



Review Article

The impact of coping on emotional adjustment to spinal cord injury (SCI): review of the literature and application of a stress appraisal and coping formulation

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Objectives: This article reviews literature examining the psychological adjustment to Spinal Cord Injury (SCI) and illustrates the applicability of a Stress Appraisal and Coping model (SAC) for rehabilitation of this population.

Method: Articles concerning psychological adjustment to SCI from the previous three decades have been reviewed and critiqued. When possible the articles have been discussed in a SAC framework.

Results: The literature indicates that psychological adjustment to SCI is largely predictable from psychological variables including coping, appraisal and psychosocial resources. Recent literature has suggested psychological intervention can promote positive psychological adjustment following SCI for those individuals at risk of developing clinical levels of depression.

Conclusion: The SAC model provides a comprehensive formulation to incorporate the heterogeneity of populations with SCI. Suggestions for future research include developing assessment and treatment regimes specifically tailored to the strengths and weaknesses of an individual as highlighted in the model.

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Introduction

Recovery from a spinal cord injury (SCI) requires significant ongoing psychological adjustment. For example, 30% to 40% of individuals with a SCI develop a depressive disorder^{1–4} and between 20% and 25% experience an anxiety disorder.^{3,4} Longitudinal studies of adjustment have found that psychological distress does not decrease significantly over time. An estimated 30% of individuals still experience depression or anxiety at 2 years after injury.⁵ Suicide rates are two to six times higher in populations with SCI than in community populations.⁶ In addition to clinical depression and anxiety, SCI has been shown to have a significant impact on a variety of other areas of psychological functioning. For example, the prevalence of substance abuse in populations with SCI's is twice as high as that of community populations (46% vs 25%).⁷ However, difficulty exists in stating high rates of abuse in this population are related to the injury

when rates of misuse in this population have been found to be high before injury.⁷ Furthermore, divorce rates in marriages are higher for those with a SCI than the general population.⁸ Finally, financial and occupational opportunities are restricted for this population.⁹

An important task in rehabilitation is the promotion of successful adjustment of both the individual with SCI and his or her significant others. Adaptation to SCI is a complex process and variability in emotional adjustment to injury has characterised the literature in this area. For those working with injured individuals and their families, an increased understanding of the psychosocial and emotional consequences of SCI could be facilitated by a clearly articulated model of the influences on psychological adjustment following injury. This article describes a stress appraisal coping formulation of emotional adjustment to SCI. This model proposes general rules underlying adaptation to stressful life events and also recognises conditions that reflect differences in individuals and their environments. By including enviro-

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onmental and individual specific variables, the model is able to account for the large individual differences in psychological outcome despite seemingly similar disabilities.

Models of adaptation

Spinal cord injury is associated with extensive social, occupational, and psychological challenges. Previously these adaptations have been viewed in a stage theory framework.^{10,11} Stage theories postulate that time since injury is a crucial factor in adaptation and that the goal of rehabilitation is to move an individual through a series of predetermined stages towards acceptance of disability.¹² These presumptions have been seriously challenged in the past two decades.¹³ A lack of empirical evidence for stage model theories, significant variability in rehabilitation outcomes, and an increased awareness of the heterogeneity of this population has promoted a differing emphasis for rehabilitation research. This contemporary emphasis considers rehabilitation to be a multi-factorial process and places emphasis on the roles that coping and appraisal play in adjustment.

Stress appraisal and coping

The stress appraisal and coping model developed by Lazarus and Folkman¹⁴ was a starting point for much of the more recent research into SCI rehabilitation. Research into other illnesses and injury has indicated that a coping and appraisal framework is suitable for explaining the dynamic process of rehabilitation.¹⁵ The Stress Appraisal and Coping Model (SAC) involves a process formulation for explaining an individual's ability to cope with, and adjust to, life stress.

Stressors

Lazarus and Folkman¹⁴ define psychological stress as 'a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being' (p 19). Following SCI, a variety of factors can be considered to be stressors. An individual may be unable to perform many tasks as competently as he or she could before the injury. The demands of work, family, social relationships and physical changes may now put strain on an individual's competency.

Stress response

Stress responses concern an individual's reactions to demands placed on him or her. Typical examples of stress responses to SCI include depression, anxiety, and distress about physical symptoms. The manifestations of these signs of personal distress vary from individual to individual and may occur at varying times since injury.

Mediators

Mediators in the SAC model influence the magnitude of an individual's emotional reaction by modifying or mediating the impact of stressors. Mediators include the individual's appraisal of the level of demand the stressors place on him or her, the perceived competency to meet these demands through the application of available coping skills, and the resources that they can utilise.

In the past two decades research has provided encouraging evidence for the applicability of the SAC model for understanding emotional adjustment to SCI.^{16,17} The model incorporates three classes of variables impacting on adjustment, and is described below.

Role of appraisal

SAC theory proposes two types of appraisal processes: primary appraisal and secondary appraisal. Primary appraisal is not an objective analysis of the stressors and resources involved in a situation. Rather, it is an inference about a situation determined by many factors such as an individual's psychological characteristics, past experience with stressful situations and expectations for the future. Primary appraisal involves scanning the environment for potential harm. Environmental stimuli can be perceived as one of three kinds: irrelevant, benign-positive and stressful.¹⁴ Stress appraisals include harm, loss and threat to an individual and are the most common appraisals in those sustaining a SCI. Several determinants of threat have been outlined by Lazarus and Folkman.¹⁴ The strength of commitments being endangered and the individual's belief in his or her ability to control the situation, contribute to appraisals of threat and have been examined in SCI populations.

