

## Original Article

# Linkages between coping and psychological outcome in the spinal cord lesioned: development of SCL-related measures

ML Elfström<sup>\*1</sup>, A Rydén<sup>1</sup>, M Kreuter<sup>2</sup>, L-O Persson<sup>3</sup> and M Sullivan<sup>1</sup>

<sup>1</sup>Health Care Research Unit, Göteborg University, Sweden; <sup>2</sup>Department of Physiotherapy, Sahlgrenska University Hospital, Sweden; <sup>3</sup>Department of Nursing, Göteborg University, Sweden

**Study design:** Cross-sectional.

**Objectives:** To investigate relationships between coping and mental well-being with clinical relevance to spinal cord lesion (SCL).

**Setting:** The Gothenburg Spinal Injuries Unit in Sweden.

**Methods:** The study sample comprised 274 persons. From in-depth interviews, literature reviews, and the transactional theory of stress and coping, items reflecting coping and psychological outcome, respectively were generated. Principal components factor analysis, multi-trait analysis, and structural equation modelling were used.

**Results:** The coping scale comprised three factors: Acceptance (i.e. reevaluation of life values); Fighting spirit (i.e. efforts to behave independently); Social reliance (i.e. a tendency towards dependent behaviour). The outcome scale included the factors: Helplessness (i.e. feeling perplexed, out of control and low self-esteem); Intrusion (i.e. bitterness and brooding); Personal growth (i.e. positive outcomes of life crisis). Acceptance showed a positive relation to Personal growth and was inversely related to both Helplessness and Intrusion. Fighting spirit had a weak negative association to Helplessness and a weak positive association to Personal growth. Social reliance was positively related to Helplessness and Intrusion. Only Social reliance showed any association to neurological status. Those lesioned 1–4 years reported more Helplessness, Intrusion, Social reliance, and less Acceptance than those lesioned  $\geq 5$  years.

**Conclusion:** Coping is related to psychological outcome in SCL. Our situational coping measure may be a candidate to assess intervention effects.

*Spinal Cord* (2002) 40, 23–29. DOI: 10.1038/sj/sc/3101238

**Keywords:** spinal cord lesion; coping; distress; scale development; psychometric validation

## Introduction

Considering the enormous challenge spinal cord lesion (SCL) poses to individuals' physiological, psychological and social balance,<sup>1,2</sup> it is no wonder coping has received attention. Coping strategies mobilised in response to SCL have been shown to be related to the extent of psychological impact of the lesion.<sup>3–5</sup>

According to the transactional theory of stress and coping, coping strategies are conceptualised as mediators of emotional reactions,<sup>6</sup> and an interaction between coping and emotional outcome is suggested.<sup>7</sup> However, the largest cross-sectional study ( $n=257$ ) to date<sup>8</sup> reported no significant effect of coping strategies

on emotional well-being when controlling for selected sociodemographic and disability-related variables. A small longitudinal study ( $n=28$ ) indicated that coping strategies during acute rehabilitation were not associated with long-term adjustment 5–6 years post lesion.<sup>9</sup> A pilot study ( $n=19$ ) evaluating coping effectiveness training for people with SCL<sup>10</sup> showed that although depression and anxiety scores were significantly reduced after training no significant differences were found between the coping strategies used by the intervention group and the matched controls. In a recent review of psychological effects of SCL, coping was not even mentioned among factors predicting favourable psychological outcome.<sup>2</sup> Nevertheless, another longitudinal study ( $n=87$ ) demonstrated a predictive relationship between coping

\*Correspondence: ML Elfström, Health Care Research Unit, Institute of Internal Medicine, Sahlgrenska University Hospital, SE-413 45 Göteborg, Sweden

strategies used the first months after lesion and psychological adjustment up to one year post-discharge.<sup>11</sup>

