

Autor / Publication Date	Title	Outcome Measure	Assessment	PDF	Principal objectives / Aim	Conclusion	Application to local population
Gagnon et al., 2016	Do Performance-Based Wheelchair Propulsion Tests Detect Changes Among Manual Wheelchair Users With Spinal Cord Injury During Inpatient Rehabilitation in Quebec?	Wheelchair propulsion performance change over the course of inpatient rehabilitation	20-m propulsion at both self-selected natural and maximal speeds, the slalom, and the 6-minute propulsion tests	x	To quantify and compare the responsiveness and concurrent validity of 3 performance-based manual wheelchair propulsion tests among manual wheelchair users with subacute spinal cord injury (SCI) undergoing inpatient rehabilitation.	The slalom (SRM=1.24), 20-m propulsion at maximum speed (SRM=.99), and 6-minute propulsion tests (SRM=.84) were the most responsive. The slalom and 20-m propulsion at maximum speed were strongly correlated at both admission (r=.93) and discharge (r=.92).	x
Klyce et al. , 2015	Distinguishing grief from depression during acute recovery from spinal cord injury.	Mental Function (Grief)	Adapted version of the 12-item structured clinical interview for Prolonged Grief Disorder was used to assess symptoms of grief Patient Health Questionnaire-9 was used to measure depression	x	To examine whether grief is a psychometrically sound construct that is distinct from depression in individuals who have recently sustained a spinal cord injury (SCI).	A measure of grief adapted for use in patients with SCI demonstrated adequate internal consistency during acute rehabilitation.	x
van Diemen et al., 2017	Body Image in Patients With Spinal Cord Injury During Inpatient Rehabilitation.	Body Image (alienation and harmony)	Body Experience Questionnaire	x	(1) To investigate the course of body image in patients with spinal cord injury (SCI) during their first inpatient rehabilitation stay; and (2) to explore the association between demographic and injury-related variables and body image and the association between body image and psychological distress.	During participants' first inpatient rehabilitation stay after SCI, body image progressed toward a healthier state.	x

Chan et al., 2017	Retrospective assessment of the validity and use of the community balance and mobility scale among individuals with subacute spinal cord injury.	Activity	CB&M	x	The objective of this study was to evaluate the convergent validity, internal consistency and use of the Community Balance & Mobility Scale (CB&M) in individuals with incomplete spinal cord injury (iSCI) during inpatient rehabilitation.	The CB&M is a valid measure in high-functioning individuals with iSCI.	sub-group: incomplete SCI
Misirlioglu et al., 2016	Validation of Duruöz Hand Index in patients with tetraplegia.	Activity	Duruöz Hand Index	x	Investigate the validity of the Duruöz Hand Index (DHI) in the assessment of hand function in patients with tetraplegia.	The DHI showed significant correlations with UEMS, AIS, QIF-SF, VAS-HF, physical functioning and physical compound summary scores of SF-36.	sub-group: tetraplegia
Noojen et al., 2015	Fatigue in persons with subacute spinal cord injury who are dependent on a manual wheelchair.	Fatigue	Fatigue Severity Scale (FSS)	x	To determine the prevalence and severity of fatigue in persons with subacute spinal cord injury (SCI), assess whether demographic and lesion characteristics are related to fatigue and determine the relationship with physical fitness and physical behavior.	atigue was prevalent and is of concern in persons with subacute SCI. Those with incomplete lesions seem to be at higher risk. Because fatigue is known to persist among persons with SCI, interventions to reduce fatigue seem necessary.	x
Anton et al, 2017	The course of fatigue after acute spinal cord injury.	Fatigue	Fatigue Severity Scale (FSS) Modified Fatigue Impact Scale for Spinal Cord Injury (MFIS-SCI)	x	To determine the prevalence and course of fatigue following acute spinal cord injury (SCI) during rehabilitation and after discharge.	Fatigue is common in SCI patients admitted to rehabilitation. Fatigue remained stable during rehabilitation and after discharge into the community.	x
Sukhvinder et al., 2016	Responsiveness, Sensitivity, and Minimally Detectable Difference of the Graded and Redefined Assessment of Strength, Sensibility, and Prehension, Version 1.0	Neuromusculoskeletal and movement-related functions & structure Activity	GRASSP	x	The objective of this study was (1) to define the responsiveness of each GRASSP subtest starting from as early as 10 days post-injury, (2) to determine the minimally detectable difference for each GRASSP subtest, and (3) to	The GRASSP is an appropriate and well-designed outcome measure specific for tetraplegia.	x

