Author, Year Study Design Setting	Population Characteristics	Methods	Outcomes
Cathomen et al. 2023 Cohort Study Switzerland	**N:** 361 **Level:** Paraplegia **Mean age:** 40 **% Female:** 20.5%	**Objective:** To assess walking function using an established outcome measure featuring a continuous scale. **Outcome Measure:** 6-minute walk test, 10-m walk test, Spinal Cord Independence Measure III, mobility items 12-14, Walking Index for Spinal Cord Injury	**Results:** The group of non-walkers showed no muscle function early after injury in any myotome (motor score median [range] = 0 [0-1]), compared to indoor walkers with residual muscle function in myotomes L2 (motor score median [range] = 1 [0-5]) and L3 (motor score median [range] = 2 [0-4]). Indoor walkers were thereby characterized by a lack of muscle function of the MI leg in distal myotomes L4, L5, and S1 (motor score median [range] = 0 [0-4]) ≤15 days after injury.
Van Middendorp et al. 2011 Longitudinal Cohort Study Europe	**N:** 640 **Level:** AIS - 241 A; 63B; 82C; 171D; 5E **Mean Age (SD):** 45 ± 17 (18-92) **% Female:** 21%	**Study Duration:** longitudinal cohort study of adult patients with traumatic spinal cord injury, with early (within the first 15 days after injury) and late (1-year follow-up) clinical examinations, who were admitted to one of 19 European centres between July 2001, and June 2008 **Outcome Measures:** SCIM A clinical prediction rule based on age and neurological variables was derived from the international standards for neurological classification of spinal cord injury with a multivariate logistic regression model **Objective:**	**Results:** A combination of age, motor scores of the quadriceps femoris (L3), gastrocsoleus (S1) muscles, and light touch sensation of dermatomes L3 and S1 showed excellent discrimination in distinguishing independent walkers from dependent walkers and non-walkers The prediction rule distinguished well between those patients who were able to walk independently and those who were not (AUC 0·956, 95% CI 0·936–0·976, p<0·0001) Prediction Rule: - Four neurological predictors: - Quadriceps femoris muscle grade (L3)

		Developed a simple clinical prediction rule derived from data from a large prospective European database that can be used by physicians to counsel patients with traumatic spinal cord injury and their families during the initial phase after injury	- Gastrocsoleus muscle grade (S1) - Light Touch Score at L3 - Light Touch Score at S1 - Age
Burns et al. 1997 Inception Cohort Study USA	**N:** 1191 (105) **Level:** AIS: 64 C, 41 D **Mean Age (SD):** 45 + 17 (18-92) **% Female:** 21%	**Objective:** To determine the effect of age and initial neurologic status on recovery of ambulation in patients with motor incomplete tetraplegia. **Study Duration:** Inception cohort study of acute SCI patients admitted between January 1984 - January 1993, within 72 hours of admission. **Outcome Measure:** Ambulatory Status at time of discharge from inpatient rehab. For this study, a patient was considered ambulatory if able to walk 50 feet without assistance from another person. The use of ambulatory aids and orthoses was permitted.	**Results:** Age and initial ASIA classification are associated with recovery of independent ambulation. - All ASIA D patients have a good prognosis for ambulation, regardless of age. - Older patients with ASIA C tetraplegia demonstrate less functional motor recovery than younger patients. Results ($p < 0.0001$, x2 test): ● 30/33 ASIA C subjects younger than 50 became ambulatory by discharge ● 13/31 ASIA C subjects older than 50 became ambulatory by discharge ● All ASIA D subjects became ambulatory by discharge
Van Hedel et al. 2009 Prospective cohort Europe	**N:** 886 **Level:** AIS - 413 A, 113 B, 137 C, 223 D **Mean Age (SD):** ASIA A, 39 (18) ASIA B, 42 (18) ASIA C, 48 (20) ASIA D, 47 (17) **% Female:** ASIA A 19%; ASIA B 27;	**Objective:** The aim of the present study was to assess gait speeds that distinguished between levels of functional ambulation in subjects with a spinal cord injury. **Study duration:** Patients within 2 weeks of injury were prospectively	**Results:** 1. In general, participants in a higher category walk at higher speeds. For each time point, the walking speed differed between the ambulatory categories (for all, P <.001) 2. Speeds that separate ambulation Categories:

