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RELATIONS BETWEEN COPING STRATEGIES AND HEALTH-RELATED QUALITY OF LIFE IN PATIENTS WITH SPINAL CORD LESION

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Objective: **Although the use of appropriate coping strategies has been suggested to be a key factor in determining successful adjustment to severe physical illness/disability, little systematic support for this link has been found. We investigated relationships between spinal cord lesion-related coping strategies and health-related quality of life when studying for sociodemographic, disability-related and social support variables.**

Design and subjects: **We studied 256 persons with traumatically acquired spinal cord lesion (‡1 year) from a typical rural/urban Swedish area in a cross-sectional design.**

Methods: **Coping measure was the Spinal Cord Lesion-related Coping Strategies Questionnaire. Outcome measures were the Spinal Cord Injury Quality of Life Questionnaire, the Short-Form 36 Health Survey version 2.0, and a standardized global question of overall quality of life. Multiple regressions were performed.**

Results: **Coping strategies were clear correlates of health-related quality of life when sociodemographic, disability-related and social support variables were studied. The relationship between coping strategies and quality of life was: the more revaluation of life values (Acceptance) and the fewer tendencies towards dependent behaviour (Social reliance) the better the health-related quality of life.**

Conclusion: **Our results suggest that greater focus needs to be directed to coping strategies and to ways of facilitating adaptive outcomes in rehabilitation.**

Key words: spinal cord injuries, coping behaviour, quality of life, psychometrics, validation studies.

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INTRODUCTION

Health-related quality of life (HRQL) is often considered the primary endpoint in research, clinical medicine and health promotion when impairments are incurable or insufficiently understood (1). For people with a traumatic spinal cord lesion[1] (SCL), extended life spans and the need for life-long follow-up make it important to expand the outcome parameters of medical care and health services to include HRQL measures (2).

Although the use of appropriate coping strategies has been suggested to be a key factor in determining successful adjustment to severe physical illness/disability (3), little systematic support for this link has been found (4). In SCL, a number of studies have used the Ways of Coping Questionnaire (WCQ; 5), that views coping strategies as conscious efforts to deal with stressful situations. Whereas some WCQ-studies found associations between coping strategies and different adjustment aspects (6, 7), the largest cross-sectional study ($n = 257$) to date (8) 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 (9). Other studies have used a coping measure that emphasizes enduring dispositional styles (i.e. COPE; 10). Of these COPE-studies, a longitudinal study ($n = 87$) demonstrated a predictive relationship between coping strategies used the first months after lesion and psychological adjustment up to 1 year post-discharge (11). However, a study ($n = 45$) that evaluated coping effectiveness training for people with SCL (12) 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.

There may be several explanations for the failure to find consistent empirical support for a link between coping and psychological/social well-being in SCL: (i) small sample sizes; (ii) methodological weaknesses in many existing coping measures, i.e. psychometric shortcomings (13); (iii) general coping scales may be inadequate or insufficient for groups who perceive more intense or permanent distress, such as persons with SCL (8, 13); (iv) coping still needs conceptual clarification to be clinically relevant in SCL. It thus remains to be studied whether relations of coping strategies to adjustment can be uniquely and independently assessed in SCL.

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[1] The term “lesion” in spinal cord lesion (SCL) is used as recommended by the International Spinal Cord Society instead of “injury”, i.e. spinal cord injury (SCI). However, many writers still use “injury” and the terms are used interchangeably in this text.

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Recently, a coping measure specifically designed for the use with persons with traumatically acquired SCL was made available. The SCL-related Coping Strategies Questionnaire (SCL CSQ) was developed using a rigorous psychometric procedure in a SCL sample (14). The coping factors in the measure were clearly associated with levels of emotional outcome even when a wide range of sociodemographic, disability-related and social support variables were controlled for (15).

To cover the multidimensional HRQL concept it is recommended that both generic and condition-specific instruments be used (2, 16, 17). About a dozen well-established generic instruments have been used in studies of persons with SCL (2), but only a handful have been tested on a SCL population (18). Among those instruments tested, the Short-Form 36 Health Survey (SF-36) is the most extensively used generic measure and it is one where evidence of construct validity and discriminant ability has been found in SCI (18). Only a few SCL-specific HRQL instruments exist (2). Of these, the Spinal Cord Injury Quality of Life Questionnaire (SCI QL-23; 19) is the only one that has been validated for Swedish conditions.

