



Original article

Subjective and clinical assessment criteria suggestive for five clinical patterns discernible in nonspecific neck pain patients. A Delphi-survey of clinical experts



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ABSTRACT

Background: Nonspecific neck pain patients form a heterogeneous group with different musculoskeletal impairments. Classifying nonspecific neck pain patients into subgroups based on clinical characteristics might lead to more comprehensive diagnoses and can guide effective management.

Objective: To establish consensus among a group of experts regarding the clinical criteria suggestive of a clinical dominance of 'articular', 'myofascial', 'neural', 'central' and 'sensorimotor control' dysfunction patterns distinguishable in patients with nonspecific neck pain.

Study design: Delphi study.

Methods: A focus group with 10 academic experts was organized to elaborate on the different dysfunction patterns discernible in neck pain patients. Consecutively, a 3-round online Delphi-survey was designed to obtain consensual symptoms and physical examination findings for the 5 distinct dysfunction patterns resulting from the focus group.

Results: A total of 21 musculoskeletal physical therapists from Belgium and the Netherlands experienced in assessing and treating neck pain patients completed the 3-round Delphi-survey. Respectively, 33 (response rate, 100.0%), 27 (81.8%) and 21 (63.6%) respondents replied to rounds 1, 2 and 3. Eighteen 'articular', 16 'myofascial', 20 'neural', 18 'central' and 10 'sensorimotor control' clinical indicators reached a predefined $\geq 80\%$ consensus level.

Conclusion: These indicators suggestive of a clinical dominance of 'articular', 'myofascial', 'neural', 'central', and 'sensorimotor control' dysfunction patterns may help clinicians to assess and diagnose patients with nonspecific neck pain. Future validity testing is needed to determine how these criteria may help to improve the outcome of physical therapy interventions in nonspecific neck pain patients.

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1. Introduction

Neck pain is experienced by people of all ages (Hogg-Johnson et al., 2008; Haldeman et al., 2010, 2012). In most cases it is, however, not due to a serious disease or neck problem, and often

the exact cause for the pain remains unclear. This is frequently referred to as 'nonspecific neck pain'. In the absence of a precise pathological etiology (Cote et al., 2000; Ernst et al., 2005) different alternative methods have been developed to classify patients into subgroups (Fritz and George, 2000; Fritz and Brennan, 2007).

It has been demonstrated that classifying patients into subgroups and providing them with matched management strategies may improve the outcome of physical therapy interventions (Childs et al., 2004, 2008). Several authors have proposed classification strategies for neck pain patients mainly based on specific clinical features (Werneke et al., 1999; Wang et al., 2003; Childs et al., 2004;

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Fritz and Brennan, 2007; Childs et al., 2008). Werneke and colleagues ground their categorization on changes in pain location (centralization, noncentralization, partial reduction) in response to a McKenzie-based assessment (Werneke et al., 1999). Wang et al. categorize patients into 1 of 4 main categories (i.e., radicular arm or neck pain, referred arm or neck pain, cervicogenic headaches, or neck pain only) with numerous subcategories depending on the results of several key tests (Wang et al., 2003). The authors call attention to the coexistence of patterns and mention that during the course of treatment other patterns may emerge as the initial symptomatology resolves. Childs et al. propose a treatment-based classification that places patients into 1 of 5 subgroups (i.e., mobility, centralization, exercise and conditioning, pain control, or headache) (Childs et al., 2004). This subgrouping is based on the anticipation of an initial treatment approach. In 2008, the Orthopaedic Section of the American Physical Therapy Association (APTA) published its clinical guidelines on neck pain, starting from the classification of Childs et al. (2004, 2008). Only slight adjustments were made in the pain control category, dividing it into neck pain with movement coordination impairments and neck pain with mobility deficits (Childs et al., 2008).

In addition to the abovementioned classification patterns based on clinical features, attempts have also been made to classify patients based on the dominant pain mechanism. It should be noted that a mechanism-based classification is not to be considered an alternative to the existing classifications. Instead, it could serve as a parallel reasoning model, acting as a generator to increase our understanding of mechanisms underlying neck pain (Woolf et al., 1998).