	ASIA C 32; ASIA D 22	assessed across 18 European centres between 2001 - 2007. Assessments occurred at 1, 3, 6, and 12 months after SCI **Outcome Measures:** SCIM II 10MWT 6MWT	a. Indoor walker, wheelchair dependent: 0.15 ±0.08m/s b. Assisted walker: 0.44±0.14m/s c. No aid walkers: 0.70±0.13m/s 3. Distinguishing between minor and strong dependence on walking aids categories: a. Minor dependence for aids (1 cane, leg orthosis): 0.64 m/s @ 3 months, 0.68 m/s @ 6 months b. Strong dependence for aids: 0.44 m/s
Zörner et al. 2010 Prospective cohort Europe	**N:** 90 **Level:** Tetraparesis: 4 C2; 5 C4; 17 C4; 20 C5; 5 C6 AIS (subacute phase): 20C, 31 D AIS (chronic phase): 1B, 5C, 45 D Paraparesis: 20 thoracic; 19 lumbar AIS (subacute phase): 19 C, 20 D AIS (chronic phase): 2 C, 35 D, 2E **Etiology:** Tetraparesis: 43 traumatic, 5 ischemic, 1 hemorrhagic, 1 disk herniation, 1 other Paraparesis: 28 traumatic, 6 ischemic, 1 hemorrhagic, 4 disk herniation	**Objectives:** The aims of this study on people with motor incomplete SCI (miSCI) were: (1) to rank the strongest single predictors and predictor combinations of later walking capacity; (2) to develop a reliable algorithm for clinical prediction; and (3) to identify subgroups with only limited recovery of walking function **Study Duration:** Participants were selected from a prospectively gathered European database and admitted between 2001 and 2005 to acute care and rehabilitation hospitals **Outcome Measures:** WISCI II, 6MWT, lower extremity motor score (LEMS)	**Results:** 1. Participants with tetra- or paraparesis achieved average WISCI II scores of 13.6 ± 8.4 (median = 20) or 17.9 ± 4.1 (median = 20) respectively, six months after injury. 2. Within 6 min (6MWT), participants with tetraparesis were able to walk a mean distance of 284 ± 235 m; paraparetic subjects: 376 ± 209 m. 3. For participants with tetraparesis, results of the 6MWT (57% "functional" walkers) were very similar to the WISCI II outcome (53% "independent" walkers) 4. In contrast, 79% of the participants with paraparesis were scored as "functional" (6minWT), but only 64% as "independent" walkers (WISCI II) 5. Strongest correlations between single

	Mean Age (SD): Tetraparesis**:** 50.27 ± 16.17 Paraparesis: 42.38 ± 16.46 **% Female:** Tetraparesis: 19.6% Paraparesis: 30.8%		predictors + outcome measures for walking function in tetra + paraplegia a. Pin prick: r=0.80 i. WISCII: tetra: p<0.01, para: p<0.01 ii. 6MWT: tetra: p<0.01, para: p>0.01 b. Light touch: r=0.69 i. WISCI II: tetra: p<0.01, para p>0.01 ii. 6MWT: tetra p<0.01. Para p>0.01 6. LEMS = best predictor of walking outcomes - correct prediction rates: a. Tetraparesis = 90% for WISCI II, 90% for 6MWT (p<0.01 both) b. Paraparesis = 67% for WISCI II, 90% for 6MWT (p<0.01) 7. Strongest combined predictors a. 6MWT (functional vs non-functional walkers): LEMS and AIS most predictive
Phan et al. 2019 Prospective Cohort Study Canada	**N:** 675 **Level:** AIS A&D 515; B&C 160 **Etiology:** Assault 17; Fall 302; Sports 129; Transport 181; Other 34; Surgery 97 **Mean Age (SD):** AIS A&D 47.2(18); B&C 45.1 (18.6) **% Female:** A&D 22%; B&C 21%	**Objective:** To compare independent ambulatory outcomes in AIS (ASIA [American Spinal Injury Association] Impairment Scale) A, B, C, and D patients, as well as in AIS B+C and AIS A+D patients by applying two existing logistic regression prediction models **Study duration:** Individuals with traumatic SCI enrolled in the pan-Canadian Rick Hansen SCI	**Uses prediction models from (see above extractions):** **1. Van Middendorp** **2. Hicks** **Van Middendorp model:** 1. AUCs for AIS A, B, C, and D were 0.730 (0.622–0.838), 0.691 (0.533–0.849), 0.850 (0.771–0.928), and 0.516 (0.320–0.711), respectively.

