

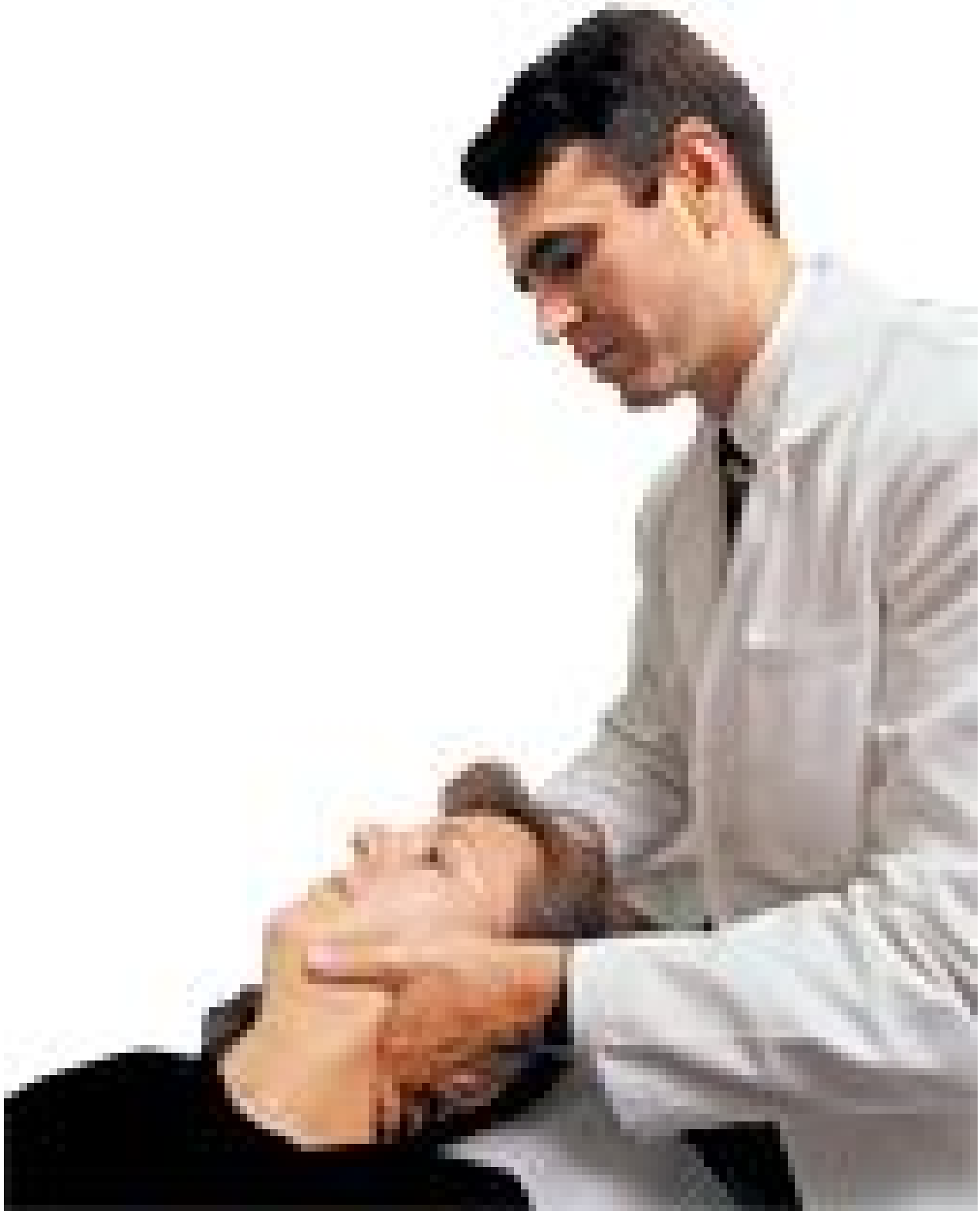
Which Tests Do You Use to Evaluate Neck Pain?