To deepen our understanding of the relations between coping strategies and adjustment outcome it is crucial to control for background characteristics such as sociodemographic, disability-related and social support variables. Such variables have been associated with the emotional impact of SCL in previous studies (8, 20–22). Furthermore, the availability of population norms for generic and specific outcome measures greatly enhances interpretation (1, 16, 17).

The aim of this study was to investigate relationships between SCL-related coping strategies and HRQL in persons with traumatic SCL when sociodemographic, disability-related and social support variables were controlled.

METHODS

Participants

All traumatically lesioned patients treated and/or followed at the Gothenburg Spinal Injuries Unit between 1982 and 1998 comprised the pool of potential participants ($n = 439$). A total of 58 persons were excluded: 29 were dead, 6 had non-traumatic lesions, 6 had recovered (i.e. the American Spinal Injury Association (ASIA)/International Medical Society of Paraplegia (IMSOP) classification E; 23), 6 were not Swedish speaking, 5 had a psychiatric disease, 3 had diagnosed brain injuries, 2 were living abroad and 1 had dementia. Thus 381 persons were sent questionnaires with a letter describing the rationale of the study. Questionnaires included measures of coping strategies, social support and HRQL. Follow-up mailings were made. A further 20 persons were excluded due to recovery from lesion, severe illness or because they could not be located. The total eligible sample thus comprised 361 persons. A total of 256 individuals returned completed questionnaires (response rate = 70.9%). The local ethics committee approved the study.

Respondents were compared with non-respondents using non-parametric tests. No statistically significant differences were found concerning gender, age, duration of disability, age at lesion or neurological deficit.

Table I describes the sociodemographic and disability-related background characteristics of the participants. Data were recorded from the Spinal Unit's Regional Database. Following a neurological classification scheme used in a study of psychological stress in SCL (24), participants were assigned to 1 of 3 groups based on level and completeness of the lesion and in accordance with the ASIA/IMSOP classification (23). ASIA classes A, B, C were put together and called functionally complete because the walking ability was non-useful. The 3 groups were: (i) persons with functionally complete (ASIA/IMSOP A, B, C) tetraplegia who used wheelchair and had impaired function in their upper extremities; (ii) individuals with functionally complete (ASIA/IMSOP A, B, C) paraplegia who typically had intact upper extremities and used wheelchairs for their mobility; (iii) persons with functionally incomplete (ASIA/IMSOP D) SCLs at any neurological level who had neurological sparing such that ambulation was typically possible.

Table I. *Background characteristics of the study sample (*n *= 256)*

	Number	Percentage
Gender		
Men	191	74.6
Women	65	25.4
Age		
Mean (SD)	43.9 (15.9)	
Median (range)	40.0 (16–85)	
Educational level		
Compulsory level (7 years)	42	16.4
Compulsory level (9 years)	44	17.2
Vocational school (11 years)	61	23.8
Secondary school (12 years)	52	20.3
University	57	22.3
Marital status		
Single, divorced, widowed	116	45.3
Married, stable partner	140	54.7
Age at lesion		
Mean (SD)	35.0 (16.7)	
Median (range)	29.5 (14–80)	
Duration of disability		
Mean (SD)	8.9 (7.0)	
Median (range)	7.0 (1–40)	
Neurological classification[a]		
Tetraplegia: ASIA/IMSOP A,B,C	81	32.8
Paraplegia: ASIA/IMSOP A,B,C	86	33.6
All levels: ASIA/IMSOP D	85	33.2

SD = standard deviation; ASIA = American Spinal Injury Association; IMSOP = International Medical Society of Paraplegia.

[a] One missing value.

The sample was considered representative of the Swedish population with SCL in that the main catchment area of the Spinal Unit comprises a typical rural/urban Swedish population. Furthermore, the sample did not differ from what was found in an almost total prevalence study of the most populated region in Sweden (25–27).