The failure to find consistent empirical support for a link between coping and psychological/social well-being in SCL may stem from a number of sources: (1) small sample sizes; (2) methodological weaknesses in many existing coping measures, e.g. psychometric shortcomings;<sup>12,13</sup> (3) general coping scales may be inadequate or insufficient for groups who perceive more intense or permanent distress, such as persons with SCL;<sup>8,14</sup> (4) perhaps most importantly, coping still needs conceptual clarification to be clinically relevant in SCL, i.e. strategies to deal with stressful situations have to be separated from outcome reactions to the adverse situations. This last point is strongly emphasised by Lazarus and Folkman in their transactional theory of stress and coping.<sup>6</sup> In their view, coping involves cognitive and behavioural efforts of the individual to manage perceived discrepancies between situational demands and personal capacity. We further define coping as *conscious* efforts to manage the perceived discrepancy (i.e. the stress). On the other hand, psychological outcome is the emotional reaction to stress and coping.

The general purpose of this study was to investigate relationships between coping and mental well-being with clinical relevance to SCL in a large sample, and with a rigorous psychometric procedure. Our specific goal thus was to identify coping strategies employed to overcome the challenges connected with SCL, as well as to identify SCL-related psychological outcome reactions. Thirdly, we briefly wanted to investigate the associations between coping, psychological outcome, time since lesion, and neurological status.

## Methods

### Participants

All traumatically lesioned patients treated and/or followed at the Gothenburg Spinal Injuries Unit between 1982 and 1998 comprised the target population. Those who had recovered were excluded and only those who had been lesioned for  $\geq 1$  year ( $n=381$ ) were mailed questionnaires with letters describing the rationale of the study. Follow-up mailings were made. Eight persons were lost due to severe illness or because they were unable to be located. Of the remaining sample of 373 persons, six individuals refused to participate and 90 did not respond. Three responders did not complete the questionnaire. The study sample thus consists of 274 participants (response rate=73.5%). The study was approved by the local ethics committee.

Table 1 shows the demographic, social, and neurological background characteristics of the participants. Time since lesion ranged from 1–41 years (median 7 years). Following a neurological classification scheme recently used in a study of stress in SCL,<sup>15</sup>

**Table 1** Characteristics of SCL participants ( $n = 274$ )

Characteristic	Males	Females
Sex distribution (%)	74.5	25.5
Age (year)		
Median (range)	40 (16–85)	40 (16–83)
Marital status (%)		
Married or cohabiting	35.0	10.6
Living alone, stable partner	7.7	0.7
Single, divorced	31.8	14.2
Education (%)		
$\leq 9$ years	23.4	9.9
$> 9$ years	51.1	15.7
Neuro grouping (%)		
Tetra: ASIA A,B,C	25.9*	6.6
Para: ASIA A,B,C	25.9*	7.3
All levels: ASIA D	22.3*	11.7
Time since lesion (%)		
1–4 years post lesion	20.8	10.9
$\geq 5$ years post lesion	53.6	14.6

Due to rounding error, percentages for some variables do not equal 100% in total. \* One missing value for men

participants were assigned to one of three groups based on level of the lesion and in accordance with the American Spinal Injury Association (ASIA)/International Medical Society of Paraplegia (IMSOP) classification.<sup>16</sup> The three groups were: (i) Persons with functionally complete tetraplegia who used wheelchair but also had impaired function in their upper extremities (Tetraplegia: ASIA ABC); (ii) Persons with functionally complete paraplegia who typically had intact upper extremities but used wheelchairs for their mobility (Paraplegia: ASIA ABC); (iii) Persons with functionally incomplete SCLs at any neurological level who had neurological sparing such that ambulation was typically possible (All levels: ASIA D).

Since the Gothenburg Spinal Injuries Unit is a specialised unit receiving patients from all of Sweden, we believe that the sample is representative of the general Swedish SCL population.

### Measures: coping and psychological outcome items

Coping and psychological outcome items were derived as part of a larger project on adaptation to chronic illness and disability.<sup>17</sup> First, in-depth interviews were carried out with 26 persons diagnosed with different chronic illnesses/disabilities, including three persons with SCL. The persons were asked to freely describe their psychological and emotional reactions and how they successively managed to adapt to the problems and adversities. The latter domain was of particular focus in the interviews, e.g. mental strategies that the respondents believed had helped them to come to terms with their chronic condition.

