Title: The associations of acceptance with quality of life and mental health following spinal cord injury: A systematic review

Running title: Acceptance, quality of life, and mental health

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Abstract

**Study Design:** Systematic review.

**Objectives:** To identify, critically appraise, and synthesize research findings on the associations between acceptance, quality of life (QOL), and mental health outcomes in individuals living with spinal cord injury (SCI).

**Methods:** Five databases (PubMed, PsycINFO, Embase, Web of Science, and Scopus) were systematically searched. Studies were included if they provided findings on the association between acceptance and QOL, mental health outcomes, or both in an SCI population aged 16 years or older. Only peer-reviewed original quantitative and qualitative studies were included. Screening, quality assessment, and data extraction were conducted independently by two researchers. Findings were tabulated and synthesized by outcome.

**Results:** Forty-one studies were included. Greater acceptance was consistently associated with greater global and psychological QOL, life satisfaction, sense of well-being, mental health, and with lower levels of depression and anxiety. Inconsistent evidence was found with regards to social QOL and post-traumatic stress disorder. Acceptance was generally not associated with adjustment outcomes further than two years into the future. Study quality of the quantitative studies was mostly *fair* (n = 17) followed by *good* (n = 13), and *poor* (n = 9).

**Conclusion:** Health-care professionals may regard acceptance as a psychological resource they can aim to support in improving QOL and mental health following SCI. A range of methodological and conceptual limitations were present in the research. Future studies should prioritize longitudinal designs, consider dyadic effects, explore subjective meaning(s) of acceptance, and investigate the effectiveness of therapeutic approaches that stimulate the acceptance process.
Introduction

A spinal cord injury (SCI) is a severe and chronic condition that is often accompanied by paralysis, numerous secondary complications, functional impairments, and persistent pain [1]. This type of injury causes profound and irretrievable changes in many aspects of life [2] and has repeatedly been described as one of the most devastating injuries a person can experience [3,4]. Individuals with SCI are faced with a myriad of daily challenges, including disruptions in work [5], family and social relationships [6], and community participation [7]. Furthermore, some individuals with SCI experience reduced satisfaction with life [8], poor social participation [9], and up to 30% report clinical levels of depression and anxiety at some point following their injury [10]. Hence, psychological distress is common in SCI and has been shown to persist up to 10 years or more post-injury [11].

The presence and severity of negative psychological outcomes are influenced by many factors, including acceptance of the injury [12–14]. Acceptance is defined as perceiving the injury as an integral part of life going forward and a re-evaluation of life values [15], and thus provides a coping strategy that is particularly relevant in unalterable situations [16]. Empirical studies show that greater acceptance is associated with greater quality of life (QOL) [17] and with lower levels of depression [13], anxiety [18], and post-traumatic stress disorder (PTSD) [19]. However, these empirical studies often focus more generally on psychological factors such as the global construct of coping, where acceptance is only incidentally included [e.g., 13,17–19]. This all-encompassing approach has some benefits, but it complicates the matter of getting a detailed overview of the specific role of acceptance in the adjustment process. This complication was highlighted in a previous systematic review from 2012 on psychological factors and QOL following SCI [4]. In this review acceptance was associated with lower levels of depression and anxiety as well as higher satisfaction with life, but due to the large-scale nature of their review, the authors recommended that future
research provide more detailed insights into the factors that were consistently related to favorable adjustment outcomes [4]. However, a systematic review on the associations between acceptance, QOL, and mental health outcomes does not currently exist.

The aim of the present systematic review was to identify, critically appraise, and synthesize relevant research findings to answer the research question of how acceptance is associated with QOL and mental health outcomes in individuals living with SCI.

**Theoretical foundation**

Over time, acceptance has been conceptualized in a variety of ways. Initially, stage-theory approaches of adjustment to SCI and other disabilities conceptualized acceptance as the result of successful progression through predefined stages such as denial, anger, bargaining, and depression [20]. However, these theories relied on clinical observations rather than empirical studies [21] and are generally not supported today [20]. Another cornerstone that continues to be a major influence is the seminal work of Wright [22]. Wright proposed a theory of disability acceptance as an adjustment of a person’s value system. In this framework, acceptance entails that the perceived losses resulting from the disability do not devalue existing abilities or the person as a whole [22,23]. While the theory of disability acceptance is still relevant today, in recent years most of the empirical researchers have turned their attention to the stress and coping literature [20]. The transactional model of stress and coping is based on the premise that psychological distress is caused by appraising a situation as exceeding the personal and situational resources needed to manage that situation [24]. In this framework, acceptance is proposed to reduce the discrepancy between what one prioritizes in life and what one is capable of doing, thus reducing psychological distress [25]. One of the newest developments in this theoretical framework is the Spinal Cord Injury Adjustment Model or SCIAM [20]. This is a dynamic, multivariate model of the adjustment process.
following SCI, which proposes that biological, psychological, and social factors all influence adjustment outcomes via appraisals and coping strategies.

In empirical studies, acceptance is generally conceptualized and measured in relation to two aspects: “accepting reality” and “value-change”. The accepting reality aspect focuses on an acknowledgement of reality as it is in the present moment, whereas the value-change aspect focuses on changing one’s perspective and learning to appreciate new aspects of life [15].

**Methods**

This systematic review was conducted and reported in accordance with the PRISMA checklist [26], and a review protocol was registered in PROSPERO on January 29, 2019 (ID: CRD42019118644).

**Search strategy**

A systematic literature search identified peer-reviewed publications exploring an association between acceptance and either QOL or mental health outcomes in individuals with SCI. On September 3, 2018 five databases (PubMed, PsycINFO, Embase, Web of Science, and Scopus) were systematically searched for eligible studies. An update search was performed on September 5, 2019 to identify studies published in the preceding year. All results and figures in this report include data from the updated search. The preliminary work consisted of pilot searches to ensure exhaustiveness of search terms and to identify appropriate Subject Headings and Medical Subject Headings (MeSH). These preliminary searches indicated that a search strategy focused on synonyms and related terms of spinal cord injury (e.g., spinal cord lesion) and acceptance (e.g., coping) would yield a manageable total sum of records. Therefore, no further specifiers were added. A final search algorithm was developed using Boolean logic operators (“AND” and “OR”). Search terms available as a subject heading or a MeSH term were searched both as such without explosion and as free
text in title/abstract/keywords or similar. No restrictions were put on publication date. The search algorithm was performed as uniformly as possible across databases. The research librarians at University of Southern Denmark provided feedback on the search algorithm. The full electronic search algorithm in PsycINFO is provided in Supplementary Appendix 1 as an example.

**Eligibility criteria**

Inclusion and exclusion criteria were developed prior to screening. Peer-reviewed original quantitative and qualitative research papers written in English, Danish, Norwegian, or Swedish were included, while reviews, doctoral dissertations, protocols, conference abstracts, and editorials were excluded. To be included, studies had to explore the association between acceptance and either QOL, mental health outcomes, or both among individuals with SCI aged 16 or older. Note that the QOL construct also comprised measures of life satisfaction and well-being, while mental health included measures of depression, anxiety, and PTSD. Studies focusing on narrower constructs such as hopelessness, functional independence, and social isolation, were not included. Furthermore, acceptance was conceptualized as either an acknowledgement of the permanence of the injury, as a re-evaluation of life-values, or a combination of the two. Studies were selected based on their use of standardized measures of acceptance, QOL, and mental health that have demonstrated adequate validity, such as the Spinal Cord Lesion-related Coping Strategies Questionnaire (SCL-CSQ) [15], the Coping Orientations to Problems Experienced (COPE) Inventory [16], the acceptance of disability scale (ADS) [27], World Health Organization Quality of Life Questionnaire (WHOQOL) [28], and Patient Health Questionnaire (PHQ-9) [29]. Readers are encouraged to visit the SCIRE website at [www.scireproject.com](http://www.scireproject.com) for an easy-access description of many of the scales used in the included studies. Lastly, studies were excluded if they only dealt with inborn spinal cord conditions or disease entities, such as spinal cord
infarction, myelitis, or spinal stenosis or if they only involved second analyses of a sample, but not adding new results to this review.

