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Catastrophizing, Pain, and Pain Interference in Individuals with Disabilities

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Abstract

Objective—To examine the influence of sex and disability on catastrophizing, pain intensity, and pain interference in individuals with a spinal cord injury (SCI) or multiple sclerosis (MS).

Design—A cross-sectional survey design was employed. 248 community-dwelling adults with a physical disability (SCI=124; MS=124) and chronic pain completed measures of demographic and clinical characteristics, pain intensity and interference, psychological functioning, and pain catastrophizing.

Results—Men reported marginally greater catastrophizing ($p<.10$) than women across both disability groups; however, there was no significant difference in catastrophizing between disability groups. Catastrophizing was the only significant predictor of pain intensity in the multivariate regression analysis, with greater catastrophizing associated with greater pain. Pain intensity and catastrophizing were the only significant variables in the regression analyses predicting pain interference and psychological functioning; as hypothesized, greater pain intensity and catastrophizing were associated with more pain interference and poorer psychological functioning. There was also a trend ($p<.10$) for females, relative to males, to have a stronger association between catastrophizing and pain interference.

Conclusions—These findings are consistent with a biopsychosocial conceptualization of pain and functioning in individuals with chronic pain secondary to a physical disability. In addition, these data suggest that assessment and treatment (when indicated) of catastrophizing should be a regular part of the clinical management of these patients.

Keywords

Pain; Catastrophizing; Multiple Sclerosis; Spinal Cord Injury; Biopsychosocial

Chronic pain is a significant problem for many individuals with disabilities, such as spinal cord injury (SCI) and multiple sclerosis (MS).^{1–4} Moreover, recent research indicates that a

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number of psychosocial factors that have been shown to contribute to the experience of pain, distress, and disability in individuals who present with chronic pain as a primary problem are also associated with measures of patient functioning in individuals with disabilities and chronic pain.^{5–10} Pain catastrophizing, in particular, has been consistently shown to predict patient functioning across most, if not all, populations of individuals with chronic pain.^{10–12}

Pain catastrophizing refers to a propensity to focus on and magnify pain sensations, and to negatively evaluate one's ability to cope with pain.¹² Research has shown that individuals with chronic pain who catastrophize report higher levels of pain intensity, psychological distress, and disability, and also report higher rates of healthcare usage, longer hospitalizations, and greater use of pain medication than those who do not catastrophize.¹² Longitudinal research has also shown that catastrophizing can lead to greater pain intensity, functional impairment, and depression.¹¹ These findings have generally been replicated in samples of individuals with physical disabilities and chronic pain. For example, catastrophizing has been shown to be positively associated with measures of distress and disability in individuals with SCI,^{10,13} and with pain intensity and disability in individuals with phantom limb pain.¹⁴ Catastrophizing has also been shown to be significantly associated with greater pain intensity, increased pain interference, and poorer psychological functioning in patients with MS.¹⁵

Research in individuals who present with pain as a primary problem (e.g., chronic low back pain) suggests that women tend to catastrophize more than men.¹⁶ Moreover, when catastrophizing cognitions are controlled, statistically significant sex differences in pain intensity and distress that are often observed (women reporting higher levels of both^{17,18}) disappear.^{11,19} These findings suggest that catastrophizing may play an important role in the differences that are sometimes observed between men and women in pain and distress. However, because previous studies have focused on individuals with primary chronic pain problems, it is not clear whether such sex differences extend to individuals with chronic pain that is secondary to a disability.