The interviews were transcribed and returned by mail to the interviewees for comments and revisions. Content analysis was performed by two independent

raters, resulting in 122 statements reflecting the dimensions of approach/avoidance and internal/external locus of control and these dimensions were confirmed in extensive reviews of the literature. According to our definitions, 42 statements clearly reflected coping strategies and 23 reflected psychological outcome. Lastly, some statements were reformulated to fit the specific conditions faced by persons with SCL. The respondents rated each item on a symmetrical four-step response scale ranging from 'Strongly agree' to 'Strongly disagree'. Scores were calculated by computing the individual mean values of all items belonging to each factor, giving an average between 1 and 4.

### Psychometric methods

Coping and psychological outcome items were analysed separately. To identify possible meaningful and homogeneous factors, and if called for, to reduce the number of items, exploratory principal components analysis was performed with both orthogonal and oblique rotations. Factors were retained if they met Kaiser's criterion (eigenvalue > 1), fulfilled the scree-test criteria,<sup>18</sup> and the same items grouped together in both rotations and reflected the same underlying dimension with regard to conceptual content. To meet the requirements of multi-trait analysis only factors  $\geq 3$  items were retained.

Multi-trait analysis was used to test the validity of the hypothesised multi-item scales. Item-internal validity was achieved when the correlation between an item and its own scale was at least 0.40 (corrected for overlap). For item-discriminant validity, a definite scaling success was noted if an item correlated significantly higher with its own scale (corrected for overlap) than with competing scales, i.e. exceeding two standard errors of the correlation matrix. A probable scaling success was noted if the item-scale correlation was higher, but not significantly, for the hypothesised scale than competing scales. A probable scaling failure was noted if the item-scale correlation was lower, but not significantly, for the hypothesised scale than competing scales. A definite scaling failure was noted if the item-scale correlation was significantly lower for the hypothesised scale than competing scales. Cronbach's alpha coefficient was used to estimate the internal consistency reliability of the multi-item scales. Values exceeding 0.70 were judged acceptable for group comparisons, but 0.80 and higher was desired.<sup>18</sup>

Attempts were made to control for age, time since lesion and gender in the hypothesised scales by performing multi-trait analyses in subgroups. For age, the sample was split in two by the median age ( $n_{\leq M_d} = 141$ ;  $n_{> M_d} = 133$ ). Because psychosocial functions and mood disturbances have been reported to vary greatly during the first four years after lesion,<sup>19</sup> the sample was dichotomised by time since lesion into 1–4 ( $n = 87$ ) and  $\geq 5$  ( $n = 187$ ) years post lesion. The

number of women participating was 70, and the number of men 204. In these subgroup analyses, the decision to include items depended on repeated definite/probable scaling successes, and the decision to exclude items depended on repeated probable/definite scaling failures. These criteria were used since items that discriminate very well may appear to fail some tests when samples are small due to the resulting large confidence intervals for correlations.<sup>20</sup> The scales and items that met these criteria were again tested in the total sample. Only those items and scales achieving definite scaling success were retained. Scale labels were selected to reflect their item content.

For correlations between factors, the Pearson product-moment correlation coefficient was calculated. The Mann–Whitney U-test was employed for significance testing by time since lesion. The Kruskal–Wallis one-way ANOVA (corrected for ties) and the Mann–Whitney U-test were used for testing differences by neurological status.

Structural equation modelling (SEM) was used to briefly elucidate the relation between coping and outcome reactions. The adequacy of the hypothesised model, where coping according to the transactional definition is regarded as having a buffering effect on outcome, was assessed through fit indices. Since no clearly established criteria exist for the minimally acceptable ratios we chose a  $\chi^2/df$  cut-off < 3 as suggested by Kline.<sup>21</sup> The values of the Goodness of Fit Index (GFI) are ranging 0–1, the higher the better.<sup>22</sup> For the Root Mean Square Error of Approximation (RMSEA) a rule of thumb is that values < 0.08 indicate a reasonable fit.<sup>23</sup>

## Results

### The SCL-related coping scale

Factor analysis and extensive multi-trait analyses revealed 30 unsuccessful coping items, leaving 12 coping items from three factors. As can be seen in Table 2, the three-scale structure fulfilled all the conditions required in multi-trait analysis for item scaling and reliability. The coping scale thus consisted of three factors labelled Acceptance, Fighting spirit and Social reliance (see Appendix).

