

EXTENDED REPORT

A re-examination of the whiplash associated disorders (WAD) as a systemic illness

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Objective: To describe the systemic nature of the illness reported after motor vehicle collisions using data from a large, population based cohort of individuals making an injury insurance claim.

Methods: All subjects who submitted a claim or were treated for whiplash injury following a motor vehicle collision in Saskatchewan, Canada during an 18 month period were examined. Demographics of claimants, collision related data, pre-collision health data, symptom prevalence, and scores on the short form 36 item general health survey (SF-36) were obtained on average within one month post-collision.

Results: Of 9006 potentially eligible claimants, 7462 (83%) met criteria for whiplash injury and provided information regarding demographics and injury related symptoms; 45% of these consented to complete the SF-36 at baseline. For most subjects, neck pain was only one of many diffuse and intense symptoms, including, often, low back pain. The range of symptoms, including fatigue, dizziness, paraesthesiae, headache, spinal pain, nausea, and jaw pain, could be interpreted as a systemic disorder. SF-36 scores showed low physical and mental functioning one month post-collision.

Conclusions: What is commonly referred to as whiplash associated disorders (WAD) is best appreciated as a syndrome extending well beyond what can be labelled as a neck injury. More research is needed for a better understanding of the underlying mechanisms involved so that treatment can be directed at the broad spectrum of the illness rather than focusing on finding a focal neck injury.

The Quebec Task Force on Whiplash Associated Disorders (WAD) undertook an important project in redefining whiplash in 1995.¹ One of the most significant outcomes of that effort was the grading system of whiplash associated disorders, from grade 0 to grade IV. According to that grading system, grade 0 designates no symptoms, while at the other end of the spectrum, grade III designates neck pain or stiffness associated with neurological signs (for example, a disc protrusion causing nerve root compression or spinal cord impingement could result in this diagnosis), and grade IV designates neck pain or stiffness associated with cervical fracture or dislocation. Two further grades were designated grade I and grade II. Here the pathology is unknown, but they represent more than 90% of "whiplash injury claims."^{2,3} Various other symptoms can be manifest in all grades and include hearing disturbance, dizziness, headache, memory loss, dysphagia, and jaw pain.

The term WAD was designed to recognise the broad disorder seen in many symptomatic individuals following a collision. Subsequent studies have shown the substantial clinical value of the grading scheme.^{3,4} There have been previous studies reporting the clinical syndrome, but these have suffered notably from small sample size,^{5,6} substantial selection bias,⁶ limited outcome measures,⁵⁻⁷ and a failure to control for compensation systems, treatment, and collision parameters.⁵⁻⁷ Some previous reports have emphasised an aetiological role for one or more abnormalities of facet joints as the problem that induces and maintains the symptoms. The purpose of the current study is to describe, using a large population based cohort, the clinical spectrum of initial symptom expression and health related measures of WAD. To examine WAD from this perspective, we have revisited a database concerning 7462 whiplash claimants in Saskatchewan, Canada.⁸

Saskatchewan is a province of approximately one million residents with a single automobile insurer, the Saskatchewan Government Insurance Company (SGI). SGI is a crown

corporation that maintains a central database of all claimants. The study population includes all subjects enrolled in a population based inception cohort study of traffic injuries in Saskatchewan. The previously reported cohort study⁸ had the broad objective of studying the incidence of and recovery from traffic injuries in Saskatchewan, under both tort and no-fault insurance policies. Included in the cohort were individuals who sustained a traffic injury in Saskatchewan between 1 July 1994 and 31 December 1995 and reported it to SGI; were residents of Saskatchewan; and were 18 years of age or older. This included all individuals injured in both single and multiple vehicle collisions, as each injured individual submits his or her own injury claim. Excluded from the cohort were claimants who died because of the collision, did not speak English, were unable to complete the questionnaires because of serious co-existing health conditions, sustained a severe injury and were unable to answer the questionnaires, or were involved in a work related motor vehicle collision covered by the Workers' Compensation Board. In all, 9006 claimants met the inclusion criteria. Of these, 7462 met a case definition for whiplash injury (neck or shoulder pain after a collision), and their outcomes have been reported elsewhere according to stratification by insurance system.⁸

Here we give a full characterisation of these 7462 claimants (unrelated to their insurance claim basis) according to their demographics, initial symptom picture, and overall physical and mental functioning.

