

**ORIGINAL RESEARCH**

# Description of Common Clinical Presentations and Associated Short-Term Physical Therapy Clinical Outcomes in Patients With Neck Pain



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## Abstract

**Objective:** To determine the effect of clinical presentations of neck pain on short-term physical therapy outcomes.

**Design:** Retrospective analysis of pair-matched groups from a clinical cohort.

**Setting:** Thirteen outpatient physical therapy clinics in 1 health care system.

**Participants:** Patients (N=1069) grouped by common clinical presentations of neck pain: nonspecific neck pain (NSNP) with duration <4 weeks; NSNP with duration >4 weeks; neck pain with arm pain; neck pain with headache; and neck pain from whiplash.

**Intervention:** Conservative interventions provided by physical therapists.

**Main Outcome Measures:** Neck Disability Index (NDI) and numerical pain rating scale (NPRS) recorded at the initial and last visits. The main outcome of interest was achieving recovery status on the NDI. Changes in NDI and NPRS were compared between clinical presentation groups.

**Results:** Compared with patients presenting with NSNP >4 weeks, patients with NSNP <4 weeks had increased odds of achieving recovery status on the NDI ( $P<.0001$ ) and demonstrated the greatest changes in clinical outcomes of pain ( $P<.0001$ ) and disability ( $P<.0001$ ). Patients with neck pain and arm pain demonstrated an increased odds of achieving recovery status on the NDI ( $P=.04$ ) compared with patients presenting with NSNP >4 weeks.

**Conclusions:** Treating patients with NSNP within <4 weeks of onset of symptoms may lead to improved clinical outcomes from physical therapy compared with other common clinical presentations.

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Neck pain is the second most common musculoskeletal disorder in population surveys and is associated with high injury and disability claims.<sup>1,2</sup> It is generally accepted that neck pain has a favorable course of care,<sup>3</sup> but there is variation in short-term outcomes in patients with neck pain.<sup>3,4</sup>

Certain factors are known to be prognostic for the course of neck pain, and several interventions, including those provided by physical therapists, are likely to produce a favorable outcome.<sup>5-9</sup> Approximately 35% of persons with neck pain reported being seen by a physical therapist, the most frequently visited provider,<sup>10</sup> and evidence suggests that physical therapy can be an

effective secondary prevention strategy for neck pain.<sup>11</sup> In recent years, organized efforts have been made to improve clinical outcomes and standardize physical therapy treatment, including using classification system approaches. Fritz and Brennan<sup>12</sup> supported that subgrouping patients with neck pain and providing interventions matched to the patient classification improves short-term outcomes of pain and disability from physical therapy, but this approach has not been validated nor have other classification systems published in the literature been validated.<sup>13,14</sup>

Therefore in this study, rather than introduce a new classification system, we wished to pragmatically examine a large cohort of patients with common clinical presentations of neck pain. The purposes of this study were to describe the demographics and

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clinical characteristics of patients receiving outpatient physical therapy for neck pain with 5 common clinical presentations, determine which clinical presentation groups experienced the greatest changes in clinical outcomes of pain and disability during an episode of care, and ultimately determine whether clinical presentation increases the odds of recovery from an episode of neck pain.

## Methods

### Participants

Patients included in this study received physical therapy intervention for the primary complaint of neck pain between January 1, 2008, and December 31, 2011, from 13 outpatient physical therapy clinics located in Salt Lake City, Utah and surrounding regions. A retrospective analysis of data was performed. Inclusion criteria for these analyses were as follows: (1) nonsurgical patient; (2) Neck Disability Index (NDI) score  $\geq 10$  and numerical pain rating scale (NPRS)  $\geq 2$  at initial evaluation; (3)  $\geq 2$  visits; and (4) duration of treatment (DOT) between 2 and 180 days. The criteria were implemented to permit the evaluation of clinical outcomes,<sup>12,15</sup> that exceed measurement error.<sup>16,17</sup> The study protocol was approved by the Institutional Review Board of Intermountain Healthcare.

### Database

Data were extracted for this study from the Rehabilitation Outcomes Management System and the AS-400 financial databases. These databases contain demographic, clinical outcomes, and billing data that are maintained by Intermountain Healthcare, a private, nonprofit integrated health care system.