Measures

Outcome measures. The Spinal Cord Injury Quality of Life Questionnaire (SCI QL-23) was used as a specific measure of HRQL. Items comprising the SCI QL-23 were derived and adopted from a comprehensive battery of specific and generic questionnaires applied in a study of persons with traumatic SCL (19). The SCI QL-23 consists of 3 factors: Problems regarding injury (PROB; 6 items), which was derived from a list of items (28) describing perceptions of physical dependency, of complications, and of social stigma. PROB thus reflects perceptions of loss of independence, of complications and of social stigma due to problems specific to the injury. PROB has a 4-point response scale. Physical/social functioning (FUNC; 10 items) was derived from the Swedish version (29) of the Sickness Impact Profile (SIP; 30). FUNC covers limitations in mobility, body care and movement and social interaction. Respondents have only to check each item that describes a dysfunction in relation to their health at the time. FUNC-items have predetermined weights in accordance to the weighting system of the SIP that are intended to correspond to severity of dysfunction. Depressive feelings (DEPR; 6 items) was derived from the Swedish version (31) of the Hospital Anxiety and Depression scale (HAD; 32).

DEPR reflects distress and depressive symptoms. DEPR has a 4-point response scale. In all 3 scales of the SCI QL-23, coded values are summed, divided by the maximum score of the scale and multiplied by 100 to a 0–100 scale. High scores represent limitations in SCL-related quality of life. SCI QL-23 values are compared with a SCL sample from the same catchment area ($n = 167$; 33).

The Swedish version of the standardized SF-36 Health Survey version 2.0 was used as a generic measure of HRQL (34, 35). The SF-36 taps 8 health domains representing multiple operational definitions of health, including function and dysfunction, distress and well-being, and favourable and unfavourable self-ratings of one's general health status (36). The 8 subscales are Physical functioning (PF; 10 items), Role functioning-physical (RP; 4 items), Bodily pain (BP; 2 items), General health (GH; 5 items), Vitality (VT; 4 items), Social functioning (SF; 2 items), Role functioning-emotional (RE; 3 items), and Mental health (MH; 5 items). All scale scores are linearly transformed to a 0–100 scale. High scores represent optimal physical and mental health. SF-36 values were compared with an age- and sex-matched reference group ($n = 110$) randomly drawn from the Swedish norm database for version 2.0 (35; $n = 2185$).

Overall quality of life was measured by a single standardized question from the European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire Core 30 (EORTC QLQ-C30; 37). Responses to this global rating of life situation range between 1–7 and are linearly transformed to a 0–100 scale (GQOL), where high scores represents optimal overall quality of life. GQOL is included in the SCI QL-23 questionnaire as an independent part. Values of the GQOL rating are compared with reference values from the general population sample studied by Kreuter et al. (33; $n = 264$).

Predictor measure. The SCL-related Coping Strategies Questionnaire (SCL CSQ) is a measure of coping strategies that met basic psychometric standards for validity and reliability in the SCL-sample in which it was developed (14). Items in the SCL CSQ were generated from in-depth interviews. A rigorous psychometric testing procedure including exploratory, confirmatory and subgroup analyses was used. Only those factors/coping strategies meeting established criteria were retained. SCL CSQ consists of 3 factors: Acceptance (4 items) is revaluation of life values; Fighting spirit (5 items) includes efforts to minimize the effects of the lesion; and Social reliance (3 items) reflects a tendency towards dependent behaviour. Items are rated on a scale from 1 to 4. Scores represent the mean of the ratings, with higher scores indicating greater use of the strategy in question.

Background measures. Sociodemographical variables were gender, educational level and marital status recorded from the Spinal Unit's Regional Database. Categories for sociodemographic variables are presented in Table I.

Disability-related variables were age at lesion, duration of disability and neurological classification recorded from the Spinal Unit's Regional Database (Table I). Regarding neurological classification, the database is based on clinical examinations.

Social support was measured by short forms of the Swedish versions of Availability of attachment (AVAT) and Availability of social integration (AVSI) scales derived from the Interview Schedule for Social Interaction (38). The short forms have proven psychometrically equivalent to the original lengthier scales (39). AVAT has a yes/no response format. AVSI uses a 6-point response format and the answers are then dichotomized. Each scale consists of 3 items. Ratings are summed and range between 0 and 3, where higher scores indicate more perceived social support.

Statistical methods

All analyses of data were conducted using the Statistical Package for Social Sciences (SPSS) version 11.0.