Secondary appraisal concerns a further process implemented to decide what could be done to lessen the impact of a stressful situation. Secondary appraisal is more than a process of listing possible options to deal with stress. It is a complex evaluative activity that takes into account available coping resources, the likelihood of these resources being sufficient in each situation and the likelihood that one can use these resources.¹⁴

To date, research investigating possible relationships between appraisal and emotional adjustment in SCI individuals has been contradictory. In one of the earliest attempts to relate primary appraisal to adaptation, Bulman and Wortman¹⁸ questioned SCI individuals' concerning appraisal of blame for the injury. Participants assigned blame to four factors, self, other, environment, and chance. Results of this pioneering research indicated that those who appraised the situation as being avoidable and thus able to be controlled, were deemed to have better emotional adjustment, than those individuals who blamed external factors for their disability. The authors stated that participants, making a primary appraisal of

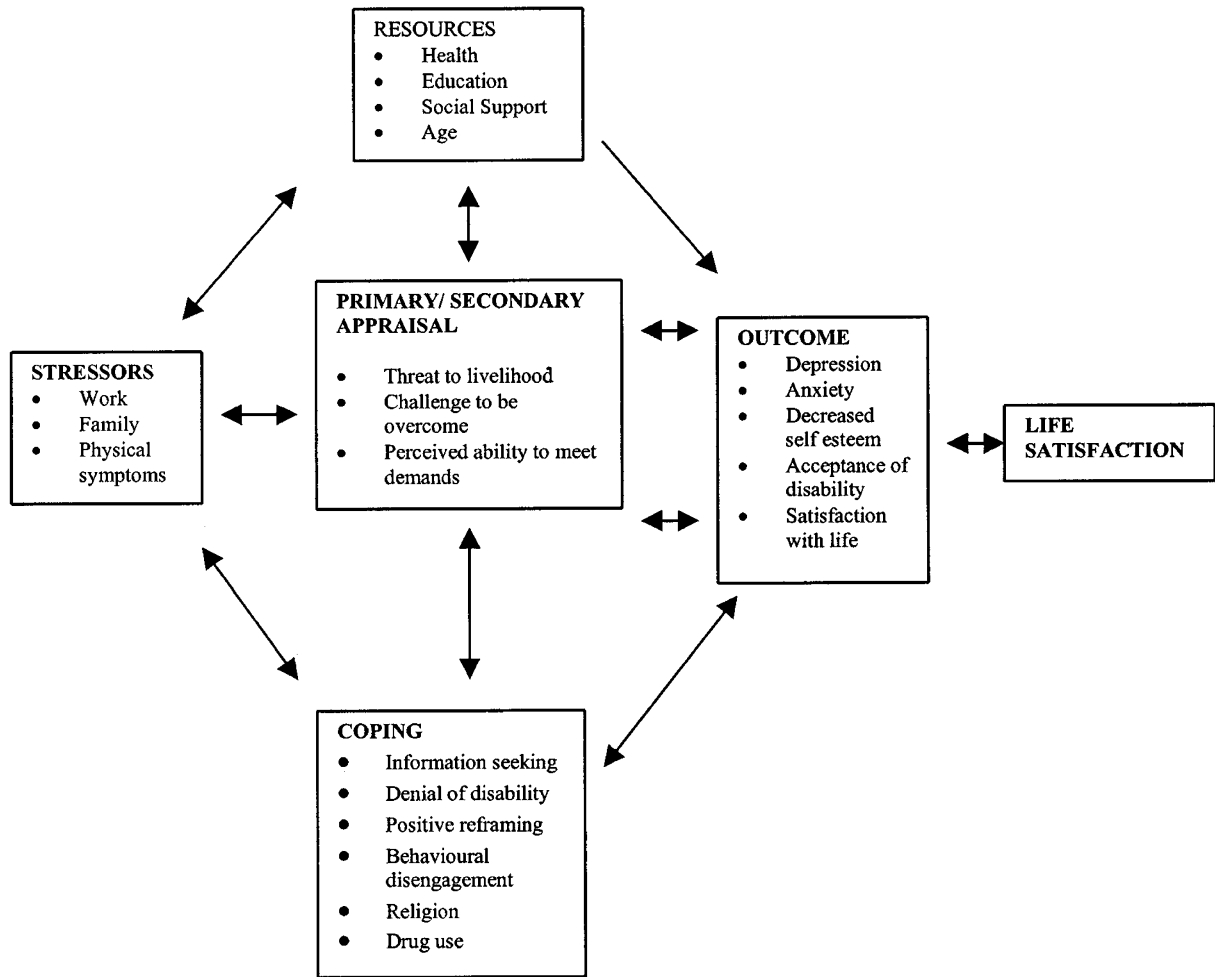


Figure 1 Stress appraisal and coping formulation of emotional adjustment to spinal cord injury

control, had better emotional adjustment because of the belief that they had the resources and abilities to change their environment. The results of this study are somewhat discredited by the fact that social workers and nurses rated individuals' emotional adjustment. A common belief at this time was that rehabilitation involved universal stages. This belief held significant allure for professionals as it contributed to the development of treatment plans based on anticipated reactions. As such, staff may have been subject to a confirmational bias and were hypervigilant to information supporting their erroneous beliefs. A further limitation of this study is the limited nature of the variables studied. While the quest for meaning appears to be almost universal following trauma this search may not be the primary predictor of emotional adjustment. Self blame appeared to predict adjustment but this relationship may have disappeared if other variables such as coping strategies, social support, and general appraisals of threat or challenge were included. Schultz and Decker¹⁹ replicated Bulman and Wortman's¹⁸ study and used inventories rather than

staff report to assess emotional adjustment. The researchers attempted to address the question of whether primary appraisal of self-blame was still an effective coping strategy after acute rehabilitation. This study involved 100 individuals who had been injured, on average 20 years earlier. Three measures of emotional adjustment were used: The Index of Psychological Well Being,²⁰ The Life Satisfaction Index²¹ and the Centre for Epidemiologic Studies Depression Scale (CES-D).²² Correlations between self-blame primary appraisals and scores of emotional adjustment were modest but significant. This finding indicated, a tendency for those who blamed themselves for their injury, to be less depressed than those who blamed external influences. Although this study had included a more effective means of assessing emotional outcome it was still severely constrained by its simplicity, with appraisal of blame being the only variable examined. Furthermore, Shultz and Decker¹⁹ attempted to overcome problems concerning the lack of control groups by using standardised inventories with norm data. This attempt to include controls was

somewhat flawed as the norm data from the majority of inventories is significantly different from SCI populations. However, this study does represent the beginning of a new era for research in SCI. Rather than accepting the universal nature of emotional adjustment researchers began to ask who was more vulnerable to difficulties and why.