METHODS

Sample

In this study, we examined the previously reported 7642 subjects not according to insurance stratification but rather

Abbreviations: SF-36, 36 item medical outcomes study short form general health survey; SGI, Saskatchewan Government Insurance Company; WAD, whiplash associated disorders

Table 1 Sociodemographic characteristics of whiplash claimants stratified by sex

Characteristic	Male* (n = 2926)	Female* (n = 4533)	p Value
Age (years) (mean (SD))	37.34 (15.71)	36.83 (14.56)	NS
Marital status			
Married	1599 (54.7)	2424 (53.5)	NS
Single	1079 (36.9)	1415 (31.2)	<0.01
Separated/divorced	206 (7.0)	515 (11.4)	<0.01
Widowed	41 (1.4)	178 (3.9)	NS
Number of dependents			
None	1698 (58.0)	2451 (54.1)	<0.01
1 or 2	828 (28.3)	1452 (32.0)	NS
More than 2	400 (13.7)	630 (13.9)	NS
Education			
Grade 8 or less	229 (7.8)	237 (5.2)	NS
<High school	778 (26.6)	829 (18.3)	<0.01
High school	782 (26.7)	1187 (26.2)	NS
Post-secondary	858 (29.3)	1768 (39.0)	<0.01
University graduate	278 (9.5)	511 (11.3)	NS
Annual family income			
<\$20 001	1085 (37.4)	1860 (41.4)	NS
\$20 001 to \$40 000	947 (32.6)	1376 (30.7)	NS
\$40 001 to \$60 000	521 (18.0)	790 (17.6)	NS
More than \$60 000	349 (12.0)	462 (10.3)	NS
Employment status			
Full time	1876 (64.1)	1867 (41.2)	<0.01
Student	223 (7.6)	420 (9.3)	NS
Part time	312 (10.7)	1098 (24.2)	<0.01
Homemaker	20 (0.7)	743 (16.4)	<0.01
Retired	221 (7.6)	178 (3.9)	<0.01
Unemployed	273 (9.3)	225 (5.0)	<0.01
Body mass index (mean (SD))	26.36 (4.39)	25.00 (5.27)	NS

Values are n (%) unless specified otherwise.

*Missing data: 3/7462 claimants did not provide information on sex. Of the remaining cohort of 7459, the missing cases were as follows: marital status, 2; education, 2; family income, 69; employment status, 3; and body mass index, 52.

according to sex, as sex had been shown to be an important prognostic factor and may thus be important to the initial symptom picture of WAD.⁸ We have previously reported the differences in baseline demographic characteristics and initial symptom prevalence in the tort or no-fault systems were similar.⁸

Data collection

The cohorts stratified by sex were analysed to provide a description of the prevalence of symptoms after collisions, as well as the demographics. Claimants for motor vehicle related injury are required to provide demographic and symptom related information to the insurer through standard questionnaires, and this source of information formed part of the data gathering. The median number of days from the time of collision over which the data in this cohort were gathered was 10, and 75% of the questionnaires were completed within 23 days of the collision (that is, well within the acute phase after the injury). To assess physical and mental functioning at the time of the injury claim, we used the 36 item medical outcomes study short form general health survey (SF-36). The SF-36 is a multipurpose, short form health survey with only 36 questions. It yields an eight scale profile of scores as well as physical and mental health summary measures. It is a generic measure, as opposed to one that targets a specific age, disease, or treatment group. The scores on both scales range from 0 to 100, with higher scores indicating less pain and better function. Both scales have been used extensively as outcome measures and possess good psychometric properties. Low scores on the physical health summary scale reflect limitations in self care, physical, social, and role activities; bodily pain; fatigue; and health in general. Low scores on the mental health summary scale reflect psychological distress; social and role disability because of emotional problems; and health in general.⁹ We normalised the component summary scores for a mean score