Velstra et al., 2014	Prediction and stratification of upper limb function and self-care in acute cervical spinal cord injury with the graded redefined assessment of strength, sensibility, and prehension (GRASSP).	Upper limb function Self-Care	GRASSP	x	To evaluate the value of Graded Redefined Assessment of Strength, Sensibility, and Prehension (GRASSP) in predicting upper limb function and self-care outcomes in individuals with cervical SCI.	The GRASSP at 1 month can accurately predict upper limb function and self-care outcomes even in a heterogeneous group of individuals across a wide spectrum of neurological recovery. The	x
Velstra et al., 2015	Changes in Strength, Sensation, and Prehension in Acute Cervical Spinal Cord Injury: European Multicenter Responsiveness study of the GRASSP.Changes in Strength, Sensation, and Prehension in Acute Cervical Spinal Cord Injury: European Multicenter Responsiveness Study of the GRASSP.	Neuromusculoskeletal and movement-related functions & structure Activity	GRASSP	x	To investigate the internal and external responsiveness and recovery profiles of the Graded Redefined Assessment of Strength, Sensibility, and Prehension (GRASSP) instrument in revealing changes in upper limb function within the first year following cervical spinal cord injury (SCI).	The GRASSP is a responsive and clinically meaningful tool for the evaluation of upper limb outcomes in cervical SCI and can be recommended for follow-up assessments.	mixed phases
Sukhvinder et al., 2014	Outcome of the upper limb in cervical spinal cord injury: Profiles of recovery and insights for clinical studies.	Upper limb function	ICSNCSCI GRASSP SCIM-III CUE-Q	x	To define the sensory, motor, and prehension recovery profiles of the upper limb and hand in acute cervical SCI	Specific recovery profiles of the upper limb over the 1-year timecourse provide new insights and opportunity for combined analysis of recovery profiles for different clinical assessment tools of upper limb function which are meaningful to inform the design of study protocols.	x
Walden et al., 2016	Development and validation of a computerized algorithm for International Standards for Neurological Classification of Spinal Cord Injury (ISNCSCI)	Neuromusculoskeletal and movement-related functions	ISNCSCI □	x	To describe the development and validation of a computerized application of the international standards for neurological classification of spinal cord injury (ISNCSCI).	The web interface assists in maximizing usability while minimizing the impact of human error inclassifying SCI.	x

Freund et al., 2013	MRI investigation of the sensorimotor cortex and the corticospinal tract after acute spinal cord injury: a prospective longitudinal study.	Neuronal degeneration	MRI	x	We aimed to use MRI to assess neuronal degeneration above the level of the lesion after acute spinal cord injury.	Extensive upstream atrophic and microstructural changes of corticospinal axons and sensorimotor cortical areas occur in the first months after spinal cord injury, with faster degenerative changes relating to poorer recovery. Structural volumetric and microstructural MRI protocols remote from the site of spinal cord injury could serve as neuroimaging biomarkers in acute spinal cord injury.	x
Tate et al., 2013	Depression and pain among inpatients with spinal cord injury and spinal cord disease: differences in symptoms and neurological function.	Depression Pain	Patient Health Questionnaire 9 (PHQ-9) One of the questions from the Brief Pain Inventory	x	To examine the relationship between depression and pain severity during inpatient rehabilitation for those with new onset of spinal cord injury or spinal cord disease (SCI/D), along with patient characteristics, neurological function and etiology.	Depressive symptoms were not associated with pain severity in this sample. Etiology was associated with pain, those with traumatic SCI reporting more pain at admission. Among demographic characteristics, age was related to pain, with younger subjects reporting higher levels.	x
Marino et al., 2016	Reliability and Validity of S3 Pressure Sensation as an Alternative to Deep Anal Pressure in Neurologic Classification of Persons With Spinal Cord Injury.	Neuromusculoskeletal and movement-related functions	S3 pressure sensation	X	To determine whether pressure sensation at the S3 dermatome (a new test) could be used in place of deep anal pressure (DAP) to determine completeness of injury as part of the International Standards for Neurological Classification of Spinal Cord Injury.	S3 pressure sensation is reliable and has substantial agreement with DAP in persons with SCI at least 1 month postinjury.	x