An initial data quality check showed the greatest skewness (1.46) and kurtosis (2.73) for duration of disability. This variable was logarithmically transformed to a normal distribution. All other variables were approximately normally distributed.

The SCI QL-23 and the SF-36 v2.0 were compared to reference values using the *t*-test (two-tailed). Effect sizes were also calculated to estimate the magnitude of mean score differences. Effect sizes were calculated as the difference between group means divided by the standard deviation of the comparison group. Interpretation followed Cohen's (40) criteria: trivial (0 to < 0.20), small (0.20 to < 0.50), moderate (0.50 to < 0.80), and large (≥ 0.80) effects.

To avoid collinearity, parametric (Pearson) and non-parametric (Spearman) correlations were calculated for all variables and the correlation matrices were inspected.

A series of stepwise multiple regression analyses were performed. The 3 subscales from SCI QL-23, the 8 subscales from SF-36 and the GQOL rating were treated as dependent variables. The dependent variables together form a hypothetical HRQL continuum where the scales range from condition-specific complaints/consequences via general aspects of health to overall quality of life (Fig. 1). The dependent variables also cover functions and dysfunctions as well as physical, psychological and social aspects of HRQL. Independent variables were coping strategies and the background variables. A $p < 0.05$ level was used for entering independent variables and only variables with $p < 0.05$ were accounted for in the total R^2. Standardized residuals for the difference between observed and predicted values > 3 were considered outliers. Cases with missing data were deleted listwise in all regression analyses.

RESULTS

Descriptive statistics

Means and confidence intervals for the social support variables and SCL CSQ are presented in Table II. A positive skew in the scoring distribution of the AVAT scale and the Fighting spirit factor was noted. In SCI QL-23, participants did not differ from a previous study in the same catchment area (Table III; 33). In SF-36, scores were significantly lower than the age- and sex-matched comparison group on all subscales (Table II). In the GQOL rating, participants scored lower than a general population sample (Table III; 33). The effect sizes were trivial for SCI QL-23, large to moderate in all subscales of the SF-36, whereas a small effect size was seen for GQOL (Table III).