Sex may also moderate the relationship between catastrophizing and measures of pain and dysfunction, although this possibility has only been examined in very few studies. In one such study, Hirsh and colleagues²⁰ found a stronger association between pain, mood and disability in women compared to men in individuals with low back, myofascial, neck, arthritis, and fibromyalgia pain. While this paper did not directly examine catastrophizing, it did suggest the possibility that men and women may differ in how psychosocial variables are related to pain and other important pain-related variables; such differences could potentially extend to catastrophizing. In other words, among women, the association between pain and disability may be mediated by negative mood and psychological functioning, while psychosocial factors may play less of a role in these associations for men.²⁰

Along these lines, Sullivan and colleagues¹⁹ reported that women differ from men in their behavioral responses to pain. These investigators cited several studies demonstrating that women (a) report more health care utilization than men, (b) take more sick days than men in response to pain, and (c) are more likely to go on short-term disability following a pain-related condition compared to men. Despite these previous findings suggesting differences between men and women in the associations among pain-related variables (including psychosocial variables), no study has yet examined the relationship between sex, catastrophizing, pain, and dysfunction in individuals with a disability and chronic pain. Knowledge concerning these relationships is important because, if sex differences are found, this raises the possibility that men and women may benefit from different treatment interventions or approaches. Determining the extent to which such sex differences are found

in individuals with a disability and chronic pain is also important because the rates of many disabling conditions vary between men and women. For example, and of most relevance to the current study, approximately 80% of spinal cord injuries occur in men,²¹ whereas MS is twice as common in women.²²

The analyses performed in this study were designed to help advance our understanding of the role that sex may play in the associations among psychosocial factors and physical functioning, and how certain psychological variables, such as catastrophizing, may be associated with pain and dysfunction in two distinct disabilities (MS and SCI). Specifically, the purposes of this study were to: (1) determine if the sex differences in catastrophizing that have previously been found in other pain groups replicate in a sample of patients with chronic pain that is secondary to a disability (MS or SCI); (2) examine, for the first time, the possible moderating effects of sex on the associations between catastrophizing and measures of pain and functioning in individuals with MS and SCI; and (3) explore possible differences in catastrophizing between MS and SCI groups, and whether the associations between catastrophizing and measures of pain and functioning vary as a function of disability group.

Based on the results of previous, relevant research, we hypothesized that women will report greater catastrophizing than men across both disability groups studied. We also anticipated that the association between catastrophizing and critical outcome variables will be stronger for women than for men. Given the lack of previous research examining differences in psychosocial variables between disability groups, we did not have specific hypotheses concerning possible similarities and differences in the associations between catastrophizing and measures of pain and functioning between patients with MS and SCI; therefore, the analyses for the third study purpose were considered exploratory.

METHODS

Participants

The study participants (Table 1) were 248 adults with a physical disability and chronic pain (SCI, N=124; MS, N=124). The data for the MS sample was drawn from a previously published paper.¹⁵ A detailed account of the recruitment procedures can be found in that paper. All procedures were approved by the University of Washington Human Subjects Review Committee. Briefly, participants were recruited from the Multiple Sclerosis Association and self-referral. Participants were mailed a study survey and asked to return the completed documents to the research team. Respondents were paid \$25 for completing and returning the consent forms and survey. 124 participants indicated that they had a current or recent pain problem, and had complete data for the primary study variables listed below. These 124 participants were included in the analyses for the current study.

Data for the SCI patients was also drawn from previous survey studies^{23–24} that included all of the variables needed for the analyses for this study. Recruitment details can be found in the 2 papers cited above. Of note, one of these studies²³ included analyses of both non-veteran and veteran patients; the current study included only the non-veteran patients. All study procedures were approved by the University of Washington Human Subjects Review Committee. Briefly, potential participants were mailed a packet of materials that included the study questionnaires and consent forms. Individuals were paid \$25 for completing and returning the forms. The 124 participants who indicated that they had a current or recent pain problem, and who had complete data for the primary study variables listed below, were included for the current study.

Although this study included participants from previously published reports, the current analyses focus on distinct issues and pose new questions that were not examined in the previous studies.

Measures

Demographic and Clinical Characteristics—Participants provided information about their sex, age, race and ethnicity, education level, marital status, and employment status. Information was also collected about the participants' clinical conditions, such as illness/injury duration, MS type, SCI level, and SCI completeness. The demographic and clinical characteristics of the sample are presented in Table 1.