Glennie et al., 2014	Reliability of the spine adverse events severity system (SAVES) for individuals with traumatic spinal cord injury	Body Structure: Spine	SAVES	x	To determine the intra- and inter-rater reliability of the Spine Adverse Events Severity System for Spinal Cord Injury (SAVES-SCI) in patients with traumatic SCI.	The SAVES-SCI demonstrated acceptable intra-and inter-rater reliability for a majority of the AEs. Further clarification and definition of some of the AEs as well as provision of sample training cases for clinicians would assist in reducing measurement errors.	sub-group: traumatic SCI
Street et al., 2015	Incidence of acute care adverse events and long-term health-related quality of life in patients with TSCI.	Quality of Life	SAVES SF-36	x	To determine the incidence and types of AEs occurring in patients with TSCI during acute care and the impact on length of stay (LOS) and health-related quality of life (HRQOL).	This prospective study found that more than 77% of patients with TSCI sustain an AE during acute hospital care, significantly higher than previously reported. We demonstrate the utility of a dedicated AE collection system and the effect of these events on health status.	x
Akpinar et al., 2017	Reliability of the Spinal Cord Assessment Tool for Spastic Reflexes.	Neuromusculoskeletal and movement-related functions & structure	SCATS	x	To assess the reliability of the Spinal Cord Assessment Tool for Spastic Reflexes (SCATS) in patients who were at least 6 months postinjury.	The SCATS is a reliable tool for assessing spasm activity and spastic hypertonia in patients with SCI.	x
Sinha et al., 2015	Functional Ability Level Development and Validation: Providing Clinical Meaning for Spinal Cord Injury Functional Index Scores	Activity	SCI-FI	x	Develop functional ability levels for the Spinal Cord Injury Functional Index (SCI-FI) and to validate them	Clinicians can use functional ability levels to discuss patients' functional capabilities with them and their family.	x

Fyffe et al., 2016	Clinical interpretation of the Spinal Cord Injury Functional Index (SCI-FI).	Body Functions and Structures	SCI-Fit	X	To provide validation of functional ability levels for the Spinal Cord Injury – Functional Index (SCI-FI).	These results strongly support the use of SCI-FI functional ability levels to document the perceived functional abilities of persons with SCI.	x
Unalan et al., 2015	Validity and reliability study of the Turkish version of Spinal Cord Independence Measure-III	Activity	SCIM III	x	The objective of this study was to assess the validity and reliability of the Turkish version of Spinal Cord Independence-Measure-III (SCIM-III).	The Turkish version of SCIM-III is a valid and reliable measurement tool for the functional assessment of SCI patients in Turkey.	x
Fekete et al., 2014	Development and validation of a self-report version of the Spinal Cord Independence Measure (SCIM III).	Activity	SCIM-SR	x	To develop and validate a self-report version of the Spinal Cord Independence Measure (SCIM III).	Our results support the criterion validity of SCIM-SR.	x
Bryce et al., 2014	Screening for neuropathic pain after spinal cord injury with the spinal cord injury pain instrument (SCIPI): a preliminary validation study.	Sensory Functions and Pain	SCIPI	x	Preliminarily evaluate the validity of an interview-based spinal cord injury (SCI) neuropathic pain screening instrument.	SCIPI, which can be administered by a nonclinician, appears to have good sensitivity, specificity and diagnostic accuracy in a SCI population.	x
Delparte et al., 2016	Psychometric Properties of the Spinal Cord Injury Pressure Ulcer Scale (SCIPUS) for Pressure Ulcer Risk Assessment During Inpatient Rehabilitation.	Functions of the skin and related structures	SCIPUS	x	To assess the psychometric properties of the Spinal Cord Injury Pressure Ulcer Scale (SCIPUS) for pressure ulcer (PU) risk assessment during inpatient rehabilitation.	Modifications to the current measure could possibly improve its performance.	x