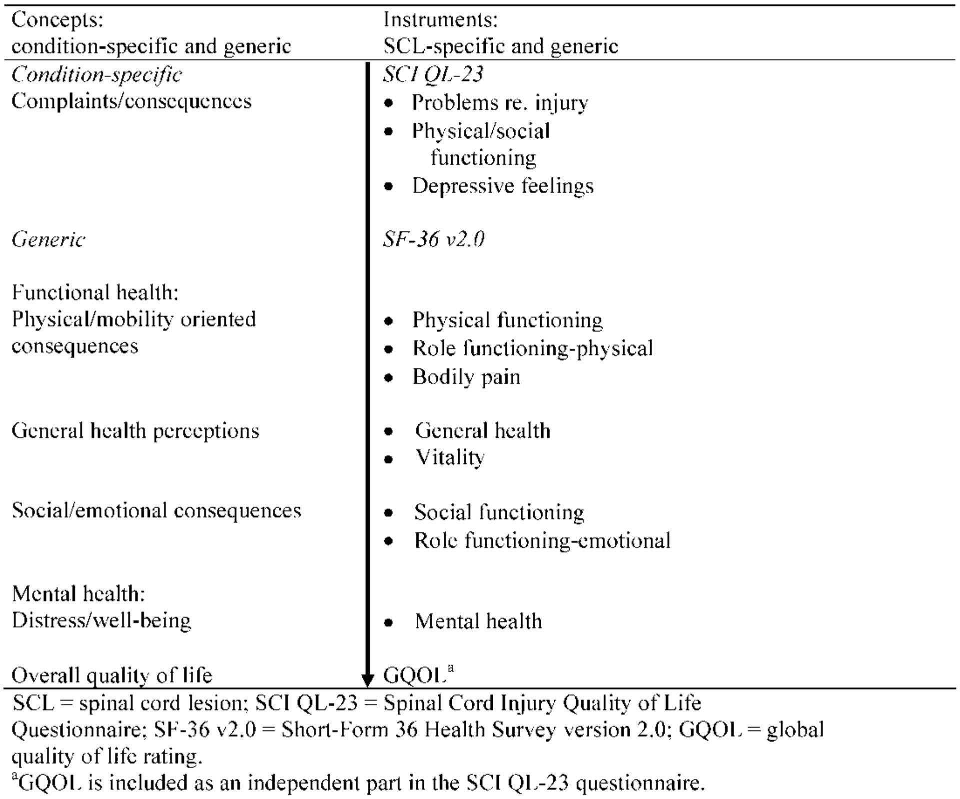
Bivariate correlation analyses

Neither non-parametric nor parametric correlations between outcome, background and predictor variables indicated collinearity (data available on request). To compensate for the number of correlations performed, the minimum level of significance was set to $p < 0.01$. High scores on the coping factors Acceptance and Fighting spirit and low scores on Social reliance correlated with better scores in almost all HRQL domains. Among the background variables, sociodemographic variables had few significant correlations with HRQL. Although some disability-related variables were significantly correlated with HRQL, most associations were explained by the fact that being young at lesion correlated with better scores in several HRQL domains. More social support, in terms of Availability of social integration, correlated with better HRQL in many domains.

Coping strategies and SCL-specific HRQL

Results from the multiple regression analyses with the subscales of SCI QL-23 as the dependent variables are presented in the first panel of Table IV. One outlier was excluded in each of the 3 analyses; the 3 outliers were different cases.

Among the background variables, sociodemographic variables did not contribute much to explain the variance in SCL-specific quality of life. Persons less neurologically disabled



Concepts: condition-specific and generic	Instruments: SCL-specific and generic
Condition-specific	*SCI QL-23*
Complaints/consequences	• Problems re. injury • Physical/social functioning • Depressive feelings
Generic	*SF-36 v2.0*
Functional health: Physical/mobility oriented consequences	• Physical functioning • Role functioning-physical • Bodily pain
General health perceptions	• General health • Vitality
Social/emotional consequences	• Social functioning • Role functioning-emotional
Mental health: Distress/well-being	• Mental health
Overall quality of life	GQOL[a]

SCL = spinal cord lesion; SCI QL-23 = Spinal Cord Injury Quality of Life Questionnaire; SF-36 v2.0 = Short-Form 36 Health Survey version 2.0; GQOL = global quality of life rating.

[a] GQOL is included as an independent part in the SCI QL-23 questionnaire.

Fig. 1. Conceptual and measurement model of health-related quality of life in persons with spinal cord lesions (SCL): a continuum of concepts used to validate the SCL-related Coping Strategies Questionnaire.

scored low on Problems re. injury and low on limitations in Physical/social functioning. Persons younger at lesion scored low on limitations in Physical/social functioning and scored somewhat lower on Depressive feelings. Persons scoring high on Availability of social integration scored low on Depressive feelings.

The coping factors Acceptance and Social reliance were among the 3 strongest covariates of all 3 subscales of SCI QL-23. Persons who scored high on Acceptance and low on Social reliance reported fewer Problems re. injury and Depressive feelings and decreased limitations in Physical/social functioning.

Table II. *Means and confidence intervals (CI) for social support and Spinal Cord Lesion-related Coping Strategies Questionnaire (SCL CSQ) subscales* (n = *256)*

Variable	Mean *(95% CI)*
Social support (range 0–3) *(the higher scores the more support)*	
Availability of attachment	2.39 *(2.27–2.52)*
Availability of social integration	1.49 *(1.34–1.63)*
SCL CSQ (range 1–4) *(the higher scores the more use)*	
Acceptance	2.53 *(2.45–2.62)*
Fighting spirit[a]	3.22 *(3.15–3.28)*
Social reliance	2.69 *(2.59–2.78)*

[a] One missing value.

Coping strategies and generic HRQL

Results from the multiple regression analyses with the subscales of SF-36 as the dependent variables are presented in the second panel of Table IV. Six outliers were excluded in the analysis with Physical functioning as the dependent variable and 1 outlier was excluded in each analysis with the 2 Role functioning scales (physical and emotional causes) and Mental health; only 1 case was an outlier more than once.

Among the background variables, sociodemographic variables did not contribute much to explain the variance of generic HRQL. Persons who were less neurologically disabled reported few limitations in Physical functioning. Individuals with a shorter duration of disability reported somewhat better HRQL in some domains. Those who were young at the time of the lesion also scored better in some domains, where the strongest associations appeared in the 2 Role functioning scales. Persons scoring high on Availability of social integration scored somewhat higher on SF-36 scales related to social consequences and general health perceptions, the strongest association was found in Mental health.

