Author Year Country Research Design Score Total Sample Size	Methods	Outcome
Galea et al. 2018 Australia RCT PEDro = 7 Level 1 N = 116	**Population:** 116 participants who had sustained a SCI above the level T12; 98 males and 18 females; mean age 41.45 years; level of injury C2-C8 (n = 62), T1-T6 (n = 31), and T7-T12 (n = 23); AIS A (n = 57), AIS B (n = 17), AIS C (n = 12), and AIS D (n = 30); and mean time since injury 4.7 years. **Treatment:** The intervention consisted of 36 sessions over 12 weeks. Participants were randomly assigned to: • Full-body exercise program (n = 60: Participants in received a triad of interventions comprising LT (BWSTT for 30 min), FES-assisted cycling (for 10-60 min), and trunk and upper and lower extremity exercise. • Upper body exercise program (n = 56): Participants received a circuit-based exercise program for the upper body, incorporating resistance and aerobic training. **Outcome Measures:** Spinal Cord Injury–Falls Concern Scale (SCI-FCS), 6MWT, and 10MWT were assessed at baseline, 12 weeks, and 24 weeks after randomization.	1. There were no statistically significant between-group differences for 6MWT, 10MWT and SCI-FCS after 12 weeks of training or at 6 months follow-up. 2. There was neither consistent trend toward improvement nor deterioration of walking performance on the 10MWT or the 6MWT. 3. AEs: 31 serious AEs (16 full-body exercise, 15 upper body exercise) and 719 AEs (404 full-body exercise, 309 upper body exercise) were recorded over the 6-month trial period. a. One serious AE in full-body exercise (bilateral medial femoral condyle and tibial plateau subchondral insufficiency fractures) was considered to be definitely related to the intervention. b. Another serious AE in full-body exercise (severe worsening back pain) was considered probably related to the intervention. 4. In upper body exercise, one serious AE (pain and loss of strength in upper limbs) was considered possibly related to the intervention.
Gurcay et al. 2022 Turkey Pre – post Level 4 N = 15	**Population:** 15 participants with SCI, able to stand up and walk with long leg braces or assistive devices and with stable neurological status; 9 males and 6 females; mean (± SD) age 32.4 (± 10.0) years; injury level T1 (n = 4), T8 (n = 1), T10 (n = 4), T11 (n = 1), T12 (n = 1), L1 (n = 2), L2 (n = 1), and L5 (n = 1); AIS A (n = 4), AIS B (n = 4), AIS C (n =	1. No AEs were recorded during the intervention period. 2. In gait analysis, temporal spatial parameters including gait distance (p = 0.001) and step length (p = 0.001) increased at T1 due to the intervention. 3. The required time for 20MWT (T1; p = 0.011) and the number of

	5), and AIS D (n = 2); and mean (± SD) time since injury 65.9 (± 55.9) months. **Treatment:** The program was applied 30 min (5-min warm-up, a 20-min training of FES lower extremity cycling, and a 5-min cool-down) regularly at a frequency of 3 sessions per week, for 6 weeks. **Outcome Measures:** 6MWT; 20-meter walk test (20-MWT); and thigh circumference were conducted at baseline (T0) and after the 6-week (T1) FES-cycling program.	rests needed was reduced (T1; p = 0.007). Cadence increased but reached no significant level (p > 0.05).
Duffell et al. 2019 UK Pre – post Level 4 N = 11	**Population:** 11 participants with incomplete SCI who were using a wheelchair for at least 2 hours per day; 10 males and one female; mean age 56.5 years; injury level C1 (n = 2), C3 (n = 1), C4 (n = 1), T2 (n = 3), T3 (n = 1), T5 (n = 1), T7 (n = 1), and T12 (n = 1); AIS C (n = 7) and AIS D (n = 3); and median time since injury 1 year and 1 month. **Treatment:** Participants trained three 1-h sessions per week over 4 weeks on the iCycle (which is a FES ergometer) with biofeedback through a VR game (in which the speed of the avatar depends on the actual crankshaft torque while motion is maintained by a motor) to encourage voluntary drive during pedaling. **Outcome Measures:** Voluntary motor function (assessed using ISNCSCI motor scores); Oxford scale motor power grading (carried out for knee extension/flexion and ankle plantarflexion/dorsiflexion); WISCI II; and 10MWT were assessed pre- and post- training, and 4 weeks after completing training.	1. All 11 participants completed the training sessions, with no reported serious AEs. Only two participants noticed skin redness at the end of a session. 2. Only two of the participants included in the trial were ambulatory, therefore WISCI II scores and the 10MWT could only be completed for these participants. a. Participant #7 showed no change in either measure. b. Participant #15 demonstrated an improvement in WISCI II score of 5 points at end of training compared with baseline, and 10MWT time improved from 82 s at baseline to 41 s at end of training.
Kuhn et al. 2014 Germany Pre-post Level 4 N = 30	**Population**: 30 participants; average age 44 ± 15.5y; motor complete and incomplete spinal cord injuries in the cervical, lumbar, and thoracic regions; AIS A = 10, B = 3, C = 15, D = 2; 0-122 months post injury.	1. For the 5 patients with partial walking ability at the start of the study, the mean 6MWT distance significantly increased from 62.3±135.3 to 94.3±167.1 m throughout the study (P = 0.03).