Van Den Bout *et al.*²³ also examined the relationship between emotional adjustment and preoccupation with the cause of the accident in a group of 22 individuals with SCI. The participants were divided into two groups, those recently injured and those who had been injured for longer for 2 years. This study found that, for the long disabled group concern with causality of the accident was associated with high self-esteem and utilisation of adaptive coping skills. Results for the recently disabled group indicated that concern for causality of the accident was related to poorer emotional adjustment. Van Den Bout *et al.*²³ stated that this paradox could be explained by the fact that recently disabled individuals who are concerned with appraisals of causality, may be neglecting to investigate existing coping resources. In contrast, those who had been injured longer were aware of residual abilities and therefore, could give more thought to causality for the accident without risking their emotional adjustment. The fact that the hypothesis was not supported for long term injured may reflect the complexity of the predictors of emotional adjustment. The authors seem determined to provide evidence that self blame is a fundamental determinant of emotional outcome, and this may not be so. The particular challenges and environments in long term *vs* short term injured are very different, thus the factors contributing to emotional adjustment are also likely to differ. Van Den Bout *et al.*²³ neglected to highlight this fact.

In an attempt to clarify the discrepancies in previous studies of appraisal, Reidy and Caplan²⁴ conducted a longitudinal investigation and viewed the appraisal of self-blame as a dynamic phenomenon. Specifically, these researchers investigated change in patients' perceptions of responsibility for injury over time and related these changes to emotional adjustment. Eighteen men took part in this study during acute rehabilitation and again at 18–24 months post injury. The Beck Depression Inventory (BDI)²⁵ was used as an outcome measure for depression. At the time of first assessment, no aspect of blame correlated significantly with the BDI scores. In contrast at the 2-year assessment self-blame was positively correlated with the affective, cognitive, and total BDI indices. Although this study did attempt to address many of the limitations in past research by addressing the dynamic nature of appraisals of self blame it still presents a simplistic view of adjustment.

In summary, studies investigating the psychological impact of SCI as a dynamic process, independent of specific stages, indicate that a primary appraisal of blame may contribute to individuals' emotional

adjustment.^{18,19,24} Individuals appraising the situation as uncontrollable perceived a higher level of threat. As such, these individuals had poorer emotional adjustment than individuals appraising the situation as controllable. These findings indicate appraisal may play an important role in mediating adjustment. However the inclusion of appraisal as the only factor predicting emotional adjustment only tells a small segment of the story.

Coping

A further mediator of emotional adjustment in the SAC model is coping. Lazarus and Folkman¹⁴ define coping as 'constantly changing cognitive and behavioural efforts to manage a specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person' (p. 178). The coping skills utilised by individuals' surviving a SCI are the most extensively researched aspect of the SAC model. Two main types of coping have been proposed.¹⁴ The first is emotion-focused coping. This type of coping describes the attempts made by an individual to regulate his or her emotional response. Lazarus and Folkman¹⁴ state that this type of coping occurs most frequently in situations, where an individual perceives he or she cannot change the situation. The second type is problem-focused coping. This type of coping involves responses aimed at managing the stressful situation and is utilised most frequently when an individual perceives the situation as controllable.

Frank *et al.*²⁶ conducted one of the first studies to examine the relationship between coping and emotional adjustment to SCI. In this study 53 patients with a SCI were administered measures of coping and emotional adjustment. Each participant was administered the BDI,²⁵ the Life Experiences Survey²⁷ and the Global Symptom Checklist of the Symptom Checklist 90 Revised (SDL-90-R)²⁸ as measures of psychological distress. The Ways of Coping Questionnaire (WOC)²⁹ was used to measure coping responses.

Two clusters were identified from the WOC in the Frank *et al.*²⁶ study. Participants in cluster one, utilised more wishful thinking, mixed coping, growth coping, and self-blame than participants in cluster two. The use of these coping strategies was related to higher levels of depression and perceived life stress in cluster one. Frank *et al.*²⁶ concluded that these research findings suggested an alternative to traditional stage model conceptions of adjustment. Participants did not differ significantly in time since injury. However, participants did show significant differences in adjustment, a fact that contradicts the stage model conception of emotional adjustment to SCI. The results of this study supported the growing awareness of the fact that coping mediates emotional adjustment to SCI. However, the authors suggested the need for replication to further understand the role coping strategies play in emotional adjustment, while control-

ling for confounding variables such as age and time since injury. The lack of suitable control groups in this study also make the results somewhat tentative.

In response to the suggestions of Frank *et al.*²⁶ Buckelew *et al.*³⁰ examined coping and appraisal in populations with SCI while controlling for confounding variables such as age and locus of control. Participants were administered the WOC, Multi-dimensional Health Locus of Control Scales³¹ and SCL-90-R.²⁸ Based on the results of the SCL-90-R Global Scale (GSI), three distress groups were identified: Low, Moderate, and High. In this sample coping strategies contributing more to psychological adjustment than age, time since injury, level of injury and locus of control beliefs. In contrast to the findings of Bulman and Wortman¹⁸ the coping strategy of self-blame was positively related to psychological distress in the tested population. Coping strategies most frequently implemented by the high psychological distress group were Wish Fulfilling Fantasy, Emotional Expression, Self-Blame and Threat Minimisation. The aforementioned studies provided results supporting the idea that coping is an important influence on emotional adjustment to SCI. Due to the correlational nature of the studies it is impossible to infer the direction of the relationship between coping and emotional adjustment. This is a significant limitation of much of the early coping literature. Following this realisation, researchers began to investigate relationships between specific coping strategies and emotional adjustment.