of 50 with a standard deviation of 10.⁹ Subjects gave written informed consent to be identified and included in the follow up portion of the study. The University of Saskatchewan's advisory committee on ethics in human experimentation approved the collection and analysis of these data.

Statistical analysis

Differences between means were assessed by *t* tests ($\alpha \leq 0.01$) and differences between proportions by χ^2 values. Because of the large sample size, we chose a more stringent cut off *p* value of 0.01.

RESULTS

Table 1 shows the demographics of the entire cohort stratified by sex, the larger percentage of subjects (61%) being female. Women were less likely to be employed full time but otherwise the demographic variables were very similar between the sexes.

Tables 2 and 3 provide collision related and pre-collision health information, respectively. Females differed from males in a number of collision related factors, having their collisions more often during the day, being more often the front passenger rather than driver, and being more likely to report use of a seat belt and head restraint. Males tended to report their pre-collision health as better than females, both in the way they responded to questions about overall health and pre-existing symptoms. Table 4 provides the injury-related information and within this table the prevalence of symptoms after the collision are shown. The wide array of other symptoms is apparent, the symptoms extending themselves well beyond the chief symptoms of spinal pain. Females reported more severe neck pain and headache, and a greater percentage of body in pain. They were also more likely to report non-spinal symptoms such as concentration problems, nausea, dizziness, jaw pain, headache, and hand/arm numbness or pain.

Table 2 Collision related factors in whiplash claimants stratified by sex

Characteristic	Male* (n = 2926)	Female* (n = 4533)	p Value
Time of collision			
Day	1870 (63.7)	3185 (70.3)	<0.01
Night	723 (24.7)	875 (19.3)	<0.01
Sunrise	116 (4.0)	140 (3.1)	NS
Sunset	216 (7.4)	332 (7.3)	NS
Location in vehicle			
Driver	2391 (82.4)	3065 (67.9)	<0.01
Front passenger	421 (14.5)	1251 (27.7)	<0.01
Other passenger	88 (3.0)	199 (4.4)	NS
Direction of impact†			
Front	892 (30.7)	1076 (23.8)	<0.01
Rear	1147 (39.4)	1922 (42.6)	<0.01
Driver's side	480 (16.5)	823 (18.2)	NS
Passenger's side	391 (13.4)	692 (15.3)	NS
Vehicle rolled over	221 (7.6)	216 (4.8)	NS
Vehicle not drivable after collision	1516 (53.1)	2582 (58.7)	<0.01
Vehicle stopped at time of collision	1145 (39.7)	1871 (42.4)	NS
Type of road			
Highway	478 (16.3)	614 (13.6)	NS
Rural road	217 (7.4)	196 (4.3)	<0.01
Urban street	2124 (72.6)	3540 (78.2)	<0.01
Other	106 (3.6)	179 (4.0)	NS
Road surface			
Dry	1826 (62.7)	2838 (62.7)	NS
Wet	278 (9.5)	446 (9.9)	NS
Icy	808 (27.7)	1239 (27.4)	NS
Seat belt			
Lap/shoulder	2555 (88.3)	4195 (93.0)	<0.01
Lap	186 (6.4)	205 (4.5)	NS
None	153 (5.3)	113 (2.5)	<0.01
Had headrest	2097 (74.4)	3731 (85.6)	<0.01
Head position			
Straight ahead	1601 (65.4)	2351 (64.4)	NS
Turned right	441 (18.0)	550 (15.1)	<0.01
Turned left	407 (16.6)	751 (20.6)	<0.01
Retained a lawyer	385 (13.2)	493 (10.9)	NS
At fault for collision§	367 (12.7)	617 (13.7)	NS

Values are n (%).

