ORIGINAL ARTICLE

Psychological morbidity and spinal cord injury: a systematic review

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Study Design: A systematic review of the literature concerning the nature of the psychological morbidity in people with spinal cord injury (SCI).

Objectives: SCI is believed to place the individual at a high risk of psychological morbidity. The objective of this paper was to examine systematically the prevalence of negative psychological states in people with SCI, as well as to explore mediating and contextual factors.

Methods: Search engines such as Medline and PsycInfo were systematically searched using specific key words, such as SCI, depression, anxiety and so on. Only studies that fulfilled certain criteria such as the use of valid measures in assessing psychological morbidity were used in the review process.

Results: The systematic review revealed that clarification is still needed concerning the psychological consequences of people with SCI. However, findings suggest that approximately 30% of people with SCI are at risk of having a depressive disorder although in rehabilitation, and approximately 27% are at risk of having raised depressive symptoms when living in the community. The review also established that people with SCI have higher comparative risks of anxiety disorder, elevated levels of anxiety, feelings of helplessness and poor quality of life (QOL).

Conclusion: People with SCI have an increased risk of suffering debilitating levels of psychological morbidity. Future research needs to clarify the extent and nature of psychological morbidity following SCI by conducting prospective and comprehensive research in large heterogeneous samples of people with SCI during the rehabilitation phase and following reintegration into the community.

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Keywords: spinal cord injury; depression; anxiety; post-traumatic stress disorder; quality of life; psychological morbidity

Introduction

Although spinal cord injury (SCI) is a relatively uncommon disorder, its effects can be devastating.^{1,2} The injury usually results in permanent paralysis of voluntary muscles and loss of sensation below the lesion, which is associated with reduced mobility and functional independence, impairment of social and vocational activities, as well as negative influences on the person's health and well-being.^{1,2} The world age-standardized incidence (risk) ranges between 10.4 and 83 per million persons per year, with the risk being much higher for men aged 15–24 years at approximately 40 per million.^{3,4} Worldwide prevalence has been estimated to range between 223 and 755 per million people,⁴ and because of improved survival rates, SCI prevalence is increasing. On the basis of a national database of 30 822 SCI people in the United States, life expectancy of persons with SCI has been shown to increase over the past 30 years, with mortality rates

reducing by approximately 40% in the first 2 years after the injury.⁵ The majority of people who sustain an SCI commonly do so as a result of motor vehicle accidents, fall-related injuries (especially in the elderly), sports injuries and gun shot wounds.^{3,6}

The extent and nature of any negative psychological effects associated with SCI needs to be carefully determined. Early research suggested that the risks of psychopathology were minimal, preferring to label any psychological disturbance as 'despondency' (that is, a dysphoric or unhappy reaction to the injury), being a component of a stage process of adjustment to their injury.^{7–9} More recent research suggests that SCI is associated with the raised risks of psychological morbidity in contrast to a 'normal process' of grieving and sadness resulting from significant losses associated with the injury.^{1,8,10–12} In a critical review of the relevant literature published in 1999, North concluded that SCI is associated with abnormal levels of psychological morbidity.¹² Supporting this conclusion, latest research has shown that substance abuse and risk of suicide are more prevalent in the SCI population relative to the able-bodied population.^{11,13,14} For instance, Heinemann¹³ found over

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half of a large sample of adults with SCI had abused alcohol or some other drug after the injury, and the suicide rate among individuals with SCI is believed to be up to five times higher than expected in the general population in the United States, Europe and Australia.^{15,16} Hospitalization rates are twice that for the general US population, most likely because of the high prevalence of medical complications, such as spasticity, pain and infections.¹⁷ Krause¹⁸ found there were four major groups of problems in people with SCI living in the community, and these were (i) psychological problems including loneliness, depression and stress, (ii) dependency and control issues, (iii) health problems such as pain and (iv) environmental problems such as accessibility. Clearly, SCI can present barriers to psychological health of those affected. Given that earlier reviews were published around a decade ago among calls for research to clarify this issue,^{2,12,19} it was considered timely to review in a systematic manner research that has investigated the psychological consequences associated with sustaining an SCI. The aim of the paper was to examine systematically the prevalence of psychological morbidity in people with SCI, as well as to explore possible mediating and contextual factors.