Pain Intensity—Participants were first asked to indicate the presence or absence of pain problems by responding to the following question: "Are you currently experiencing, or have you in the past 3 months experienced any pain (other than occasional headaches or menstrual cramps)?" Participants who responded affirmatively were then asked to rate their average pain intensity during the past week on a numerical rating scale (NRS) that ranged from 0 (no pain) to 10 (pain as bad as could be). This rating scale was adapted from the Graded Chronic Pain Scale.²⁵ NRSs for pain intensity are widely used and have demonstrated excellent psychometric characteristics in previous research.²⁶

Pain Interference—A modified version of the Brief Pain Inventory (BPI) Pain Interference Scale²⁷ was used to assess pain interference. The original BPI asks respondents to rate the degree to which pain interferes with 7 functional domains: general activity, mood, normal work, walking, relations with other people, sleep, and enjoyment of life. Because many individuals with SCI and MS are unable to ambulate, the walking item was modified to assess interference with mobility (ability to get around). To increase the breadth of the assessment of pain-related interference in important activities, 5 additional items were added that assess pain interference with self-care, recreational activities, social activities, communication with others, and learning new information and skills. These additions extend the functional domains assessed by the BPI to those defined as relevant and unique by the World Health Organization's (WHO) International Classification of Functioning (ICF), Disability, and Health.²⁸ Respondents rated the level of pain interference in the above 12 domains on an NRS ranging from 0 (does not interfere) to 10 (completely interferes). A total score was calculated by averaging the item ratings. This modified BPI has been used in previous studies on pain in persons with disabilities and has demonstrated good psychometric properties.^{15,29,30}

Psychological Functioning—Psychological functioning was assessed with the Mental Health scale of the SF-36 (MHS).³¹ The 5 items on this measure are scored with a possible range of 0–100, with higher scores indicating better psychological functioning. The MHS is widely used and has demonstrated good reliability and validity in previous research.³¹

Pain Catastrophizing—Pain catastrophizing was measured using the 6-item catastrophizing subscale from the Coping Strategies Questionnaire (CSQ).³² This scale assesses the frequency of helpless and pessimistic cognitions about pain. Respondents rate each item on a scale from 0 (never) to 6 (always). The subscale score is the mean of the 6 items, with higher scores indicating more frequent catastrophizing in response to pain. The catastrophizing subscale has demonstrated good psychometric properties in previous research.^{32,33}

Data Analysis

Listwise deletion was used for missing data contained in the source datasets^{15,23,24} such that the analyses for the present study included only participants with complete data on the primary variables of interest. Listwise deletion was chosen due to the small and random nature of the missing data, and because of the large sample of the current study.³⁴ Descriptive statistics were computed for the demographic, pain, and psychosocial variables listed above. Next, hypothesized sex differences in pain catastrophizing (study purpose 1) were examined with an analysis of variance (ANOVA). This analysis also allowed us to explore whether any observed sex differences varied across diagnostic groups.

Finally, 3 hierarchical regression analyses were conducted to (1) test whether sex moderated the associations between catastrophizing, pain, and functioning (study purpose 2), and (2) explore differences in catastrophizing between the two disability groups and whether the associations between catastrophizing, pain, and functioning vary across these groups (study purpose 3). Pain intensity (average during the past week) was the criterion variable in the first regression. Sex and diagnosis were entered simultaneously in step 1 of the model, followed by pain catastrophizing in step 2. Two interaction terms were entered in step 3: Sex $\times$ Catastrophizing and Diagnosis $\times$ Catastrophizing. The second regression predicted pain interference (BPI). In this analysis, sex, diagnosis, and pain intensity were entered in step 1, followed by pain catastrophizing in step 2, and the two interaction terms (Sex $\times$ Catastrophizing and Diagnosis $\times$ Catastrophizing) in step 3. Psychological functioning (MHS) served as the criterion variable in the third regression. Otherwise, this analysis was identical to the second regression, such that step 1 consisted of sex, diagnosis, and pain intensity, step 2 consisted of pain catastrophizing, and step 3 consisted of the two interaction terms.