- *Acceptance (four items)*. The lesion and its ramifications are seen as integrated parts of the individual's life. The individual tries to find new values and interests to replace those made unattainable by the lesion.
- *Fighting spirit (five items)*. The person tries to make the best of life despite the lesion, tries to get along by her-/himself, sets goals to achieve and attempts to find tricks that can make living easier.
- *Social reliance (three items)*. The individual adopts the view that he/she is dependent on other people and their ability to help. Support from others is viewed as the only protection against helplessness.

**Table 2** Results of item scaling tests and reliability of the SCL-related coping scale and of the SCL-related psychological outcome scale ( $n = 274$ )

Scale	$k^a$	Range of item correlation		Item scaling tests		Scale
		Item-internal validity <sup>b</sup>	Item-discriminant validity <sup>c</sup>	Success/ total <sup>d</sup>	Scaling success (%)	Reliability <sup>e</sup>
<i>Coping</i>						
Acceptance	4	0.56–0.64	0.05–0.31	4/4	100	0.79
Fighting spirit	5	0.44–0.57	0.01–0.43	5/5	100	0.72
Social reliance	3	0.49–0.61	0.05–0.30	3/3	100	0.73
<i>Psychological outcome</i>						
Helplessness	6	0.54–0.66	0.07–0.51	6/6	100	0.84
Intrusion	3	0.70–0.76	0.19–0.60	3/3	100	0.86
Personal growth	3	0.53–0.62	0.10–0.26	3/3	100	0.75

<sup>a</sup>Number of items and number of item-internal consistency tests per scale; <sup>b</sup>Correlation between items and hypothesised scale corrected for overlap; <sup>c</sup>Correlation between items and other scales (absolute values); <sup>d</sup>Number of hypothesised significantly higher/total number of correlation; <sup>e</sup>Internal-consistency reliability (Cronbach's alpha)

**Table 3** Mean scores and 95% confidence interval of the SCL-related coping scale and of the SCL-related psychological outcome scale ( $n = 274$ )

Scale	Mean (95% CI)
<i>Coping</i>	
Acceptance	2.53 (2.44–2.61)
Fighting spirit	3.23 (3.17–3.30)
Social reliance	2.67 (2.57–2.76)
<i>Psychological outcome</i>	
Helplessness	2.06 (1.97–2.14)
Intrusion	2.07 (1.95–2.19)
Personal growth	2.61 (2.52–2.70)

Min–max score = 1–4

Scores from the coping scales are presented in Table 3. The correlation between Acceptance and Fighting spirit was 0.37, between Acceptance and Social reliance  $-0.14$ , and between Fighting spirit and Social reliance  $-0.13$ .

#### *Coping versus time since lesion and neurological status*

Persons lesioned  $\geq 5$  years reported significantly higher levels of Acceptance ( $P=0.038$ , two tailed) and significantly lower levels of Social reliance ( $P=0.043$ , two tailed) than those lesioned 1–4 years. No differences were found concerning Fighting spirit.

Differences regarding neurological status were significant only for Social reliance ( $P<0.001$ ;  $df=2$ ). Significantly higher levels of Social reliance were found in group (i) versus group (ii) ( $P<0.001$ , two tailed) and group (iii) ( $P<0.001$ , two tailed). There were no differences between group (ii) and (iii).

#### *The SCL-related psychological outcome scale*

Factor analysis and extensive multi-trait analyses revealed 11 unsuccessful psychological outcome items, leaving 12 outcome items from three factors. As can be seen in Table 2, the three-scale structure fulfilled all the conditions required in multi-trait analysis for item scaling and reliability. The outcome scale thus consisted of three factors labelled Helplessness, Intrusion, and Personal growth (see Appendix).

