIBILITY IN PATIENTS WITH WHIPLASH INJURY

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ABSTRACT. This study investigated cervicocephalic kinesthetic sensibility in patients with whiplash injury and the effects of a rehabilitation programme. Fourteen patients with a whiplash injury and 34 healthy subjects participated in this study. The ability to appreciate both movement and the position of the head with respect to the trunk was investigated. Active head repositioning was significantly less precise in the whiplash subjects compared to the control group. Repositioning was more precise in whiplash subjects after the 5-week rehabilitation programme. There was no correlation between error of repositioning in patients and pain intensity. It is probable that cervicocephalic kinesthesia is linked to sensory information from the extensive muscular and articular proprioceptive system. A flexion-extension injury to the neck may result in dysfunction of this system.

Key words: kinesthesia, kinesthesiologic sensibility, neck pain, proprioception, whiplash.

INTRODUCTION

Whiplash injuries are characterized by a sudden positive or negative acceleration of the trunk with hyperextension, hyperflexion or lateroverion of the neck. The head is thereby thrown backwards, forwards or laterally without being hit externally. The symptoms after a whiplash trauma include neck pain, headache, vertigo and nausea as well as emotional and cognitive disturbances. Whiplash injuries result in long-term disability with up to 6% of patients not returning to work after 1 year (7). Whiplash injuries usually result in neck pain due to myofascial trauma, which has been documented in both animal and human studies. It is likely that proprioception is primarily involved, either by lesioning or functional impairment of muscular and articular receptors, or by alteration in afferent integration and tuning (3, 11, 19, 21). Head

orientation in space and with respect to the trunk makes use of visual, vestibular, and cervical proprioceptive cues (1, 2, 4, 6, 8, 11, 16, 22). The rehabilitation technique in the field of musculoskeletal diseases aims at an improvement of muscular force, joint mobility, and proprioceptive sensibility (14). Currently, only strength and mobility are evaluated in cervical spine rehabilitation programmes, although a wealth of cephalic and neck receptors suggest a major emphasis on proprioceptive information in postural and dynamic functions of the head-neck system (1, 2, 4, 6, 13, 15, 17, 18, 22, 23). Cervical kinesthetic performance is not well described in healthy subjects. Recently, a method of evaluating cervicocephalic kinesthesia was introduced by Revel et al. (14). The test concerns the ability to appreciate both movement and the position of the head with respect to the trunk. It involves information from the cervical proprioceptive apparatus and from the vestibular system, but a number of experimental arguments point to primarily a cervical proprioceptive role (12). It is probable that cervicocephalic kinesthesia is linked to information coming from the extensive muscular and articular proprioceptive system (4, 6, 12, 13, 15, 22). In a previous study, patients with cervical pain showed a significantly diminished accuracy compared to a control group in terms of the capacity to relocate the head in space after an active displacement moving the head away from the reference position (14). The aim of this study was to evaluate alterations in cervical kinesthetic sensibility in patients with whiplash injuries who participated in a 6-week multimodal rehabilitation programme.

MATERIAL AND METHODS

A consecutive series of 14 patients (7 men and 7 woman), 23 to 47 years old (mean 36), participated in the study. Eight patients participated in a 6-week multidisciplinary rehabilitation programme at the Department of Physical Medicine and Rehabilitation at the University Hospital of Northern