Reviewer ID: Nicole Elfring, John Zhu, Jeremy Mak, Kyle Diab, Risa Fox

Type of Outcome Measure: Functional Independence Measure (FIM) | **Total articles:** 45

Author ID Year	Study Design	Setting	Population (sample size, age) and Group
Flett et al. 2019	Retrospective cohort	Two tertiary rehabilitation centers	N=754 (244F, 510M) all participating in inpatient SCI rehabilitation Mean age at injury = 53.9 ± 18.5 SCI 303 Traumatic 451 Non-traumatic 325 Tetraplegia 376 Paraplegia 53 Unknown 111 Complete Injury 582 Incomplete Injury 61 unknown
de Almeida et al 2016	Cross-sectional validation, using Brazilian SCIM-III & FIM	Neurology and Rehabilitation Clinics of the Ribeirão Preto Medical School of the University of São Paulo	N=30 (10M, 20F) nontraumatic SCI individuals N=17 ambulates without assistance, N=9 used mobility aids, N=2 cannot walk independently Etiologies: N=15 familial N=5 infectious disease N=6 under investigation N=4 other myelitis
Anderson et al. 2011	Multi-center, prospective, cohort study	Inpatient rehabilitation hospitals in the US	N= 390 (294 M, 96 F) Mean age at injury= 45.3 ± 17.9 SCI 270 Traumatic 120 Non-traumatic 187 Tetraplegia 203 Paraplegia AIS A = 135 AIS B = 54 AIS C = 80 AIS D = 121
Barbetta et al. 2014	Retrospective cohort study	SARAH Network of Rehabilitation Hospitals, Brasília, Brazil.	N=218, 176 male Mean age 30.9 yrs SCI patients hospitalized in 2006 Excluded patients with injury @ C4 or above AIS-A=130; B=30; C=20; D=20

Beninato et al. 2004	Retrospective review	Acute rehabilitation hospitals, Boston, MA, USA	N=20 (16M, 4F) Mean age 36.8±13.4yrs (range 18-62yrs Inpatients at one of 2 acute rehab hospitals in Boston, MA. 7 C5, 11 C6, 2 C7 13 AIS A, 6 AIS B, 1 anterior cord syndrome Admitted to rehabilitation within 1 year of injury Excluded incomplete individuals with abdominal or lower extremity MMT scores of ≥2.
Davidoff 1990	FIM subscales of cognition/communication compared to comprehensive neurological battery.	Patients admitted to a university medical center for acute care and rehabilitation within 45 days of injury.	N=41 acute care traumatic SCI patients (35M, 6F) Age range: 18 to 55 N=22 control subjects (12M, 10F) completed the same testing
Dijkers 1999	Secondary analysis	A Model SCI centre database	N=2183 (1766M, 417F) Age range <19 to >60yrs. Records from the National SCI database, containing entries since 1973.
Dijkers & Yavuzer 1999	Secondary analysis	National Spinal Cord Injury Database	N = 4,128 (3323M, 805F) Mean age = 37.5 Complete tetraplegia = 23.7% Incomplete tetraplegia = 28.1% Complete paraplegia = 31.1% Incomplete paraplegia = 17.0%
Ditunno et al. 2007	Single-blinded, parallelgroup, multicenter randomized clinical trial	6 regional SCI inpatient rehab. centres	N= 146 (114M, 32F) Mean age = 32 years (range 16 – 69 years) Duration of SCI <= 8 weeks Incomplete spinal cord injury patients who had a Functional Independence Measure locomotor score for walking of < 4 on entry.
Dodds et al. 1993	Not specified	The Northwest Assoc. of Rehabilitation Facilities (NWARF)	N=786 (393M, 393F) in one of the NWARF facilities Mean age= 65 SCI patients
Donnelly et al. 2004	Retrospective analysis	Spinal cord injury unit at GF strong in Vancouver BC	N=41 (29M, 9F, 3 individuals' demographics were not reported) Mean age=49±18.1 years 3 individuals demographics were not reported Paraplegia = 18 Tetraplegia = 20 Incomplete = 27 Complete = 11 Mean time since injury (days) = 52±73.1

Fujiwara et al. 1999	Cross-sectional	Subjects recruited from National Murayama Hospital (1995-1997)	N=14 (12M, 2F) C6 complete tetraplegic patients Mean age: 30.7 (13~62) Mean time since SCI: 462 (169~1080) days
Graham et al. 2014	Analysis of secondary data	300+ US inpatient rehabilitation facilities that contributed data to the UDSMR; Jan 2002 ~ Dec 2010	N=6663, 29.3%F 70.7%M Age breakdown: <45: 44.6% 45-64: 30.2% 65-74: 12.8% >= 75: 12.4% Admission: Living alone: 17.6% Living in community: 98.6% Discharge: Living alone: 7.2% Living in community: 82.5% Follow-up: Living alone: 12.1% Living in community: 92.5% Employed: 8.0% Unemployed: 42.0% Retired: 45.1%
Graves et al. 2006	Secondary analysis. Review of reports, investigating the ASIA motor scores (AMS) and the FIM.	National Spinal Cord Injury Statistical Center Database.	440-de-identified records were extracted from a clinical database with complete data from the discharge evaluation on the AMS and the FIM motor scores. First factor of FIM: functional abilities. Second factor of FIM: motor function.

Grey and Kennedy 1993	Longitudinal study. Looking at self-report version of FIM.	In hospital and postdischarge. National Spinal Injuries Centre, Stoke Mandeville Hospital, UK.	n = 40 patients with SCI mean age at time of injury = 29.6 yrs Mean (SD) time post-SCI at discharge = 24.75 (8.57) weeks 85% male 32.5% tetraplegic, 67.5% paraplegic
Hall et al. 1999	Descriptive study of FIM raw data collected at 1,2 and 5 years after injury	National Database of the 18 Spinal Cord Injury Model System	Persons with SCI, age 16 and over Data were available for: N=3971 at rehab admission (≤60 days post-SCI) N=4033 at discharge N= 903 at 1-yr post injury N=712 at 2-yrs post injury N=570 at 5-yrs post injury
Hamilton 1999	Cross-sectional study; FIM in the prediction of 1) Minutes of daily assistance provided (V1) 2) Cost of goods at use (V2) 3) Number of paid helper hours (V3)	Discharged patients from medical centers in New York	N=109 SCI patients (90M, 19F) Incomplete paraplegia (N=26) Complete paraplegia (N=29) Incomplete tetraplegia (N=28) Complete tetraplegia (N=26)
Hamilton et al. 1994	Methodological study. Assessing Inter rater reliability of 7-scale FIM	Hospital	89 (1018 patients) facilities; 24 (306 patients) of which met criteria of facility inter rater reliability for the purpose of reporting USDmr aggregating data.