The coping factors Acceptance and Social reliance were among the 3 strongest covariates of all 8 SF-36 subscales. Persons who scored high on Acceptance and low on Social reliance scored better on all 8 domains.

Results from the multiple regression analyses with the GQOL rating as the dependent variable are presented in the third panel of Table IV. No outlier emerged.

Table III. *Health-related quality of life in the study sample* (n = 256) *as compared with reference values from different groups*

Variable (range 0–100)	Study sample[a] Mean (95% CI)	Reference values[b] Mean (95% CI)	*t*	ES
SCI QL-23 (the lower scores the better)				
Problems re. injury	49.6 (46.3–52.9)	53.4 (49.6–57.3)	−1.4	0.16
Physical/social functioning	34.2 (30.7–37.7)	34.6 (29.9–39.3)	−0.1	0.01
Depressive feelings	25.9 (23.2–28.6)	26.3 (22.8–29.7)	−0.2	0.02
SF-36 v2.0 (the higher scores the better)				
Physical functioning	33.0 (28.9–37.1)	91.5 (88.6–94.4)	−17.6***	3.85
Role functioning-physical	58.9 (54.5–63.3)	89.5 (85.4–93.6)	−8.5***	1.42
Bodily pain	50.9 (47.3–54.4)	77.2 (72.1–82.4)	−8.1***	0.96
General health	59.6 (56.6–62.5)	77.8 (74.0–81.5)	−7.0***	0.92
Vitality	52.9 (50.0–55.8)	68.0 (63.7–72.2)	−5.7***	0.67
Social functioning	67.1 (63.2–71.0)	88.4 (84.4–92.4)	−6.5***	1.01
Role functioning-emotional	73.1 (69.1–77.1)	89.0 (85.2–92.8)	−4.8***	0.80
Mental health	68.9 (66.2–71.6)	80.5 (77.2–83.8)	−4.8***	0.67
GQOL (the higher scores the better)	63.9 (61.2–66.7)	69.8 (52.6–61.7)	−3.1**	0.28

CI = confidence interval; ES = effect size; SCI QL-23 = Spinal Cord Injury Quality of Life Questionnaire; SF-36 v2.0 = Short-Form 36 Health Survey version 2.0; GQOL = global quality of life rating.

[a] *n* for different scales range 256–244 due to non-response. [b] SCI QL-23 is compared with a spinal cord injury sample from the same catchment area (*n* = 167; 33). SF-36 v2.0 is compared with an age- and sex-matched reference group (*n* = 110) from the Swedish norm database (35). GQOL is compared with reference values from the general population sample (*n* = 264) studied by Kreuter et al. (33).

** $p < 0.01$. *** $p < 0.001$.

Among the background variables, sociodemographic and disability-related variables were not significant covariates of overall quality of life. Persons scoring high on the social support measures scored somewhat higher on overall quality of life.

The coping factors Acceptance and Social reliance were the strongest covariates of overall quality of life. Persons who scored high on Acceptance and low on Social reliance had higher scores on overall quality of life.

DISCUSSION

We found clear limitations in generic HRQL for the study group as compared with an age- and sex-matched reference group. Two SCL-related coping factors were distinct covariates of specific and generic HRQL: the more Acceptance (i.e. revaluation of life values) and the less Social reliance (i.e. tendencies towards dependent behaviour) the better the HRQL. The third coping factor, Fighting spirit, was only weakly related to depressed mood and overall quality of life.

Our results corroborate previous findings from Sweden (27), US (18) and Canada (41) that persons with SCL report limitations in generic HRQL as measured by the SF-36. Like these studies, we found the SF-36 informative, although items related to walking in the Physical functioning scale may pose a problem for persons who use wheelchairs (18). High levels of the coping factor Acceptance and low levels of the coping factor Social reliance have previously been shown to be distinctly related to increased psychological well-being when controlling for a wider range of background variables than in this study (15). The coping factor Fighting spirit did not significantly contribute to psychological well-being in that study. Another acceptance measure has been reported to predict psychological well-being in SCL when controlling for some possible confounders (11, 42).