Methods

To determine the extent and nature of psychological morbidity or negative psychological states associated with SCI, a systematic review of the literature was conducted using Medline, PsycInfo and Google Scholar search engines. Key words used included SCI, depression, psychological morbidity, depressive mood, anxiety, post-traumatic stress disorder (PTSD), adjustment and quality of life (QOL). Only studies that fulfilled the following criteria were included in the review: (i) valid measures of psychological status; (ii) provision of statistical outcomes on the basis of group analyses and (iii) psychological morbidity outcomes collected either during the rehabilitation inpatient phase or following reintegration into the community. It was not the required criteria (though desirable) for a study to provide comparisons of psychological morbidity to an able-bodied control group.

Psychological morbidity following SCI

For the purposes of this review, psychological morbidity was simply defined as a pathological state involving abnormal levels of negative psychological, emotional or behavioral states. Before psychological morbidity in people with SCI is discussed, it is important to say that studies consistently show that the majority of people who sustain an SCI seem to cope adaptively with the traumatic injury and severe resultant impairment.^{1,7,9,10} This conclusion is supported by the studies designed to determine the risk of psychological morbidity following an SCI. Most of these studies find that at least 50% and above of people with SCI do not develop psychopathology as a consequence of the injury and impairment. However, a substantial minority is presumed to be at risk and the nature of the associated psychological morbidity following SCI will now be discussed.

Depression and/or depressive mood states

Tables 1 and 2 show the details for 18 studies that were detected by the systematic review process, and which reported data on rates of depression, depressive symptoms or depressive mood following SCI. A proportion of these studies have used either a structured clinical interview on the basis of diagnostic statistical manual of mental disorders (DSM) criteria and/or validated and reliable self-report measures of depressive mood.^{9,10,20–35} Although few, if any of these measures have been validated for use with SCI, they have been used widely for research in other areas, such as with able-bodied populations with a psychopathology such as major depressive disorder or anxiety disorder. Measures that were not developed for use with the hospital populations, and which include items measuring physical symptoms that could possibly inflate the level of psychopathology or negative psychological states (such as the Beck depression inventory) were included in the critical review.^{29,35} Although this decision could result in an overestimation of psychological morbidity rates, it was believed to be important to include as many studies that provided reliable estimates of psychological morbidity. Inspection of prevalence rates in Table 2, for instance, reveals that studies using the Beck

Table 1 Studies that have investigated the rates of depression or depressive mood symptoms in persons with SCI during the inpatient rehabilitation phase

Study	Subjects	Measures	% with depression or depressive symptoms	Significant difference to controls
Buckelew <i>et al.</i> ²⁰	57 SCI	SCL-90	26% (dep. symp.)	—
Dryden <i>et al.</i> ²¹	201 SCI	Clinical diagnostic assessment	28.9% (MDD)	—
Frank <i>et al.</i> ²²	32 SCI	DSM-III diagnostic interview	37% (MDD) 6% (dysthymia)	—
Fullerton <i>et al.</i> ⁹	30 SCI	Research diagnostic criteria	30% (MDD)	—
Howell <i>et al.</i> ²³	22 SCI AB cont.	SADS; BDI	SCI: 23% (dep. symp.) AB cont: 6% (dep. symp.)	Yes
Judd <i>et al.</i> ²⁴	71 SCI	DSM-III clinical interview	20% (MDD)	—
Kennedy and Rogers ²⁵	40 SCI	BDI	30% (dep. symp.)	—
Kishi <i>et al.</i> ²⁶	60 SCI	DSM-III structured interview HDRS	22% (MDD); 8% (minor dep. disorder) 23% (MDD)	—

Abbreviations: AB cont., able-bodied controls; BDI-Beck depression inventory; dep., depressive; DSM, diagnostic statistical manual of mental disorders; HDRS, Hamilton Rating Scale for Depression; MDD, major depressive disorder; SADS, schedule of affective disorders and schizophrenia; SCI, spinal cord injury; SCL-90, symptom checklist-90; symp., symptoms.