- *Helplessness (six items)*. The individual feels at a loss, without really knowing how to deal with various situations and that he/she has no control over the impact of events in her/his life. Lack of understanding from others, low self-esteem, and worries about the future are included in this factor.
- *Intrusion (three items)*. The person feels bitter about the lesion. The question “why me?” is frequently on her/his mind. The lesion is regarded as an injustice.
- *Personal growth (three items)*. This factor reflects feelings of having become a more harmonious, mature, and humble person as a consequence of the lesion.

Scores from the outcome scales are presented in Table 3. The correlation between Helplessness and Intrusion was 0.63, between Helplessness and Personal growth  $-0.30$ , and between Intrusion and Personal growth  $-0.23$ .

#### *Psychological outcome versus time since lesion and neurological status*

Persons lesioned 1–4 years displayed higher levels of Helplessness ( $P<0.001$ , two tailed) and Intrusion  $P=0.001$ , two tailed) compared to participants who were lesioned  $\geq 5$  years. No difference was found concerning Personal growth.

No differences with regard to neurological status were found.

*Relations between coping and psychological outcome scales*

Figure 1 shows our hypothesised model of the buffering effect of coping. The goodness-of-fit indices indicate a moderate fit of the model to the data. The three coping factors (Acceptance, Fighting spirit and Social reliance) together explained 63% of the variance in Helplessness, 50% in Intrusion, and 50% in Personal growth. Acceptance was positively related to Personal growth, and was inversely related to both Helplessness and Intrusion. Fighting spirit had a positive association with Personal growth and a negative association with Helplessness. Social reliance was positively related to Helplessness and Intrusion.

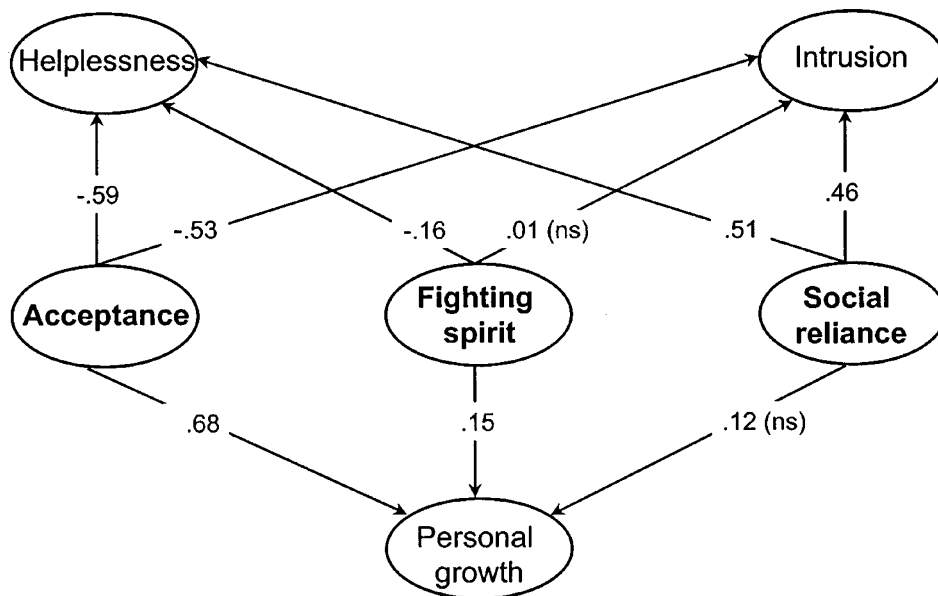
**Discussion**

We found three psychometrically valid and reliable coping factors in SCL: Acceptance, Fighting spirit and Social reliance. Acceptance reflects reevaluation of life values. Others have also used measurements of acceptance as a coping mechanism in SCL.<sup>11,24</sup> Fighting spirit involves efforts to behave independently. An adapted fighting spirit factor from the Mental Adjustment to Cancer Scale has been used in an SCL setting before.<sup>25</sup> Our coping factor Fighting spirit is also similar to Independence and Assertiveness, a coping

strategy reported in a qualitative interview study with SCL participants.<sup>26</sup> Our third coping factor, Social reliance, reflects a tendency towards dependent behaviour. This coping factor has some resemblance to Dependency on Sickrole, a coping measure used by Bracken and Bernstein,<sup>24</sup> although Dependency on Sickrole seems more oriented to the hospital setting than the more generally oriented Social reliance factor.