Because the inclusion of interaction terms in regression analyses increases the chances of problematic multicollinearity among the associated predictor variables, the pain catastrophizing variable was centered prior to inclusion in the models; i.e., the sample mean for this variable was computed and then subtracted from each participant's raw score.³⁵

RESULTS

Sex Differences in Catastrophizing

Results of the ANOVA indicated that, across the two disability groups, men ($M=1.26$, $SD=0.25$) demonstrated slightly higher catastrophizing scores than women ($M=1.19$, $SD=0.19$); however this sex difference only approached statistical significance ($p=0.09$). No significant difference in catastrophizing scores emerged between diagnosis groups ($p=.15$), and the Sex $\times$ Diagnosis interaction predicting catastrophizing scores was also not significant ($p=.71$).

Predicting Pain Intensity

Detailed results of the hierarchical regression analyses testing the hypotheses associated with study purposes 2 and 3 are found in Table 2. In the regression predicting average pain intensity, neither sex nor disability group were significant in step 1 of the model ($\Delta R^2=0.01$, $p=.46$). Catastrophizing was a significant predictor in step 2, and accounted for an additional 19% of the variance in pain intensity ($p<.001$). These results indicated that higher scores on the catastrophizing scale of the CSQ were associated with greater pain intensity. Finally, after controlling for sex, diagnosis, and catastrophizing variables, the two interaction terms (Sex $\times$ Catastrophizing and Diagnosis $\times$ Catastrophizing) did not account for additional, unique variance in pain intensity in step 3 of the model ($\Delta R^2=0.01$, $p=.38$).

Predicting Pain Interference

Pain interference served as the dependent variable in the second regression model. The group of variables in step 1 of the model accounted for 40% of the variance in pain interference ($p<.001$). Of these variables, pain intensity was the only unique predictor of pain interference ($\beta=0.64$, $p<.001$), such that greater average pain intensity over the preceding week was associated with greater pain interference scores on the BPI. After controlling for the variables in step 1, catastrophizing accounted for an additional 12% of the variance in pain interference in step 2 ($p<.001$); higher scores on the catastrophizing scale were associated with more pain interference. Finally, the interaction terms (Sex $\times$ Catastrophizing and Diagnosis $\times$ Catastrophizing) were not significant additions to the model in step 3 ($p=.17$).

Examination of the regression coefficients for the final model (i.e., with all variables considered simultaneously) indicated that the interaction between catastrophizing and sex approached significance ($\beta=0.28$, $p=0.06$) as a predictor of pain interference. Therefore, we decided to further explore the nature of this interaction by examining the relationship between catastrophizing and pain interference separately in men and women. Specifically, in each sex, we computed partial correlation coefficients (controlling for diagnosis and pain intensity) for catastrophizing and pain interference. Results from these analyses indicated that females ($R=0.50$, $p<0.001$) demonstrated a slightly stronger association between catastrophizing and pain interference compared to men ($R=0.42$, $p<0.001$). Although the correlation between catastrophizing and pain interference was significant for both men and women, the magnitude of the associations was not significantly different between the sexes.

Predicting Psychological Functioning

In the third regression model predicting psychological functioning, the demographic and pain variables were significant in step 1, and accounted for 5.6% of the variance in the dependent variable ($p<.01$). Pain intensity was the only significant predictor in this step ($\beta=-0.22$, $p<.001$), such that greater pain was associated with poorer psychological functioning. In step 2, catastrophizing accounted for an additional 27% of the variance in psychological functioning ($p<.001$); greater frequency of catastrophizing cognitions was associated with poorer psychological functioning. Finally, and consistent with the previous regression analyses, after controlling for sex, diagnosis, pain intensity, and catastrophizing, the interaction terms (Sex $\times$ Catastrophizing and Diagnosis $\times$ Catastrophizing) were not significant in the third step of the model ($p=.76$).