In contrast to prior research that globally examined coping in populations with a SCI, Elliott *et al.*³² investigated the more specific Problem Solving coping strategies. Because of the many adaptations involved in rehabilitation, the authors considered the ability to develop and utilise problem-solving strategies as important to emotional adjustment. This study tested the hypothesis that, individuals who appraised themselves as effective problem solvers would be less depressed and more assertive than those who appraised their problem solving skills as lacking. Participants were assessed using The Problem Solving Inventory (PSI),³³ The Inventory to Diagnose Depression (IDD),³⁴ The Sickness Impact Profile (SIP)³⁵ and The Spinal Cord Injury Assertion Questionnaire (SCIQ).³⁶ Participants' subjectively perceived problem-solving ability was significantly predictive of depression, emotional distress, and assertiveness. Those individuals who believed they had the ability to solve problems in their environment were less depressed, distressed, and more assertive, than those who did not hold such beliefs. Similar results to Elliott *et al.*³² were found by Moore *et al.*³⁷ These authors found individuals' utilising predominantly Problem Focused Coping had better emotional adjustment than those individuals utilising predominantly Emotion Focused Coping. Again, the correlational nature of this study makes inferences concerning the impact of specific coping strategies on outcomes difficult. It is

impossible to say if individuals experiencing more distress use more emotion focused coping to manage this distress, or if high use of emotion focused coping results in more emotional distress.

Kennedy *et al.*¹⁶ conducted a cross-sectional study examining the subtle relationships between different coping strategies as influences on emotional adjustment. Kennedy *et al.*¹⁶ aimed to contribute further to coping research by isolating coping strategies responsible for variance in outcome adjustment in a population of 41 individuals with SCI. This study involved two groups with SCI, those 6 week post injury and a second group included those 4–7 years post injury. Participants completed a variety of measures assessing the psychological impact of SCI, effectiveness of social support, and coping strategies. Investigation into coping strategies indicated that those strategies used most frequently, eg acceptance, could be categorised according to Carver *et al.*³⁸ as being adaptive. Strategies considered to be maladaptive, eg drug and alcohol use, were used the least in both groups of participants. A high level of active coping was also present in this study. The authors state that this may reflect a variety of controllable aspects involved in living with a SCI. For example, participants could control much of their self-care routines, leisure time, social and occupational alternatives. Step wise multiple regression analysis on the combined data of both groups indicated that coping strategies and group membership (length of time injured) were more predictive of psychological impact than marital satisfaction and functional independence. Individuals who had been injured for a number of years were found to be significantly more functionally independent and had significantly fewer social supports. Very few differences were found in coping strategies between the two groups. Differences that were evident was a higher use of focusing on and venting of emotions and behavioural disengagement in the long term group. In contrast the long term group were less likely to seek emotional and instrumental social support than the short term group. These differences may reflect actual variation between coping in the two groups or may be an artifact of the samples chosen. Individuals who have been recently injured do need more help and are less independent than individuals who have been living with their disability for many years. Similarly, newly injured individuals would be expected to have significant social supports over the original trauma and this high level of support may decrease as individuals adjust to the injury.

The aforementioned studies^{16,32,37} were significant in indicating that coping could be predictive of emotional adjustment and that in contrast to prior belief, populations with SCI use predominantly adaptive coping strategies. Up until this finding, coping strategies had been examined at single points in time. Moore *et al.*³⁷ emphasised the need for longitudinal research into spinal cord injury arguing that this type

of research was necessary in order to understand the dynamic nature of coping strategies.

Kennedy *et al.*¹⁷ responded to the need for longitudinal studies examining the predictive nature of coping strategies on emotional adjustment. This study assessed 87 individuals at regular time intervals for 2 years after injury. Participants were included in statistical analysis if they had completed assessment at a minimum of two points in time. Individuals were assessed for coping strategies utilised, functional independence, depression, anxiety and social support.

Kennedy *et al.*¹⁷ produced three major findings. Firstly psychological outcomes and coping strategies across time were found to be relatively stable. A high level of consistency was evidenced across all nine assessment times for depression and anxiety. Twenty-five per cent to 35 per cent of those individuals assessed reached clinical levels of depression and 20% to 35% clinical levels of anxiety. Coping strategy use was also found to be stable across time with the most commonly used strategy being acceptance. The pattern of least used strategies was also fairly consistent and included behavioural disengagement, denial and alcohol and drug use ideation.

Secondly, high correlations were found between depression, anxiety and a variety of coping strategies coined as maladaptive by past researchers Kennedy *et al.*¹⁷ These strategies included behavioural disengagement, drug and alcohol use ideation, and denial.

The third major finding from Kennedy *et al.*¹⁷ was the prediction of psychological adjustment. Regression models were used to predict psychological outcome over the testing period. These analyses found coping strategies such as behavioural disengagement, acceptance (negative coefficient), alcohol and drug use ideation accounted for a significant proportion of the variation in depression and anxiety across all assessment periods. Coping strategies at 6 weeks were also found to predict 67% of the variance in depression and anxiety at 1 year.

Although high attrition rates in the Kennedy *et al.*¹⁷ study prevented comprehensive collection of 2 year follow up data, this research still provides a clear example of the information that is necessary to clarify the role of coping on emotional adjustment. This future research in this area would benefit from the inclusion of other possible variants predicting psychological adjustment such as appraisal of concurrent stressors and the possible moderating roles of social support.

Alongside the need for increased longitudinal studies into SCI was the need for control groups. Traditionally individuals with a SCI were deemed to be less well adjusted than able-bodied individuals. However, coping literature had supported the growing realisation that impairments in adjustment were not universal in this population. Inclusion of able-bodied controls would allow for comparisons of coping between populations, in an attempt to identify strategies unique to those with SCI.

Hancock *et al.*³⁹ responded to the need for well-controlled, longitudinal research into SCI adjustment. This group conducted an investigation examining the impact of SCI on perceptions of control, self-esteem and coping responses within the first year post injury. At approximately 3 monthly intervals, 41 SCI patients and 41 able-bodied matched controls completed inventories assessing self-esteem, locus of control, and coping. The inventories administered to participants included the Rosenberg Self Esteem Scale,⁴⁰ an adapted version of the Mental Adjustment to Cancer Scale⁴¹ and The Locus of Control Behaviour Scale.⁴² Results of this study indicated that the SCI participants had more maladaptive coping responses (fatalistic attitudes, helpless/hopeless attitudes towards injury) than controls. Although mean levels of self-esteem for the SCI participants were lower than the controls, they did not fall in the below average range. This finding contradicts the belief that SCI has a severe detrimental impact on self-esteem. The notion that adjustment improves over time was not supported in this study with overall adjustment remaining stable across the first year for those with a SCI. Furthermore, Craig *et al.*⁴³ found that coping styles and self esteem did not change significantly after 2 years in this population.