We interpret Acceptance as a way of approaching the stressors by changing oneself, thereby diminishing the gap between personal capacity and situational demands. Fighting spirit implies that the individual tries to challenge the stressors by increasing control over life circumstances. Social reliance, on the other hand, seems to mean attempts to externalise the control for stressors to other people and rely on their ability to bridge the gap between situational demands and personal capacity of the individual with SCL.

There are a large number of generic mental well-being scales and some have documented relevance in SCL;<sup>19</sup> however, none deals specifically with SCL-related psychological outcome reactions. We found three psychometrically stable psychological outcome factors: we interpret Helplessness and Intrusion to be psychological distress factors, and Personal growth to be a positive morale measure. The Personal growth factor is an indicator of crisis growth,<sup>27</sup> i.e. positive outcomes of life crises. Intrusion includes bitterness and brooding. Attributional cognitions like these have been linked to poor coping behaviour in SCL,<sup>28</sup> especially for the long-term disabled.<sup>29</sup> Helplessness



*Note.* Figures represent the standardised parameter estimates (coping factors in bold; n = 271;  $\chi^2/df = 2.44$ ; GFI = 0.84; RMSEA = 0.073).

**Figure 1** The hypothesised model of coping buffering the effect of stress on psychological outcome

is a measure of perplexion, lack of control, and loss of self-esteem. Others have used a Helplessness/Hopelessness factor as a measure of coping styles in SCL,<sup>25</sup> but in accordance with the transactional coping definition we regard Helplessness as a *consequence* of stress and coping.

The profound challenges faced by the spinal cord lesioned are reflected in the findings that the newly lesioned tended to report more Helplessness and Intrusion. The newly lesioned additionally reported more Social reliance. Because the initial period after lesion might include stressors that seem overwhelming to the individual, it may be a natural coping strategy to rely on others. In the acute phase this might be adaptive, although we do not have data for that period. The adaptive process after a traumatic lesion is also reflected by the fact that those lesioned  $\geq 5$  years reported more Acceptance than did the newly lesioned.

Only Social reliance showed any relation to neurological status: the tetraplegic group reported higher levels of Social reliance. Further validation is needed to determine if Social reliance reflects physical dependence more than coping. That no other significant associations were found is consistent with reports of weak or nonsignificant predictive power of physical and/or medical factors for mental well-being in SCL.<sup>19,30</sup> This finding offers further support for the inclusion of psychological interventions in rehabilitation.<sup>1,10</sup>

With these findings in mind we hypothesised a model to briefly elucidate the effect of coping on psychological outcome reactions, albeit limited by the cross-sectional design of our study. The long median period of time since lesion indicates that an interactive process has been established, i.e. how the individual is coping influences her/his emotional reactions and the emotional reactions influence the individual's coping. An increase in the use of Acceptance was associated with elevated levels of Personal growth and reduced levels of Helplessness and Intrusion. Although more weakly related, the more Fighting spirit the individual shows the more Personal growth and the less Helplessness he/she manifests. Increased use of Social reliance was associated with elevated levels of Helplessness and Intrusion.

We believe that the Acceptance factor reflects more fundamental changes in the individuals' affective-cognitive systems, and thereby more profound adaptive changes. The predictive power of acceptance in persons with SCL as regards psychological impact has been reported by others.<sup>5,11</sup> The Fighting spirit factor was less powerful in influencing mental well-being than expected. High levels of internal control have been linked to less psychological distress<sup>4,31</sup> and better well-being among persons with SCL.<sup>32</sup> A partial explanation for the weak effects of Fighting spirit might be related to the positive skew of the scoring distribution (Table 3). This might be explained by the fact that being a positive and independent individual is a highly valued attitude in western culture. Social reliance was associated with increased psychological distress, since this strategy

involves externalising control. Elevated external control attributions have been associated to higher levels of psychological distress and depression in SCL.<sup>4</sup>

We believe that the fairly moderate fit for the buffer model is largely due to the many unpredicted covariances between item error terms. Fit indices of the structural equation model gave a clear indication of this, and the multi-trait analysis pointed to it, even though minimum standards were met. We intend to evaluate the buffer model further, controlling for the effects of sociodemographic and disability-related variables.