Heinemann 1997	Correlation Cohort Design	Rehab Hospital	N=129 traumatic brain injury (TBI) and N=53 traumatic brain injury (SCI) patients
Horn et al. 2013	Prospective observational cohort study	Inpatient rehabilitation and community followup at 6 US SCI treatment centers	N=1376, 81.2% male Mean age 37.7, SD=16.7 Patients >= 12 yrs of age Lvl C1-4 & AIS-A/B/C = 28.4% Lvl C5-8 & AIS-A/B/C = 19.8% Paraplegia & AIS-A/B/C = 36.2% AIS-D = 15.6%
Itzkovich et al. 2007	Multi-center cohort study to examine the third version of the Spinal Cord Independence Measure for reliability and validity	13 spinal cord units in six countries from North America, Europe and the Middle East.	N = 425 (309M, 116F) Mean age = 46.93 Tetraplegia = 188 Paraplegia = 237 Inclusion criteria included: age ≥ 18 and no concomitant impairments that might influence everyday function. Traumatic SCL participants = 261 Non-traumatic SCL participants = 164, including: Spinal stenosis = 23; benign tumor = 27, disc protrusion = 25; myelopathy unknown = 16; syringomyelia = 5; decompression sickness = 3; multiple sclerosis = 2; congenital anomaly = 2 spinal abscess = 2; metastatic disease = 2; other = 41.
Jackson et al. 2008	A subcommittee of international experts evaluated locomotion measures	N/A	N = 54 expert raters
Karamehmetoglu et al. 1997	Cross sectional. Comparing the FIM rating by the same clinician by questioning the patient vs. observing the patient.	Rehabilitation Centre, Istanbul, Turkey.	N = 50 patients with SCI, 38 males, 12 female Mean age = 33.94 (SD = 14.59) 11 tetraplegic, 39 paraplegic
Koca et al. 2014		Physical Medicine and Rehabilitation Outpatients Clinic of Gaziantep University, Gaziantep, Turkey	N=44 (15F, 29M) Age: 34.25 ± 4.42 Time since SCI (months): 31.2 ± 4.7 AIS A: 14 AIS B: 9 AIS C: 10 AIS D: 11

Kozlowski & Heinemann 2013	Observational longitudinal secondary analysis	Six rehabilitation facilities participating in the SCIRehab project	N=1146 81.2%M 18.8%F Mean age 37, SD=16.5 Level and completeness of injury: C1~C4 AIS-A~C: N=314 C5~C8 AIS-A~C: N=229 Paraplegia AIS-A~C: N=422 AIS-D: N=181 Days from injury to admission: mean 30.0, median 22.0, SD 26.0 Rehab length of stay (days): mean 55.0, median 44.0, SD 42.0 Days from admission to discharge: mean 57.0, median 46.0, SD 44.0 Days from admission to follow-up: mean 444.0, median 407.0, SD 134.0
Kucukdeveci et al. 2001	Longitudinal study	Inpatient rehab centre, Turkey	N=62 (27M, 35F) Mean age 32.7yrs Mean DOI 16.4mo (range 1-210mo). 21% cervical, 42% thoracic, 37% lumbar.
Lawton et al. 2006	Cross-sectional study; analyzing cross cultural validity of FIM in SCI. Data from the FIM was fitted to the Rasch model. A detailed analysis of scoring functions of the seven categories of the FIM items was undertaken before to testing fit to the model	19 rehabilitation facilities from four countries in Europe	N = 647 (408M, 239F; Denmark = 168; Israel = 153; Italy = 226; UK = 100) Mean age = 46 (range: 11-93 yrs)
Lundgren-Nilsson et al. 2006	Cross-sectional study; analyzing cross-diagnostic validity of the FIM motor items in patients with SCI, stroke and traumatic brain injury and the comparability of summed scores between these diagnoses. Data from FIM was fitted to Rasch model.	9 rehabilitation facilities in Scandinavia	N=471 Stroke=157 SCI=157 TBI=157 Age range=11-90 Male=70%

Marino & Graves 2004	Secondary analysis of prospectively collected data. Applying item response theory (IRT) methods to determine the value of ASIA motor and ability estimates, rather than total ASIA motor scores, to predict motor FIM instrumental scores.	Model Spinal Cord Injury Systems centers	N= 4338 SCI patients (3443M, 895F) Median age = 33 years AIS grade: A: N= 2049 B: N= 511 C: N= 655 D: N= 1123
Marino et al 1998	Methodological study. Survey of people with chronic spinal cord injury	Regional Spinal Cord Injury Center	N=154 patients Avg. age = 37 years, injured for avg. of 8 years. 99% of subjects had neurological examinations within 2 years of completing study.
Marino et al. 1993	Cross-sectional	SCI centre	N=22 (all male) Avg. age = 33 years (range 10 to 63 years) Inpatients traumatic quadriplegia C4-C7 injury
Middleton et al. 2003	Descriptive, correlational study, validation study of a new instrument	Moorong Spinal Unit of the Royal Rehabilitation Centre Sydney, Sydney, New South Wales, Australia.	Sample 1: People with SCI living in the community who previously were at in-patient rehabilitation N=36, 28 male Mean age 36.33 (SD = 9.52) Mean time post-trauma 11.23 (SD = 9.67) years 11 paraplegia, 25 tetraplegia 15 incomplete, 21 complete Sample 2: People who had recently sustained a SCI and were currently enrolled at in-patient rehabilitation N=31, 23 male Mean age 31.48 (SD = 10.46) Mean time post-trauma 2.01 (SD = 2.50) months 21 paraplegia, 10 tetraplegia 13 incomplete, 18 complete Sample 3: People with SCI living in the community who previously were at in-patient rehabilitation N=108, 30 male Mean age 45.26 (SD = 15.99) Mean time post-trauma 7.92 (SD = 9.83) years 66 paraplegia, 42 tetraplegia 58 incomplete, 49 complete
Middleton et al. 2006	Repeated-measures design to assess the validity and responsiveness of 5 additional mobility and locomotor items when used in conjunction with the FIM	Specialized acute spinal and rehabilitation units in Sydney, Australia.	N = 39 (32M, 7F) Paraplegic = 28 Tetraplegic = 11 Median age = 28 Paraplegic: ASIA motor: Initial = 50 (50-50)