*Missing data: 3/7462 claimants did not provide information on sex. Of the remaining cohort of 7459, the missing cases were as follows: time of collision, 2; position in vehicle, 43; direction of impact, 36; vehicle rolled over, 32; vehicle not drivable after collision, 201; vehicle stopped at time of collision, 164; type of road, 5; road surface, 24; seat belt, 52; headrest, 278; head position, 1358; and retained a lawyer, 9.

†Subjects were asked "From what direction was the "main" impact to your vehicle" to account for multiple impact cases.

§Assessed by insurance company as being over 50% at fault for collision.

Table 5 shows the SF-36 summary scale scores for approximately 45% of the cohort, this subgroup being those who consented to complete and who returned the completed SF-36. Although only 45% of claimants consented to provide responses to the SF-36, extensive analysis of the respondents and non-respondents (see Côté *et al*¹⁰) has shown they are well matched for other variables. The results from the responses of this group confirm that the illness of WAD affects both physical and mental health even in the short term (one month). As the physical and mental health scales of the SF-36 range from 0 to 100, the mean scores of approximately 36 on the aggregate physical scale for men and women indicate poor overall physical functioning. The mental health scores were also somewhat lower than 50 (48.6 for men and 46.6 for women).

DISCUSSION

These findings underscore the wide range of symptoms present after a whiplash injury and emphasise the need to adopt a broader concept of post-collision sequelae. An important contribution of the WAD classification system proposed by the Quebec Task Force¹ was to gather a group of symptoms into one clinical syndrome. Our findings of the array of health quality measures and symptomatology evident after a whiplash injury support this concept. To extend this further, we propose that rather than trying to

view whiplash as a specific, anatomically definable injury, this diverse cluster of post-whiplash symptoms be reconceptualised as forming a "general illness" with widespread symptom presentation—that is, an illness in which symptoms arise from and are modulated by pathology, psychological responses, and social context.

Our data indicate that beyond neck pain, symptoms such as low back pain, dizziness, nausea, both upper and lower limb numbness and tingling, tinnitus, and cognitive problems are common after a whiplash injury. A small proportion of individuals lost consciousness in the collision, and in these, the post-collision symptoms might have been caused by concussion. However, even if these cases are excluded, it is clear that in the acute stages after the injury, persons with whiplash present with a broad range of systemic physical and mental symptoms that cannot be explained by a single anatomical region of injury.

The impact of the injury can be seen most clearly in the symptom reporting and in the low physical component scores of the SF-36. To place the SF-36 physical and mental health scores in perspective, one notes that they are of the same order as those seen in some rheumatoid arthritis samples.¹¹ Despite the fact that the mental component scores of the SF-36 were only slightly below the general population normative mean of 50, this should be interpreted within the context of extremely good self reported psychological health before the

Table 3 Health status before the collision for whiplash claimants stratified by sex