Table 2 Studies that have investigated the rates of depressive mood symptoms in persons with SCI when living in the community

Study	Subjects	Measures	Time measured	% with depressive symptoms	Significant difference to AB cont.
Bombardier <i>et al.</i> ²⁷	849 SCI	Patient health quest	1 year after SCI	11.4% (dep. symp.)	—
Craig <i>et al.</i> ¹⁰	31 SCI 31 AB cont.	BDI	2 years post-injury	SCI: 30% (dep. symp.) AB cont.: 6% (dep. symp.)	Yes
Fuhrer <i>et al.</i> ²⁸	140 SCI AB norms	CES-D	Community based	No data provided to calculate %	Yes
Hancock <i>et al.</i> ²⁹	41 SCI 41 AB cont.	MACS: helplessness subscale	1 year post-injury	SCI: 45% (perceived helpless) AB cont.: 10% (perceived helpless)	Yes
Kemp <i>et al.</i> ³⁰	211 SCI	Hamilton Dep Scale	Community sample	20% (dep. symp.)	—
Kemp and Krause ³¹	177 SCI 62 AB cont.	OAHMQ	Community sample	SCI: 41% (dep. symp.) AB cont.: 15%	Yes
Kennedy and Rogers ²⁵	46 SCI	BDI	12 months post-injury	35% (dep. symp.)	—
Krause <i>et al.</i> ³²	1391 SCI	OAHMQ using DSM-III-R criteria	At least 1 year post-injury	24% (probable MDD) 48% (dep. symp.)	—
MacDonald <i>et al.</i> ³³	53 SCI	BDI; CDM	Living in the community	60% (dep. symp.)	—
Scivoletto <i>et al.</i> ³⁴	100 SCI	QD	Mean 4.6 years post-injury	16% (dep. symp.)	—
Craig <i>et al.</i> ³⁵	33 SCI 33 AB cont.	POMS	12 years post-injury	SCI: 18.2% (dep. Symp.); AB cont.: 3% (dep. symp.)	Yes

Abbreviations: AB cont., able-bodied controls; BDI, Beck depression inventory; CDM, clinical depression measure; CES-D, Centre for Epidemiologic Studies Depression Scale; DSM, diagnostic statistical manual of mental disorders; MACS, Mental Adjustment to Cancer Scale; MDD, major depressive disorder; OAHMQ, Older Adults Health and Mood Questionnaire; POMS, profile of mood states; QD, Depression Questionnaire from the Cognitive Behavioural Assessment; SCI, spinal cord injury.

depression inventory do not seem to have found over inflated rates of depressive mood in comparison with other measures.

Eight studies^{9,20–26} reported the rates of depression or depressive mood during the rehabilitation or inpatient hospitalization phase (Table 1). Of those eight studies, five^{9,21,22,24,26} reported the rates of depression based on a structured diagnostic interview. All five studies found a substantial minority of people with SCI had a depressive disorder such as a major depressive disorder (MDD) or a minor depressive disorder, ranging from 20,²⁴ 29,²¹ 30%^{9,26} through to 43%.²² On the basis of the median value, these studies suggest that approximately 30% of people with SCI are at risk of being depressed during the rehabilitation phase. The other three studies^{20,23,25} assessed negative mood using a variety of validated-mood-related questionnaires, such as the Beck depression inventory, the SCL-90 and the Hamilton Rating Scale of Depression. Findings suggest that between 23 and 30% of persons with SCI in the rehabilitation phase are at risk of having abnormal levels of depressive mood-related symptoms. One study compared able-bodied controls with the SCI sample and found a significantly higher rate of depressive mood in persons with SCI relative to the controls.²³ It is important to point out that the range of depression/depressive mood rates found in the SCI inpatients (that is, 20–43%) is consistent with the levels of depression/depressive mood found in the studies of all types of patients in hospital settings.³⁶

Table 2 shows 11 studies that reported rates of depressive mood in people with SCI living in the community.^{10,25,27–35} None of the 11 studies used a structured diagnostic interview technique to determine the risk of depression. Three studies^{30–32} used a validated questionnaire measure of depressive symptoms called the Older Adults Health and