			6 months = 50 (50–56) ASIA sensory: Initial = 137 (100-146) 6 months = 130 (104-149) Tetraplegic: ASIA motor: Initial = 17 (13-23) 6 months = 24 (18–31) ASIA sensory: Initial = 44 (31-84) 6 months = 68 (42-122)
Morganti et al. 2005	Retrospective analysis	Rehab Hospital in Italy	Total sample: N=284 patients (184M, 100F) Mean age: 50.4±19.3 years WISCI 0 to 20 Validity sample: N=76 WISCI 1 to 19 Traumatic or non traumatic SCLs admitted between 1997-2001. Non-traumatic etiology was present in the majority of the patients (177/284): inflammatory (4), vascular (36), neoplastic (39), degenerative (62); traumatic lesions (107/284): car accident (38), motorcycle accident (15), sport accident (&), act of violence (6), suicide attempts (6), and accidental falls (31).
Mulcahey et al. 2004	Methodological study.	Shriners Hospitals for Children, Philadelphia, Pennsylvania	N=16 Age range: 7-20 years All had cervical level SCI. 3 had strong C6 or C7 function and underwent bilateral surgical tendon transfers, 16 had C5 or weak C6 level SCI and underwent unilateral surgical implantation of the Freehand System.
Nilsson 2005	Cross-sectional study. Evaluation of the structural properties of the FIM using the Rasch model.	Rehabilitation centres in Scandinavia.	N=358 (64% male) Median age = 48, range; 16-90
Oleson & Marino 2014	Longitudinal, with convenience sample Studying the revised CUE-Questionnaire (5pt instead of 7pt scale)	“Data were obtained at admission and discharge from acute inpatient rehabilitation”	N = 46, 42 male Median age 44±21 yrs AIS-A = 14, B = 5, C = 8, D = 19 Right motor lvl: C1-C4 = 11, C5 = 25, C6 = 7, C7-C8 = 3 Left motor lvl: C1-C4 = 9, C5 = 27, C6 = 5, C7-C8 = 5 28 Caucasian, 18 African-American Etiology: fall = 18, MVA = 17, sports = 8

Ovechkin et al. 2013	Prospective cohort study	University of Louisville	N= 11 (3F, 8M) Age: 48 ± 19 AIS A: 4 AIS C: 1 AIS D: 6
Poncumhak et al. 2013		Tertiary referral hospital in Thailand	Validity Test: N=66 (46M, 20 F) FIM-L 6: n=33 Age: 50.9 ±13.4 FIM-L 7: n=33 Age: 50.2 ±9.5 Reliability Test: N=16 (11M, 5F) Age: 50.8 ±10.3
Saboe et al. 1997	Prospective longitudinal study	Tertiary care acute, rehabilitation hospitals and home settings.	N=160 (125M, 35F) Mean age at injury: 30±13 Admission ASIA-A/B/C/D/E: 97/14/7/37/5 Admission ASIA-A/B/C/D/E: 80/11/10/58/1 Lvls of Injury - Cervical/Thoracic/Thoracolumbar/Lumbar: 72/32/49/7
Segal et al. 1993	Field study of institutional agreement of individual FIM items.	Discharge data from the acute care rahab. setting (ACRS) and discharge data from the ongoing rehab. setting (ORS).	N=57 Received treatment between Jan. 1989 and May 1990. 14 complete quadriplegia, 17 incomplete quadriplegia 13 complete paraplegia, 9 incomplete paraplegia
Soler et al. 2013	Postal surveys; Validation of Spanish MPI-SCI (MPI-SCI-S)	Guttmann Institute, Barcelona, Spain	N=126, 78M 48F Mean age 49.0±13.8 Mean time since injury 11.8±10.8 yrs AIS-A/B/C = 78/20/28 43 traumatic, 83 nontraumatic Chronic pain (>1yr) & SCI (>2yr) & pain rating of >=3 on Numerical Rating Scale
Spooren et al. 2006	Longitudinal cohort study to assess responsiveness of tools to changes in arm hand skilled performance.	SCI Units in 8 rehabilitation centres in the Netherlands	N= 60 (46M, 14F) Mean age = 38.9 Acute SCI C3-C6 = 42 C7-T1 = 18 AIS A-B = 34 AIS C-D = 26
Stineman et al. 1996	Cross-sectional analysis of patient records	Patients discharged in 1992 from in-hospital rehabilitation units or freestanding rehabilitation hospitals.	N = 2609 nontraumatic SCI; mean age = 64.4 years N = 1831 traumatic SCI; mean age = 43.0 years

Yavuz et al. 1998	Cross-sectional	Ankara Rehabilitation Center	N=29 (20M, 9F) Mean age 37yrs (range 14-66yrs) C3-T1 tetraplegic (18 ASIA complete, 11 ASIA incomplete). Consecutive patients of the Ankara Rehab Centre between May 1994 and January 1996. Mean time since injury to admission 20wks (range 272wks).

1. RELIABILITY

Author ID	Internal Consistency	Test-retest, Inter-rater, Intra-rater
Segal et al. 1993	No data available	Across two settings acute care rehabilitation and ongoing rehabilitation setting: ρ=0.83 Median reliability coefficient for individual items: ρ=.42 Median proportion of agreement for items: .465 10 of 18 FIM items differed significantly across settings. Subgroup: Complete quadriplegic: ρ=.87 Incomplete quadriplegic: ρ=.49 Complete paraplegic: ρ=.74 Incomplete paraplegic: ρ=.85
Kucukdeveci et al. 2001	Cronbach's alpha. Admission: Motor subscale α=.934 Cognitive subscale α=.983 Discharge: Motor subscale α=.953 Cognitive subscale α=.930	Intraclass correlation coefficient. Mean ICC=.90 (motor) and .98 (cognitive) Kappa statistic. Range K=.48 – 1.00

Lundgren-Nilsson et al. 2006	The SCI data had a significant item-trait interaction. The person separation index was between .94 and .96. A Person Separation Index is calculated as the base for estimating internal consistency reliability, where the estimates on the logit scale for each person are used to calculate reliability. The interpretation is similar to Cronbach's alpha. The PSI indicates the degree to which the scale can separate patients into discrete groups. A value of .7 is the minimum required to discern two groups.	No data available
Morganti et al. 2005		Inter-rater reliability: r=.90 (P<.001)
Hall et al. 1999	Motor items were highly inter correlated (r=.58-.92).	No data available

Hamilton et al. 1994	No data available	All facilities: FIM total: ICC=.96 Motor domain: ICC=.96 (subscales=.90-.94) Cognitive domain: ICC=.91 (subscales=.89-.91) Criterion facilities: FIM total: ICC=.99 Motor domain: ICC=.99 (subscales=.97-.98) Cognitive domain: ICC=.98 (subscales=.97-.98) FIM item scores: All facilities: Self Care: Κ=.54-.62 Sphincter control: Κ=.61-.62 Transfers: Κ=.57-.64 Locomotion: Κ=.57-.64 Communication: Κ=.59 Social cognition: Κ=.53-.56 Criterion facilities: Self Care: Κ=.71-.78 Sphincter control: Κ=.78-.84 Transfers: Κ=.78-.80 Locomotion: Κ=.76-.82 Communication: Κ=.73-.77 Social cognition: Κ=.69-.79
Dodds et al. 1993	FIM and the subscales at admission and discharge: α>.70 (except locomotion subscale α=.41)	No data available