### Outcome measures

At each visit, patients completed a condition-specific disability questionnaire, the NDI, and a pain rating scale, the NPRS. The NDI is a condition-specific outcome measure composed of 10 items; each item is scored from 0 to 5. The total score is expressed as a percentage and is reflective of a level of disability related to neck pain where high percentages are related to higher disability. The NDI is a commonly used outcome measure for people with neck pain and has been found to be reliable and valid in the neck pain population.<sup>18-22</sup> The NPRS is an 11-point scale, anchored with 0 rated as “no pain” and 10 rated as “worst pain” imaginable. Patients are asked to rate their current pain using this scale. The NPRS exhibits fair to moderate test-retest reliability in patients with mechanical neck pain and shows adequate responsiveness in this patient population.<sup>16,23</sup> The minimal clinically important difference for the NDI has been reported as a 19- percentage-point change (9.5 raw score), and the minimal clinically important

difference for the NPRS has been reported as a 1.3-point change in this population.<sup>23</sup>

### Clinical variables

Demographic and process variables were included in the clinical outcomes database including age, sex, number of physical therapy visits, and DOT. Records from the Rehabilitation Outcomes Management System database were linked to the AS-400 database using an enterprise master patient index number. The billing database contains Current Procedural Terminology (CPT) codes billed for physical therapy services during an episode of care. These codes are billed by the physical therapist and recorded in the AS-400 database at each visit. The billed CPT codes are reflective of the type of intervention provided by the physical therapist at each visit. Physical therapists contributing data to this analysis did not receive additional training on CPT coding for purposes of this study.

### Clinical presentation

At initial evaluation, patients seeking care for neck pain were categorized into 1 of 5 clinical presentation groups by a physical therapist. These groups were created as broad categories to describe common clinical presentations of patients with neck pain by the rehabilitation department at Intermountain Healthcare in 2002 to evaluate clinical outcomes. Studies support that the clinical presentation of neck pain with arm pain,<sup>24,25</sup> neck pain with headache,<sup>26</sup> and neck pain from whiplash<sup>27</sup> differ in their clinical course compared to patients with acute, subacute, or chronic nonspecific neck pain (NSNP).<sup>28</sup> This strategy has been implemented at Intermountain Healthcare since 2002, and there is a 94.5% adherence rate in collecting these clinical data by physical therapists.<sup>29</sup> Physical therapists were oriented to using this categorization method at clinical training sessions at the time of hiring and used the criteria in [table 1](#) for categorizing patients. Reliability of the categorization method by the physical therapists was examined by 1 author in this study by reviewing 100 randomly selected charts. The interrater reliability was found to be acceptable ( $ICC_{2,2} = .91, P < .001$ ).

Patients were categorized into 1 of the following groups for comparison: (1) NSNP with duration  $< 4$  weeks (NSNP  $< 4$ wk); (2) NSNP with duration  $> 4$  weeks (NSNP  $> 4$ wk); (3) neck pain with arm pain; (4) neck pain with headache; and (5) neck pain from whiplash. The determination of the clinical presentations of headache, neck pain with arm pain, and whiplash were made based on patient self-report of symptoms related to the appropriate clinical presentation and objective tests found in [table 1](#). Although some patients may present with both temporal and clinical presentations consistent with multiple groups, by default, patients are categorized by their clinical presentation in the following hierarchy: whiplash, neck pain with arm pain, or neck pain with headache, and patients with NSNP are categorized by temporality of symptoms (duration  $< 4$ wk or  $> 4$ wk). Criteria for membership in clinical presentation groups can be found in [table 1](#).

### Intervention

A variable, “% active treatment,” was calculated from CPT codes to reflect the type of physical therapy intervention received in lieu of specific data related to treatment. The algorithm used to calculate this variable has been previously published as a method

#### List of abbreviations:

CI	confidence interval
CPT	Current Procedural Terminology
DOT	duration of treatment
NDI	Neck Disability Index
NSNP	nonspecific neck pain
NPRS	numerical pain rating scale

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