Factor	Male* (n = 2926)	Female* (n = 4533)	p Value
General health before collision			
Excellent	1341 (45.9)	1655 (36.5)	<0.01
Very good	942 (32.2)	1572 (34.7)	NS
Good	505 (17.3)	1034 (22.8)	<0.01
Fair	106 (3.6)	222 (4.9)	NS
Poor	27 (1.0)	47 (1.1)	NS
Previous motor vehicle injury to neck	1095 (37.4)	1620 (35.7)	NS
Neck/shoulder pain before collision			
Never	2373 (81.1)	3184 (70.3)	<0.01
Sometimes	409 (14.0)	1038 (22.9)	<0.01
Very often	80 (2.7)	181 (4.0)	NS
Every day	63 (2.2)	126 (2.8)	NS
Headaches before collision			
Never	2277 (77.8)	2537 (56.0)	<0.01
Sometimes	551 (18.8)	1715 (37.9)	<0.01
Very often	77 (2.6)	228 (5.0)	<0.01
Every day	20 (0.7)	50 (1.1)	NS
Low back pain before collision			
Never	2099 (71.8)	2926 (64.6)	<0.01
Sometimes	629 (21.5)	1260 (27.8)	<0.01
Very often	95 (3.2)	201 (4.4)	NS
Every day	102 (3.5)	140 (3.1)	NS
Jaw pain before collision			
Never	2860 (97.9)	4272 (94.3)	<0.01
Sometimes	49 (1.7)	187 (4.1)	NS
Very often	8 (0.3)	51 (1.1)	NS
Every day	5 (0.2)	19 (0.4)	NS
Bodily discomfort before collision			
Never	2479 (84.8)	3542 (78.2)	<0.01
Sometimes	309 (10.6)	702 (15.5)	<0.01
Very often	65 (2.2)	138 (3.0)	NS
Every day	69 (2.4)	146 (3.2)	NS
Tired and lack of energy before collision			
Never	2220 (75.9)	2692 (59.5)	<0.01
Sometimes	571 (19.5)	1467 (32.4)	<0.01
Very often	80 (2.7)	239 (5.3)	<0.01
Every day	53 (1.8)	130 (2.9)	NS
Depressed before collision			
Never	2584 (88.4)	3793 (83.8)	<0.01
Sometimes	274 (9.4)	622 (13.7)	<0.01
Very often	42 (1.4)	84 (1.9)	NS
Every day	22 (0.8)	29 (0.6)	NS
Anxious before collision			
Never	2510 (85.8)	3712 (82.0)	<0.01
Sometimes	347 (11.9)	679 (15.0)	<0.01
Very often	39 (1.3)	109 (2.4)	NS
Every day	28 (1.0)	29 (0.6)	NS
Angry before collision			
Never	2381 (81.4)	3570 (78.8)	NS
Sometimes	471 (16.1)	845 (18.7)	NS
Very often	55 (1.9)	95 (2.1)	NS
Every day	18 (0.6)	18 (0.4)	NS
Frustrated before collision			
Never	2251 (77.0)	3252 (71.9)	<0.01
Sometimes	575 (19.7)	1097 (24.2)	<0.01
Very often	70 (2.4)	135 (3.0)	NS
Every day	29 (1.0)	40 (0.9)	NS
Fearful before collision			
Never	2736 (93.6)	4052 (89.5)	<0.01
Sometimes	151 (5.2)	401 (8.9)	<0.01
Very often	22 (0.8)	46 (1.0)	NS
Every day	15 (0.5)	27 (0.6)	NS
Sleep problems before collision			
Never	2393 (81.8)	3511 (77.5)	<0.01
Sometimes	378 (12.9)	709 (15.7)	<0.01
Very often	97 (3.3)	213 (4.7)	NS
Every day	56 (1.9)	97 (2.1)	NS
Concentration problems before collision			
Never	2743 (93.8)	4163 (91.9)	NS
Sometimes	140 (4.8)	297 (6.6)	NS
Very often	24 (0.8)	50 (1.1)	NS
Every day	17 (0.6)	20 (0.4)	NS
Memory problems before collision			
Never	2766 (94.6)	4210 (92.9)	NS
Sometimes	123 (4.2)	258 (5.7)	NS
Very often	20 (0.7)	47 (1.0)	NS
Every day	15 (0.5)	15 (0.3)	NS

Values are n (%).

*Missing data: 3/7462 claimants did not provide information on sex. Of the remaining cohort of 7459, the missing cases were as follows: general health before collision, 8; previous motor vehicle injury to neck, 3; ache/pain in neck/shoulder, 5; headaches before collision, 4; low back pain before collision, 7; jaw pain before collision, 8; bodily discomfort before collision, 9; tired and lack of energy before collision, 7; depressed before collision, 9; anxious before collision, 6; angry before collision, 6; frustrated before collision, 10; fearful before collision, 9; sleeping problems before collision, 5; concentration problems before collision, 5; and memory problems before collision, 5.

