

Identifying Those at Risk of Developing Persistent Pain Following a Motor Vehicle Collision



The development of musculoskeletal pain following trauma, particularly a motor vehicle collision (MVC), is common, with many people showing poor recovery¹ and incurring substantial personal and economic costs. There is evidence to suggest that musculoskeletal pain conditions from a MVC demonstrate a more complex clinical presentation than pain of idiopathic or insidious onset. Individuals with neck pain (whiplash) from a MVC not only report higher levels of pain and disability but also widespread sensory hypersensitivity (a manifestation of central hyperexcitability) when compared to idiopathic neck pain².

Interestingly similar sensory disturbances are a feature of conditions with more widespread pain such as fibromyalgia (FM)³, a condition that occurs more frequently in those with neck pain following a MVC compared to non-MVC injuries⁴. It appears that patients presenting with musculoskeletal symptoms following a MVC may be both clinically more complex and at greater risk of chronicity than those with a non-traumatic history.

Of course, it is important to identify factors that are predictive of poor outcome, in this case the development of persistent pain and disability. Much of the research in this area has focused on whiplash injury, but whiplash shares overlapping clinical and epidemiological characteristics with conditions of more widespread pain, such as FM⁴. With regard to whiplash, despite investigation of numerous factors, a recent systematic review found that high initial pain intensity was the only consistent prognostic indicator of poor functional recovery⁵.

In this issue of *The Journal*, Wynn-Jones, *et al* showed similar factors to be important in the development of widespread pain following a MVC⁶. The authors prospectively followed (to 12 months post accident) 695 participants who had lodged a claim with a UK-based insurance company and who reported no widespread pain prior to their accident. They found that a greater number of physical symptoms and perceived injury severity following the collision were predictive of later widespread pain, although it is not completely clear whether these measures correlate with pain

intensity. Nevertheless it does send a strong message regarding the early clinical assessment of patients injured in a MVC — that valid measures of perceived pain/symptom intensity and severity should be included as useful early indicators of potential non-recovery.

One drawback of most if not all prospective studies of pain development following a MVC is that the prognostic factors investigated were measured from either around the time of, or soon after injury. It is possible that some of these factors (and even additional ones) were present prior to the occurrence of the collision, thus increasing the vulnerability of some people to the effects of injury. Research investigating relationships between pre-existing factors and outcome following MVC is sparse, most likely due to logistical issues of recruiting the large sample sizes required. For probably the first time, Wynn-Jones, *et al* have attempted to identify pre-collision factors, in addition to collision-specific and post-collision factors, that may contribute to the occurrence of a new episode of widespread pain. The authors are to be congratulated in their attempt of this difficult endeavor.

In multivariate analysis, pre-collision factors of health seeking behavior (frequent health consultations), somatization (number of somatic symptoms), and age predicted the onset of widespread pain. One criticism is that participants were asked to retrospectively recall the required data, although the authors attempted to account for this by providing the participants with a precise time frame for recall. The authors suggest that participants may be more likely to overestimate their health status prior to the collision, and this could be true particularly in the compensation environment of the study. It would have been interesting to have information on the nature of the participants' health visits — were they for previous musculoskeletal pain (back or neck pain) or perhaps for more systemic type illnesses? Some may (unjustifiably) draw from the terminology "health seeking behavior" representation about the participants' psychological state — for example catastrophizing behaviors.

Leading from this, it may be tempting to extrapolate

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from the findings of Wynn-Jones, *et al* that mainly pre-existing psychological factors (health seeking behaviors and somatization) predict the onset of widespread pain following MVC. It should be made clear that insufficient information is provided to support this conclusion. In particular, the term “somatization” is controversial, variously defined and often perceived as implying that the patient has “medically unexplained symptoms⁷.” Again, using the literature on whiplash prognosis, it has been shown that a history of neck pain or headache prior to the accident is associated with a worse functional outcome⁸. Further, motor control deficits persist even in those who report full recovery from both whiplash injury and acute low back pain, a factor that may be associated with symptom recurrence^{9,10}. Thus it cannot be ruled out that previous musculoskeletal pain may provide physical reasons for the individual to be more vulnerable to further insult or injury. Genetic factors may also play a role. An association between genetic polymorphisms, pain sensitivity, and chronic pain development has been demonstrated¹¹. This may prove to be important considering the findings of increased pain sensitivity in subgroups of patients with whiplash and FM^{3,12}. Early (within weeks of injury) sensory hypersensitivity to both mechanical and thermal stimuli has been shown to predict poor recovery, at least following whiplash injury^{10,13}. It is possible that a prior disposition to increased pain sensitivity may mean a greater tendency toward central hyperexcitability following injury and ensuing non-recovery.

This is not a criticism of the work of Wynn-Jones, *et al* but a suggestion for future research in this area, where more detailed information (including both physical and psychological factors) may be gleaned such that firmer conclusions can be drawn.

Wynn-Jones, *et al* found few collision-specific factors to be associated with the onset of widespread pain, findings similar to those in whiplash, where such factors are not strong predictors of outcome⁵. Interestingly, while not an independent predictor in multivariate analysis, perceived collision severity was associated with pain development in univariate analysis. The authors did not measure posttraumatic stress symptomatology, but the case for the inclusion of this factor is strong based on findings of concurrent chronic pain, including widespread pain and posttraumatic stress disorder following MVC⁴. Moreover early posttraumatic stress symptoms also predict chronicity following whiplash injury¹⁰. An interesting model for the development of chronic pain following MVC, as proposed by McLean, *et al*⁴, incorporates interrelationships between stress responses, central pathways, and psychological factors. Preliminary support for such a model is provided by longitudinal whiplash data, where relationships exist between early sensory disturbances and persistent posttraumatic stress¹⁴.

In conclusion, motor vehicle collisions cost the community dearly both in personal and economic losses associated

with the development of persistent musculoskeletal pain. There is accumulating evidence that both physical and psychological factors present around the time of injury are associated with non-recovery. The crucial “window of opportunity” to identify those at risk and to institute appropriate and effective intervention is likely to be within this early time frame. Wynn-Jones and colleagues have provided additional pre-collision factors also involved in the development of persistent pain. The next challenge will be to further explore all these factors in order to illuminate underlying mechanisms and develop improved management strategies.

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