The Acceptance factor is a measure of a coping strategy that may lead to *disability acceptance*. This concept has been elaborated by Wright (43). Like her, we do not think acceptance implies resignation. Instead, acceptance implies that the individual actively changes his life values as opposed to giving up.

Social reliance, on the other hand, is interpreted as a more passive strategy that includes externalizing locus of control for stressors to other people. This is different from the well-known coping strategy *Seeking social support* (5), where the individuals see themselves as active agents that seek help from other persons when incapable of meeting their own needs. Viewing Social reliance as a behavioural indicator of external locus of control is also in line with the findings that elevated external control attributions are associated with higher levels of psychological distress and depression in SCL (7).

Fighting spirit implies that the individual tries to challenge the stressors by increasing control over life circumstances. High levels of internal control have been linked to less psychological distress (7) and better well-being among persons with SCL (22). The weak independent associations of Fighting spirit found here may result from social desirability possibly deriving from western culture valuing positive and independent individuals highly, which may also be reflected in the attitude among the staff of the Spinal Unit. Social desirability may dampen the effects of Fighting spirit because it may lead to over reporting by respondents, as reflected in the positive skew of the scoring distribution (Table II).

Sociodemographical, disability-related and social support variables were considerably less related to HRQL than Acceptance and Social reliance. Sociodemographic variables were largely unrelated to HRQL. In contrast to a previous study from

Table IV. *Results of the stepwise multiple regression analyses with subscales from Spinal Cord Injury Quality of Life Questionnaire (SCI QL-23) and Short-Form 36 Health Survey version 2.0 (SF-36 v2.0) as well as the global quality of life rating (GQOL) as dependent variables*

Dependent variable	R^2	R^2 change	β	Predictor variables
SCI QL-23 (the higher score the worse)				
Problems re. injury ($n = 250$)	0.29	0.29	0.41***	Social reliance
	0.46	0.18	−0.43***	Acceptance
	0.50	0.04	−0.20***	Neurological deficit
Physical/social functioning ($n = 253$)	0.37	0.37	0.41***	Social reliance
	0.44	0.07	−0.24***	Acceptance
	0.50	0.06	−0.30***	Neurological deficit
	0.54	0.04	0.20***	Age at lesion
	0.55	0.01	−0.10*	Education
	0.55	0.01	−0.09*	Marital status
Depressive feelings ($n = 250$)	0.30	0.30	−0.37***	Acceptance
	0.40	0.10	−0.31***	Availability of social integration
	0.43	0.02	0.12*	Social reliance
	0.44	0.01	0.12*	Age at lesion
	0.45	0.01	−0.11*	Fighting spirit
SF-36 v2.0 (the higher score the better)				
Physical functioning ($n = 245$)	0.34	0.34	0.49***	Neurological deficit
	0.42	0.08	−0.26***	Social reliance
	0.45	0.02	0.16**	Acceptance
	0.46	0.02	−0.18**	Age at lesion
	0.49	0.03	−0.17**	Duration of disability
Role functioning-physical ($n = 244$)	0.23	0.23	−0.37***	Social reliance
	0.33	0.09	0.27***	Acceptance
	0.38	0.06	−0.25***	Age at lesion
Bodily pain ($n = 251$)	0.08	0.08	0.23***	Acceptance
	0.11	0.03	−0.15*	Social reliance
	0.13	0.02	−0.14*	Age at lesion
General health ($n = 252$)	0.12	0.12	0.30***	Acceptance
	0.20	0.08	−0.29***	Social reliance
	0.23	0.03	−0.17**	Duration of disability
	0.24	0.02	0.14*	Availability of social integration
Vitality ($n = 253$)	0.17	0.17	0.33***	Acceptance
	0.29	0.12	−0.34***	Social reliance
	0.32	0.03	0.19**	Availability of social integration
	0.33	0.01	−0.11*	Duration of disability
Social functioning ($n = 252$)	0.23	0.23	0.40***	Acceptance
	0.28	0.05	−0.21***	Social reliance
	0.31	0.02	0.17**	Availability of social integration
Role functioning-emotional ($n = 247$)	0.15	0.15	0.28***	Acceptance
	0.23	0.08	−0.21***	Social reliance
	0.27	0.04	−0.20**	Age at lesion
	0.28	0.01	−0.12*	Gender
	0.30	0.01	0.12*	Availability of social integration
Mental health ($n = 252$)	0.24	0.24	0.38***	Acceptance
	0.31	0.08	0.28***	Availability of social integration
	0.33	0.02	−0.15**	Social reliance
GQOL (the higher score the better) ($n = 251$)	0.29	0.29	0.38***	Acceptance
	0.35	0.06	−0.22***	Social reliance
	0.38	0.03	0.16**	Availability of social integration
	0.39	0.02	0.11*	Availability of attachment
	0.40	0.01	0.11*	Fighting spirit