We suggest that psychological interventions in an SCL-setting should aim at giving individuals the opportunity to find coping strategies that match their needs as well as the demands of the situation. Much of these principles are included in the coping effectiveness training programme used by King and Kennedy,<sup>10</sup> although there is no explicit focus on changing fundamental cognitive schemes. This might partly explain why they found no significant changes in the use of coping strategies between the intervention and control groups. As the authors note, a coping measure that emphasises enduring dispositional styles was used. We believe that a more situational coping measure like ours might be more responsive to effects of interventions.

## References

- 1 El Masri WS, Short DJ. Current concepts: spinal injuries and rehabilitation. *Curr Opin Neurol* 1997; **10**: 484–492.
- 2 North NT. The psychological effects of spinal cord injury: a review. *Spinal Cord* 1999; **37**: 671–679.
- 3 Buckelew SP, Baumstark KE, Frank RG, Hewett JE. Adjustment following spinal cord injury. *Rehab Psychol* 1990; **35**: 101–109.
- 4 Frank RG et al. Differences in coping styles among persons with spinal cord injury: A cluster-analytic approach. *J Consult Clin Psychol* 1987; **55**: 727–731.
- 5 Kennedy P, Lowe R, Grey N, Short E. Traumatic spinal cord injury and psychological impact: a cross-sectional analysis of coping strategies. *Br J Clin Psychol* 1995; **34**: 627–639.
- 6 Lazarus RS, Folkman S. *Stress, Appraisal, and Coping*. Springer: New York, 1984.
- 7 Folkman S. Positive psychological states and coping with severe stress. *Soc Sci Med* 1997; **45**: 1207–1221.
- 8 Wineman NM, Durand EJ, Steiner RP. A comparative analysis of coping behaviors in persons with multiple sclerosis or a spinal cord injury. *Res Nurs Health* 1994; **17**: 185–194.
- 9 Hanson S, Buckelew SP, Hewett J, O'Neal G. The relationship between coping and adjustment after spinal cord injury: a 5-year follow-up study. *Rehab Psychol* 1993; **38**: 41–52.
- 10 King C, Kennedy P. Coping effectiveness training for people with spinal cord injury: preliminary results of a controlled trial. *Br J Clin Psychol* 1999; **38**: 5–14.
- 11 Kennedy P et al. A longitudinal analysis of psychological impact and coping strategies following spinal cord injury. *Br J Health Psychol* 2000; **5**: 157–172.