**Screening**

All results from the searches were imported into EndNote, and duplicate records were identified and removed prior to screening. Next, all unique records were transferred to the online tool Covidence [30], and screened in title and abstracts according to the eligibility criteria (step 1). Records that could not be excluded based on title or abstract were full-text screened (step 2). At this step, reasons for exclusion were registered. The screening process was carried out by two raters independently, and disagreements between raters were discussed at each step. A third researcher was consulted when necessary.

**Quality assessment**

The U.S. National Institutes of Health’s Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies (OCCSS) was used to appraise the quantitative studies [31] and the Critical Appraisal Skills Programme (CASP) was used to appraise the qualitative studies [32]. The OCCSS includes 14 criteria and has a final global rating scale of poor, fair, and good. Studies that were longitudinal or statistically controlled for confounders, or both, were given a quality rating of *good* unless there were other considerable methodological issues. Studies with a cross-sectional design that lacked any statistical control for confounders were given a quality rating of *fair*, unless there were considerable methodological issues (e.g., missing eligibility criteria or unclear sample population), in which case they were rated *poor*. The CASP includes 10 questions that support a critical appraisal of qualitative evidence. It does not produce a final rating. Quality assessments were carried out independently by two raters. Disagreements were discussed, and a third researcher was consulted when necessary. Studies were not excluded based on their quality rating, and the studies were not weighted according to quality in the synthesis. Further, no analysis of
quality across studies was conducted. Instead, study quality across studies (such as potential publication bias) was discussed at a general level.

**Data extraction and synthesis**

Data extraction included sample characteristics (i.e., sample size, age, gender, type of injury, and time since injury), study country and setting, study design and time of measurement, the measure of acceptance, measure(s) of adjustment, and key findings of the study. Only findings relevant to address the research question were extracted. This information was tabulated. Data extraction was conducted independently by two raters. Disagreements were resolved by checking the original paper. The authors of the original paper were contacted in three instances to clarify ambiguous results. These results are marked with an asterisk (*) in Table 1 containing the extracted data.

The data synthesis was done separately for cross-sectional and longitudinal studies, and both followed the same three-step procedure: (1) direction and significance of correlations between acceptance and outcome, (2) the association between acceptance and an outcome in multiple regression analyses with control for potential confounding variables, and (3) any associations derived from other statistical methodologies (e.g., cluster analysis, latent growth mixture modeling, or qualitative findings). The synthesis was organized according to the psychological correlates examined in the individual studies. These were (1) global and specific domains of QOL, (2) well-being, (3) satisfaction with life, (4) mental health, (5) depression, (6) anxiety, and (7) PTSD.
Results

Systematic search results

The search retrieved 2,772 unique records, of which 2,492 were excluded in title and abstract screening, and 239 excluded in full-text screening. Thus, 41 studies were included in this review (see Fig.1). There were 39 quantitative studies and two qualitative ones.

Figure 1. PRISMA Flowchart of the systematic search and screening process, including reasons for exclusion. Final search was performed on September 5, 2019.

Study characteristics of the included studies

Most studies were cross-sectional (n = 30) with sample sizes between 12 and 511. All studies had a majority of male participants, and the mean age ranged from 30 to 63 years.
Mean time since injury varied extensively from six weeks post-injury to 24 years post-injury. The majority of studies were conducted in western developed countries. Six scales were used to measure acceptance (see Table 1) with the three most used being the SCL-CSQ [15] (n = 23), the COPE [16] (n = 6), and the ADS [27] (n = 6). The included studies explored associations between acceptance and global and specific domains of QOL (n = 19), satisfaction with life (n = 4), well-being (n = 4), mental health (n = 1), depression (n = 26), anxiety (n = 18), and PTSD (n = 2). Many studies explored more than one of these associations.

**Study quality**

Of the 39 quantitative studies, nine studies received a study quality rating of *poor*, 17 a rating of *fair*, and 13 a rating of *good*. Recurrent quality issues were a lack of longitudinal study designs, a lack of statistical control for confounders, poorly defined study populations, and low participation rates. A summary of the ratings and main issues of each study is provided in Supplementary Appendix 2. Quality assessment of the qualitative studies revealed appropriate research designs and data collection for both studies, but an inappropriate recruitment strategy and inadequate discussion of findings in one.

**Data synthesis**

**Global and specific domains of quality of life**

The association between acceptance and QOL was explored in 19 studies [12,17,18,33–48]. In cross-sectional studies, greater acceptance was consistently associated with greater QOL [12,17,33–42,44,47]. Furthermore, acceptance was a significant predictor of global QOL even when socio-demographic factors (e.g., gender, age, marital status), injury-related variables (e.g., cause and type of injury, time since injury), and the other coping strategies of the SCL-CSQ (i.e., fighting spirit and social reliance) [12,17] were controlled for. Moreover, acceptance was associated with a greater likelihood of reporting greater global QOL [33,34].
A single qualitative study found acceptance to be a component of QOL, and was grouped with maintaining goals and motivation into the domain of psychological resources [43]. No longitudinal studies focused on global QOL.

Acceptance was also consistently correlated with greater psychological QOL in all cross-sectional studies [36,39,40,44,47]. Individuals who were moderate or high in acceptance reported significantly greater psychological QOL compared to individuals who were low in acceptance [44]. In longitudinal studies acceptance at six to 12 weeks post-injury was significantly correlated with psychological QOL one and two years post-injury [45,49]. Furthermore, acceptance was a significant predictor of psychological QOL at one year post-injury even when the effect of socio-demographic factors, injury-related variables, sense of coherence, cognitive appraisals, and additional coping strategies were controlled for [45]. However, acceptance was not a significant predictor of psychological QOL at 12 weeks [46] and two years post-injury [18] when socio-demographic factors, injury-related variables, perceived manageability, sense of coherence, cognitive appraisals, and coping strategies were controlled for.

In contrast to global and psychological QOL, the association between acceptance and social QOL was inconsistent. One cross-sectional study found a significant correlation [40], and acceptance was further a significant predictor of social QOL with control for socio-demographic factors, injury-related variables, social support, and coping strategies [17]. Conversely, three other cross-sectional studies and a two-year follow-up study reported non-significant correlations [18,36,47,48].

**Well-being**

The association between acceptance and well-being was investigated in four cross-sectional studies [41,50–52] and was consistently associated with a greater sense of well-being [41,50,52] with only one reporting a non-significant result [51]. Specifically,
acceptance was positively correlated with general well-being [41,50], social and family well-being [52], and psychological well-being [52]. Acceptance was also a predictor of general well-being with control for the effect of socio-demographic factors, injury-related variables, pain intensity, anger, helplessness, disease benefits, catastrophizing, pain coping, and internal and external pain control [41]. No longitudinal studies explored this association.

**Satisfaction with life**

Associations between acceptance and satisfaction with life were explored in four cross-sectional studies [35,50,53,54]. Their findings consistently indicated correlations between acceptance and greater satisfaction with life [50,54]. Acceptance was a significant predictor of satisfaction with life [53] and satisfaction with health [35] even when socio-demographic factors, injury-related variables, and coping strategies were controlled for. However, acceptance was not a significant predictor of life satisfaction when injury-related variables, pain, self-efficacy, social support, hope, and self-esteem were controlled for [54]. No longitudinal studies explored this association.