		Registry (RHSCIR) between 2004 and 2016 with complete neurologic examination and Functional Independence Measure (FIM) outcome data **Outcome Measures:** FIM locomotor score was used to assess independent walking ability at 1-year follow-up.	2. AUCs for A+D = 0.954 (95% confidence interval [CI]0.933–0.975 3. AUCs for B+C 0.833 (95% CI 0.771–0.895 **Hicks model:** 1. AUC for AIS A, B, C, and D were 0.730 (0.621–0.839), 0.714 (0.565–0.863), 0.840 (0.747–0.933), and 0.519 (0.307–0.731), respectively 2. AUCs for A+D = 0.950 (95% CI 0.928–0.971) 3. AUCs for B+C = 0.821 (95% CI 0.754–0.887) Comparing Models: 1. The difference in AUC between AIS A+D and AIS B+C cohorts was statistically significant using both the van Mid-dendorp and Hicks models (p=.00038) 2. When comparing between the two models, the difference of AUCs was not statistically significant for AIS A+D (p=.131) or AIS B+C(p=.448)
Kay et al. 2007 Retrospecti ve Study USA	**N:** 343 **Level** AIS A or B tetraplegia 135 A or B paraplegia 84 C tetraplegia 44 C paraplegia 16 D 64 **Mean Age (SD):**	**Objective:** To investigate how injury level and American Spinal Injury Association Impairment Scale (AIS) grade at rehabilitation admission are related to walking at discharge after traumatic spinal cord injury (SCI). **Study duration:** Traumatic SCI Inpatients between January 1998 to	**Results:** 1. Significantly more participants admitted with AIS grade C than AIS grade A or B injuries walked at discharge (P<.001) 2. No AIS grade C tetraplegics at admission walked at discharge, a significant difference (P<.001) 3. Fewer AIS grade A or B patients walked at

	42.1 **Avg time post injury (SD):** 24 days **% Female:** 30%	May 2004 were retrospectively studied **Outcome Measures:** FIM instrument walking rating of 3 (moderate assistance) or higher at discharge	discharge than AIS grade C (P<.001) 4. Injury level was not significantly associated with walking at discharge for participants with AIS grade C injuries (P=.756) 5. A logistic regression model showed that injury level was not associated with walking (P=.946) when data were adjusted for age and onset time. 6. The presence of Central Cord Syndrome was not associated with walking at discharge with an AIS grade C injury in this sample. 7. Participants with AIS grade D injuries at admission were more than twice as likely to walk as subjects with AIS grade C injuries (67.2% vs 28.3%, P.001) 8. A logistic regression model showed that admission AIS grade (D vs C) was associated with walking at discharge (P.001) when data were adjusted for age and onset time. 9. Among participants aged >50, non-significant association between age and walking while adjusting for neurological level and onset time (P=.810) 10. Significantly more participants younger than 50 walked than participants older than 50 (P=.0401)

Hicks et al. 2017 Prospective cohort Canada	**N:** 278 **Level** AIS A 113 B 30 C 55 74 D **Mean Age (SD):** 44(18) **Avg time post injury (SD):** n/a **% Female:** 20%	**Objective:** To revalidate an existing clinical prediction model for independent ambulation (van Middendorp et al. 2011) using acute and long-term post-injury follow-up data, and to investigate **Study duration:** Acute (0-15 days) and long term follow up data (>12 months) were extracted for traumatic SCI patients were prospectively obtained from the RHSCIR, between 2004 and 2014. **Outcome Measures:** The FIM locomotor score was used to assess independent walking ability	Proposed simplified prediction model: three variables: - age at injury (<65 years vs. ≥65 years), - L3 motor score at admission, and - S1 light touch sensory score at admission. - The AUC was calculated to be 0.866 (95% confidence interval 0.816–0.916, p<.001), which is only slightly lower than that of the five-variable LR model The fitted model yielded 85% overall classification accuracy, 79% sensitivity, and 90% specificity. The AUC was calculated to be 0.889 (95% confidence interval 0.846–0.933, p<.001)
Buehner et al. 2012 Prospective cohort study USA	**N:** 224 **Level** AIS C 57 D 167 **Mean Age (SD):** 42.5 (15.9) **Avg time post injury (SD):** 2.45 (3.79) **% Female:** 26%	**Objective:** To determine the effects of locomotor training on: (1) the International Standards for Neurological Classification of Spinal Cord Injury examination; (2) locomotion (gait speed, distance); (3) balance; and (4) functional gait speed stratifications after chronic incomplete spinal cord injury (SCI). **Study duration:** Acute (0-15 days) and long term follow up data (>12 months) were extracted for traumatic SCI patients were prospectively obtained from the RHSCIR, between 2004 and 2014. **Outcome Measures:**	**Results:** 1. Post-locomotor training, a significant number of participants (28.1%) classified as AIS grade C improved to AIS grade D (9/32; P.001) 2. 92% of the overall sample remained unchanged (n=23 AIS grade C; n=109 AIS grade D) 3. Significant gains in gait speed, ambulation distance, and balance occurred after locomotor training regardless of initial AIS classification (n225) (P<.01) 4. Gains in gait speed resulted in significant conversion between these functionally stratified groups after