Krishnan et al., 2016	Predictive validity of the Spinal Cord Injury Pressure Ulcer Scale (SCIPUS) in acute care and inpatient rehabilitation in individuals with traumatic spinal cord injury.	Sensory Functions and Pain	SCIPUS	x	To evaluate the validity of the Spinal Cord Injury Pressure Ulcer Scale (SCIPUS) during acute care and inpatient rehabilitation following spinal cord injury (SCI) by determining critical cutoff points and assessing the ability to predict risk for pressure ulceration (PrU).	The SCIPUS could predict PrU occurring within 2-3 days following administration during acute, but unable to predict over a longer term within acute or inpatient rehabilitation. Improved PrU risk assessment following SCI may be possible with modification to the SCIPUS.	x
Zanca et al., 2013	Pain and its impact on inpatient rehabilitation for acute traumatic spinal cord injury: analysis of observational data collected in the SCIR rehab study.	Pain	Self-reported rating of pain intensity (0-10) Pain locations	x	To describe pain during inpatient rehabilitation and its impact on delivery of inpatient rehabilitation services for persons with spinal cord injury (SCI).	Pain is a common problem for persons receiving inpatient rehabilitation for traumatic SCI and adversely impacts delivery of therapy services.	x
Rognoni et al., 2014	Quality of life of patients with spinal cord injury in Italy: preliminary evaluation.	Quality of Life	SF-36 questionnaire	x	The aim of this study is twofold: 1) to evaluate the quality of life (QoL) of patients with SCI, focusing on the associations among functional status and health dimensions and 2) to provide a synthetic quality of life index to be used in cost-utility analyses involving SCI patients.	The present study develops reflections on the perceived quality of life of 130 SCI Italian patients and, even if the sample size is quite small, the reported results are consistent with the ones already published.	N.A.
Jette et al., 2015	Development and initial evaluation of the SCI-FI/AT.	Functional performance	Spinal Cord Injury Functional Index for samples using Assistive Technology (SCI-FI/AT)	x	Spinal Cord Injury Functional Index for samples using Assistive Technology (SCI-FI/AT)	Development and initial evaluation of the SCI-FI/AT.	mixed phases

Krause JS, Edles PA, 2015	Injury perceptions, hope for recovery, and psychological status after spinal cord injury.	Quality of Life	the Purpose in Life Scale the Satisfaction with Life Scale the abbreviated version of the Patient Health Questionnaire	x	The purpose of this study was to investigate the relationship of injury perceptions and hope for recovery with life satisfaction, purpose in life, and depressive symptoms measured during inpatient rehabilitation after spinal cord injury (SCI).	Hope for recovery and favorable SCI perceptions were related to positive psychological outcomes during inpatient rehabilitation, although the strength of the relationship was limited.	x
MacBean et al. , 2013	Phonation after cervical spinal cord injury (CSCI): prospective case examinations of the acute and sub-acute stages of recovery.	Phonation Quality of Life	Therapy Outcome Measurement Scales World Health Organization descriptors of impairment, disability, and handicap were rated according to a 6-point scale (0 – 5)	x	The aim of the investigation was to examine the changes in phonation and related quality-of-life in the acute and subacute stages of recovery post-cervical spinal cord injury (CSCI).	Phonation during the acute and sub-acute period of recovery post-CSCI was seen to undergo frequent and, in certain areas, substantial change in the present investigation.	x
Aigner et al., 2016	Concurrent validity of single and groups of walking assessments following acute spinal cord injury	Activity	WISCI	x	Demonstrate criterion (concurrent and predictive) and construct validity of the Walking Index for Spinal Cord Injury (WISCI) scale and other walking measures in the Spinal Cord Injury Locomotor Trial (SCILT).	Concurrent validity of the WISCI scale was supported by significant correlations with all measures	sub-group: incomplete SCI
Ditunno et al., 2013	The Walking Index for Spinal Cord Injury (WISCI/WISCI II): nature, metric properties, use and misuse.	Neuromusculoskeletal and movement-related functions & structure Activity	WISCI WISCI II	x	To critically review all publications/internet sites that have described/used the Walking Index for Spinal Cord Injury (WISCI II), as a measure of impairment of walking function after spinal cord injury (SCI), in order to identify its psychometric properties, clarify its nature, specify misuse and incorporate the findings in an updated guide.	The increased use of the WISCI II is attributed to its unique characteristics as a capacity measure of walking function and its strong metric properties. Appropriate use of the WISCI II was clarified and incorporated into a new guide for its use	x