**Mental health**

One longitudinal study explored the association between acceptance and mental health as a global construct [55]. Acceptance was significantly correlated with greater mental health both during and after discharge from rehabilitation [56]. Further, multilevel regression analyses showed that changes in acceptance over time were associated with improvements in mental health even when controlling for potential confounding variables (see Table 1). This indicated that the association was based on within-subject variance rather than differences between individuals.

**Depression**

The associations between acceptance and depression were investigated in 26 studies [11,13,18,25,33,37–41,45–47,49,51,57–67]. Greater acceptance was associated with lower
depression in most cross-sectional studies [13,25,33,37–41,47,57,58,60–63,66], with only two studies reporting non-significant correlations [51,67]. When socio-demographic factors, injury-related variables, and additional psychosocial variables were controlled for, acceptance was a significant predictor of depression in four studies [13,40,61,62], while three studies showed non-significant results [13,39,63]. One longitudinal study conducted a series of regression analyses on cross-sectional data and reported that acceptance was associated with depression scores at six and 12 weeks post-injury as well as one month post-discharge from a rehabilitation center [13]. This was not the case at 24 weeks post-injury nor one year post-discharge [13]. The longitudinal data generally showed a similar tendency. Acceptance measured within six to 12 weeks post-injury correlated significantly with depression at one [45] and two years post injury [18], while the correlation was non-significant at 10 years post-injury [11]. Similarly, when the effect of socio-demographic factors, injury-related variables, cognitive appraisals, and coping strategies were controlled for, the association between acceptance and depression was inconsistent. Specifically, acceptance was a significant predictor of depression at 12 weeks and one year post injury, and at one month post-discharge from rehabilitation [13,45,46] while the results were non-significant at two, 10, and 21 years post-injury [11,18,65]. Lastly, one study used latent growth mixture modeling to explore trajectories of depression and found individuals high in acceptance to show favorable trajectories of stable low depression and improvement when followed over a two-year period [49].

Anxiety

Associations between acceptance and anxiety were explored in 18 studies [11,13,18,25,33,37–40,45–47,49,58,62–64,67]. Five cross-sectional studies found that greater acceptance was related to lower anxiety [13,25,38,40,62], while four reported non-significant results [37,47,63,67]. When socio-demographic factors, injury-related variables, and coping
strategies were controlled for, acceptance was a significant predictor of anxiety in four cross-sectional studies [13,39,40,62], while two reported non-significant results [13,63]. One longitudinal study conducted a series of regression analyses using cross-sectional data, which indicated that acceptance was only associated with anxiety in the early stages of an injury (i.e., at six and 12 weeks post-injury), while it was not at 24 weeks post-injury nor at one month and one-year post-discharge [13]. In the longitudinal studies, acceptance at six to 12 weeks post-injury was significantly correlated with anxiety at one year [45] and two years post-injury [18], but not at 10 years [11]. When the effect of socio-demographic factors, injury-related variables, and coping strategies were controlled for, acceptance did not contribute significantly to anxiety scores at 12 weeks [46], one year [45], two years [18], or 10 years post-injury [11], nor at one-month post-discharge from rehabilitation [13]. Thus, while acceptance was associated with anxiety when the two were measured simultaneously, it was not associated with future anxiety scores when potential confounders were controlled for. Lastly, individuals high in acceptance presented with a favorable trajectory of stable low anxiety as compared to delayed anxiety and anxiety improvement when followed over a two-year period [49].

**Post-traumatic stress disorder**

Two cross-sectional studies explored the association between acceptance and PTSD [19,51]. One found that greater acceptance correlated significantly with lower PTSD symptomology [19], while the other reported non-significant results [51]. The first study subdivided PTSD symptomatology into intrusion and avoidance and found that higher acceptance significantly predicted lower intrusion scores over and above what was predicted by socio-demographic factors, injury-related variables, coping strategies from the COPE inventory, and participant country (Great Britain, Germany, and Switzerland) [19]. The association between acceptance
and avoidance was not statistically significant [19]. No longitudinal studies explored this association.

**Discussion**

The aim of this systematic review was to identify, critically appraise, and synthesize relevant research findings on how acceptance is associated with QOL and mental health outcomes in individuals living with SCI. Forty-one studies were included, which collectively showed that greater acceptance was related to favorable psychosocial outcomes. Specifically, greater acceptance was associated with greater global and psychological QOL, satisfaction with life, well-being, and with lower levels of depression and anxiety. Inconsistent evidence was found with regards to social QOL and PTSD. In the majority of studies, acceptance was a significant predictor of these adjustment outcomes even when sociodemographic factors, injury-related and psychosocial variables like social support, cognitive appraisals, and coping strategies were controlled for. This was an important finding as it indicated that the observed associations were not simply due to between-group differences such as injury severity. This systematic review also identified a range of methodological issues across studies, including reliance on cross-sectional designs, lack of statistical control for confounders, poorly defined study populations, and low participation rates.

**The declining direct influence of acceptance over time**

Acceptance, QOL, and mental health outcomes were much less consistently related in the longitudinal compared to the cross-sectional studies. Acceptance predicted favorable trajectories of depression and anxiety over a two year period [49], and further predicted scores of both QOL and depression up to one year following injury [45,46]. Conversely, acceptance did not predict QOL, depression, nor anxiety at two, 10, or 21 years following injury [11,18,65]. Notably, these longitudinal studies struggled with small sample sizes (see Table 1), so it might be explained by a lack of statistical power [68]. However, it could also
suggest that acceptance does not predict favorable long-term adjustment. In this light, acceptance may function primarily as a catalyst initiating favorable adjustment but declines in direct influence as the individual gradually adjusts to the new life circumstances. This could be interpreted in line with the Spinal Cord Injury Adjustment Model (SCIAM), which suggest that the adjustment process is dynamic and self-reinforcing (i.e., greater acceptance can lead to more favorable adjustment outcomes, and these in turn lead to even greater acceptance, and so on) [20]. Initial acceptance may, therefore, not predict future adjustment levels because mediational and self-reinforcing processes has occurred between the two time-points. This interpretation finds some support in this review as the association between acceptance and later QOL and mental health disappeared only when additional psychosocial variables were included in regression models. This trend suggests that the direct effect of acceptance on later QOL and mental health declines over time, and either suggests that acceptance has little or no relevance over time, or that its long-term effect is mediated by other variables.

**Potential mediational effects**

Unfortunately, such mediational effects were not explicitly tested in the included studies. However, a potentially relevant mediator was positive reinterpretation from the COPE inventory, which refers to construing a stressful situation in positive terms [16]. While acceptance was a significant predictor of both depression and psychological QOL, this effect disappeared whenever positive reinterpretation was added to regression models (see Table 1). There are several possible explanations. First, it could simply suggest that the aspects of acceptance that significantly predict QOL and depression share variance with other relevant constructs. It could also suggest a mediational relationship in which greater initial acceptance leads to perceiving the injury in more positive terms, a frame of mind more directly associated with lower depression and greater psychological QOL.
The value-change aspect of acceptance

In the longitudinal studies, including the value-change aspect of acceptance (i.e., measuring acceptance with the SCL-CSQ) generally led to significant results while omitting it (i.e., measuring acceptance with the COPE inventory) often led to non-significant results (see Table 1). In the transactional model of stress and coping, acceptance is assumed to decrease psychological distress by reducing the discrepancy between priorities in life and what one is capable of doing after SCI or other disability onset [25]. In this framework, it may, therefore, not be enough to accept the reality of the situation if it does not lead to a process of value change. The results of this review tentatively supported this framework and highlighted the importance of the value-change aspect of acceptance when considering the temporal associations between acceptance, QOL, and mental health outcomes.

