Course and Prognostic Factors for Neck Pain in Whiplash-Associated Disorders (WAD)

Results of the Bone and Joint Decade 2000–2010 Task Force on Neck Pain and Its Associated Disorders

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Objective. To perform a best evidence synthesis on factors in neck pain and its associated disorders.


Results. We found 226 articles related to course and prognostic factors in neck pain and its associated disorders. After a critical review, 70 (31%) were accepted on scientific merit; 47 of these studies related to course and prognostic factors in WAD. The evidence suggests that approximately 50% of those with WAD will report neck pain symptoms 1 year after their injuries. Greater initial pain, more symptoms, and greater initial disability predicted slower recovery. Few factors related to the collision itself (for example, direction of the collision, headrest type) were prognostic; however, postinjury psychological factors such as passive coping style, depressed mood, and fear of movement were prognostic for slower or less complete recovery. There is also preliminary evidence that the prevailing compensation system is prognostic for recovery in WAD.

Conclusion. The Neck Pain Task Force undertook a best evidence synthesis to establish a baseline of the current best evidence on the course and prognosis for WAD. Recovery of WAD seems to be multifactorial.

Key words: neck pain, systematic review, epidemiology, prognosis, whiplash.

Neck pain after traffic collisions is common; the most recent figures suggest that more than 300 persons per 100,000 in the population are seen in emergency departments every year.\(^1\) Whiplash is a mechanism of injury, consisting of acceleration-deceleration forces to the neck. In 1995, the Quebec Task Force on Whiplash-Associated Disorders (WAD) coined the term ‘WAD’ to describe the symptom sequelae of this injury. This cluster of symptoms includes neck pain, along with other symptoms of the injury such as dizziness and pain in other parts of the body.\(^2\) WAD is thought to result from cervical strain or sprain, probably from soft tissue damage to ligaments and muscles in the neck. Although joints may also be involved, the term WAD generally does not include cervical fractures, and we excluded this degree of injury from our discussions on the course of recovery and prognostic factors for recovery in WAD. Thus our mandate involves Grades I–III WAD (described in more detail later).
The ‘course’ of recovery from WAD refers to 2 key questions: Are neck pain and associated symptoms likely to resolve, and, if so, within what time frame? These questions are of vital interest to all stakeholders, including individuals with WAD and their families, their health care providers, those who develop and implement policy and regulations, and researchers who study WAD.

Likewise, the determinants of that course of recovery (prognostic factors) are important in planning effective health policies, health care interventions, and lifestyle changes. However, knowledge about the course of recovery in WAD-related neck pain is also informative in determining the effectiveness of interventions [i.e., it may help demonstrate whether a particular intervention improves (or worsens) the usual course of recovery of WAD]. Identifying factors associated with poor prognosis after WAD can also provide a useful target for intervention studies; this may also provide information about those most likely to benefit from such an intervention.

A plethora of widely varying evidence and opinion exists on these issues, resulting in a certain amount of confusion among stakeholders. This makes it imperative to conduct a considered and thorough examination of the scientific evidence and also look at the strength of that evidence.

Research on the course of neck pain in WAD and identification of prognostic factors necessarily involves longitudinal research. This means studying a group of persons with WAD (preferably those with a recent injury), and tracking their recovery over time. Because cross-sectional studies provide a ‘snapshot’ in time, factors found to be associated with neck pain in such studies could be risk factors, prognostic factors, or consequences of neck pain. Findings from cross-sectional studies on WAD are reported elsewhere.1

In examining findings from longitudinal studies, the strength of the evidence produced by these studies should also be considered. One paradigm classifies cohort studies into a 3-level hierarchy of knowledge. This model has been used to interpret evidence obtained in prognostic studies of breast cancer, WAD, and mild traumatic brain injuries.3–6

- Phase I studies are descriptive and hypothesis generating, exploring crude associations between potential prognostic factors and health outcomes.
- Phase II studies are also exploratory, but use stratified or multivariable analyses to identify sets of prognostic factors.
- A Phase III study is hypothesis driven and confirmatory. The goal is to confirm or refute the independence of any apparent relationship between a particular prognostic factor and the outcome of interest, after adjusting for confounding.7

In the current article, we have used this hierarchy to help us interpret findings from prognostic studies of WAD. The course of neck pain and prognostic factors for recovery in the general population and in workers are presented elsewhere.7,8 Although there may be many similarities across these populations, we believe this way of organizing our findings will be most useful to audiences.

Within the studies on WAD, we further separated the tables reporting the course of recovery (for example, time to recovery) from those reporting prognostic factors for recovery.

Methods

Design and Data Collection

The literature search and critical review strategy are outlined in detail elsewhere.7 In brief, we systematically searched the electronic library database Medline for literature published from 1980 through 2005 on neck pain and its associated disorders; we also systematically checked the reference lists of relevant articles and updated the search to include key articles for 2006 and early 2007.7 We screened each citation for relevance to the Neck Pain Task Force mandate, using a priori inclusion and exclusion criteria. We made no attempt to assess the scientific quality of each study when establishing its relevance to the Neck Pain Task Force mandate. Studies were considered relevant if:

- they pertained to the assessment, incidence, prevalence, determinants or risk factors, prevention, course, prognosis, treatment and rehabilitation, and/or economic costs of neck pain
- they contained data and findings specific to neck pain and/or disorders associated with neck pain, or described a systematic review of the literature on neck pain
- they included at least 20 persons with neck pain or at risk for neck pain We excluded studies on neck pain which was associated with serious local pathology or systemic disease, such as neck pain from infections; fractures or dislocations (except where such studies informed differential diagnosis of neck pain); myelopathy; rheumatoid arthritis and other inflammatory joint diseases; or tumors.

Quality Assessment

Rotating pairs of Scientific Secretariat members performed independent, in-depth critical reviews of each article, identifying methodologic strengths and weaknesses. Where Scientific Secretariat members were authors or coauthors of an article under consideration, they were excluded from both the discussions and the decisions about scientific merit. The forms used in the methodologic appraisal of the studies can be seen at the following: (address of our web-version: available online). Our methodologic appraisal focused on sources of potential selection bias, information bias, and confounding. We also considered whether or not these biases would likely result in erroneous or misleading conclusions. After discussions of each article, decisions were made about the article’s scientific merit. Studies judged to have adequate internal validity and to be methodologically rigorous, such that the results could be accepted with reasonable confidence, were considered to be scientifically admissible and were summarized in evidence tables. These evidence tables were used to formulate the best evidence synthesis.

Analysis

We classified the studies identifying prognostic factors into Phase I, II, or III studies (described earlier). We used this framework in our synthesis of the studies and in our development of summary statements of the evidence. Where the evidence from