Pain mechanisms are broadly categorized into *input mechanisms*, including nociceptive pain and peripheral neurogenic pain; *processing or central mechanisms*, comprising central pain, central sensitization and cognitive-affective mechanisms of pain; and *output mechanisms*, including autonomic, motor, neuroendocrine, and immune systems (Gifford, 1998). All these mechanisms occur at the same time, however there may be a clinical dominance of one mechanism over the others. By pattern generation, a reasoned decision about the dominant mechanism(s) in operation can be made (Butler, 2000).

With the biopsychosocial model as a starting point, it is clear from the scientific literature and clinical practice that a multi-dimensional approach is required to deal with the diversity of factors present in musculoskeletal disorders (Elvey and O'Sullivan, 2004; Waddell, 2004; O'Sullivan, 2005). The relative contribution of the different dimensions and their dominance associated with the disorder will differ for each patient (O'Sullivan, 2005). An estimation of the prevailing pain mechanism is therefore relevant and allows for a diagnosis and mechanism based classification guiding appropriate management of the disorder (Jones, 1995; Elvey and O'Sullivan, 2004).

Despite the growing body of studies on pain mechanisms, evidence on clinical criteria associated with pain mechanisms in nonspecific neck pain patients is noticeably absent in the current literature. Smart and colleagues recently published several papers on clinical judgments and criteria associated with nociceptive, neuropathic and central pain in patients with low back pain (Smart et al., 2010, 2012a,b,c). They did, however, not include the output mechanism. The output mechanism is typically interpreted as a response to the input and processing mechanisms. In some patients, output pain mechanisms can be considered as pain evoking mechanisms, and might become the clinical dominant mechanism in operation (Butler, 2000).

In what follows, a more detailed and dynamic classification system is proposed based on the 3 pain mechanisms in relation to neuromusculoskeletal dysfunctions, as these are the key features

within musculoskeletal physical therapy. "More detailed" refers to a refinement of the input pain mechanism into dysfunctions of the articular, myofascial, and nervous system. In addition, an output dysfunction pattern related to impaired sensorimotor control is included. A "dynamic classification" points towards the fact that patterns coexist and may shift throughout the course of the treatment.

In order to delineate what empirical criteria are associated with each dysfunction pattern a Delphi-survey was conducted. The goal was to generate a set of pertinent clinical criteria, derived from subjective and physical examination, upon which clinicians decide to assume a dominant dysfunction pattern underlying the clinical presentations of neck pain. By identifying accurate and useful diagnostic criteria for neck pain, more informed decisions regarding the management of these conditions can be made (Rubinstein and van Tulder, 2008).

2. Methods

2.1. Study design

A 3-round online Delphi-survey was designed to obtain a consensus on indicators for 5 distinct clinical patterns in neck pain patients. The Delphi technique is a structured process that uses a series of questionnaires or 'rounds' to gather information which are reiterated until 'group' consensus is reached (Beretta, 1996; Green et al., 1999; Hasson et al., 2000; Powell, 2003). The Delphi approach provides a suitable methodology from which to commence the process of classification system development and validation by providing clinically meaningful classification criteria with a high degree of face and content validity (McCarthy et al., 2006). Prior to the Delphi-study a focus group was organized and charged with the assignment to elaborate on the distinct dysfunction patterns discernible in neck pain patients, with the mechanisms-based classification of pain as a starting point.

2.2. Participants

The focus group consisted of 10 academic experts within the field of musculoskeletal physical therapy with an average of 18.2 years of clinical experience and an average of 16.2 years of academic teaching experience. These experts were recruited from the teaching board of different postgraduate educational programs in musculoskeletal physical therapy in Belgium, and selected upon their expertise related to the topic. The 10 academic experts all combine clinical work with their teaching assignment and have all updated and integrated knowledge by regular training and attendance at international congresses within the field of the different aspects in musculoskeletal physical therapy. Focus group demographics are presented in Table 1.

Delphi-participants were recruited from both the Belgian (Dutch speaking members) and Dutch association for manual therapy, assuming substantial relevant clinical knowledge and expertise in assessing and treating neck pain patients in this group of professionals.

Table 1
Demographics of participants at the focus group (n = 10).

Gender	Male = 7 Female = 3
Mean (SD) age, years	43.7 (8.3)
Mean (SD) years of teaching experience	16.2 (6.9)
Mean (SD) years of clinical experience	18.2 (10.0)

Abbreviation: SD, standard deviation.

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