Mood Questionnaire on the basis of DSM-III-R criteria and found probable MDD rates of approximately 17–24%, with significant depressive symptoms present in 41³¹ and 48%³² of the SCI samples. The other eight studies reported raised levels of depressive mood symptoms and/or negative mood states in persons with SCI living in the community, ranging from 11,²⁷ 16,³⁴ 20,³⁵ 30,¹⁰ 35,²⁵ 45²⁹ to 60%.³³ No data was provided in one study to calculate the rates of depressive mood.²⁸ On the basis of the median value from these 10 studies, it is estimated that the rate of significant depressive symptoms in people with SCI living in the community lies between 25 and 30%. Five studies found significant differences in depressive symptoms among persons with SCI living in the community relative to able-bodied controls, that is, people with SCI have higher risks of psychological morbidity than able-bodied controls.^{10,28,29,31,35} As an example, Craig *et al.*³⁵ found in a group of 33 persons with SCI living in the community (the majority for at least 6 years) that 18.2% had levels of negative mood states typical of someone with severe psychopathology or psychiatric disorder compared with 3% in the able-bodied controls. The SCI group were found to have seven times the risk of psychological morbidity than the controls, and the SCI sample had higher levels of negative mood states in all measures comprising the Profile of Mood States.³⁵

The presence of MDD or elevated depressive mood symptoms has associated additional psychosocial risks. Research has found that the negative mood states increase the risk of poor outcomes, such as longer hospitalization periods, increased medical complications, decreased self-care independence, spending more time in bed, spending fewer days outside the ward and difficulties with transportation.^{37,38} Research also suggests that unless those individuals with SCI having depressive disorder or high

levels of negative psychological states are treated, psychological morbidity will remain significantly elevated for up to 2 years or more after the injury compared with those treated with cognitive behavior therapy.^{10,39,40}

In addition, increased pain has also been found to be related to depressive symptomatology.^{41,42} In a follow-up survey of 192 persons with SCI living in the community, high levels of pain were shown to be related to poor quality sleep, as well as high levels of anxiety and depression.⁴³ In a prospective study of persons with SCI followed up to 2 years after their injury, Craig *et al.*⁴⁴ found that depressive mood 2 years after the injury was predicted by pain and feeling helpless or out of control of one's life before discharge from their rehabilitation phase in hospital. It is not surprising that the presence of high levels of pain are associated with the depressive mood, given that the pain is mostly perceived as a negative and unpleasant stimulus, and is perceived to lower well-being significantly.¹

Anxiety and distress

A substantial minority of people with SCI are at risk for abnormal levels of anxiety.^{10,25} Results from controlled longitudinal research suggest that up to 30% of persons with SCI have raised levels of anxiety, which does not diminish appreciably over time up to 2 years post-injury.¹⁰ Scivoletti *et al.*³⁴ found a 13% prevalence of anxiety disorder in 100 persons with SCI assessed 12 months after their injury. Kennedy and Rogers²⁵ assessed persons with SCI for state anxiety after the initial week of the injury, and then every 6 weeks up to the time of discharge (mean 48 weeks), when assessments were performed 1, 3, 6, 12 and 24 months after discharge. They found that mean anxiety levels steadily increased from the initial week after the injury to scores above those expected for a clinical anxiety disorder at approximately 36–48 weeks post-injury (just before discharge), after which mean levels fell below the clinical cut off score for a clinical disorder.²⁵ Chung⁴⁵ found well over half of a large number of persons with SCI in the rehabilitation phase had difficulties with anxiety and somatisation, and traumatic events associated with their injury were significantly associated with arousal and anxiety. In a longitudinal aging study, in which self-reported problems were monitored in a large group of people with SCI, data revealed that anxiety and stress were dominant factors of concern for most of the SCI participants.⁴¹

Post-traumatic stress disorder

Evidence suggests that a similar amount of people with SCI will show symptoms typical of PTSD.^{12,45–47} Experiencing an SCI is generally a traumatic and life-threatening event. Given that the majority of people with SCI receive their injury in a car accident, from falls, sporting injuries, acts of violence and so on, it is understandable that persons with SCI may have disturbing and distressing memories related to their injury. Kennedy and Evans⁴⁶ found that 14% of persons with SCI had PTSD symptoms, such as intrusive thoughts about the injury-related trauma and avoidance of the trauma stimuli. They also found that women with SCI were more

susceptible to PTSD symptoms. Recently, Chung⁴⁵ reported that 44% of 62 people with SCI met the criteria for a PTSD diagnosis relative to able-bodied controls.