Nilsson 2005	In the Rasch model; reliability of a measure is evaluated in terms of separation; 3 category FIM was found to be the best model for motor items: Real person separation = 2.28 Real person reliability = .84 Item reliability = .99 4 category FIM was found to be the best model for social/cognitive items: Real person separation =0.67 Real person reliability = .31 Item reliability = .90 (reliability can be interpreted as Chronbach's alpha; separations of 2 and below are considered low)	No data available
Hamilton 1999	No data available	r = .90 or higher (no details given on range, actual values)
Heinemann et al. 1997	No data available	*Test re-test:* ICC = .89 or higher (no details given on range, actual values)
Soler et al. 2013	Cronbach's alpha: 0.88	
Grey & Kennedy 1993	N/A	Inter-rater reliability: Excellent correlation b/w total FIM scores taken by clinician discharge report and self-report at one month (r = .828) Poor to Excellent correlation between FIM subscales scores taken by clinician discharge report and self-report at one month: • Self care: *r* = .841 (Excellent) • Sphincter control: *r* = .710 (Adequate) • Mobility: *r* = .733 (Adequate) • Locomotion: *r* = .454 (Adequate) • Communication: *r* = .029 (Poor) • Social cognition: *r* = .085 (Poor)
Karamehmetoglu et al. 1997	N/A	Excellent intra-rater correlation of FIM scores obtained by questioning the patient and by observation of patient performing the activity (*r* = .94)

Stineman et al. 1996	Excellent internal consistency for nontraumatic spinal cord diagnosis (Cronbach's alpha for total = .91; for FIM Motor = .91; for FIM Cognitive = .90) Excellent internal consistency for traumatic spinal cord diagnosis (Cronbach's alpha for FIM Total Score = .92; for FIM Motor = .94; for FIM Cognitive = .90)	N/A
2. VALIDITY		
Author ID	**Validity**	
Marino et al. 1993	Quadriplegia Index (QIF) modified and FIM: ρ=.93 (ns) Subscale Grooming: ρ=.94 (ns) Bathing: ρ=.92 (ns) Feeding: ρ=.75 (ns) Upper Extremity Motor Score and FIM: ρ=.84 (ns)	
	Subscale Grooming: ρ=.91 (ns) Bathing: ρ=.75 (ns) Feeding: ρ=.53 (P<.01)	

<table>
<tr><td>Yavuz et al. 1998</td><td>Comparison of FIM and Quadriplegia Index of Function (QIF) scores to ASIA scores.

Spearman’s correlation.

Total QIF and FIM scores were significantly correlated to each other (r=.97, P<.001), as well as to the scores for ASIA motor (QIF: r=.91, P<.001; FIM: r=.91; P<.001), ASIA light touch (QIF: r=.64, P<.001; FIM: r=.58; P<.01) and ASIA pinprick (QIF: r=.65, P<.01; FIM: r=.55; P<.01).

Self-care category (bathing, grooming and feeding) scores for the QIF and FIM were significantly correlated to each other (r=.91, .96, .91, respectively and P<.001) and to ASIA upper extremity motor scores (UEMS; r=.75 to .85; P<.001).

Other category (dressing, transfers, mobility, bladder and bowel programs) scores for the QIF and FIM were significantly correlated to each other (r=.87-.99, P<.001) and to whole body ASIA motor scores (QIF range: .79-.91; FIM range: .74-.86; P<.001 for all).

Percent recovery in ASIA motor scores over the rehabilitation stage was significantly correlated to percent improvement in total QIF scores (r=.68, P<.001), but not significantly correlated to percent improvement in total FIM scores (r=.38, P>.05).

Percent recovery in ASIA motor scores was not correlated to either QIF or FIM improvement when the patients were grouped according to age or length of hospital stay; however, it was significantly correlated to QIF improvement (P<.005), but not FIM improvement (P>.05), when patients were grouped based on a latency of more or less than 3 months between injury and admission.</td></tr>
<tr><td>Dijkers 1999</td><td>SWLS total mean (SD) score by FIM-motor and FIM-sociocognitive score categories:
<table>
<tr><th>FIM-motor component score</th><th>Mean (SD) SWLS score:</th><th></th></tr>
<tr><td>14-28 (low)</td><td>17.0 (8.0)</td><td rowspan="6">F=22.26, df=5, P<.001, eta^2=.05</td></tr>
<tr><td>29-55</td><td>18.1 (7.4)</td></tr>
<tr><td>56-76</td><td>18.6 (8.0)</td></tr>
<tr><td>77-80</td><td>20.4 (8.0)</td></tr>
<tr><td>81-87</td><td>20.3 (7.8)</td></tr>
<tr><td>88-91 (high)</td><td>23.1 (7.1)</td></tr>
<tr><td>FIM-sociocognitive component score</td><td>--</td><td></td></tr>
<tr><td>6-32 (low)</td><td>15.3 (8.0)</td><td rowspan="3">F=18.98, df=2, P<.001, eta^2=.02</td></tr>
<tr><td>33-34</td><td>18.8 (7.8)</td></tr>
<tr><td>35 (high)</td><td>19.8 (7.9)</td></tr>
</table></td></tr>
<tr><td>Beninato et al. 2004</td><td>MMT scores were compared to FIM scores (all data taken from time of discharge).

Spearman’s rank correlations.

Manual Muscle Test:
Elbow flexion and 10 of 12 FIM tasks: ρ=.48-.75
Shoulder flexion and 8 of 12 FIM tasks: ρ=.45-.72
Wrist extension and 7 of 12 FIM tasks: ρ=.52-.64
Elbow extension and 6 of 12 FIM tasks: ρ=.57-.69
Wrist flexion and 5 of 12 FIM tasks: ρ=.56-.73
Shoulder extension and 2 of 12 FIM tasks: ρ=.59-.76</td></tr>
</table>