		AIS classification, lower extremity pin prick, light touch and motor scores, 10MWT, 6MWT, and the Berg Balance Scale	locomotor training (P<.001) 5. LEMS at enrolment did not correlate well with gait speed, endurance, or balance after locomotor training
Wirz et al. 2006 Longitudinal and cross-sectional analysis Europe	**N:** 178 **Level:** A (motor complete, walking) tetra 49 para 68 B (motor incomplete, non-walking) tetra 24 para 22 C (motor incomplete, standing or walking) tetra 3 para 12 1 (limited walking function) Tetra 16 Para 33 2 (unrestricted walking function) Tetra 24 Para 13 **Mean Age (SD):** A 35.3 (14.1) B 44.1 (16.4) C 42.1 (14.4) 1 tetra 46.2 (12.8) 1 para 37.7 (15.4) 2 tetra 42.2 (14.1) 2 para 37.1 (10.6) **% Female**: 33%	**Objective:** To relate locomotor function improvement within the first 6 months after spinal cord injury (SCI), to an increase in Lower Extremity Motor Score (LEMS) and to assess the extent to which the level of lesion influenced the outcome of ambulatory capacity. **Study duration:** Retrospective study on an electronic database in 2005 over a 20-month period. Traumatic or ischemic injuries were included. **Outcome Measures:** WISCI, Gait speed, LEMS LEMS = voluntary muscle strength of hip flexors, knee extensors, ankle dorsiflexor, toe extensor, ankle plantar flexor	**Results:** 1. Walking function (i.e., WISCI, gait speed) did not change. 2. For the total group, the overall improvement in LEMS, WISCI, and gait speed was significant (P<0.001). 3. No difference was evident between the relative improvements of LEMS and gait speed (P=0.54). 4. Group C (motor incomplete, standing or walking) the overall improvements of LEMS, WISCI, and gait speed was significant (P=0.001).
Draganich et al. 2023	**N:** 3721 participants' data **Level:**	**Objective:** Retrospective analysis of USA SCI Model	1. Clinical Prediction Rule (CPR) ≥ 33 was identified as the optimal predictive CPR threshold to predict

Retrospective Study USA	AIS A: 446 AIS B: 145 AIS C: 255 AIS D: 337 **Mean age:** 47.2 **% Female:** 21.4%	Systems data from 12 centers. **Outcome measures:** L3 motor score, L5 motor score, and S1 sensory score	outdoor walking one year after SCI. 2. We were also able to predict outdoor walking one year after SCI with high accuracy in the testing dataset using the optimal CPR threshold determined by cross-validation (CPR ≥ 33) 3. Prediction performance-area under the curve: 0.900 (95% CI: 0.890 – 0.910; p < 0.0001), classification accuracy of 82.9% (95% CI: 81.6% – 84.1%; p < 0.0001), balanced accuracy of 83.8% (95% CI: 82.6% – 85.0%; p < 0.0001), sensitivity of 88.1% (95% CI: 0.890 – 0.910; p < 0.0001), and specificity of 79.4% (95% CI: 0.890 – 0.910; p < 0.0001)
Silfhout et al. 2016 Retrospective Study Europe	**N:** 184 **Level:** ABC C1-C4 – 45; ABC C5-C8 – 58; ABC T1-T6 27 ABC T7-S5 31 D 23 **Mean Age (SD):** 42 (18) **% Female:** 26%	**Objective:** To determine the accuracy of a previously described Dutch clinical prediction rule for ambulation outcome in routine clinical practice (Van Middendorp study). Study duration: Traumatic SCI patients were retrospectively studied from hospital records (2006 - 2014) **Outcome Measures:** Ability to walk independently at 1 year post injury	4. The AUC was 0.939, 95% CI (0.892, 0.986) 5. There was no significant difference between those who did and those who did not walk in terms of gender or whether the patients had spinal surgery 6. Analyses comparing the patients with a 1-year follow-up, a 6-month follow-up and a missing follow-up showed significant differences (Po0.05) in time hospitalised.