Potential mediating factors

Perceived control, feelings of helplessness, self-esteem and coping styles. A number of factors may mediate or influence the risk of developing psychological morbidity. Perceived control, learned helplessness or self-efficacy are constructs that can broadly be defined as a person's belief or sense of confidence in his/her own ability to perform a particular task or behavior successfully in the future.¹ Perceived control or self-efficacy has been found to be an important mediating factor associated with psychopathology.^{1,44} Coping styles are also considered to be influential mediating factors,⁴⁴ and can be described as the methods humans use to deal with internal and external stressors.⁴⁸ Research has found that up to 40% of people with SCI have more external perceptions of control, lower levels of self-esteem and more helpless and fatalistic coping styles relative to able-bodied controls 12 months after the injury.¹⁰ Craig^{10,48} has shown in prospective controlled research that persons with SCI continue to have higher levels of external control relative to able-bodied controls 2 years following their injury. These studies concluded that although the majority of people with SCI have adaptive coping styles and an intact self-esteem, approximately 30–40% tended to be more helpless, externally focussed in their thinking with poor self-esteem. Those people with SCI who rely more on chance and powerful, others are likely to suffer higher levels of distress than those who rely more on their own resources⁴⁹ and an external locus of control has been found to be associated with depressive mood 2 years after their injury.⁴⁴ Having an external locus of control has also been associated with an increased likelihood of experiencing PTSD, severe pain and general health problems in persons with SCI.^{45,49}

Perceived quality of life. Quality of life measures assess the judgment of people about their own health and life status and is believed to be an important factor relating to mental health.¹ Studies have now shown that SCI has a definite negative impact on QOL across a range of dimensions, such as physical functioning, social functioning, mental health, vitality, emotional functioning and pain when assessed using a universal instrument such as the SF-36.¹ Although factors, such as level of lesion, age, age at the time of injury, sex, time at injury and completeness of the lesion have not been consistently found to be associated with lower QOL, negative psychological states (such as low levels of self-efficacy, that is, perceiving that one has little control over one's life and behavior) and pain intensity have been found to lower QOL.¹ Middleton, Tran and Craig¹ conducted research with over 100 persons with SCI living in the community and found that low self-efficacy and high pain intensity were associated with reduced QOL across all SF-36 domains above and beyond the effect of any physical impairment. Findings suggest that the negative impact on QOL may well be cumulative. The combination of the two

negative factors 'low self-efficacy' and 'pain intensity' was associated with an even greater reduction in QOL compared with the reduced QOL associated with each of the two factors independently.¹

Pre-morbid factors. Pre-morbid psychological and psychiatric disorders occur in a small minority of the SCI population and this premorbid influence is likely to have a negative impact on rehabilitation outcome and community reintegration.^{14,50} For instance, it is known that people with SCI who were prone to substance abuse before the injury are at high risk afterward.¹³ Stanford *et al.*¹⁴ found that 56 of 2752 SCI admissions to a spinal unit during the period from 1970 to 2000 were because of attempted suicide. Psychiatric diagnoses among those with SCI who attempted suicide and admitted to the spinal unit found that many had multiple disorders, such as personality disorder (48%), schizophrenia (28%), depression/mood disorder (43%) or chronic alcohol abuse (18%). Stanford¹⁴ also found that 8.5% of persons with SCI who attempted suicide before their injury, actually committed suicide during the 8 years following the SCI. Judd and Brown¹⁶ found that those persons with SCI who commit suicide were more likely to: (i) be men, (ii) have a schizoid, depressive or narcissistic personality, (iii) abuse alcohol or other drugs and (iv) show symptoms of the development of significant depression.

Discussion

The systematic review found that a substantial minority of people with SCI have a relatively high risk of developing depressive psychological morbidity. On the basis of DSM diagnostic criteria, estimates of the risk of a depressive disorder were mostly found to range from approximately 20% up to 40% during the first 6–8 months of the injury, that is, in the rehabilitation phase. In studies that did not employ a diagnostic interview, approximately 30% of persons with SCI in the rehabilitation phase were found to have abnormally high levels of negative psychological states. This risk is similar to other patients who have received a serious injury such as traumatic brain injury.^{36,51} Given the high prevalence of traumatic brain injury in people with SCI, research is needed to study the rates and nature of psychological morbidity in people with SCI who also have a comorbid traumatic brain injury.⁵²