	Significance at p<.05 for all. The strongest correlations existed between left shoulder extension and bladder management (.76), elbow flexion to toileting (.75), wrist flexion to toilet/tub/shower transfers (.73), and shoulder flexion and right shoulder extension to dressing upper body (.71 and .72, respectively). No significant correlations were found between any MMT muscle group and the FIM task of locomotion (wheelchair).
Kucukdeveci et al. 2001	*Total and subscale scores of FIM were correlated to ASIA motor impairment scale at admission and discharge.* **Kruskall-Wallis test and Spearman's Rho.** FIM total motor scores were more strongly correlated to ASIA motor scores (admission: r=.58, P<.01; discharge: r=.76, P<.01) compared to ASIA sensory scores (admission: r=.40, P<.01; discharge: r=.49, P<.01). (There was medium to high correlation between most of the FIM motor subscale scores and ASIA motor/sensory scores.) ASIA scores were not correlated with FIM cognitive scores. *FIM data were fitted to the Rasch Model (one-parameter Item Response Theory) to test for unidimensionality of the scales.* Bladder and bowel management scores show a considerable level of misfit, which compromises the unidimensionality of the motor scale. Grooming showed higher than acceptable variability.
Dijkers 1999	*Satisfaction With Life Scale (SWLS) scores were correlated to those for the Functional Independence Measure (FIM) and the Craig Handicap Assessment and Reporting Technique (CHART).* **ANOVA and Eta².** Both FIM subscales (motor and socio-cognitive) and all four CHART subscales (physical independence, mobility, social integration and occupation) were significantly correlated to SLWS scores (P<.001). Effect size (Eta²): FIM Motor score: F=22.26, df=5 (P<.001); η^2=0.05 Sociocognitive score: F=19.98, df=2 (P<.001); η^2=.02 **Stepwise Regression Analysis.** (Beta weights and significance level indicated in brackets.) Adding the FIM motor (0.21, P<.0001) and sociocognitive (0.10, P<.0001) variables into the regression produced an R^2 value of .14. Adding the CHART subscales of physical independence, mobility (0.26, P<.0001), occupation (0.10, P<.001) and social integration (0.11, P<.0001) produced an R^2 value of .23.
Donnelly et al. 2004	Relationship between COPM & Functional Independence measure (FIM) motor scores Admission FIM motor & COPM Performance r=.452, (P<.001) Admission FIM motor & COPM Satisfaction r=.514, (P<.001) Discharge FIM motor & COPM Performance r=.388, (P<.05) Discharge FIM motor & COPM Satisfaction r=.513, (P<.05) Change FIM motor & COPM Performance r=.351, (P<.05) Change FIM motor & COPM Satisfaction r=.475, (P<.05)

Ditunno et al. 2007	**Spearman correlation w/Walking Index for SCI** At 3 months: r = .73 At 6 months: r = .77 At 12 months: r = .74
	All P<.001 **Spearman correlation w/Berg Balance Scale** At 3 months: r = .76 At 6 months: r = .72 At 12 months: r = .77 All P<.001 **Spearman correlation w/50-Foot Walking Speed** At 3 months: r = .57 P<.001
Middleton et al. 2006	Construct of the 5-AML was assessed by testing ability of items to discriminate between different impairment groups (tetraplegia and paraplegia **All locomotor items failed to discriminate between the paraplegic and tetraplegic groups.**
Itzkovich et al. 2007	Pearson correlation w/ Functional Independence Measure (FIM): 1st rater: r = .790 (P<.01) 2nd rater: r = .779 (P<.01) McNemar test comparing SCIM III subscale scores to FIM tasks that match those subscales: The responsiveness of the SCIM III was better than that of the FIM in the Respiration and sphincter management and Mobility indoors and outdoors subscales. In the Self care and Mobility in the room and toilet subscales, differences between the two scales were statistically non significant: Self care: 1st rater: P<.360 2nd rater: P<.533 Respiration and sphincter mgmt: 1st rater: P<.001 2nd rater: P<.001 Mobility in the room and toilet: 1st rater: P<.341 2nd rater: P<.784 Mobility indoors and outdoors: 1st rater: P<.001 2nd rater: P<.001

Lawton et al. 2006	The present scoring system for the FIM motor and cognitive scales, that is a seven category scale, was found to be invalid, necessitating extensive rescoring. Following this, differential item functioning was found in a number of items within the motor scale, requiring a complex solution of splitting items by country to allow for the valid pooling of data. The FIM cognitive scale fitted the Rasch model after rescoring, but there was a substantial ceiling effect. Only after refitting to the Rasch model could data from the FIM motor score scale be pooled, or compared from country to country. The FIM cognitive scale works well following rescoring, and data may be pooled, but many patients were at the maximum score.
Morganti et al. 2005	Walking Index for Spinal Cord Injury: ρ= .70 Rivermead Mobility Index: ρ=.9 Barthel Index: ρ=.7 Spinal Cord Independent Measure: ρ=.8 All P<.001

Marino et al. 1993	Best FIM predictive model was using separate ASIA upper extremity motor score (UEMS) and lower extremity motor score (LEMS) (model 3). ASIA UEMS and FIM motor score: t=91.0 (P<.001) ASIA LEMS and FIM motor score: t=33.2 (P<.001) Use of separate ASIA UEMS and LEMS improved prediction of motor FIM scores (R^2 = .71) over that of total ASIA motor scores (R^2 = .59) ASIA UEMS and FIM upper cord score: t=101.7 (P<.001) ASIA LEMS and FIM upper cord score: t=8.4 (P<.001) R^2 = .72 ASIA UEMS and FIM lower cord score: t=73.0 (P<.001) ASIA LEMS and FIM lower cord score: t=41.0 (P<.001) R^2 = .75
Heinemann 1994	Burden of care and measure of disability: Medication: r=.66 Treatment: r=.41 Teaching=.67 (all significant at P<.01) FIM motor and total nursing contact time at admission and discharge (4 of 6 categories were significant): Medication dispensing: r=-.33 (P=.014), r=-.47 (P<.001) Treatment provision: r=-.42 (P<.002), r=-.25 (P=.066) Teaching/ADL: r=-.47 (P<.001), r=-.54 (P<.001) Indirect: r=-.35 (P=.010), r=-.24 (P=.088) Total minutes: r=-.46, r=-.52 (P<.001)
Graves et al. 2006	r = .642 between FIM factors (upper extremity and lower extremity) The two FIM factors accounted for 81% of variance in ASIA (AMS) scores; first factor (70%), second factor (11%). The two American Spinal Cord Injury Association motor score (AMS) factors (upper extremity and lower extremity) predict 73% of the variance in the first factor and 56% of the second factor of FIM.