Scivoletto et al., 2013	Walking Index for Spinal Cord Injury version II in acute spinal cord injury: reliability and reproducibility.	Neuromuskoskeletale and movement-related functions & structure Activity	WISCI WISCI II	x	The objective of this study is to assess the reliability and reproducibility of the WISCI II in patients with traumatic, acute SCI.	This study demonstrates that the WISCI II has high IRR and intrarater reliability. Further, the WISCI II has good reproducibility as assessed by the ICCs and SRDs.	x
Bergamaschi et al., 2014	Content validity of the Work Rehabilitation Questionnaire-Self-Report Version WORQ-SELF in a subgroup of spinal cord injury patients.	Participation	WORQ-SELF	x	The objective of this study is to establish the content validity of WORQ-SELF in a subgroup of spinal cord injury (SCI) patients in the early post-acute context.	The WORQ-SELF proved to have content validity for utility in patients with SCI within the context of VR.	x
Scheuer et al., 2011	Überprüfung der Messqualität des Aktivitätstests zur Mobilität im Rollstuhl (AMR) bei erworbener Paraplegie anhand einer Rasch-Analyse	Mobility	AMR	x	Um zu prüfen, ob die Vorteile streng eindimensionaler Assessmentskalen für den AMR-Test in der Diagnostik genutzt werden können, wurde die Itemgruppe auf Passung zum ordinalen Rasch-Modell analysiert.	Vor dem Hintergrund zunehmend geforderter Qualitätssicherung rehabilitativer Maßnahmen stellt der AMR-Para-Test unter Ausschluss eines Items ein geeignetes Assessmentinstrument zur Dokumentation der aktivitätsorientierten Rollstuhlmobilität bei Querschnittlähmung dar, für das die besonders wünschenswerten Eigenschaften streng eindimensionaler Assessmentskalen in der klinischen Routinediagnostik genutzt werden können.	NA

Study Type	Methodological Quality (COSMIN, STROBE, AMSTAR)	Recommendation
Validation Study: responsiveness and concurrent validity	Poor (COSMIN)	The slalom and 6-minute propulsion tests best document wheelchair propulsion performance change over the course of inpatient rehabilitation.
Cross-sectional survey	20/21 (STROBE)	The items used to assess grief symptoms in patients participating in inpatient rehabilitation for recently sustained SCI appear to capture a psychometrically reliable construct that is distinct from that of depression.
Longitudinal inception cohort study	15/21 (STROBE)	Body image explains part of the variance in depression and anxiety, and the entire rehabilitation team should be targeting interventions to improve body image.

Validation Study: Internal consistency, Construct validity	Poor internal consistency Excellent construct validity (COSMIN)	The CB&M is a valid measure in high-functioning individuals with iSCI.
Validation Study: Internal Consistency, Construct Validity	Fair (COSMIN)	The DHI was found a valid method in the assessment of hand functions in patients with tetraplegia.
Cross-sectional	21/21 (STROBE)	Fatigue was prevalent and is of concern in persons with subacute SCI. Those with incomplete lesions seem to be at higher risk.
Prospective cohort study	19/21 (STROBE)	Clinicians should consider early screening for fatigue and interventions to reduce the consequences of fatigue in people with SCI.
Validation Study: Responsiveness	Fair (COSMIN)	GRASSP should be used as an adjuvant measure in studies that utilize neurological and functional change in the upper limb as an end-point.

Prospective longitudinal multicenter study	21/21 (STROBE)	The prediction of upper limb function and self-care in patients with acute cervical SCI can be achieved by using the GRASSP tool, of which the motor scoring in particular is of excellent predictive value for clinical outcomes at 6 and 12 months.
Validation Study: Responsiveness	Good (COSMIN)	GRASSP can be recommended for follow-up assessments.
Observational longitudinal cohort study	20/21 (STROBE)	In cervical SCI, clinical recovery can be assessed using standardized measures that distinguish levels of activity and impairment.
Validation Study: Criterion Validity	Good (COSMIN)	The Algorithm provides a current, validated and a standardized method to determine the level and severity of a SCI.