THEME ISSUE OF JMPT FOCUSES ON CERVICAL OUTCOMES MEASURES.

Editorial Staff

Earlier this year, the Task Force on Neck Pain and Its Associated Disorders released comprehensive findings addressing the prevention, diagnosis and management of neck pain. Now the *Journal of Manipulative and Physiological Therapeutics (JMPT)* has devoted an entire issue to the condition, specifically to cervical outcomes measures. Howard Vernon, DC, PhD, who coordinated the theme issue, is imminently qualified to do so: In 1991, he published the first outcome measure for assessing disability resulting from neck pain - the Neck Disability Index (NDI) - and has been involved in cervical spine research for the past several decades.

"In the last 15 years, clinical researchers have turned their attention to the cervical spine and developed a number of "region-specific" tests for patients with neck pain," says Dr. Vernon in an introduction to the September theme issue. "They have applied good theory regarding the interaction of pain, impairment of function, and the resulting disability. They have applied the modern biopsychosocial model, using the best from biomechanics, pain neurophysiology, and the psychosocial sciences to develop or refine unique, but clinically valid, tests for neck pain patients. They have subsequently spent a major part of their careers conducting the appropriate psychometric validation studies to show the reliability, responsiveness, and applicability of these tests. To their credit, none of these researchers has stooped to the old trick of naming the test after themselves. Instead, the names we have include 'The Neck Disability Index,' the 'craniocervical flexion test,' and so on.



"For this special theme issue of the *JMPT*, I invited a number of these dedicated researchers to write what I call 'state-of-the-art' articles about cervical tests they had either developed or had pursued to a great degree, thus establishing acknowledged expertise. Not every test applicable to the cervical spine, nor every researcher so involved, could be included. No offense is meant in any exclusion. Perhaps a future set of articles will tackle such a project. Here, in this issue of the *JMPT*, we offer the works covering a large part of the territory of currently used clinical tests for patients with neck pain."

As is customary, we have reprinted select abstracts from this unique issue of *JMPT*, including one

by Dr. Vernon himself (see first abstract) addressing the history and clinical utility of the NDI. To access complete issue contents, visit www.mosby.com/jmpt.

The Neck Disability Index:State-of-the-Art, 1991-2008
Howard Vernon, DC, PhD

Background: Published in 1991, the Neck Disability Index (NDI) was the first instrument designed to assess self-rated disability in patients with neck pain. This article reviews the history of the NDI and the current state of the research into its psychometric properties - reliability, validity, and responsiveness - as well as its translations. Focused reviews are presented into its use in studies of the prognosis of whiplash-injured patients as well as its use in clinical trials of conservative therapies for neck pain.

Special Features: The NDI is a relatively short, paper-pencil instrument that is easy to apply in both clinical and research settings. It has strong psychometric characteristics and has proven to be highly responsive in clinical trials. As of late 2007, it has been used in approximately 300 publications; it has been translated into 22 languages, and it is endorsed for use by a number of clinical guidelines.

Summary: The NDI is the most widely used and most strongly validated instrument for assessing self-rated disability in patients with neck pain. It has been used effectively in clinical and research settings in the treatment of this very common problem.

Cervical Motion Testing:Methodology and ClinicalImplications
Tamara Prushansky, PhD,Zeevi Dvir, PhD

Background: Measurement of cervical motion (CM) is probably the most commonly applied functional outcome measure in assessing the status of patients with cervical pathology. In general terms, CM refers to motion of the head relative to the trunk as well as conjunct motions within the cervical spine.

Special Features: Multiple techniques and instruments have been used for assessing CM. These were associated with a wide variety of parameters relating to accuracy, reproducibility, and validity. Modern measurement systems enable recording, processing, and documentation of CM with a high degree of precision.

Summary:Cervical motion measures provide substantial information regarding both the severity of motion limitation and level of effort in cervically involved patients. They may also be used for following up performance during and after conservative or invasive interventions.