Dodds et al. 1993	Statistically significant differences in levels of impairment severity with scores decreasing with increased severity (P<.005).
Nilsson 2005	Rasch analysis: Motor scale items: Misfit – Infit mean square values: Bladder =1.59, Walk/Wheelchair=1.29, Stairs=3.56 Misfit Outfit: Bladder =2.10, Bowel=1.42, Walk/Wheelchair=1.53, Stairs=4.70 No misfits within Social-cognitive items.
Hamilton 1999	FIM-18 and square root of minutes of assistance: r = -.92 FIM-18 and square root of cost of durable goods: r = -.496 FIM-18 and square root of hours of paid help/day: r = -.76 FIM-motor domain and square root of minutes of assistance: r = -.878 to -.92 FIM- motor domain and square root of cost of durable goods: r = -.492 to -.537 FIM-motor domain and square root of hours of paid help/day: r = -.737 to -.76 FIM-subscales and square root of minutes of assistance: r = -.593 to -.916 FIM- subscales and square root of cost of durable goods: r = -.405 to -.480

	FIM-motor domain and square root of hours of paid help/day: r = -.472 to -.764 All significant at P≤.001 Authors predicted all negative correlations.
Marino et al 1998	The FIM was correlated: Capabilities of Upper Extremity (CUE): r = .738, ρ = .798, P<.05 Upper Extremity Motor score (UEM): r = .741, ρ = .803, P<.05 None of the correlations were statistically different from each other at P<.05 CUE explained 73% of variance within FIM where as UEM only explains 67% of variance.
Mulcahey et al. 2004	<u>Relationship between GRT objects at post-rehabilitation and 12 month Functional Independence Measure (FIM) Scores</u> Fork from Grasp and Release Test (GRT) & 12-month FIM: ρ = .624 (P<.01) Can from GRT & 12-month FIM: ρ = .700 (P<.01) Videotape from GRT & 12-month FIM: ρ = .503 (P<.05) Non-significant items from GRT and 12-month FIM were: peg, block, paperweight, and total number of objects.
Anderson et al. 2011	The Pearson correlation coefficients for the FIM and the Spinal Cord Independence Measure III (SCIM III) first rater or the SCIM III second rater were both .80 (P<.001). For all subscales, the SCIM III was in agreement with the FIM in responding to functional change (P<.0001)
Oleson & Marino 2014	Spearman Correlations of: Modified CUE-Q total score at: Admission: With FIM-Self Care: r=.73 Discharge: With FIM-Self Care: r=.80 Modified CUE-Q score change between admission and discharge: With FIM-Self Care: r=.51

Soler et al. 2013	Pearson's r btwn: MPI-SCI general activity subscale and FIM: .35, p<.05
Koca et al. 2014	With BDI (Beck Depression Index) score (Pearson r= -.674, p < .001)
Poncumhak et al. 2013	FIM-L (FIM locomotion subscale) with 10mWT Point biserial coefficient r_{pb}=.778 (p<.001)
Ovechkin et al. 2013	FIM motor score correlated (Spearman) with the following: AIS: r= .57 (not significant) SCIM III total: r=.88 (p< .01) SCIM III Self-care: r=.88 (p< .01) SCIM III Mobility: r=.86 (p< .01) WISCI: r= .69 (p<.01)
Grey & Kennedy 1993	Face validity was evaluated by asking clinicians specific questions addressing: • Difficulty of understanding (88% had no difficulty) • Unnecessary items (97% reported no unnecessary items • Items that should be added (83% felt no extra items needed)

Jackson et al. 2008	FIM – Locomotion item was rated as Valid/Useful by 6%, Useful But Requires Validation or Changes by36% , and Not Useful or Valid for Research in SCI by 58%
Fujiwara et al. 1999	Spearman's rho btwn: ASIA Motor Score and FIM Motor Score: .73 (p<.01) ASIA Motor Score and FIM Transfer Score: .64 (p<.01) Total shoulder strength score* and FIM motor score: .95 (P<.001) Total shoulder strength score* FIM transfer score: .93 (P<.001) Total shoulder strength score is defined as the sum of MMT scores for: Bilateral scapular abduction Upward rotation Shoulder vertical adduction Shoulder extension
Saboe et al. 1997	Correlation coefficient btwn FIM score 2 years after SCI onset and: ASIA Motor Score at rehab admission: .68 ASIA Motor Score at rehab discharge: .80 ASIA Impairment at rehab admission: .50 ASIA Impairment at rehab discharge: .53
Middleton et al, 2003	Spearman correlations with Moorong Self-Efficacy Scale (Sample 1 only, N=36): Functional Independence Measure (FIM) motor (N=34): .04 (P>.05) FIM cognitive: -.39 (P<.05)
de Almeida et al. 2016	Spearman's rho between: SCIM-III and motor FIM: .6, p<.01 SCIM-III Grooming and FIM self-care: .8, p=.001 SCIM-III respiration & sphincter and FIM sphincter: .6, p=.0005 SCIM-III mobility indoor & outdoors and FIM locomotion: .6, p=.0006

3. RESPONSIVENESS

Author ID	**Responsiveness**

Middleton et al. 2006	Responsiveness was assessed by analysing ability to detect changes in mobility and locomotor function over time **Mobility items:** Bed transfer: reasonable responsiveness over time for the paraplegic group but less so for the tetraplegic group. Toilet transfer: similar to bed transfer Bath transfer: similar to bed transfer **Locomotor items:** Push/walk: not responsive Stair item: not responsive
Spooren et al. 2006	t1-t3 = from start of rehab to discharge t1-t2 = from start of rehab to 3 months later t2-t3 = from 3 months after the start of rehab to discharge. For the interpretation of SRM and ES, a value of 0.20 was considered small, a value between 0.50 and 0.80 was moderate and > 0.80 was large degree of responsiveness. **Total FIM**: there was a significant difference in the FIM scores across the three measurements (Friedman, P<.001). There was a significant difference between all time intervals (Wilcoxon; P<.001) SRM_{FIM3-1} = 1.47 SRM_{FIM2-1} = 1.16

	SRM_{FIM3-2} = 0.85 ES_{FIM3-1} = 2.08 ES_{FIM2-1} = 1.36 ES_{FIM3-2} = 0.42 **Groups A-B and C-D:** There was a significant difference across the three measurements for both groups (Friedman, P<.001). There were significant differences between all time intervals (Wilcoxon, P<.001) **Group A-B** SRM_{FIM3-1} = 1.23 SRM_{FIM2-1} = 1.40 SRM_{FIM3-2} = 0.77 ES_{FIM3-1} = 2.01 ES_{FIM2-1} = 1.08 ES_{FIM3-2} = 0.79 **Group C-D** SRM_{FIM3-1} = 1.94 SRM_{FIM2-1} = 1.46 SRM_{FIM3-2} = 0.99 ES_{FIM3-1} = 2.47 ES_{FIM2-1} = 1.83 ES_{FIM3-2} = 0.37 **Groups C3-C6 and C7-T1:** There was a significant difference across the three measurements for both groups (Friedman, P<.001). There were significant differences between all time intervals (Wilcoxon, P<.002) **Group C3-C6** SRM_{FIM3-1} = 1.35 SRM_{FIM2-1} = 1.07 SRM_{FIM3-2} = 0.84 ES_{FIM3-1} = 2.12 ES_{FIM2-1} = 1.45 ES_{FIM3-2} = 0.34 **Group C7-T1** SRM_{FIM3-1} = 1.86 SRM_{FIM2-1} = 1.39 SRM_{FIM3-2} = 0.95 ES_{FIM3-1} = 2.08 ES_{FIM2-1} = 1.25 ES_{FIM3-2} = 0.63
Dodds et al. 1993	Significant improvements between admission and discharge Functional Independence Measure (FIM) scores (P<.0005)
Anderson et al. 2011	For all subscales, the Spinal Cord Independence Measure III (SCIM III) was in agreement with the FIM in responding to functional change (P<.0001). For the respiration and sphincter management subscale, the SCIM III was more responsive to change than the FIM (P<.0001)
Oleson & Marino 2014	Effect Size of change (FIM selfcare subscale): 1.38
Flett et al. 2019	Se: sensitivity, Sp: specificity, PPV: positive predictive value, NPV: negative predictive value Sensitivity and specificity analysis for FIM subscales, scales, and items with AUC $\geq$ 0.70 Braden Scale Se: 0.82, Sp:0.59, PPV:0.35, NPV: 0.93 SCIPUS Scale Se:0.85, Sp:0.37, PPV:0.38, NPV:0.85 FIM Scale Se:0.89, Sp:0.57, PPV:0.35, NPV:0.95 Subscales:

	FIM Self-care subscale, Se:0.86, Sp:0.54, PPV:0.33, NPV:0.94 FIM transfers subscale, Se:0.89, Sp:0.65, PPV:0.36, NPV:0.96 FIM Motor subscale, Se:0.89, Sp:0.58, PPV:0.35, NPV:0.95 Scale Items: FIM bathing, Se:0.98, Sp:0.33, PPV:0.42, NPV:0.97 FIM bladder, Se:0.79, Sp:0.57, PPV:0.30, NPV:0.92 FIM bowel, Se:0.84, Sp:0.58, PPV:0.32, NPV:0.94 FIM dressing lower body, Se:0.91, Sp:0.45, PPV:0.35, NPV:0.94 FIM toileting, Se:0.97, Sp:0.45, PPV:0.38, NPV:0.97 FIM bed/chair transfer, Se:0.83, Sp:0.63, PPV:0.34, NPV:0.95 FIM tub/shower transfer, Se:0.89, Sp:0.56, PPV:0.34, NPV:0.95 FIM toilet transfer, Se:0.89, Sp:0.61, PPV:0.35, NPV:0.96
4. FLOOR/CEILING EFFECT	
Author ID	**Floor/ceiling effect**
Davidoff et al. 1990	Ceiling effect: most patients were rated 6 or 7 (out of 7) on each of the FIM items in Cognitive/ Communication subscales. Such scores give the impression that a patient is cognitively intact, when in fact there may be several neurocognitive and language impairments.
Middleton et al. 2006	**Mobility items:** Bed transfer: ceiling effect for paraplegic group; floor effect for the tetraplegic group. Toilet transfer: similar to bed transfer
	Bath transfer: similar to bed transfer **Locomotor items:** Push/walk: ceiling effect Stair item: floor effect

Hall et al. 1999	Ceiling effects of the FIM cognition items. 80-90% of the cases avg. 6 or 7 (on a 7point scale) across the 5 FIM cognition items. High tetraplegia- Floor - Motor score Admisssion=86% Discharge=14-21% 1 Years=28-30% 2 Years=25% 5 Years=13% High tetraplegia – Ceiling - Cognition score Admission=59-61% Discharge=80-81% I Year=89-90% 2 Years=96% 5 Years=98% Low tetraplegia – Floor - Motor score Admission=58-61% Discharge=1-3% I Year=5-6% 2 Years=4% 5 Years=3% Low tetraplegia – Ceiling - Motor score Admission=0% Discharge=2-4% I Year=15-18% 2 Years=18% 5 Years=16% Low tetraplegia – Ceiling - Cognition score Admission=67-69% Discharge=84-86% I Year=94-95% 2 Years=99% 5 Years=96% Paraplegia - Ceiling – Motor score Admission=0% Discharge=23-36% I Year=55-57% 2 Years=66% 5 Years=75% Paraplegia – Ceiling – Cognitive score Admission=75-76% Discharge=90-93% I Year=97-98% 2 Years=98%
	5 Years=99%

Grey & Kennedy 1993	Ceiling: 92% of subjects and 88% of clinicians reported a max score on communication 75% of subjects and 73% of clinicians reported a max score on social cognition
5. INTERPRETABILITY	
Author ID	**Interpretability**
Segal et al. 1993	Mean (SD) FIM scores for the acute setting and ongoing rehabilitation setting:

Item:	Acute setting Mean (SD)	Ongoing rehabilitation setting Mean (SD)
Feeding	5.30 (1.90)	4.49 (2.46)
Grooming	4.95 (2.07)	4.30 (2.50)
Bathing	3.26 (1.96)	2.58 (1.83)
Dressing: upper body	3.88 (2.10)	3.26 (2.29)
Dressing: lower body	2.53 (1.65)	2.07 (1.40)
Toilet	1.56 (1.30)	1.95 (1.25)
Bladder management	1.44 (1.28)	1.77 (1.43)
Bowel management	1.51 (1.38)	1.72 (1.35)
Bed transfer	2.65 (1.85)	2.40 (1.50)
Toilet transfer	2.19 (1.54)	2.33 (1.49)
Tub/shower transfer	1.86 (1.43)	2.14 (1.51)
Walk/wheelchair	3.88 (2.31)	3.18 (2.35)
Stairs	1.07 (0.53)	1.26 (1.17)
Comprehension	6.84 (0.62)	6.86 (0.48)
Expression	6.82 (0.63)	6.84 (0.53)
Social interaction	5.00 (1.57)	6.21 (1.42)
Problem solving	5.04 (1.60)	6.23 (1.55)
Memory	5.53 (1.43)	6.63 (1.17)

Hall et al. 1999

Mean (SD) Motor FIM scores at rehabilitation admission, discharge, and 1, 2, and 5 years post injury. (AIS Grades A, B, C individuals)

FIM Motor	Admission	Discharge	1 yr status post	2 yr status post	5 yr status post
C1-C3	14.1(4.7) n = 156	18.6 (7.8) n = 115	25.4 (22.2) n = 29	26.5 (26) n = 17	22.1 (15.0) n = 18
C4	14.9 (6.1) n = 517	23.1 (11.6) n = 458	26.9 (19.6) n = 118	25.4 (17.0) n = 87	24.9 (14.9) n = 52
C5	16.0 (7.9) n = 578	31.3 (15.0) n = 433	35.6 (20.7) n = 91	37.5 (22.7) n = 81	38.5 (22.6) n = 67
C6	16.9 (7.8) n = 313	37.4 (14.3) n = 394	39.7 (19.6) n = 89	46.7 (21.9) n = 75	42.2 (20.2) n = 63
C7	19.6 (9.0) n = 177	50.2 (15.8) n = 236	59.6 (22.3) n = 56	58.3 (22.6) n = 46	56.9 (20.5) n = 42
C8	22.6 (8.2) n = 55	61.9 (16.4) n = 76	68.7 (18.7) n = 21	68.4 (16.4) n = 14	73.3 (17.2) n = 14
Thoracic	32.5 (12.0) n = 1718	69.3 (13.1) n = 1869	72.2 (14.4) n = 402	74.7 (12.8) n = 320	77.4 (10.0) n = 256
Lumbar / sacral Sacral	36.7 (12.6) n = 457	73.2 (11.9) n = 452	79.8 (12.4) n = 97	83.2 (5.9) n = 72	82.4 (5.5) n = 58