Table 4 Injury related characteristics of whiplash claimants stratified by sex

Characteristic	Male* (n = 2926)	Female* (n = 4533)	p Value
Neck/shoulder pain† (mean (SD))	54.87 (25.01)	58.57 (24.90)	<0.01
Headache† (mean (SD))	33.40 (33.19)	39.89 (34.30)	<0.01
Other pain† (mean (SD))	39.51 (34.02)	43.64 (34.34)	<0.01
Per cent of body in pain (mean (SD))	18.18 (14.14)	22.54 (15.96)	<0.01
Initial health care provider			
None	104 (3.6)	124 (2.8)	NS
MD	1869 (65.2)	2862 (64.3)	NS
DC	149 (5.2)	256 (5.7)	NS
MD and DC	405 (14.1)	624 (14.0)	NS
MD and PT	338 (11.8)	588 (13.2)	NS
Admitted to hospital overnight	156 (5.3)	158 (3.5)	NS
Broken bone(s)	96 (3.3)	127 (2.8)	NS
Hit head in collision	976 (33.4)	1169 (25.8)	<0.01
Lost consciousness in collision	199 (6.8)	178 (3.9)	<0.01
Off work because of collision	1419 (49.0)	2002 (44.5)	<0.01
Symptoms after collision			
Neck/shoulder pain	2926 (100)	4533 (100)	NS
Headache	2291 (78.4)	3902 (86.1)	<0.01
Numbness/tingling or pain in arms/hands	1104 (37.8)	2103 (46.4)	<0.01
Numbness/tingling or pain in legs/feet	688 (23.5)	1283 (28.3)	<0.01
Reduced/painful jaw movement	386 (13.2)	906 (20.0)	<0.01
Dizziness/unsteadiness	1210 (41.4)	2183 (48.3)	<0.01
Nausea	631 (21.6)	1534 (33.9)	<0.01
Vomiting	143 (4.9)	294 (6.5)	NS
Difficulty swallowing	248 (8.5)	477 (10.5)	NS
Ringing in the ears	625 (21.4)	928 (20.5)	NS
Vision problems	336 (11.5)	590 (13.0)	NS
Memory problems	357 (12.2)	570 (12.6)	NS
Concentration problems	705 (24.1)	1256 (27.8)	<0.01
Low back pain	1808 (61.9)	2926 (64.6)	NS

Values are n (%) unless specified.

*Missing data: 3/7462 claimants did not provide information on sex. Of the remaining cohort of 7459, the missing cases were as follows: neck pain, 112; headache pain, 94; other pain, 101; per cent body in pain, 43; initial health care provider, 139; admitted to hospital overnight, 15; off work because of collision, 62; headache symptoms after the collision, 7; reduced/painful jaw movement, 12; numbness/tingling or pain in arms/hands, 5; numbness/tingling or pain in legs/feet, 4; dizziness/unsteadiness, 14; nausea, 6; vomiting, 9; difficulty swallowing, 5; ringing in ears, 7; memory problems, 14; concentration problems, 12; vision problems, 15; low back pain, 7; loss of consciousness, 1; hit head, 2; and broken bones, 1.

†Current pain measured on 100 mm visual analogue scale. "Other pain" refers to pain in parts of the body other than neck and headache pain.

DC, chiropractor; MD, doctor; PT, physiotherapist.

collision, as over 80% of claimants reported never being depressed or anxious before the collision. Although not conclusive because of differences in the questions about pre- and post-collision psychological factors and the retrospective nature of assessing pre-injury health,¹² these findings do suggest that individuals with whiplash injuries experience at least short term psychological as well as physical symptoms. These findings are in keeping with the observations of Mayou *et al*¹³ who followed 1141 attendees at an accident and emergency department, most of whom were discharged on the same day with "physically minor" injuries. At follow up three months later, about 30% of the subjects had both physical and psychological problems of a diffuse nature.