DISCUSSION

The current study investigated several important aspects of the pain experience in a sample of individuals with MS or SCI. Specifically, we tested for possible sex differences in the level of pain catastrophizing, and the extent to which sex and disability diagnosis may moderate the associations between catastrophizing and measures of pain and functioning. Counter to study hypotheses and previous research, no statistically significant differences between men and women were found in catastrophizing scores across the two disability samples. In fact, to the extent that sex differences in pain catastrophizing were present, in our samples, men reported greater catastrophizing than women. Consistent with previous research in individuals with chronic pain as a primary problem, catastrophizing was a consistent and important predictor of pain and functioning in the regression models.

The findings regarding the lack of sex differences in catastrophizing were surprising, given the consistent differences between men and women in catastrophizing scores (women having higher scores than men) in other samples.^{10,36–39} Interestingly, in our sample, men

reported slightly greater catastrophizing than women, although this difference was small and not statistically significant. Much of the previous literature in this area focused on individuals for whom chronic pain was the primary clinical condition,^{16,19,38,40} as opposed to individuals whose pain is secondary to a disability. It is possible that men and women with a disability catastrophize about their pain differently than the non-disability population, which may partly explain why we did not observe a sex difference in the current sample. Additional research is needed to further examine this issue.

In the regression analyses, we found that sex and diagnosis did not significantly predict average pain intensity, pain interference, or psychological functioning. While sex differences in the pain experience have been investigated in the broader pain literature, relatively little is known about how males and females with MS, SCI, and other disabilities differ with regard to these factors. Two studies yielded conflicting results about the *prevalence* of pain among men and women with SCI. Whereas, Norrbrink Budh and colleagues⁴¹ found a higher pain prevalence among women, Finnerup and colleagues⁴² found a higher prevalence among men; however, neither study reported significant sex differences in pain intensity. In a recent study of patients with limb loss, females were found to report significantly greater pain intensity and interference than males;⁴³ however, because that study involved a different patient population, the findings may not directly apply to individuals with SCI and MS. The current findings concerning a lack of sex differences in pain intensity and interference are consistent, however, with another recent study that also examined this in a large sample of veterans with MS.⁴⁴ The results of these few investigations suggest the intriguing possibility that the existence of sex differences in the pain experience may depend on the type of disability. Future research is needed to test this possibility and, if confirmed, determine whether these differences are rooted in physiological factors, psychosocial factors, or some combination of the two.

Consistent with previous studies in persons with a disability,⁴⁵ catastrophizing did contribute significantly to the prediction of pain intensity, providing further support for the important role of this variable in the experience of pain in individuals with disabilities. The magnitude of the catastrophizing-pain relationship observed herein was consistent with what has been found in other patient groups,¹¹ suggesting that the deleterious effects of catastrophizing are similar in persons with pain secondary to MS and SCI as they are in non-disability chronic pain patients. Catastrophizing was also a significant predictor of pain interference and psychological functioning, and this finding is also consistent with previous studies.⁴⁵ Compared to the non-disability chronic pain literature, there are fewer empirical investigations of the associations between catastrophizing and functioning in persons with physical disabilities. Nevertheless, a growing body of literature has emerged over recent years indicating that catastrophizing in this context is associated with and predictive of poorer functioning across a range of important psychosocial domains.⁴⁵ As such, it is important that rehabilitation providers regularly assess the extent of catastrophizing cognitions in their patients, and provide or arrange for appropriate clinical interventions to address these cognitions when present.

Results of the regression analyses were also suggestive of an interesting and potentially important sex difference in the association of catastrophizing and pain interference. Women in the current sample had a slightly stronger association between catastrophizing and pain interference than did men, although it should be noted that this difference was not statistically significant and was based on exploratory analyses. As noted previously, Hirsh and colleagues²⁰ found a stronger association between pain, mood, and disability in women compared to men in a non-disability chronic pain sample. To our knowledge, the current study is the first to examine such sex differences in a primary disability sample. Given this, and the fact that these differences did not reach the traditional level of statistical

significance, these results should be viewed as preliminary and in need of replication in future studies that include larger and more diverse (in demographic characteristics and disability conditions) samples. Nevertheless, they do suggest that one's thinking about pain in the context of a disability is closely related to one's functioning, and that this may be particularly true for women. If this is borne out in future studies, practitioners may need to be especially vigilant to the cognitive-emotional status of their female patients.