Mean (SD) Cognitive FIM scores at rehabilitation admission, discharge, and 1, 2, and 5 years post-injury (AIS

A, B, and C individuals)

FIM Motor	Admission	Discharge	1 yr status post	2 yr status post	5 yr status post
C1-C3	26.8(9.7) n = 131	29.8 (8.2) n = 95	33.8 (2.4) n = 17	33.4 (2.1) n = 10	34.5 (1.2) n = 12
C4	29.0 (7.2) n = 456	32.2 (4.8) n = 380	33.2 (5.2) n = 67	34.3 (1.7) n = 47	34.3 (1.4) n = 37
C5	29.5 (7.3) n = 541	32.5 (4.9) n = 371	33.8 (4.2) n = 55	34.4 (1.7) n = 55	34.1 (2.1) n = 55
C6	29.4 (7.1) n = 290	32.9 (3.5) n = 351	33.5 (3.5) n = 56	34.2 (3.3) n = 53	34.6 (1.3) n = 48
C7	30.1 (7.1) n = 165	32.9 (4.4) n = 212	34.7 (0.8) n = 40	34.9 (0.3) n = 27	34.6 (0.8) n = 30
C8	30.5 (6.8) n = 52	32.3 (4.5) n = 70	34.5 (0.9) n = 14	35.0 (0.0) n = 6	35.0 (0.0) n =7
Thoracic	31.2 (5.9) n = 1594	33.3 (3.5) n = 1644	34.4 (2.0) n = 249	34.5 (1.5) n = 199	34.8 (0.9) n = 180
Lumbar/ Sacral	32.1 (5.2) n = 431	33.5 (3.4) n = 405	34.6 (1.5) n = 59	35.0 (0.2) n = 41	34.1 (4.2) n = 38

Mean Motor FIM scores at rehabilitation, admission and discharge by level and completeness of injury:

	Admission*			**Discharge***		
Level	AIS A	AIS B	AIS C	AIS A	AIS B	AIS C
C1-C3	13.2 (n=88)	13.0 (n=14)	15.8 (n=54)	17.7 (n=75)	21.0 (n=13)	20.0 (n=27)
C4	13.6 (n=288)	14.5 (n=73)	17.5 (n=156)	20.9 (n=288)	24.8 (n=54)	27.8 (n=116)
C5	14.3 (n=310)	16.2 (n=127)	19.7 (n=141)	28.3 (n=236)	31.1 (n=96)	38.4 (n=101)
C6	15.3 (n=173)	17.8 (n=89)	21.1 (n=51)	35.6 (n=238)	37.6 (n=93)	43.9 (n=63)
C7	18.5 (n=90)	18.8 (n=52)	23.6 (n=35)	49.4 (n=123)	48.7 (n=56)	53.5 (n=57)
C8	22.3 (n=27)	22.4 (n=17)	23.3 (n=11)	64.1 (n=34)	58.6 (n=27)	63.0 (n=15)
Thoracic	32.2 (n=1324)	31.5 (n=202)	35.5 (n=192)	69.1 (n=1482)	67.2 (n=163)	71.7 (n=224)
Lumbar/ Sacral	35.8 (n=147)	36.6 (n=105)	37.3 (n=205)	71.5 (n=161)	74.8 (n=74)	74.0 (n=217)

* Including only those with level of injury and completeness data available

Hamilton et al. 1999	Mean (SD) FIM scores: FIM-18: 98.22 (26.00) FIM-Motor score: 63.39 (25.72) FIM-Cognitive score: 34.83 (1.37) FIM-subscales: Self-care: 31.90 (12.81) Sphincter control: 8.79 (4.79) Transfer: 14.61 (7.29) Locomotion: 8.10 (2.79) Communication: 13.94 (0.58) Social cognition: 20.89 (0.80)

Graham et al. 2014	Mean scores (mean, mean(SD) or percentage; N=6663): Admission: FIM motor: 30.3(14.0) Sphincter domain: 2.4 Self-care domain: 2.7 Transfer domain: 2.0 Locomotion domain: 1.6 FIM cognition: 29.9(5.6) Communication domain: 6.2 Social cognition domain: 5.9 FIM total: 60.2(16.1) Living alone: 17.6% Living in community: 98.6% Discharge: FIM motor: 55.0(20.0) Sphincter domain: 4.0 Self-care domain: 4.6 Transfer domain: 4.1 Locomotion domain: 3.8 FIM cognition: 32.3(4.1) Communication domain: 6.6 Social cognition domain: 6.4 FIM total: 87.3(21.4) Living alone: 7.2% Living in community: 82.5% Follow-up*: FIM motor: 66.6(23.2) Sphincter domain: 5.3 Self-care domain: 5.4 Transfer domain: 5.0 Locomotion domain: 4.2 FIM cognition: 33.6(3.0) Communication domain: 6.8 Social cognition domain: 6.7 FIM total: 100.2(24.3) Living alone: 12.1% Living in community: 92.5% Admission - discharge change: FIM total: 27.8(15.5) Discharge – follow-up* change: FIM total: 12.8(16.5) *80~180 days after discharge (mean 104, SD 23, median 95, IQR 87-114)

Kozlowski & Heinemann 2013	Mean FIM subscores (mean median (SD); N=1146): Admission: motor (13-item): 18 21 (28) motor (11-item*): 17 20 (27) transfer (3-item): 6 0 (9) self-care (6-item): 26 32 (44) upper (3-item): 34 38 (56) lower (3-item): 11 0 (23) Discharge**: motor (13-item): 37 39 (19) motor (11-item*): 37 39 (20) transfer (3-item): 34 34 (55) self-care (6-item): 51 56 (24) upper (3-item): 65 70 (39)
	lower (3-item): 42 47 (37) Follow-up***: motor (13-item): 47 47 (29) motor (11-item*): 47 49 (28) transfer (3-item): 56 66 (100) self-care (6-item): 65 68 (55) upper (3-item): 74 100 (47) lower (3-item): 59 66 (77) *13-item motor subscale without 2 sphincter items **Days from admission to discharge: mean 57.0, median 46.0, SD 44.0 *** Days from admission to follow-up: mean 444.0, median 407.0, SD 134.0