It should be noted that a diverse cluster of physical and psychological symptoms is not specific to physically injured personal injury claimants. Lees-Haley *et al*¹⁴ administered a symptom checklist to 170 personal injury litigants whose

claims were for emotional or industrial stress and wrongdoing, not physical injury. Nevertheless, back pain, neck pain, and headache were reported by more than 50% of these litigants, and at least half of the subjects endorsed 18 or more physical and psychological symptoms. When claimants were asked if they knew the cause of these complaints, they attributed the overwhelming majority of these complaints to events that led them to file their claim. Lees-Haley *et al* stress the importance of multiple factors in generating this widespread symptom picture, indicating, for example, that significant complaints may arise from pre-existing conditions, the stresses of litigation, emotional distress associated with the litigated trauma, non-neuropsychological injuries such as orthopaedic problems, unrelated illnesses, treatment for the litigated injury, treatment for other conditions, inspiration or hysteria precipitated by previous medical-legal evaluations, or the influence of third parties.

Clearly, the clinical picture of WAD is also influenced by many factors and our thesis is that we need to look beyond "neck injury" as an encompassing explanation. Along with injury severity and biological factors, social factors are significant as predictors of outcome after whiplash injury.⁸ Indeed a recent detailed investigation of the correlation of clinical findings, collision parameters, and psychological factors in the outcome of WAD suggests that culture, not the crash, is the chief determinant of outcome.¹⁵

Our findings reveal how extensively the WAD patient's health is affected, and we suggest that clinicians be prepared to understand not only the medical but also the psychosocial influences involved after a whiplash injury. Our results

Table 5 Health related quality of life of whiplash claimants stratified by sex (n = 3387)

Factor	Men (n = 1192)*	Women (n = 2193)*	p Value
Physical health†	36.8 (9.4)	36.1 (9.6)	NS
Mental health†	48.6 (11.7)	46.6 (12.1)	<0.01

Values are mean (SD).

*Data are from those consenting to be followed (40.7% of men and 48.4% of women).

†Physical and mental health summary scores from SF-36. Scores range from 0 to 100.

suggest that this syndrome should not be viewed piecemeal, as a series of specific structural disorders, but rather a more general illness, involving diverse symptoms reflecting pathology, psychological responses, and the social context in which the illness occurs. These symptoms are of significant concern to patients, and they need helpful explanations and reassurance. Rather than anxiety provoking referrals to a range of specialists, one for each body region (for example, ENT surgeon for vertigo, dentist for jaw pain, neurologist for numbness, and so on), and thus increasing the burden of anxieties by adding to the burden of diagnostic terms and tests, clinicians can help patients understand that the illness is highly influenced not only by the damage to the body itself, but also by factors related to the individual's responses to the collision event.

Benign explanations offer practical solutions to these symptoms, providing reduced anxiety about the health disturbance and advice that directs the patient to a return to normalcy, obviating the need to focus on "healing an injury".¹⁶ Treatment studies indicate that more general approaches that are not "injury focused", such as advice to act as usual, to remain active and exercising, emphasis on active coping, and to not consider pain as equivalent to damage are more helpful than specific medical treatments.¹⁷⁻²²

A multiplicity of symptoms is common after whiplash and many of the symptoms and psychological findings are non-specific. It thus seems more helpful to appreciate the diverse and biopsychosocial nature of post-whiplash sequelae. Conceptualising these sequelae as a general, systemic illness, influenced by biology and by psychological and societal factors may encourage patients, clinicians, and policy makers to adopt a more integrated approach to the understanding and treatment of whiplash injuries.

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