Clinical implications

Health-care professionals in rehabilitation today often, explicitly or implicitly, rely on the foundational principles of rehabilitation psychology where acceptance, as elaborated by Wright, is a core principle of adjustment [69]. This systematic review adds empirical weight to this perspective as the synthesis highlighted acceptance as a psychological resource supporting the adjustment process following life-changing injuries. Individuals with greater acceptance of their new life circumstances may reduce psychological distress by reducing the discrepancy between priorities in life and what they are capable of doing. However, it is still unclear whether acceptance of SCI can be improved through psychotherapy, and whether an increase in acceptance would lead to favorable outcomes. This could be explored by investigating the effectiveness of therapeutic approaches that stimulate and support the acceptance process. Acceptance and Commitment Therapy (ACT) [70] might be promising as it aims to stimulate acceptance of what cannot be changed [70], and it has shown...
encouraging results for individuals with other severely disabling health conditions such as cancer [71] and multiple sclerosis [72].

**Methodological limitations of the included studies**

The main issues in study quality were low participation rates, cross-sectional study designs, poorly defined study samples, and a lack of statistical control for confounders (see Supplementary Appendix 2). The low participation rates and poorly defined study samples are a major issue because the findings might only be representative of a subset of individuals with SCI who are highly engaged in research. Furthermore, the widespread use of cross-sectionally designed studies with correlational results is a major limitation because it does not permit temporal or causal inferences. Greater acceptance may thus follow from being less depressed and having greater QOL rather than the other way around. Longitudinal studies are important in teasing out these temporal effects [73], but unfortunately most of the longitudinal studies included were based on limited sample sizes.

Another concern was the exclusive use of self-report measures. In self-reporting it is unclear what the respondent is thinking whilst filling out the questionnaire. This is a concern because acceptance may imply resignation or giving up to some respondents. For example, a qualitative study in chronic pain patients found that acceptance was perceived by some participants as an empowerment process, while others thought of acceptance as a personal failure [74].

Lastly, mediational effects were not explored in the included studies. Investigating how acceptance is associated with QOL and mental health outcomes within a mediational framework, like the SCIAM, could have important theoretical and clinical implications.

**Limitations of this review**

One of the major limitations of this systematic review was the inclusion of studies with different measurement scales and methodologies such as cross-sectional but also longitudinal
data and bivariate but also multivariate data. This all-encompassing approach provided an overview of the research field, but was also a limitation, because many of the studies were not directly comparable. This complicated the data synthesis, and it further prohibited the use of meta-analysis to quantitatively synthesize data. Another limitation was the lack of explicit use of study quality in the selection of studies and data synthesis, where poorly designed studies with considerable risk of bias was not weighed differently than well-designed studies. A further limitation pertains to the lack of evaluation of potential reporting and publication biases. Reporting bias refers to selective reporting of results within studies [75], while publication bias refers to a bias in published academic research where positive and significant results are more likely to be published than negative or non-significant results [76]. These biases are well-known in intervention studies, but it may also be a problem in observational studies where many different variables are examined and only some associations are fully analyzed, reported, and published [77]. However, no analysis of quality across studies was conducted, so the degree to which this has happened cannot be determined. Furthermore, acceptance might be associated in relevant ways to narrower constructs such as hopelessness, functional independence, or social isolation, but these were not included in this review. Lastly, only papers published in English, Danish, Norwegian, or Swedish were included, potentially excluding relevant studies published in another language.

**Future research**

Future studies should first of all prioritize addressing methodological issues identified in this review. For example, they should focus on conducting longitudinal studies with sufficiently large sample sizes to tease out the temporal relationships. Moreover, how individuals with SCI understand the construct of acceptance should be explored with methods such as the cognitive interviewing approach [78], which seems promising as it systematically explores whether participants attach the intended meaning to questionnaire items [78].
Additionally, future studies should explore the associations between acceptance, QOL, and mental health outcomes within a dyadic perspective where the respondents and their partner are perceived as interdependent and mutually influence each other in their adjustment process [79]. Research from related fields of disability research have shown significant dyadic effects [80], but this approach was not reflected in any of the included studies, nor in the theoretical models. It might be valuable for future studies to investigate dyadic processes and potentially revise the theoretical models accordingly. Lastly, future studies should investigate the effectiveness of therapeutic approaches that stimulate and support the acceptance process, such as ACT [70].

**Conclusion**

Based on 41 studies, this systematic review highlighted the consistent association of acceptance with QOL and mental health following SCI. Generally, acceptance predicted favorable adjustment outcomes up to a two-year period, while it did not predict adjustment outcomes at 10 or 21 years following injury. This systematic review also identified a range of methodological issues, including cross-sectional designs and lack of statistical control for confounders. Future studies should prioritize addressing these issues to enhance study quality, and it might be valuable to consider dyadic effects, explore the subjective meaning(s) of acceptance, and investigate the effectiveness of therapeutic approaches that stimulate and support the acceptance process.
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Conflict of interest

The authors declare no conflict of interest.

Author contributions

AA was responsible for designing and writing the review protocol, conducting the literature search, screening identified records, conducting quality assessment, extracting and synthesizing data, interpreting results, creating figures and tables, and writing the manuscript.

SLR was responsible for screening identified records, conducting quality assessment, and extracting and synthesizing data. She further contributed with guidance and continuous feedback on the review protocol, tables and figures, and revisions of the manuscript.

HK contributed with guidance and continuous feedback on the review protocol, tables and figures, and revisions of the manuscript.

TEA was responsible for arbitrating potentially eligible studies and further contributed with guidance and continuous feedback on the review protocol, tables and figures, and revisions of the manuscript.

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Data archiving

No data were deposited.
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### Tables

Table 1. Sample size and demographics, injury-related characteristics, study design, measurement scale of acceptance and outcome, and the key findings of included studies.