It is important for clinicians to recognize catastrophizing and other pain-related coping strategies employed by their patients, since how one copes with pain, or more specifically, how one utilizes maladaptive coping strategies, is a particularly important determinant of adjustment to chronic pain.^{46–47} Our results are consistent with the IASP definition of pain as “An unpleasant sensory and emotional experience...”,⁴⁸ since we found that psychosocial factors such as catastrophizing cognitions were important correlates of pain severity. These findings are also consistent with cognitive-behavioral accounts of chronic pain, which hold that individuals' pain-related cognitions, beliefs, and coping behaviors play a role in determining their adjustment to pain;⁴⁹ many of these postulates have been supported in the literature.⁵⁰ Although such pain-related cognitions are likely to be similar in patients with and without a physical disability, clinicians should also be attentive to the potentially unique aspects of catastrophizing among disability groups. For example, among individuals with SCI or MS, a benign pain exacerbation might be more likely to elicit catastrophic thoughts that their condition is deteriorating.

Recent work by Thorn and colleagues⁵¹ has specifically focused on reducing catastrophizing among individuals with chronic pain, with promising initial findings from a randomized clinical trial in patients with chronic headache. Recently, a few studies have been conducted evaluating the effects of similar cognitive-behavioral interventions among persons with a disability. Two studies in patients with SCI found significant improvements in pain-related disability, catastrophizing, negative mood, and other indices of quality of life following multidisciplinary pain management programs that included specific interventions targeting maladaptive cognitions.^{52–53} Similarly, a small study in patients with chronic pain and mixed disabilities found improvement in average pain intensity following a cognitive restructuring intervention; participants were also highly receptive to and satisfied with the intervention.⁵⁴ Although these studies suggest that those who suffer from chronic pain and disability are likely to benefit from cognitive-behavioral interventions, it will be important for future research to continue to test the effectiveness of such targeted treatments in this patient population.

Several study limitations should be considered. First, self-report measures of catastrophizing, pain, and functioning were used, which might introduce measurement biases. Second, we employed a general measure of psychological functioning (Mental Health scale of the SF-36) that did not allow us to specifically assess factors such as depression and anxiety. It is possible that these factors and their associations with pain and functioning differ across disability group and by sex; this could be explored in future research. Third, the cross-sectional nature of these data did not allow for causal interpretations about the relationships examined herein. Fourth, because these data were drawn from a larger database that has been analyzed previously, there is an increased risk for type I error in the current study. Although we believe this risk is mitigated somewhat by the hypothesis-driven nature of most of our analyses, the findings reported herein should be replicated before drawing strong conclusions. Finally, the lack of racial and ethnic diversity in our sample, and inclusion of only patients with SCI and MS, may limit the generalizability of the findings. Moreover, although our survey response rate is consistent with similar studies, it nevertheless represents only a subset of the population of individuals with SCI and MS.

Despite these limitations, the results of the current study provide additional empirical support for a biopsychosocial conceptualization of pain and functioning in individuals with physical disabilities. In this study, we found that a key psychological variable, catastrophizing, was significantly associated with pain intensity, pain interference, and psychological functioning in a sample of individuals with pain secondary to MS or SCI. This study also provides information on the similarities and differences between men and women across the pain-catastrophizing nexus, which should be explored further in future studies. Such research may ultimately lead to improvements in the care of patients with pain.