In conclusion, these studies indicate that coping strategies can be important mediators of emotional adjustment to SCI. Research indicates that particular coping strategies are correlated with emotional outcomes. Coping strategies such as problem solving and active coping have been linked to better emotional adjustment. In contrast, coping strategies such as wish-fulfilling fantasy, emotion-focused coping, and threat minimisation have been linked to poorer emotional adjustment in those with a SCI. These coping strategies have been shown to mediate adjustment over and above variables such as time since injury, age, and marital satisfaction. Coping has been found to be a dynamic process across time, with strategies being helpful at some points and not at others. An important point to note in these studies, is that severe emotional problems, such as dramatic changes in self-esteem and significant coping deficits, are not as common in this population as was once believed.

Coping resources

The way people cope with a stressful situation depends heavily upon the resources they have to draw on. A variety of resources have been identified as contributing to successful emotional adjustment in SCI. Across a wide range of studies consistent findings have emerged. Age appears to be a valuable resource with younger individuals showing superior emotional adjustment in comparison to older persons.^{44,45} Researchers have stated that age may act as a resource as younger individuals are more flexible in the particular path their lives may take and therefore have less difficulty coping with the dramatic changes SCI can

bring. Gender also appears to act as a resource for adjustment to SCI with findings indicating that females are more accepting of SCI than males.⁴⁵ These authors state that this difference may reflect the fact that males suffer more sexual difficulties following SCI than females. Other factors that appear to act as resources are health,⁴⁶ education⁴⁷ and employment.⁴⁶

Perceived social support is known to buffer an individual from the psychological effects of adverse life events.¹⁴ Schultz and Decker¹⁹ examined the impact of social support on adjustment to SCI. These researchers interviewed 100 middle-aged and elderly spinal cord injured persons who had been injured on average 20 years earlier. This study found that social support was a significant factor in this level of life satisfaction. People who reported high levels of satisfying social support reported high levels of emotional adjustment. A significant limitation of this study is the variability in the cause of spinal cord injury for the participants. Individuals who had paraplegia or tetraplegia due to medical conditions such as polio were also included. As such, this variability makes comparisons with populations with traumatic injuries tentative.

The impact of social support on emotional adjustment to SCI was also investigated by Rintala *et al.*⁴⁸ These authors examined the impact social support had on physical well being, life satisfaction, and depression in a sample of 140 individuals with a SCI. This study was designed to replicate and extend work previously done by Schultz and Decker.¹⁹ Participants completed the CES-D22 and the Life Satisfaction Index.²¹ Social support and health status was determined with a 4 point Likert Scale using the descriptions of excellent, good, fair, and poor.¹⁹

Rintala *et al.*⁴⁸ found that psychological well being and life satisfaction were positively correlated with the amount of perceived social support and that depression was negatively correlated with perceived social support, results consistent with Schultz and Decker's¹⁹ work. Those individuals rating higher in social support were more satisfied with life and physically healthier than those with less social support. Higher satisfaction ratings with social support were also associated with less depression. The correlational nature of this study makes it impossible to predict the direction of the relationship between emotional adjustment and social support. The authors postulate that individuals with high levels of social support are more likely to have better emotional adjustment. Although feasible, it is also possible that individuals with better health and emotional adjustment will be more likely to seek and maintain satisfying social relationships.

Elliott *et al.*⁴⁹ furthered research in the area of social support by examining whether specific types of social support were related to emotional adjustment to SCI. One hundred and seventy-nine individuals were assessed. Social support was assessed using the Social Provisions Scale (SPS)⁵⁰ and the Sickness Impact Profile (SIP)³⁵ was used to measure psychosocial impairment. Elliott *et al.*⁴⁹ suggest that the effects of

social support on adjustment can be influenced by the nature of the support offered. Social relationships characterised by higher levels of Nurturing were associated with more impairment. Higher levels of Reassurance of Worth and Guidance were associated with less impairment. The possible confound of level of injury was not examined by Elliott *et al.*⁴⁹ As such, the possibility exists that individuals with higher injuries would be involved in more nurturing relationships due to the practical implications of the injury. This may mean that the level of injury, and not the social relationship, was contributing to the emotional adjustment. The limited assessment of emotional outcome also hinders the validity of the results. The authors assessed emotional adjustment using a psychosocial subscale of the SIP. This scale may not have been sensitive to the specific nature of emotional adjustment in those with SCI. For example, the item 'I laugh or cry suddenly' may be a very normal reaction to trauma and do not necessarily reflect problems in adjustment.

SCI research examining resources has highlighted the importance of age, gender, employment and social support for emotional adjustment to SCI. These factors have been found to moderate the severity of emotional reactions to SCI. More than any other resource, social support has received recognition as a mediator of emotional adjustment. The quality of social support offered to an individual, especially relationships characterised by reassurance of worth and independence, has been associated with good emotional adjustment. In contrast, relationships characterised by nurturing have been associated with poor adjustment in individuals with a SCI. However, with increased social support, rates of depression and poor health have been found to decrease in populations with SCI (Table 1).

Intervention

Increased understanding and awareness of the emotional impact of spinal cord injury has, in part, promoted investigation into the effectiveness of intervention options for improving emotional outcome. Recent literature reviews provide empirical evidence supporting the notion that interventions targeting emotional adjustment to SCI are lacking.⁵¹ Anecdotal evidence describing interventions does exist but has not been well controlled or empirically validated.¹⁴ Cognitive Behavioural Therapy (CBT) approaches are widely accepted as strategies for helping individuals deal with stress and emotional adjustment.⁵² Including a CBT component in SCI rehabilitation was a logical development following the increased recognition of the impact SCI has on emotional adjustment. CBT interventions for spinal cord injury are designed to develop coping skills in individuals adjusting to the challenges of living with a disability.