<table>
<thead>
<tr>
<th>Authors</th>
<th>Sample size (n)</th>
<th>Mean age (SD) and gender</th>
<th>Country and setting</th>
<th>Type of injury and mean time since injury (SD)</th>
<th>Study design and assessment time(s)</th>
<th>Measure of acceptance</th>
<th>Outcome measure(s)</th>
<th>Key findings of the study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anderson et al. (2008)</td>
<td>n = 259</td>
<td>M = 30 years (SD = 14.1)</td>
<td>USA and Canada Individuals with SCI</td>
<td>58% tetraplegia, 42% paraplegia Time since injury not reported.</td>
<td>Cross-sectional Time: minimum three years post-discharge.</td>
<td>Brief Coping Orientations to Problems Experienced (Brief COPE)</td>
<td>Life satisfaction: Satisfaction with Life Scale</td>
<td>Acceptance was a significant unique predictor of satisfaction with life ($\beta = 1.186, p = .004$) in a multiple linear regression model. Acceptance accounted for 51% of the variance in life satisfaction along with three other coping strategies (emotional support, religion, and substance abuse), age at interview, marriage status, perceived health, and occupation status. Coping strategies were added in the second step and explained an additional 10% of the variance in life satisfaction compared to age at interview, marriage status, perceived health, and occupation status alone.</td>
</tr>
<tr>
<td>Berry et al. (2007)</td>
<td>n = 199</td>
<td>M = 40.5 years (SD = 16.7)</td>
<td>USA Inpatient medical rehabilitation with referral for psychological assessment as part of the rehabilitation program.</td>
<td>33.7% complete, 63.3% incomplete Time since injury = 73 weeks (range: 1-2,600)</td>
<td>Longitudinal Time: Admission T1: Admission T2: Discharge - mostly within three months.</td>
<td>Acceptance of Disability Scale</td>
<td>Depression: The Inventory to Diagnose Depression</td>
<td>Acceptance at discharge was negatively correlated with depression at admission ($r = -.30, p &lt; .01$).</td>
</tr>
<tr>
<td>Bonanno et al. (2012)</td>
<td>n = 233</td>
<td>Mean age not reported. Range: 16-83</td>
<td>Great Britain, Switzerland, Sweden, Germany, Ireland, and Austria.</td>
<td>Type of injury not reported.</td>
<td>Longitudinal Time: T1: 0-6 weeks post-injury T2: 3 months post-injury T3: 1 year post-injury T4: 2 years post-injury</td>
<td>Spinal Cord Lesion-related Coping Strategies Questionnaire</td>
<td>Depression and anxiety: Hospital Anxiety and Depression Scale</td>
<td>Depression: Acceptance was a significant predictor of trajectories of depression over a two-year period. Specifically, acceptance was a significant predictor of class membership for stable low depression compared to chronic depression ($OR = 3.06, p &lt; .05$), and for depression improvement compared to chronic depression ($OR = 1.94, p &lt; .05$). Anxiety: Acceptance was a significant predictor of class membership for stable low anxiety compared to anxiety improvement ($OR = 1.90, p &lt; .01$), and for stable low anxiety compared to delayed anxiety ($OR = 2.23, p &lt; .05$).</td>
</tr>
<tr>
<td>Carvalho et al. (1998)</td>
<td>n = 65</td>
<td>M = 38.8 years (SD = 17.1)</td>
<td>Portugal Adults with SCI in inpatient rehabilitation.</td>
<td>36.6% Cervical, 46.2% Dorsal, 17.5% Lumbar Time since injury not reported</td>
<td>Cross-sectional Please note that the study was longitudinal, but the only relevant data for this review was cross-sectional. Assessment time: 0-6 weeks from admission.</td>
<td>Coping Assessment Scale</td>
<td>Depression and anxiety: Symptom Checklist 90 – Revised.</td>
<td>Acceptance was negatively correlated with depression ($r = -.26, p = .05$). There was no reported correlation between acceptance and anxiety.</td>
</tr>
<tr>
<td>Catalano et al. (2010)</td>
<td>n = 413</td>
<td>M = 46.4 years (SD = 14.1)</td>
<td>Canada Type of injury not reported.</td>
<td></td>
<td>Cross-sectional</td>
<td>Acceptance of Disability Scale</td>
<td>Well-being: The Sense of Well-Being Inventory</td>
<td>Acceptance correlated positively with financial well-being ($r = .37, p &lt; .01$), psychological well-being ($r = .59, p &lt; .01$), social and family well-being ($r = .44, p &lt; .01$), and physical well-being ($r = .50, p &lt; .01$).</td>
</tr>
<tr>
<td>Study</td>
<td>Sample Characteristics</td>
<td>Time since injury</td>
<td>Type of injury</td>
<td>Socio-demographic</td>
<td>Health-related QOL</td>
<td>Depression and anxiety</td>
<td>Acceptance of Injury</td>
<td>Notes</td>
</tr>
<tr>
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<tr>
<td>deRooij et al. (2013)</td>
<td>Married veterans</td>
<td>2.44 years (SD = 1.21)</td>
<td>Not reported</td>
<td>Marital status</td>
<td>PTSD, The PTSD Checklist—Civilian Version</td>
<td>Depression: The Zung Self-Rating Depression Scale, Well-being: Sense of Well-Being Inventory</td>
<td>Not significantly associated with PTSD, depression, nor well-being.</td>
<td></td>
</tr>
<tr>
<td>Elfström et al. (2006)</td>
<td>Participants with SCI</td>
<td>47% tetraplegia, 53% paraplegia, 68% complete, 32% incomplete</td>
<td>Cross-sectional</td>
<td>Comorbidity</td>
<td>Spinal Cord Injury Quality of Life Questionnaire</td>
<td>No specific values were reported. The authors stated that acceptance correlated significantly with both health-related and SCI-specific QOL scores.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elfström et al. (2007)</td>
<td>Participants with SCI</td>
<td>41.1% Cervical, 43.7% Thoracic, 6.5% Lumbar, 0.3% Sacral, 8.2% Missing</td>
<td>Cross-sectional</td>
<td>Comorbidity</td>
<td>Spinal Cord Injury Quality of Life Questionnaire</td>
<td>Depression and anxiety: Hospital Anxiety and Depression Scale</td>
<td>Strongly, negatively correlated with depression (r = −.58, p &lt; .01). Further, acceptance was moderately, negatively correlated with anxiety (r = −.45, p &lt; .01). The scores ranged from r = −.40 to r = −.68 across study countries for depression, and from r = −.28 to r = −.50 for anxiety.</td>
<td></td>
</tr>
<tr>
<td>Elfström, Kresten et al. (2005)</td>
<td>Participants with SCI</td>
<td>32% complete tetraplegia, 34% complete paraplegia, 34% incomplete</td>
<td>Cross-sectional</td>
<td>Comorbidity</td>
<td>Spinal Cord Injury Quality of Life Questionnaire</td>
<td>Global QOL: A single standardized question from the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Core 30.</td>
<td>Significant unique predictor of health-related QOL (β = .45, p &lt; .001) when controlling for the effect of the other coping strategies from the Spinal Cord Lesion-related Coping Strategies Questionnaire, the Ways of Coping Questionnaire, and social support. Background variables were not controlled for as none of them correlated with the single item of health-related QOL.</td>
<td></td>
</tr>
<tr>
<td>Elfström, Rydén et al. (2005)</td>
<td>Participants with SCI</td>
<td>32.8% complete tetraplegia, 33.6% complete paraplegia, 33.2% incomplete</td>
<td>Cross-sectional</td>
<td>Comorbidity</td>
<td>Spinal Cord Injury Quality of Life Questionnaire</td>
<td>SCI-specific QOL: The Spinal Cord Injury Quality of Life Questionnaire, Health-related QOL: Short Form-36 Health Survey version 2.0 Global QOL: A single standardized question from the European Organization for</td>
<td>A series of multiple linear regression analyses were performed with sociodemographic variables (gender, educational level, and marital status), injury-related variables (age at lesion, duration of disability and neurological classification), social support, and coping strategies entered as independent variables. SCI-specific QOL: Acceptance was a significant unique predictor of all three subscales: problems regarding injury (β = −.43, p &lt; .001), physical/social functioning (β = −.24, p &lt; .001), and depressive feelings (β = −.37, p &lt; .001).</td>
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</tr>
</tbody>
</table>
### Research and Treatment of Cancer Quality of Life Questionnaire Core 30.