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Table 1

Demographic and clinical characteristics of the study sample

Demographic Variables	Disability Group	
	SCI	MS
Sample size	124	124
Sex		
Male	89 (72%)	31 (25%)
Female	35 (28%)	93 (75%)
Age (years)	48.49 (11.84)	50.85 (10.79)
Race/Ethnicity		
Caucasian	106 (86%)	117 (95%)
Native American	8 (7%)	2 (2%)
African American	2 (2%)	1 (<1%)
Hispanic	4 (3%)	1 (<1%)
Asian	2 (2%)	2 (2%)
Other	2 (2%)	1 (<1%)
Marital status		
Married	47 (38%)	75 (61%)
Separated	1 (<1%)	5 (4%)
Divorced	20 (16%)	21 (17%)
Living with a partner	10 (8%)	10 (8%)
Never married	39 (32%)	10 (8%)
Widowed	7 (6%)	3 (2%)
Education		
Grade 11 or lower	7 (6%)	2 (2%)
High school	13 (11%)	12 (10%)
Vocational/technical school	14 (11%)	7 (6%)
Some college	38 (31%)	36 (29%)
College graduate	31 (25%)	37 (30%)
Graduate/professional school	21 (17%)	30 (24%)
Employment		
Employed full-time	31 (25%)	18 (15%)
Employed part-time	15 (12%)	12 (10%)
School/vocational training	2 (2%)	1 (<1%)
Retired	6 (5%)	1 (<1%)
Homemaker	12 (10%)	27 (22%)
Unemployed	58 (47%)	65 (52%)
Clinical Variables	SCI	MS
Disease/Injury duration (years)	14.17 (10.59)	12.79 (10.09)
MS type	N/A	
Relapsing-remitting		65 (52%)
Secondary-progressive		29 (23%)

Clinical Variables	SCI	MS
Primary-progressive		15 (12%)
Progressive-relapsing		11 (9%)
Missing data		4 (3%)
Level of injury		N/A
C1-C4	5 (4%)	
C5-T1	50 (40%)	
T2-S4	49 (40%)	
Missing data	20 (16%)	
Completeness of injury		N/A
Complete	50 (40%)	
Incomplete	61 (49%)	
Don't know	13 (11%)	
Pain intensity	5.10 (2.25)	4.81 (2.37)
Pain interference	3.69 (2.60)	3.52 (2.47)
Psychological functioning	69.29 (19.06)	66.26 (19.61)
Catastrophizing	1.26 (.24)	1.19 (.20)

Note: Pain Intensity, average pain intensity the past week (0–10); Pain Interference, modified Brief Pain Inventory Interference scale; Psychological functioning, SF-36 Mental Health scale; Catastrophizing, Coping Strategies Questionnaire Catastrophizing scale

Table 2

Regression analyses predicting pain intensity, pain interference, and psychological functioning

	R²	ΔR²	ΔF	β
<i>Pain Intensity</i>				
Block 1:	.01	.01	.78	
Sex				-.05
Diagnosis				-.04
Block 2:	.20	.19	57.21**	
Catastrophizing				.44**
Block 3:	.20	.01	.98	
Catastrophizing × Sex				.21
Catastrophizing × Diagnosis				-.24
<i>Pain interference</i>				
Block 1:	.40	.40	54.96**	
Sex				-.02
Diagnosis				.01
Pain intensity				.64**
Block 2:	.53	.12	63.08**	
Catastrophizing				.40**
Block 3:	.53	.01	1.76	
Catastrophizing × Sex				.28 [†]
Catastrophizing × Diagnosis				-.12
<i>Psychological functioning</i>				
Block 1:	.06	.06	4.78*	
Sex				.01
Diagnosis				-.10
Pain intensity				-.22**
Block 2:	.33	.27	99.16**	
Catastrophizing				-.59**
Block 3:	.33	.00	.28	
Catastrophizing × Sex				-.04
Catastrophizing × Diagnosis				-.10

Note. Pain Intensity, average pain intensity the past week (0–10); Pain Interference, modified Brief Pain Inventory Interference scale; Psychological functioning, SF-36 Mental Health scale; Catastrophizing, Coping Strategies Questionnaire Catastrophizing scale.

[†] p<.10

* p<.01

** p < .001