The most logical use of CBT programs for individuals with SCI is in a group format. Group therapy has been recommended as an effective

Table 1 Summary of SAC research in spinal cord injury

| <i>Study*</i> | <i>N</i> | <i>Design</i> | <i>Standardised measures</i> | <i>Main findings</i> |
|--|----------|---------------|------------------------------|--|
| Bulman and Wortman ¹⁸ | 29 | Cross | N | Self Blame = better adjustment |
| Shultz and Decker ¹⁹ | 100 | Cross | Y | Self Blame = better adjustment |
| Van den Bout <i>et al.</i> ²³ | 22 | Cross | Y | Impact of self blame on adj dependent on Time since injury |
| Reidy and Caplan ²⁴ | 18 | Long | Y | Impact of self blame on adj more negative over time |
| Frank <i>et al.</i> ²⁶ | 53 | Cross | Y | Wishful thinking, Mixed coping, growth Coping, self blame = poor adj |
| Buckelew <i>et al.</i> ³⁰ | 57 | Cross | Y | Wishfulfilling fantasy, Emot exp, self blame, Threat minimisation = poor adj |
| Elliot <i>et al.</i> ³² | 90 | Cross | Y | Low subjective problem solving ability = poorer adj |
| Moore <i>et al.</i> ³⁷ | 35 | Cross | Y | Emotion focused Coping = poorer adj |
| Kennedy <i>et al.</i> ¹⁶ | 30–41 | Cross | Y | Higher use of adaptive coping strategies than maladaptive strategies |
| Kennedy <i>et al.</i> ⁴ | 87 | Long | Y | Behav dis, drug/alc use predictive of poorer adj |
| Hancock <i>et al.</i> ^{3,9} | 41 | Cross | Y | SCI = higher use of maladaptive coping (fatalistic, hopeless helpless attitudes) |
| Rintela <i>et al.</i> ⁴⁸ | 140 | Cross | Y | Perceived social support neg correlated with depression |
| Elliott <i>et al.</i> ⁴⁹ | 179 | Cross | Y | Nurturing associated with poorer adj, reassurance and guidance associated with better adj |

*Papers appear in the order they were presented in the text. Intervention research not included.

approach for individuals with a disability by a variety of authors.^{53,54} Many advantages exist in developing group interventions to be used in SCI units. Group based treatments are both cost effective and practical. Targeting a group of individuals while still involved in acute rehabilitation avoids problems of access, mobility and transportation that may arise in the community.⁵⁴ Advantages reliant on group dynamics have also been identified. Individuals working within groups have the opportunity to learn through peer modelling, to benefit from social support and have access to views that would not be available in one on one treatment.^{54,55} The effectiveness of group vs individual treatment in those with SCI has not been widely researched. Qualitative reports have indicated that individuals participating in CBT group based treatments have found them to be effective at managing distress and a valuable source of opinions and support.^{55,56} Quantitative evidence concerning the effectiveness of group based treatments compared to individual treatment is still lacking. However, two recent studies have attempted to assess the efficacy of CBT interventions with populations living with SCI.^{55,56}

Craig *et al.*⁵⁵ were the first authors to evaluate a CBT intervention aimed at emotional adjustment in populations living with SCI. This study employed 28 individuals with SCI participating in a CBT treatment program on a weekly basis for 10 weeks. Individuals with SCI already participating in traditional rehabilitation served as matched controls. Craig *et al.*⁵⁵ hypothesised that those individuals receiving CBT treatment, in conjunction with traditional rehabilitation approaches, would show decreases in anxiety,

depression and increases in self esteem in comparison to the control group.

The CBT program included components from Craig *et al.*'s.⁵⁷ SCI treatment manual addressing anxiety, depression, self-esteem, sexuality, assertion and family relations. Participants were taught skills such as progressive muscle relaxation, visualisation techniques, self-hypnosis, techniques to identify and replace negative thoughts, and pain reinterpretation techniques. The program also included opportunities for participants to improve social skills, increase pleasant events and also sexuality education and discussions.

Individuals' psychological adjustment was assessed at three intervals before, immediately after, and 12 months after treatment. Participants were assessed using the BDI;²² The State-Trait Anxiety Inventory (STAI)⁵⁸ and The Rosenberg Self-Esteem Scale.⁴⁰ Results indicated no overall group differences in anxiety, depression, or self-esteem between the treatment and control groups. A trend indicated the treatment group had greater levels of improvement in BDI scores across time in comparison to the control group. The authors stated that an inherent difficulty in this study was that neither group had high levels of depressive mood prior to treatment, therefore large improvements in BDI scores were unlikely. When those individuals obtaining moderate to severe levels of depression in both groups were compared significant differences were found. Those in the treatment group obtained significant decreases in depression across treatment and additional improvements after treatment. In contrast, moderate to severely depressed control individuals did not show significant improvements over the year assessment

period. There was also a trend for anxious participants at initial assessment to improve over time. This improvement in symptoms of anxiety was greater than that experienced by the control group. Although a significant contribution to the development of effective psychological treatments for SCI, this study has limitations. The fact that no significant differences were found between the treatment and control groups suggests the intervention is not addressing the predictor variables for the majority of individuals. Those with significant distress were seen to improve after treatment but this does not overcome the fact that most individuals who may have been experiencing subclinical levels of distress were not helped by this treatment. A further difficulty with this study is the lack of control for the actual intervention itself. It is difficult to say the intervention is responsible for decreases in actual depression scores when it has not been compared to an intervention targeting depression specifically. In the future the comparison of general CBT interventions with CBT specifically for depression in this population may shed light on to the actual effectiveness of this program. At this point all that can be said is CBT may be having some non specific effects on long term adjustment.