<table>
<thead>
<tr>
<th>Study</th>
<th>n</th>
<th>Country</th>
<th>Sample Description</th>
<th>Acceptance at Discharge</th>
<th>Global QOL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elliott et al. (2000)</td>
<td>109</td>
<td>USA</td>
<td>Individuals with SCI in inpatient rehabilitation.</td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>38% tetraplegia, 53% paraplegia, 9% other</td>
<td>Longitudinal T1: Admission T2: Discharge</td>
<td>Acceptance to Diagnose Depression</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>Max. one year post-injury.</td>
<td>Qualitative semi-structured interview study at one time point</td>
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<td></td>
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<td></td>
<td></td>
<td>Acceptance of injury emerged as a theme in a Thematic analysis.</td>
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<td></td>
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<td></td>
<td>QOL and life satisfaction as these terms were conceptualized by the participants themselves.</td>
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<td>Thirteen components of QOL were identified and grouped into five domains, including participation, social support and relationships, independence, relationship with God, and psychological resources. Within the domain of psychological resources, acceptance emerged as an important component to begin with. In a quote, a participant states that by accepting the SCI, you will know what you can do and what you cannot do.</td>
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</tr>
<tr>
<td>Ferdiana et al. (2018)</td>
<td>12</td>
<td>Indonesia</td>
<td>Individuals with SCI from a vocational rehabilitation center.</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>100% paraplegia, 91.7% complete, 8.3% incomplete</td>
<td>Qualitative semi-structured interview study at one time point</td>
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<td>Acceptance of injury emerged as a theme in a Thematic analysis.</td>
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<tr>
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<td>QOL and life satisfaction as these terms were conceptualized by the participants themselves.</td>
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<td>Cluster Analysis was used to create homogenous groups based on acceptance. ANOVA with post-hoc comparisons showed that individuals with high compared to medium or low acceptance had significantly higher physical and social QOL. Further, individuals with high or medium versus low acceptance had significantly higher psychological QOL. Finally, individuals with high acceptance versus low acceptance had significantly higher QOL in the environmental domain. No statistics were reported.</td>
<td></td>
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<tr>
<td>Ferrin et al. (2011)</td>
<td>161</td>
<td>Canada</td>
<td>Community sample with members of patient association.</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Type of injury not reported.</td>
<td>Cross-sectional Multidimensional Acceptance of Loss Scale</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Time since injury = 1.4 years (SD = 1.0)</td>
<td>QOL: World Health Organization Quality of Life – Brief Version</td>
<td></td>
</tr>
<tr>
<td>Jiao et al. (2012)</td>
<td>100</td>
<td>China</td>
<td>Individuals with SCI from a vocational rehabilitation center.</td>
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<tr>
<td></td>
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<td></td>
<td>Type of injury not reported.</td>
<td>Cross-sectional Acceptance of Disability Scale</td>
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<td></td>
<td>Time since injury not reported.</td>
<td>QOL: Center for Epidemiologic Studies Short Depression Scale</td>
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<td>Firstly, the depressed group scored significantly lower on acceptance compared to the non-depressed group (r = .459, p &lt; .01). Further, acceptance was negatively correlated with depression (r = -.57, p &lt; .01).</td>
<td></td>
</tr>
<tr>
<td>Jørgensen et al. (2017)</td>
<td>122</td>
<td>Sweden</td>
<td>Community sample recruited through databases in SCI units.</td>
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<tr>
<td></td>
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<td>17.2% complete tetraplegia, 33.6% complete paraplegia, 49.2% incomplete</td>
<td>Cross-sectional Spinal Cord Lesion-related Coping Strategies Questionnaire</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Time since injury = 24.0 years (SD = 12.0)</td>
<td>Depression: Geriatric Depression Scale</td>
<td></td>
</tr>
<tr>
<td>Kennedy et al. (1995)</td>
<td></td>
<td>United Kingdom</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Group 1: Hospital inpatients at a SCI rehabilitation center.</td>
<td>Group 1: C: 46.3% tetraplegia, 53.7% paraplegia</td>
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<td></td>
<td>Coping Orientations to Problems Experienced (COPE)</td>
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<td></td>
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<td>Depression: Beck Depression Inventory Anxiety: State Anxiety Inventory</td>
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<td></td>
<td>Correlational analyses showed that acceptance was strongly negatively correlated with both depression (r = -.56, p &lt; .001) and anxiety (r = -.63, p &lt; .001) at six weeks post-injury as well as strongly with depression (r = -.58, p &lt; .01) and moderately with anxiety (r = -.45, p &lt; .05) at four to seven years post-injury.</td>
<td></td>
</tr>
<tr>
<td>Study</td>
<td>Sample Size</td>
<td>Mean Age</td>
<td>Gender</td>
<td>Setting</td>
<td>Time since Injury</td>
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</tr>
<tr>
<td>Kennedy et al. (2000)</td>
<td>n = 87</td>
<td>Mean age not reported</td>
<td>19%</td>
<td>United Kingdom</td>
<td>Individuals with SCI from onset of injury to community placement</td>
</tr>
<tr>
<td>Kennedy et al. (2009)</td>
<td>n = 54</td>
<td>Median = 31 years</td>
<td>20%</td>
<td>United Kingdom</td>
<td>Inpatients at a SCI rehabilitation center</td>
</tr>
<tr>
<td>Kennedy et al. (2010a)</td>
<td>n = 266</td>
<td>M = 37.5 years (SD = 14.6)</td>
<td>21.8%</td>
<td>United Kingdom, Switzerland, Germany, and Ireland</td>
<td>Inpatients at selected SCI rehabilitation centers from the above countries</td>
</tr>
<tr>
<td>Kennedy et al. (2010b)</td>
<td>n = 237</td>
<td>M = 38.2 years</td>
<td>21.1%</td>
<td>United Kingdom, Switzerland, Germany, Ireland, Austria, and Sweden</td>
<td>Inpatients at selected SCI rehabilitation centers from the above countries</td>
</tr>
</tbody>
</table>

Table notes:
- Women: 56.7% tetraplegia, 43.3% paraplegia
- Time since injury: n = 54, 87 years
- Women: 21.8% years (SD = 5.5 years)
- Women: 31% years (SD = 1.2 years)
- Women: 21.1%
- Women: 22.1% incomplete paraplegia, 17.4% complete tetraplegia, 28.9% incomplete tetraplegia
- Women: 31.5% complete paraplegia, 22.1% incomplete paraplegia, 17.4% complete tetraplegia, 28.9% incomplete tetraplegia
- Women: 31.5% complete paraplegia, 22.1% incomplete paraplegia, 17.4% complete tetraplegia, 28.9% incomplete tetraplegia
- Women: 20%}

Further stepwise multiple regression analyses of the combined data showed that acceptance was a unique predictor of depression ($b = -0.39$, $p < 0.01$) together with behavioral disengagement and was the only significant predictor of anxiety ($b = -0.54$, $p < 0.001$). The regression models all COPE strategies, functional independence, marital satisfaction, and group membership as independent variables.
<table>
<thead>
<tr>
<th>Study</th>
<th>n</th>
<th>Mean Age</th>
<th>Gender Distribution</th>
<th>Study Site</th>
<th>Research Design</th>
<th>Assessment Time</th>
<th>Measured Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kennedy, Lude et al. (2011)</td>
<td>127</td>
<td>M = 39.3</td>
<td>Women: 20.5%</td>
<td>United Kingdom, Germany, Switzerland, and Ireland.</td>
<td>Longitudinal</td>
<td>T1: 12 weeks post-injury T2: one year post-injury</td>
<td>Spinal Cord Lesion-related Coping Strategies Questionnaire Depression and anxiety: Hospital Anxiety and Depression Scale</td>
</tr>
<tr>
<td>Nolan et al. (2011)</td>
<td>25</td>
<td>M = 35.6</td>
<td>Women: 28%</td>
<td>Ireland</td>
<td>Cross-sectional</td>
<td>Assessment time: Approx. 12 weeks post-injury</td>
<td>Spinal Cord Lesion-related Coping Strategies Questionnaire QOL: World Health Organization Quality of Life – Brief Version Depression and anxiety: Hospital Anxiety and Depression Scale</td>
</tr>
<tr>
<td>Kennedy et al. (2012)</td>
<td>232</td>
<td>M = 40.0</td>
<td>Women: 20.7%</td>
<td>United Kingdom, Switzerland, Germany, and Ireland.</td>
<td>Longitudinal</td>
<td>T1: 12 weeks post-injury T2: one year post-injury</td>
<td>Spinal Cord Lesion-related Coping Strategies Questionnaire QOL: World Health Organization Quality of Life – Brief Version SCI-Specific QOLs: The Spinal Cord Injury Quality of Life Questionnaire Depression and anxiety: Hospital Anxiety and Depression Scale</td>
</tr>
<tr>
<td>Kennedy et al. (2016)</td>
<td>22</td>
<td>Mean age not reported.</td>
<td>Women: 13.6%</td>
<td>United Kingdom Community residing individuals with SCI.</td>
<td>Longitudinal</td>
<td>T1: 12 weeks post-injury T2: 21-plus years post-injury</td>
<td>Coping Orientations to Problems Experienced (COPE) Depression: Beck Depression Inventory</td>
</tr>
<tr>
<td>Khodayarian et al. (2017)</td>
<td>102</td>
<td>Mean age not reported.</td>
<td>Women: 29.4%</td>
<td>Iran Community residing individuals with SCI in a specific province.</td>
<td>Cross-sectional</td>
<td></td>
<td>Spinal Cord Lesion-related Coping Strategies Questionnaire QOL: Sickness Impact Profile</td>
</tr>
<tr>
<td>Lude et al. (2005)</td>
<td>156</td>
<td>Mean age not reported.</td>
<td></td>
<td>United Kingdom, Switzerland, and Germany.</td>
<td>Cross-sectional</td>
<td></td>
<td>Coping Orientations to Problems PTSD: Impact of Event Scale</td>
</tr>
</tbody>
</table>

Significant contribution to the final models predicting depression ($\beta = -0.37$), and psychological QOL ($\beta = 0.34$), but not anxiety. Specific $p$-values were not reported.