Measurement of CervicalPosture in the Sagittal Plane
Karen Grimmer-Somers, PhD,Steve Milanese, MAppSc,Quinette Louw, PhD

Background: This article provides a historical perspective and an overview of different ways of measuring sagittal plane cervical posture in clinical and research settings.

Special Features: Measures of cervical posture are considered in terms of their purpose, their reliability and validity, and their capacity to provide knowledge about cervical posture.

Summary: Despite technological advances in measurement techniques, there is still much to learn

about cervical posture in terms of understanding how the neck balances the head against the force of gravity. The individual spinal segments of the neck assume different relative positions, depending on the individual's genetics; anatomical construction; occupational demands; muscle strength and endurance; as well as mental state, personality, and culture. Valid measures which can capture this objectively and reliably continue to challenge clinicians and researchers.

Clinical Assessment of the Deep Cervical Flexor Muscles
Gwendolen Jull, PT, PhD, Shaun O'Leary, PT, PhD, Deborah Falla, PT, PhD

Background: The craniocervical flexion test (CCFT) is a clinical test of the anatomical action of the deep cervical flexor muscles, the longus capitis, and colli. It has evolved over 15 years as both a clinical and research tool and was devised in response to research indicating the importance of the deep cervical flexors in support of the cervical lordosis and motion segments and clinical observations of their impairment with neck pain.

Special Features: The CCFT could be described as a test of neuromotor control. The features assessed are the activation and isometric endurance of the deep cervical flexors as well as their interaction with the superficial cervical flexors during the performance of five progressive stages of increasing craniocervical flexion range of motion. It is a low-load test performed in the supine position with the patient guided to each stage by feedback from a pressure sensor placed behind the neck. While the test in the clinical setting provides only an indirect measure of performance, the construct validity of the CCFT has been verified in a laboratory setting by direct measurement of deep and superficial flexor muscle activity.

Summary: Research has established that patients with neck pain disorders, compared to controls, have an altered neuromotor control strategy during craniocervical flexion characterized by reduced activity in the deep cervical flexors and increased activity in the superficial flexors usually accompanied by altered movement strategies. Furthermore, they display reduced isometric endurance of the deep cervical flexor muscles. The muscle impairment identified with the CCFT appears generic to neck pain disorders of various etiologies. These observations prompted the use of the craniocervical flexion action for retraining the deep cervical flexor muscles within a motor relearning program for neck pain patients, which has shown positive therapeutic benefits when tested in clinical trials.

Cervical Outcome Measures: Testing for Postural Stability and Balance
B. Kim Humphreys, DC, PhD

Background: Clinical tests assessing a correlation between structural pathology and cervical pain have been unsuccessful, leading the way for the development of functionally based tests. The purpose of this narrative is to review 4 promising functional tests for the assessment of sensorimotor dysfunction in patients with neck pain. The Joint Position Error/Head Repositioning Accuracy tests, and the Rod and Frame Test were reviewed.

Special Features: The SPNTT was developed to test proprioceptive mechanisms in the neck by applying torsion to mainly mechanoreceptors in the cervical spine. The Joint Position Error and Head Repositioning Accuracy tests assess cervicocephalic kinesthesia or the ability to perceive both movement and position of the head in space related to the trunk. The Rod and Frame Test assesses patients' perception of the vertical orientation of their head in 3-dimensional space. All of these tests evaluate important mechanisms responsible for maintaining postural stability and balance and are thought to be applicable for use in mechanical neck pain patients.

Summary: All of the reviewed tests show clinical promise because they are able to distinguish patients with neck pain, particularly those with whiplash trauma and dizziness from asymptomatic controls. All of the tests assess cervical sensorimotor dysfunction, although considerably more research is needed to more clearly establish the psychometric properties for each test including minimal clinical important difference. Although these tests can be used in routine clinical practice, they should be used in combination with other related tests.

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