In an attempt to examine the long-term efficacy of a CBT program Craig *et al.*⁵⁹ reassessed the treatment individuals, 2 years post injury. Participants were assessed for hospital readmissions, drug usage, the quality of relationships and perceived emotional adjustment. Intervention group responses were compared with a control group who had received traditional rehabilitation at time of injury. Findings indicated that the treatment group had less hospital readmissions, reported less drug use and had better emotional adjustment than the control groups. Relationships had remained stable for both groups across the 2 years.⁵⁹ These results suggest that CBT interventions may contribute to the long term adjustment of individuals with SCI. In conclusion, these studies^{55,59} suggest that cognitive behavioural interventions may be helpful for those individuals with SCI experiencing significant difficulties in emotional adjustment. However, at this point the actual mechanisms behind this improvement are unknown.

A subsequent examination, of a CBT intervention for SCI was conducted by King and Kennedy.⁵⁶ These authors adapted an existing intervention program 'Coping Effectiveness Training' (CET)⁶⁰ for populations surviving SCI. The CET program has been used effectively to ameliorate stress reactions in populations suffering from HIV.⁶⁰ King and Kennedy⁵⁶ aimed to examine the applicability and effectiveness of this approach in those with a SCI.

The emphasis of King and Kennedy's⁵⁶ adapted CET program was on encouraging the development of personal control over the consequences of disability. Intervention involved group discussions, practical exercises, and an emphasis on identifying current problems. The CET program was composed of a

variety of components including appraisal training, strategies for developing and choosing helpful coping strategies, and strategies to obtain and maintain social support. The authors hypothesised that individuals participating in the CET program would show greater improvements in depression and anxiety and an increased use of adaptive coping strategies in comparison to the control group.

To test these hypotheses, 19 intervention group participants were assessed before, immediately after, and 6 weeks post intervention. Participants in the intervention group were all engaged in rehabilitation in a national SCI centre and were, on average, 4 months since injury. A group of 19 matched controls was selected from a data-base previously collected at the spinal injuries unit. The control participants had been assessed for depression, anxiety, and coping at 6 weekly intervals for a previous study.¹⁶ All participants in the control group had received the standard rehabilitation treatment offered at the spinal injuries unit. Participants were assessed using the Functional Independence Measure (FIM)⁶¹ and the Social Support Questionnaire (SSQ).⁶² Outcome measures of emotional adjustment were the BDI,²⁵ the State Anxiety Inventory (SAI)⁵⁸ and the COPE.³⁸

The results of King and Kennedy's⁵⁶ research indicated that the CET treatment program significantly reduced depression and anxiety in the treatment group in comparison to the control group. Furthermore, these reductions were maintained at the 6-week follow-up. Although significant improvements in mood were obtained for the treatment group, the coping strategies utilised by this group did not differ from those of the control group. King and Kennedy⁵⁶ suggest that the coping inventory used was measuring stable enduring coping styles rather than transient situational coping. As such, these styles would not have been expected to change during intervention. Additionally, the authors state that due to the stable hospital environment, the skills of the type that would change during intervention were not necessary. While in the hospital, participants did not need to cope with unique demands such as forming new relationships and seeking a new occupation. The explanations given by King and Kennedy⁵⁶ for the lack of change in coping found in this study are plausible but may be somewhat limited. The possibility does exist that coping strategies are not an effective target for intervention and the CBT program is actually addressing other unknown variables. With research focusing primarily on coping over the last decade it may be that researchers are now preoccupied with coping to the exclusion of other important variables.

In summary, cognitive behavioural interventions represent innovative approaches to improving emotional adjustment to SCI. Preliminary studies have found, that interventions aimed at skill development, improve the mood of those with a SCI, who are depressed and/or anxious. Results also indicate that

improvements in mood, less drug use and medical complications are maintained for at least 2 years after injury. At this stage it is unknown how these interventions work, with no study changing coping styles of those with a SCI.

Conclusion

A wide array of literature now exists supporting a stress and coping model of rehabilitation to SCI. This research was developed in response to inconsistencies and limitations inherent in the traditional stage model approach to rehabilitation. Initial studies in this area highlighted the impact that prior and concurrent life stressors can have on emotional adjustment to SCI, with those experiencing overall increased life stress showing poorer adjustment. In direct contrast to stage model predictions, time since injury has been found to be unrelated to emotional adjustment. The finding that life stress contributed to emotional adjustment subsequently promoted more detailed research into the investigation of specific coping processes utilised in rehabilitation and the impact of these on emotional adjustment.

In the first instance, research involving cross-sectional designs found that coping strategies such as wish-fulfilling fantasy, self-blame, emotional expression, behavioural disengagement and threat minimisation were related to higher levels of depression, anxiety, increased feelings of hopefulness and external locus of control. Research also indicates that coping strategies are related to adjustment over and above variables such as time since injury, locus of control beliefs, age, gender and level of injury.

With the advent of controlled longitudinal studies came investigations into the predictive value and dynamic nature of coping strategies. Research has indicated that coping strategies change across time, as does the adaptive value of these strategies. Longitudinal research shows that the use of maladaptive coping strategies early in rehabilitation can be predictive of adjustment up to 2 years post injury.

With the increasing awareness of the importance of coping skills in emotional adjustment to SCI, treatment programs are now beginning to be developed for this population. These programs enlist elements of cognitive behaviour techniques and work derived from Folkman and Lazarus's¹⁴ concept of a cognitive model of stress. At this point in time, these programs have produced moderately successful results. Participants in a CBT program experiencing severe depression and anxiety have been shown to improve over the treatment period, however these results have not been evidenced in those individuals experiencing mild levels of distress. The utilisation of stress appraisal programs have proffered more favourable results, with participants in treatment groups experiencing improved mood throughout and after treatment. At present this approach has been minimally effective in changing coping strategies utilised by participants.

Future directions

This article has applied the SAC model to formulate emotional adjustment to SCI. The model attempts to account for individual differences in emotional outcome following SCI despite seemingly similar injuries. It does so by proposing a number of psychological variables that mediate and moderate between injury and emotional adjustment. To date, research has largely concentrated on the impact of coping strategies on emotional adjustment to SCI. This research suggests that coping strategies account for nearly half of the variance in emotional adjustment to injury.^{16,17} Although important, the unaccounted for variance in emotional adjustment to SCI suggests that coping is not the only mediating or moderating factor. It remains to be determined to what extent other variables add to the prediction of emotional adjustment to SCI.