Prospective longitudinal study	20/21 (STROBE)	Structural volumetric and microstructural MRI protocols remote from the site of spinal cord injury could serve as neuroimaging biomarkers in acute spinal cord injury.
Cross-sectional study	21 (STROBE)	Depressive symptoms were not associated with pain severity in this sample. Etiology was associated with pain, those with traumatic SCI reporting more pain at admission. Among demographic characteristics, age was related to pain, with younger subjects reporting higher levels.
Validation Study: Test-retest Reliability, Validity	Good (COSMIN)	We suggest S3 pressure as an alternative test of sensory sacral sparing for supraconus SCI, at least in cases where DAP cannot be tested.

Validation Study: Intra- and interrater reliability	Poor (COSMIN)	This tool could be implemented in acute clinical settings working with a tSCI population and could assist the clinical staffs to better identify and manage adverse events.
Prospective cohort study	18/21 (STROBE)	Ultimately, the SAVES can be incorporated into the RHSCIR to ensure that AE data collection is standardized across the country and enable more questions to be answered and translated into best practice guidelines.
Validation Study: Interrater Reliability, Test-retest Reliability	Fair (COSMIN)	Thus, at present, the SCATS serves as a useful tool for assessing spasm activity.
Validation Study: Criterion Validity	Poor (COSMIN)	The SCI-FI CATs can either be administered at the point of care or can be completed by the patient at home before the scheduled appointment and the assessment result could be available to the clinicians.

Validation Study: Structural Validity	Poor (COSMIN)	The SCI-FI can be administered in inpatient and outpatient settings, prior to rehabilitative care visits using a web-based application on a tablet PC with touchscreen and can provide clinicians with assessment results that can be used alongside more traditional clinical information to facilitate patient-provider communication.
Validation Study: Internal consistency, Test-retest Reliability, Interrater Reliability, Cross-cultural Validity	Fair internal consistency Fair test-retest reliability and interrater reliability Poor cross-cultural validity (COSMIN)	The Turkish version of SCIM-III is a valid and reliable measurement tool for the functional assessment of SCI patients in Turkey.
Validation Study: Criterion Validity	Poor (COSMIN)	The self-report version may facilitate long-term evaluations of independence in persons with SCI in their home situation
Validation Study: Criterion Validity	Fair (COSMIN)	The measure may be useful in the clinical research setting and in clinical practice as a simple means of screening for NP after SCI. More studies to further investigate the SCIPI's validity are recommended.
Validation Study: Interrater Reliability	Good (COSMIN)	The psychometric properties of the SCIPUS do not currently support its routine use as a measure of PU risk in individuals with spinal cord injury undergoing inpatient rehabilitation.

Validation Study: Criterion Validity	Fair (COSMIN)	Most optimal for measuring risk of PrU in new traumatic SCI every 2-3 days, but weak validity for long-run assessment.
Prospective observational study and retrospective chart review.	19/21 (STROBE)	Pain is a common problem for persons receiving inpatient rehabilitation for traumatic SCI.
Cross-sectional	15/21 (STROBE)	Since improved quality of life is indicative of the success of treatment programs, it should be routinely measured among SCI patients.
Cross-sectional survey	Good (COSMIN)	With the development of the SCI-FI/AT, clinicians and investigators have available multidimensional assessment scales that evaluate function for users of AT to complement the scales available in the original SCI-FI.



Cohort Study	16/21 (STROBE)	A portion of the items from the PHQ-9 reflect physiologic factors in response to the SCI or hospitalization.
Prospective	19/21 (STROBE)	The inclusion of electromyographic (EMG) monitoring of individual muscles is recommended, in order to aid determination of the exact physiological basis for the speech breathing patterns.
Validation Study: Criterion Validity	Poor (COSMIN)	The combination of the LEMS, BBS, WISCI, 50FW-S, and LFIM appears to encompass adequate descriptors for outcomes of walking trials for incomplete SCI.
Systematic Review	8/11 (AMSTAR)	The correct use of WISCI II is clarified for testing acute/chronic phases of recovery after SCI, age of subjects, devices and settings. The WISCI II and walking speed measures may be performed simultaneously.

Validation Study: Test-retest Reliability, Intra- and interrater Reliability	Fair (COSMIN)	WISCI II is a reliable and useful outcome measure that can be used to detect changes in walking function following acute/subacute SCI.
Validation Study: Content Validity	Good (COSMIN)	WORQ-SELF can be used to assess the functioning and disability of patients in the return to work process.
Validation Study	NA	