Acceptance at 12 weeks post-injury was significantly correlated with depression scores at one year post-injury ($r = -0.46$, $p < .001$). No results regarding anxiety were reported.

Acceptance was significantly positively correlated with physical QOL ($r = -5.3$, $p < .01$), psychological QOL ($r = 0.79$, $p < .001$), and environmental QOL ($r = 0.46$, $p < .05$), while being negatively correlated with depression ($r = -5.9$, $p < .01$). Acceptance was not significantly correlated with anxiety nor social QOL ($p > .05$).

There were significant differences between individuals who had scored high on acceptance and those who had scored low. High acceptance was associated with significantly greater physical QOL ($t = 2.53$, $p < .05$), psychological QOL ($t = 3.76$, $p < .001$), and environmental QOL ($t = 2.27$, $p < .05$), and had lower depression scores ($t = 10$, $p < .01$).

Acceptance at 12 weeks post-injury was found to correlate positively with psychological QOL ($r = 0.35$, $p < .01$) and negatively with the SCI-specific QOL domain of problems regarding injury ($r = -0.36$, $p < .001$) two years post-injury while results were non-significant for all other QOL domains (physical, social, environmental, physical/social functioning).

Acceptance at 12 weeks post-injury was also found to be negatively correlated with depression ($r = -0.42$, $p < .001$) and anxiety ($r = -0.28$, $p < .01$) two years post-injury. Acceptance at 12 weeks post-injury was not a significant predictor of any QOL domains, depression nor anxiety at two years post-injury when gender, age, injury type, sense of coherence, perceived manageability, appraisals, and other coping strategies were controlled for.

Forward stepwise multiple regression was conducted with depression at 21-plus years post-injury as the dependent variable and acceptance, active coping, positive reinterpretation, behavioral disengagement, and substance abuse ideation at 12 weeks post-injury as independent variables. Only positive reinterpretation was a significant predictor in the final model. As such, acceptance at 12-weeks post-injury was not predictive of depression at 21-plus years post-injury.