The available research examining emotional adjustment to SCI is somewhat limited due to the lack of a comprehensive theory to guide analysis. For example, variables such as age and social support have been shown to be predictive of emotional adjustment^{46,49} however the mechanism by which these variables impact on adjustment has not been considered in most analyses. The SAC formulation of emotional adjustment provides a theoretically coherent guide for examining the moderating or mediating role of psychosocial variables such as social support.

Longitudinal vs Cross Sectional Designs

In addition to the need for a comprehensive theory to guide SCI research, there is a need for longitudinal research in this area. Due to the practical limitations of longitudinal research this type of study is rare. Cross-sectional designs established the relationship between predictor variables and emotional adjustment at one point in time. Such relationships may not hold when predicting from variables at one point in time to emotional adjustment at a latter point in time.

Longitudinal studies allow for analysis of changes within the SAC model over time. Thus specific appraisals or coping strategies found to be helpful directly following injury may be linked to poorer emotional adjustment in the long term. It is important to understand when strategies are effective and under what circumstances they may no longer be helpful.⁶³ Studies examining coping and appraisal at specific points in time are limited to concurrent regression analyses. Many prospective studies have highlighted the importance of examining not only concurrent correlations between coping, appraisal and emotional outcome but also the predictive power of SAC variables on long term outcome. For example, Stanton and Snider⁶⁴ found that cognitive avoidance before a biopsy predicted higher levels of distress following a positive diagnosis of breast cancer. Carver *et al.*¹⁵ also found a strong relationship between coping, appraisal and long term emotional outcome. The Carver *et al.*¹⁵

study examined the coping responses and levels of emotional distress in 59 women with breast cancer. These women were asked recent coping responses and optimism at diagnosis, one before surgery, 10 days post surgery and at 3, 6 and 12 month follow-ups. Results indicated that acceptance and the use of humour prospectively predicted less distress and denial and disengagement predicted higher levels of stress for the women in the study. Several coping strategies such as planning and avoidance were found to play mediating roles in the effect of optimism on distress. These studies highlight the importance of longitudinal designs for examining causality within the SAC model.

Measurement

A number of measurement issues need to be addressed in SCI research. Firstly, problems with measurement arise when somatic symptoms are included as indicators of depression in individuals with SCI. Many items found on depression inventories such as weight change, agitation, fatigue, decreased libido and sleep disturbances can be attributed to either the biological sequelae of SCI or as artefacts of the rehabilitation environment.⁶³ Inventories need to be developed that emphasise the cognitive and emotional components of distress rather than relying on somatic and vegetative items that may provide evidence of emotional distress in populations with SCI. Although inventories such as the BDI and the Hamilton Rating Scale may provide useful information concerning the emotional state of an individual they fail to measure depression as separate from medical symptoms. For example 33% of the BDI, 42% of the Hamilton Rating Scale and 63% of DSM IV criteria concern changes in physiological state.⁶⁶ Favourable results have been found for inventories designed specifically for populations with physical illness or injury. The Medically Based Emotional Distress Scale (MEDS)⁶⁵ has been developed to assess for emotional distress independent of physiological factors. This inventory has provided preliminary support for the appropriateness of excluding physiological symptoms and needs to be replicated in other areas of disability assessment such as stressors and appraisal specific to those with SCI.

A further measurement problem is the assessment of global measures of stress may underestimate the extent to which a person is experiencing stress because crucial sources of stress unique to SCI may not be included. Measures designed specifically for the unique stressors associated with SCI may be more suitable than measures designed for other illnesses or life trauma. The physical stressors accompanying SCI are very different from other illness or disability such as Multiple Sclerosis or Cancer. SCI is sudden, traumatic, and in many instances results in permanent physical and lifestyle changes. As such, SCI is fundamentally different from slow onset chronic illness.

Many of the measures employed in SCI research suffer from a lack of conceptual relevance. Simply

put, more inventories need to reflect the theoretical understandings of specific models such as SAC. The Brief COPE³⁸ is such an inventory and can be applied within SAC framework because it was that framework that has guided its development. More comprehensive inventories need to be developed assessing variables unique to SCI within SAC model. For example the Coping Resources Inventory (CRIS)⁶⁷ is a standardised inventory used to assess for appraisal. This inventory is cumbersome to use in research because of its length and many items are not relevant to SCI. For example a significant number of questions refer to physical activity and physiological changes that are not present in many individuals with SCI. The development of inventories guided by theoretical foundations are necessary if we are to adequately address the contribution stress and appraisal make to emotional outcome in SCI.

Treatment

Treatment for emotional adjustment following SCI has received increased attention in the past decade. Recently two studies have suggested emotional adjustment can be improved with Cognitive Behavioural Stress Management Techniques.^{55,56} These two studies examined the impact of cognitive behavioural group therapy on the emotional adjustment of individuals during rehabilitation and 2 years after injury. Results of these studies showed individuals in treatment groups had significantly greater reductions in depression and anxiety than control individuals following treatment. Furthermore, individuals who had received CBT intervention needed less medication and had significantly less hospital readmissions than controls. These results are very promising however the mechanism responsible for these changes remains unclear. For example, King and Kennedy⁵⁶ failed to find any change in the coping strategies used by the treatment group despite improvements in emotional adjustment. This raises the question as to what other factors (eg their appraisal and social support) were contributing to this change. King and Kennedy⁵⁶ suggest that a change in participants' appraisal of their disability and increased self-efficacy may have been responsible for the improvements in emotional adjustment. These findings highlight the need for a fuller understanding of moderators and mediators of emotional adjustment to SCI. A better understanding would allow for emphasis in CBT to be placed on those variables most responsible for determining emotional adjustment.

A strength of the SAC model is its ability to identify individual differences in coping, appraisal and resource use following SCI. A limitation of the existing CBT research may be the group format used for treatment. Although group treatments are a good inclusion in an overall treatment regime for SCI they may not have the efficacy of individually tailored treatment programs. SAC model stresses the impact of individual differences and group-based programs may not adequately address

these differences. Groups may provide the opportunity for social support and learning of valuable skills but may not be tailored to the individual strengths and weaknesses within the group.

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