



Observational study

## Chronic neck pain patients with traumatic or non-traumatic onset: Differences in characteristics. A cross-sectional study



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### HIGHLIGHTS

- Traumatic chronic neck pain patients report worse on most outcomes.
- They perform worse in muscle function, extension, and pressure point threshold tests.
- They report worse on self-reported quality of life, function, and depression.
- Both groups present a wide variety and range of symptoms.

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### ABSTRACT

**Background and aims:** Patients with chronic neck pain can present with disability, low quality of life, psychological factors and clinical symptoms. It is unclear whether patients with a traumatic onset differ from those with a non-traumatic onset, by having more complex and severe symptoms. The purpose of this study was to investigate the clinical presentation of chronic neck pain patients with and without traumatic onset by examining cervical mobility, sensorimotor function, cervical muscle performance and pressure pain threshold in addition to the following self-reported characteristics: quality of life, neck pain and function, kinesiophobia, depression, and pain bothersomeness.

**Methods:** This cross-sectional study included 200 participants with chronic neck pain: 120 with traumatic onset and 80 with non-traumatic onset. Participants were recruited from physiotherapy clinics in primary and secondary health care. For participants to be included, they were required to be at least 18 years of age, have had neck pain for at least 6 months, and experienced neck-related activity limitation as determined by a score of at least 10 on the Neck Disability Index. We conducted the following clinical tests of cervical range of motion, gaze stability, eye movement, cranio-cervical flexion, cervical extensors, and pressure pain threshold. The participants completed the following questionnaires: physical and mental component summary of the Short Form Health Survey, EuroQol-5D, Neck Disability Index, Patient-Specific Functional Scale, Pain Bothersomeness, Beck Depression Inventory-II, and TAMPA scale of kinesiophobia. The level of significance for all analyses was defined as  $p < 0.01$ . Differences between groups for the continuous data were determined using either a Student's  $t$ -test or Mann Whitney  $U$  test.

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**Results:** In both groups, the majority of the participants were female (approximately 75%). Age, educational level, working situation and sleeping patterns were similar in both groups. The traumatic group had symptoms for a shorter duration (88 vs. 138 months  $p=0.001$ ).

Participants in the traumatic group showed worse results on all measures compared with those in the non-traumatic group, significantly on neck muscle function (cervical extension mobility  $p=0.005$ , cranio-cervical flexion test  $p=0.007$ , cervical extensor test  $p=0.006$ ) and cervical pressure pain threshold bilateral ( $p=0.002/0.004$ ), as well on self-reported function (Neck Disability Index  $p=0.001$  and Patient-Specific Functional Scale  $p=0.007$ ), mental quality of life (mental component summary of the Short Form Health Survey  $p=0.004$  and EuroQol-5D  $p=0.001$ ) and depression (Beck Depression Inventory-II  $p=0.001$ ).

**Conclusions:** This study showed significant differences between chronic neck pain patients when differentiated into groups based on their onset of pain. However, no specific clinical test or self-reported characteristic could differentiate between the groups at an individual patient level.

**Implications:** Pressure pain threshold tests, cervical muscle performance tests and patient-reported characteristics about self-perceived function and psychological factors may assist in profiling chronic neck pain patients. The need for more intensive management of those with a traumatic onset compared with those with a non-traumatic onset should be examined further.

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## 1. Introduction

Most adults experience neck pain during their lifetime. The 12-month prevalence of neck pain is 30–50%, with activity-limiting neck pain varying between 1.7% and 11.5% [1]. In Denmark, 21% of patients referred to physiotherapy in primary care have neck pain [2,3]. The cause of chronic neck pain can be traumatic (e.g. from a whiplash injury) or non-traumatic (e.g. work-related or degenerative). Regardless of the onset, chronic neck pain patients can present with a variety of symptoms including physical impairment, psychological distress, and social dysfunction [4–6].

A traumatic onset of neck pain may relate to a whiplash injury. Approximately 50% will have on-going symptoms after a whiplash injury for months or years after the injury [8], and 10–20% will have severe pain after 7 years [8,9]. These symptoms involve both physical and psychological changes [10–14]. Some of these symptoms may be due to central sensitisation mechanisms, a phenomenon seen mainly in traumatic neck patients [12,15]. Non-traumatic chronic neck pain patients can also present with varying symptoms in addition to pain such as functional limitations [16] and psychological changes [17–19].

Some former studies have shown that the presentation of several symptoms may be dependent upon the onset being traumatic or non-traumatic: sensory alterations [15,20], sensorimotor function [21], morphological changes [22], and specific psychological factors [23–25]; other studies have not found such group differences [26–28].

Furthermore, whiplash is a controversial diagnosis [29–32]. As a consequence, in a recent report from Canada, the term ‘Whiplash’ in Whiplash Associated Disorders (WAD) was replaced with ‘Neck’ (Neck and Associated Disorders-NAD) [33]. In other articles, WAD has been described as a medico-legal illusion [34] and a “man-made illness” [35]. In clinical practice and public debate, chronic neck pain patients with a traumatic onset or WAD are often considered more challenging regarding treatment than those with a non-traumatic onset [36–40]. WAD patients have sometimes experienced injustice from their employer, insurance company, or medical profession [29,41] and been labelled as malingerers [42]. Former studies have focused mainly on whiplash patients or compared this group with healthy controls. Knowledge is lacking about the specific characteristics, similarities and differences of the two groups of neck patients (traumatic/non-traumatic), as they present in clinical practice.

In summary, a variety of symptoms are reported in both the traumatic and non-traumatic groups, but it is unclear whether patients with neck pain following traumatic onset differ substantially from those with a non-traumatic onset.

The overall aim was to investigate differences between the two groups, which might justify more individualised management. The specific objectives of this study were to compare the clinical presentation of neck pain patients with a traumatic onset with those with a non-traumatic onset, by examining the following clinical characteristics: physical impairments including range of motion, sensorimotor function, muscle function and pressure pain threshold, in addition to the self-reported characteristics of quality of life, neck pain and function, kinesiophobia, depression, and pain bothersomeness.

## 2. Materials and methods

### 2.1. Study design and setting

This study is cross-sectional, using data originally collected as baseline data for a randomised parallel two-group trial [43,44]. The participants were recruited from both primary (eight physiotherapy clinics) and secondary health care locations (two spine centres, one municipal rehabilitation centre and one hospital neurological outpatient clinic) in Denmark. Patients were recruited from March 2012 to September 2014.

### 2.2. Study population

Participants were recruited by physiotherapists and informed about the study via in-clinic advertisements, by their treating clinician or at their first contact with the health care unit.

For patients to be eligible, they had to meet the following inclusion criteria: at least 18 years of age, neck pain for at least 6 months with either traumatic or non-traumatic onset, neck-related activity limitation determined by a score of at least 10 on the Neck Disability Index, diagnostic procedures completed (i.e. medical investigations, diagnostic imaging), in a stable social and/or working situation, and able to participate in an exercise programme. Participants could have pain from other body regions as long as the primary pain area was in the neck region. Exclusion criteria were radiculopathies (clinically tested by positive Spurling test, relief on cervical traction and positive plexus brachialis tests on the affected side) [45], currently undergoing experimental or progressive medical treatment, currently pregnant, and known current fractures or depression as determined by a Beck Depression Inventory score over 29 [46].

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