- 12 Parker DA, Endler NS. Coping with coping assessment: a critical review. *Eur J Pers* 1992; **6**: 321–344.
- 13 Schwarzer R, Schwarzer C. A critical survey of coping instruments. In: Zeidner M, Endler NS (eds). *Handbook of Coping: Theory, Research, Applications*. Wiley: New York, 1996, pp 107–132.
- 14 Maes S, Leventhal H, de Ridder DTD. Coping with chronic diseases. In: Zeidner M, Endler NS (eds). *Handbook of Coping: Theory, Research, Applications*. Wiley: New York, 1996, pp 221–251.
- 15 Gerhart KA et al. Correlates of stress in long-term spinal cord injury. *Spinal Cord* 1999; **37**: 183–190.
- 16 Ditunno JF, Young W, Donovan WH, Creasey G. The international standards booklet of neurological and functional classification of spinal cord injury. *Paraplegia* 1994; **32**: 70–80.
- 17 Rydén A et al. Obesity-related coping and distress and relationship to treatment preference. *Br J Clin Psychol* 2001; **40**: 177–188.
- 18 Nunally JC, Bernstein IH. *Psychometric Theory*. 3rd edn. MacGraw-Hill: New York, 1994.
- 19 Lundqvist C et al. Spinal cord injuries. Part 1: Clinical and functional status. *Spine* 1991; **16**: 78–83.
- 20 Ware JE et al. *MAP-R for Windows: Multitrait/Multi-Item Analysis Program—Revised User's Guide*. Health Assessment Lab: Boston; 1997.
- 21 Kline RB. *Principles and Practice of Structural Equation Modeling*. Guilford: New York, 1998.
- 22 Jöreskog KG, Sörbom D. *LISREL 7: A guide to the program and applications*. 2nd edn. SPSS Inc: Chicago, 1989.
- 23 Browne MW, Cudeck R. Alternative ways of assessing model fit. In: Bollen KA, Long JS (eds). *Testing Structural Equation Models*. Sage: Newbury Park, CA, 1993, pp 136–162.
- 24 Bracken M, Bernstein M. Adaptation to and coping with disability one year after spinal cord injury: An epidemiological study. *Soc Psychiatry* 1980; **15**: 33–41.
- 25 Craig AR, Hancock K, Chang E. The influence of spinal cord injury on coping styles and self-perceptions two years after the injury. *Aust N Z J Psychiatry* 1994; **28**: 307–312.
- 26 Ray C, West J. II Coping with spinal cord injury. *Paraplegia* 1984; **22**: 249–259.
- 27 Holahan CJ, Moos RH, Schaefer JA. Coping, stress resistance, and growth: Conceptualizing adaptive functioning. In: Zeidner M, Endler NS (eds) *Handbook of Coping: Theory, Research, Applications*. Wiley: New York, 1996, pp 24–43.
- 28 Bulman RJ, Wortman CB. Attributions of blame and coping in the 'real world': Severe accident victims react to their lot. *J Pers Soc Psychol* 1977; **35**: 351–363.
- 29 Bout J van den, Son-Schoones N van, Schipper J, Groffen C. Attributional cognitions, coping behavior, and self-esteem in inpatients with severe spinal cord injuries. *J Clin Psychol* 1988; **44**: 17–22.
- 30 Woodrich F, Patterson JB. Variables related to acceptance of disability in persons with spinal cord injuries. *J Rehabil* 1983; **49**: 26–30.
- 31 Frank RG, Elliott TR. Spinal cord injury and health locus of control beliefs. *Paraplegia* 1989; **27**: 250–256.
- 32 Schulz R, Decker S. Long-term adjustment to physical disability: the role of social support, perceived control, and self-blame. *J Pers Soc Psychol* 1985; **48**: 1162–1172.

## Appendix

Items from each coping and psychological outcome factor.

### SCL-RELATED COPING SCALE

#### Acceptance

I have been able to see my lesion in perspective.  
I think I have accepted my lesion.  
Through my lesion I have learned to appreciate new aspects of life that I did not think of before.  
What I have lost physically I have gained in so many other ways.

#### Fighting spirit

I try to make the best of life despite the lesion.  
I refuse to let the lesion rule my life.  
I always try to get along by myself.  
It is important for me to set goals that I can fight to achieve.  
I always try to find tricks that might make my situation less difficult.

#### Social reliance

My lesion has taught me that you are dependent upon others.  
Without support from others I would feel completely helpless.  
You have to trust that other people are able to help you.

### SCL-RELATED PSYCHOLOGICAL OUTCOME SCALE

#### Helplessness

I often feel at a loss without really knowing what to do.  
It often feels like I have no control over my life.  
I often feel out of it – that others do not understand my situation.  
I often feel less worth than people who are not lesioned.  
I often feel anxious about how my lesion might influence my life in the future.  
Sometimes I feel like I am ashamed about my lesion.

#### Intrusion

I will probably never get over feeling bitter that it had to happen to me.  
I often ask myself why I was lesioned.  
The accident feels like an undeserved punishment.

#### Personal growth

I probably am more harmonious due to the accident.  
I believe the accident has made me more mature.  
The lesion has somehow made me more humble.