No studies were found that used structured diagnostic clinical interviews to assess the rates of depressive disorder in people with SCI after they completed rehabilitation, that is, when they were living in the community. However, studies^{30–32} that assessed probable MDD on the basis of self-reported DSM symptoms found rates varying from 17 to 24%. Elevated levels of depressive mood were found to range between 11 and 60% in people with SCI living in the community with a median of approximately 30%. Findings from prospective research suggest that the high levels of negative mood will remain elevated in the absence of treatment.^{10,36} Research has also consistently found that people with SCI, who in addition, have a depressive disorder

or raised levels of depressive mood have increased risks of secondary complications such as pain and infections.^{1,12} Distressing problems such as chronic pain, given its nature, will increase risks of developing depression or depressive mood.^{25,44,53} Persons with SCI also have a high risk of developing an anxiety disorder, such as PTSD^{46,47} or having abnormally raised levels of anxiety typical of someone with a generalized anxiety disorder.¹⁰ Best estimates suggest that between 13 and 40% will develop an anxiety disorder following SCI.^{10,34,45,46}

A number of mediating factors were discussed that are believed to increase the vulnerability of people with SCI to develop psychological morbidity. For instance, in a significant minority of SCI individuals, elevated levels of hopelessness/helplessness and low self-efficacy have been reported,²⁹ and this has been found to raise their risks of developing depression and PTSD.^{45,46} Similar findings have been found for poor coping skills and low self-esteem. It is also not surprising that people with SCI have significantly lower levels across QOL dimensions compared with able-bodied controls. Of concern is the potential negative cumulative effect on QOL of complications such as intense pain and elevated levels of negative psychological states.¹ Pre-morbid factors such as substance abuse and psychiatric disorder also raise risks of developing psychological morbidity following an SCI. The potential of these mediating factors to elevate the risk of psychological morbidity make it imperative that prospective research be conducted, which examines the dynamic association between these risk factors and psychological morbidity.

The findings of this paper have revealed deficits in our knowledge about the association between psychological morbidity and SCI. As discussed above, studies have confirmed that people with SCI have increased risks of developing MDD, PTSD or other negative psychological consequences during the rehabilitation phase or after returning to live in the community. However, comprehensive research is needed to clarify the nature of the psychological reactions of people to SCI.^{2,12,19} Differential diagnosis research is necessary to determine the type of depressive disorder that is prevalent in SCI. For instance, the prevalence of people with SCI who develop despondency or mild depressive disorder (for example, mildly elevated negative psychological states) as distinct from the presence of a diagnosed MDD or anxiety disorder is still unknown. Only a few studies have investigated the prevalence of PTSD and more research is required to determine the number of people with SCI who develop depressive symptoms because of a primary anxiety disorder such as PTSD. The relationship between persistent pain and depressive mood also needs to be clarified. Furthermore, the exact nature of psychological morbidity associated with an SCI remains unclear. For instance, the DSM IV requires that MDD and PTSD to be distinguished from a mood or anxiety disorder because of a general medical condition.⁵⁴ A mood or anxiety disorder because of a medical condition involves a person showing significant symptoms of depression and anxiety as a direct result of a medical condition. It should be differentially diagnosed if the mood or anxiety disorder can be etio-

logically linked to the medical condition through some physiological mechanism. Given that an SCI involves neurological and systemic damage, a physiological mechanism could be argued; however, this possibility has not yet been systematically explored. Consequently, we do not yet know how many persons with SCI have MDD, PTSD or whether they have a mood and/or anxiety disorder because of their medical condition, or indeed whether it is a combination of them all. The influence of mediating variables, such as pre-morbid factors, coping styles, self-efficacy, environmental contextual factors, and cognitive deficit because of head trauma on psychological morbidity following SCI also needs extensive investigation and consequent clarification.

To accomplish the above, prospective research needs to be conducted in a heterogeneous sample of people with SCI from the acute injury stage through to discharge up to at least 2 years after the injury. Multiple assessments need to occur, including structured diagnostic interviews on the basis of DSM criteria; a comprehensive selection of validated questionnaires assessing aspects of psychological morbidity, trauma, perceptions of control, QOL, pain, personality, cognitive capacity, lifestyle factors, functional capability and neurophysiological tests. Most importantly, assessment should provide sufficient sensitivity in the data to distinguish among an actual diagnosable psychological disorder from someone with despondency.³⁵ Furthermore, changes in psychological status from the acute phase to the long term should be investigated in detail. Such comprehensive data could lead to the development of more effective treatments that address the psychological needs of people with SCI.

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