Greater acceptance correlated significantly with lower total scores of post-traumatic distress as measured by the IES ($p < .01$). No $r$ was reported.
<table>
<thead>
<tr>
<th>Study</th>
<th>Sample</th>
<th>n</th>
<th>Mean Age (Range)</th>
<th>Gender</th>
<th>Time since injury</th>
<th>Assessment time: Six months post-injury</th>
<th>Experienced (COPE)</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Migliorini et al. (2008)</td>
<td>Same sample as Migliorini et al. (2008)</td>
<td>443</td>
<td>M = 51.8 years (range = 18–86)</td>
<td>Women: 22%</td>
<td>Time since injury = 19.2 years (range = 1.66)</td>
<td>Cross-sectional Spinal Cord Lesion-related Coping Strategies Questionnaire QOL: Comprehensive Quality of Life for Adults, version 5 (only ‘Satisfaction with health’ subscale) Depression and Anxiety, Depression, Anxiety, and Stress Scale - short version</td>
<td>Greater acceptance was correlated with lower depression (Spearman’s $r = –.45$) and anxiety ($r = –.24$), and with greater subjective QOL ($r = .55$). However, no p-values were reported. Further, logistic regression analyses were conducted to examine the associations between coping strategies and outcomes while keeping gender, age, level of and time since injury, marital status, household income, health, and emotional consequences constant. Acceptance was a significant predictor of a high subjective QOL ($r = 3.43$, $p &lt; .001$), but it did not significantly predict neither depression nor anxiety.</td>
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</tr>
<tr>
<td>Migliorini et al. (2009)</td>
<td>Same sample as Migliorini et al. (2008)</td>
<td>161</td>
<td>M = 46.9 years (SD = 15.5)</td>
<td>Women: 23%</td>
<td>Type of injury not reported</td>
<td>Cross-sectional Spinal Cord Lesion-related Coping Strategies Questionnaire QOL: Comprehensive Quality of Life for Adults, version 5 (only ‘Satisfaction with health’ subscale) Depression and Anxiety, Depression, Anxiety, and Stress Scale - short version</td>
<td>Reported the same correlations as Migliorini et al. (2008) and conducted a similar logistic regression analysis with a few minor changes. Here, household income was not included in the model, while objective QOL domains and presence of psychopathology were included as predictors. In this regression model, acceptance was a significant predictor of a high subjective QOL ($r = 3.46$, $p &lt; .001$).</td>
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</tr>
<tr>
<td>Miller et al. (2008)</td>
<td>Community sample of members of a Canadian SCI association.</td>
<td>40</td>
<td>M = 34.8 years (SD = 11.0)</td>
<td>Women: 7.5%</td>
<td>Time since injury = 11.9 years (SD = 8.7)</td>
<td>Cross-sectional Acceptance of Disability Scale QOL: World Health Organization Quality of Life – Brief Version</td>
<td>Acceptance was positively correlated with the physical ($r = .72$, $p &lt; .01$), psychological ($r = .51$, $p &lt; .01$), and environmental QOL domains ($r = .46$, $p &lt; .05$). It was not significantly associated with the social QOL domain.</td>
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</tr>
<tr>
<td>Nicholls et al. (2012)</td>
<td>Community sample of individuals with SCI applying for services at a non-profit organization, Applying for services at a non-profit organization</td>
<td>100</td>
<td>M = 40.8 years (SD = 16.1)</td>
<td>Women: 23%</td>
<td>Type of injury not reported</td>
<td>Cross-sectional Spinal Cord Lesion-related Coping Depression and anxiety, Hospital Anxiety and Depression Scale</td>
<td>Greater acceptance was significantly associated with lower depression ($r = –.48$, $p &lt; .002$). ** Further, in a multiple linear regression model with acceptance as the dependent variable and gender, time since injury, and depression as independent variables, lower depression was significantly associated with higher acceptance ($B = –.247$, $p = .006$).</td>
<td></td>
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<tr>
<td>Authors</td>
<td>Sample Size</td>
<td>Participants</td>
<td>Country</td>
<td>Action Categorized</td>
<td>Action Type</td>
<td>Depression and anxiety</td>
<td>Hospital Anxiety and Depression Scale</td>
<td>Health-related QOL</td>
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</table>
| Perry, Nicholas, & Middleton (2009) | n = 47 | M = 39.8 years (SD = 15.2)  
Women: 26% | Australia | Inpatients at an SCI rehabilitation center (2004 – 2006). | Cross-sectional | 51% paraplegia, 49% tetraplegia, 45% complete, 55% incomplete | Depression and anxiety, Hospital Anxiety and Depression Scale | Health-related QOL | Short Form-12 Health Survey | Greater acceptance was associated with greater QOL in both the mental component (r = .13) and the physical component (r = .19). Acceptance was also correlated with lower levels of anxiety (r = −.37) and depression (r = −.45). Only the correlation between acceptance and depression was reported to be statistically significant at p < .006 level. The p-values for the other correlations were not reported. |
| Perry, Nicholas, Middleton, & Siddall (2009) | n = 45 | M = 46.0 years (SD = 16)  
Women: 16% | Australia | Outpatients attending a pain management center (2005 – 2007). | Cross-sectional | 58% paraplegia, 31% tetraplegia, 44% complete, 51% incomplete | Depression and anxiety, Hospital Anxiety and Depression Scale | Health-related QOL | Short Form-12 Health Survey | Due to the required p-level being set at .005, acceptance was only significantly correlated with depression (r = −.78, p < .001). The correlations with QOL and anxiety were not statistically significant at the p < .005 level. |
| Pollard & Kennedy (2007) | n = 37 | M = 40.9 years | United Kingdom | Community sample (cohort followed from admission to SCI rehabilitation center). | Longitudinal | 59% paraplegia, 41% tetraplegia, 73% complete, 27% incomplete | Depression: Beck Depression Inventory  
Anxiety: State Anxiety Inventory | Acceptance did not significantly correlate with depression nor anxiety. No statistics were reported. Two multiple regression analyses were conducted with either depression or anxiety at 10 years post-injury as dependent variables and coping subscales at 12 weeks post-injury as predictors. Acceptance did not contribute significantly to these models. |
| Saffari et al. (2015) | n = 220 | M = 58.2 years (SD = 10.3)  
Women: 25.5% | Iran | Individuals with SCI referred to a neurology center. | Cross-sectional | 25.4% incomplete paraplegia, 38.2% complete paraplegia, 21.4% incomplete tetraplegia, 15.0% complete tetraplegia | Depression and anxiety, Hospital Anxiety and Depression Scale | Health-related QOL | Short Form-12 Health Survey | Acceptance was positively correlated with both mental and physical components of QOL, and negatively with anxiety and depression. Specific results were not reported. Four multiple linear regression analyses were conducted with physical QOL, mental QOL, anxiety, and depression as dependent variables. The authors do not report which variables were entered as independent variables, but the table of results show that age, gender, cause of injury, etiology of injury, time since injury, physical functioning, acceptance, fighting spirit, and social reliance were included. Acceptance contributed significantly in explaining variance in mental QOL (β = .22, p < .001) and anxiety (β = −.33, p < .001). Acceptance did not contribute significantly to explain the variance in physical QOL or depression. |
| Sauri et al. (2014) | n = 511 | M = 50.6 years (SD = 14.3)  
Women: 30.9% incomplete paraplegia, 37.4% complete paraplegia, 21.4% incomplete tetraplegia, 15.0% complete tetraplegia | Spain | Community sample (Hospital follow-up). | Cross-sectional | 30.9% incomplete paraplegia, 37.4% complete paraplegia, 21.4% incomplete tetraplegia, 15.0% complete tetraplegia | Depression and anxiety, Hospital Anxiety and Depression Scale | Greater acceptance was significantly correlated with greater global QOL (r = .48, p < .01), physical QOL (r = .38, p < .01), psychological QOL (r = .55, p < .01), social QOL (r = .42, p < .01), and environmental QOL (r = .42, p < .01). Acceptance was negatively correlated with depression (r = −.53, p < .01) and anxiety (r = −.40, p < .01). |
<table>
<thead>
<tr>
<th>Study</th>
<th>Sample Size</th>
<th>Gender Distribution</th>
<th>Country</th>
<th>Sample Characteristics</th>
<th>Study Design</th>
<th>Measure</th>
<th>Research Questions</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smedema et al. (2010)</td>
<td>n = 242</td>
<td>Women: 33.9%</td>
<td>USA</td>
<td>Time since injury = 15.44 years (SD = 10.00)</td>
<td>Cross-sectional</td>
<td>Spinal Cord Lesion-related Coping Strategies Questionnaire</td>
<td>Life satisfaction: The Satisfaction with Life Scale</td>
<td>Greater acceptance was significantly correlated with greater life satisfaction (r = .41, p &lt; .01) and well-being (r = .15, p &lt; .05).</td>
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<tr>
<td>Smedema (2017)</td>
<td>n = 235</td>
<td>Women: 32.8%</td>
<td>Netherlands</td>
<td>Time since injury = 10.4 years (SD = 9.5)</td>
<td>Cross-sectional</td>
<td>Spinal Cord Lesion-related Coping Strategies Questionnaire</td>
<td>Life satisfaction: The Satisfaction with Life Scale</td>
<td>A hierarchical regression analysis with life satisfaction as the dependent variable was conducted. Injury level, time since injury, and perceived pain were entered in the first step. Interpersonal self-efficacy and social support were added in step 2, and hope, self-esteem, and acceptance were added in the final step. Acceptance did not contribute significantly to the model over and above what was explained by the other variables.</td>
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<td>van Leeuwen et al. (2015)</td>
<td>n = 60</td>
<td>Women: 31.7%</td>
<td>Netherlands</td>
<td>Time since injury = 12.9 years (SD = 15.9)</td>
<td>Longitudinal</td>
<td>Illness Cognition Questionnaire</td>
<td>Mental health: The Mental Health Index</td>
<td>Acceptance was only measured at T2 and T3. At both measurement points, acceptance was significantly correlated with mental health (Spearman’s ρ = .69 and .52, respectively). Multilevel regression analyses with mental health as the dependent variable and self-efficacy, mastery, optimism, social comparison, helplessness, acceptance, disease benefits, and purpose in life as independent variables were conducted. The confounding effects of gender, age, marital status, education, level of injury, and completeness of injury were examined. Acceptance was a significant predictor of mental health in the basic model (β = .65, p &lt; .001) and in the change model (β = .52, p &lt; .001). The association between acceptance and mental health was thus based on within-subject variance and reflects change rather than differences between individuals.</td>
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<td>Wollars et al. (2007)</td>
<td>n = 279</td>
<td>Women: 36.2%</td>
<td>Netherlands</td>
<td>Time since injury = 11.8 years (SD = 10.7)</td>
<td>Cross-sectional</td>
<td>Illness Cognition Questionnaire</td>
<td>Depression: Patient Health Questionnaire-9 QOL and well-being: Two numerical rating scales (0-10) concerning general health and general well-being</td>
<td>Greater acceptance was correlated with greater general health (r = .33, p &lt; .001), greater general well-being (r = .36, p &lt; .001), and lower depression scores (r = -.39, p &lt; .001). Further, a hierarchical regression analysis was conducted with general health, general well-being, and depression as the dependent variables, and age, gender, marital status, educational level, time since injury, cause of injury, level and completeness of injury, pain intensity, anger, helplessness, acceptance, disease benefits, catastrophizing, pain coping, and internal and external pain control as independent variables. In these models, acceptance was not a unique contributor in explaining variance in depression scores or general health, but only in general well-being (β = .18, p &lt; .005).</td>
</tr>
</tbody>
</table>

**Abbreviations.** SCI = Spinal cord injury, QOL = Quality of life, PTSD = Post-traumatic stress disorder, SD = Standard Deviation. **Notes.**
* These papers showed a positive correlation between acceptance and depression and/or anxiety. However, correspondence with the authors confirmed that these correlations were errors in the manuscripts and that the associations were in fact in the hypothesized direction (i.e., negative correlations).

** The table in the paper shows a positive association, while the authors specifically report and discuss a negative correlation throughout their paper. We have been in contact with the authors several times, but we have not received a response on this matter at the time of publication. It is assumed that the association was in fact negative.

1 Type of injury was reported heterogeneously in the included studies. Most differentiated between tetraplegia and paraplegia, while others also included the completeness of injury, and a few studies reported level of injury as cervical, thoracic, lumbar, or sacral.

2 Outcome measure(s) relevant to the present study aim.

3 Key finding(s) relevant to the present study aim. This may not be the primary finding of the paper.

4 Combined data from two sub samples (United Kingdom and Switzerland/Germany)