Outliers are excluded. The number of subjects for different scales mainly differs from the sample size due to non-response. Due to rounding error some R^2 change values do not equal cumulative R^2 when summed.
β = standardized beta coefficient.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

the US (8), this was true also for the domain of emotional well-being. It could well be that sociodemographic situation is more important in countries with less extensive common health insurance systems than in the Scandinavian countries. Another possible explanation may be that that study (8) used a measure of coping strategies that might be psychometrically unstable (44), i.e. the Ways of Coping Questionnaire (5). Our results are in line with the findings that demographic variables were weak predictors of life satisfaction in general and in the economic domain (45).

Among the disability-related variables, persons more neurologically disabled reported, as expected, more injury-related problems as well as limitations in physical and social functioning. Persons with a shorter duration of disability reported somewhat better HRQL in some domains. This contrasts with findings from a longitudinal study that adjustment improves with time since injury (46). On the other hand, there seems to be an opposite trend with declines in adjustment with increasing age (20), which is in line with our findings of the beneficial associations of being young at lesion. The overall weak associations of lesion-related variables to HRQL in our study are in line with findings of weak effects of injury-related variables on life satisfaction in general and in the economic domain (45).

Increased social support was moderately related to increased HRQL, however, Availability of social integration explained most of these relationships. Coping strategies have been shown to be more important than social support in affecting HRQL (in terms of psychosocial role performance and numerous aspects of well-being) in other patient populations with severe chronic conditions, such as multiple sclerosis (47).

It should be noted that this study is not a cross-validation of the SCL CSQ or SCI QL-23. The participants of this study were included in the sample used in developing SCL CSQ. About 20% of the sample was also part of the sample used in the development of the SCI QL-23 (19) and about a third was included in the previous reference study from the same catchment area (33). This means that interpretation of the coping factors is still tentative and in need of cross-validation. The overlap in samples may also lead to confounding effects, that is, overestimation of the strength of the relations between coping factors and condition-specific HRQL. On the other hand, the strong relations found between coping and generic HRQL (SF-36) are consistent with these results and thus reinforce their validity. It is too early to decide if the SCL-related coping factors are stronger correlates of HRQL than other variables of potential importance. The unexplained variance in our HRQL measures vividly reminds us that there are also other candidates of adjustment determinants. Examples that need to be included in future studies are general coping strategies, coping styles and employment status. However, the latter variable did not change the associations of the SCL-related coping factors to emotional well-being in a previous study (15).

The cross-sectional study design precludes any conclusions about causation. The long median period of time since lesion suggests that an interactive process had been established, i.e. individuals' coping strategies influence their HRQL and the HRQL influences the individuals' coping strategies. From the perspective of the transactional theory of stress and coping (3) this is what *should* happen, adjusting to life with a SCL is an ongoing process as is emphasized in the influential work of Trieschmann (48).

In conclusion, our results of clear limitations in generic HRQL and the associations of SCL-related coping strategies to HRQL suggest that rehabilitation needs to focus even more on individuals' coping strategies and on what can be done to facilitate adaptive outcomes. A promising way to do this is to make more use of coping effectiveness training programs specially adapted to SCL (12). Such programs consist of brief group-based psychological interventions for improving psychological adjustment and enhance adaptive coping based on the transactional theory of stress and coping, as well as cognitive behavioural therapy techniques.

In accordance with the definition of coping strategies as *conscious* efforts to manage or reduce the stressful experiences (13, 14), e.g. living with physical illness/disability, all categories of personnel in the rehabilitation team can contribute. In addition to supervising rehabilitation procedures, professionals should explicitly ask individuals to describe their coping strategies, offer alternatives where needed, and evaluate the outcome.

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