	Treatment: During the 4-week study period, all patients received eight 20min FES interventions at the beginning and end of each week. At every intervention, circumferential measurement and spasticity testing before and after FES cycling (pretest/post-test) were performed. Ultrasound, walking tests, and MMT were only performed at the beginning of week 1 (T1) and at the end of week 4. **Outcome Measures:** Circumferential measurement, muscular ultrasound measurement, spasticity measured by Modified Ashworth Score, Walking (6MWT).	
Ladouceur & Barbeau 2000a Canada Pre-post Level 4 N = 14 (enrolled) N = 10 (analyzed)	**Population:** 14 participants; age 25-49 yrs; all participants had an incomplete SCI; C3-L1 lesion level; 1.8-19.1 yrs post-injury. **Treatment:** Surface FES: bilateral or unilateral common peroneal nerve, home use as much as possible ~1 year (26 and 56 weeks), 2 participants also had bilateral quadriceps. **Outcome Measures**: Temporal gait measures.	1. Training with FES-assisted walking during the first year increased walking speed by 0.10 m/s (P = 0.007). However, FES-assisted walking had only minor effects (P > 0.05) on the rest of the spatiotemporal parameters (stride length, stride frequency, stance duration, and swing duration).
Ladouceur & Barbeau 2000b Canada Pre-post Level 4 N = 14 (recruited) N = 10 (completed)	**Population:** 14 participants; age 25-49 yrs; all participants had an incomplete SCI; C3-L1 lesion level; 1.8-19.1 yrs post-injury. **Treatment:** Surface FES: bilateral or unilateral common peroneal nerve, 2 participants also had bilateral quadriceps, home use as much as possible ~1 year. **Outcome Measures**: Temporal gait measures.	1. 7/14 participants showed improvement based on type of ambulatory device. 2. 13/14 participants improved gait speed with FES. 3. Training/carryover effect after long-term use: increase evident even when FES off in 12/14 participants.
Wieler et al. 1999 Canada Pre-post Level 4 N = 31	**Population:** 31 males and females; mean (SD) age 36(2) yrs; all participants had an incomplete SCI; mean (SD) 6 (1) yrs post-injury. **Treatment:** Surface FES: common peroneal nerve; some participants also received FES to hamstrings, quadriceps, gluteus medius, duration	1. There was a significant improvement in gait speed in participants when treated with FES ($p<.01$) but that improvement in gait speed persisted even when participants walked without FES ($p<.01$).

	of FES ranged from 3 months to over 3 years. Each participant was tested at the start and end of the study both with and without FES. **Outcome Measures:** walking speed, stride length, cycle time.	2. The slowest quintile of participants increased their walking speed by 70% while the fastest quintile of participants increased their walking speed by 20%. 3. The initial gait speed at the start of study was significantly faster when patients used FES than when no FES was used ($p<.05$).
Klose et al. 1997 USA Pre-post Level 4 N = 16	**Population:** Mean (SD) age 28.4 (6.6) years; all participants had complete SCI; T4-T11 lesion level; 0.7-9.0 yrs post-injury. **Treatment:** Surface FES: Parastep: 6 channels (bilateral common peroneal nerve, quadriceps, glutei); 3X/week, 32 sessions (once participants had sufficient strength to stand). **Outcome Measures**: walking distance and speed (with FES).	1. Most participants improved endurance and gait speed. Longest distance walked with FES was between 12 to 1707 m (mean: 334 m; SD 402 m). 2. There were significant differences in distance travelled ($p<.001$) and gait speed ($p<.001$) over the 11 weeks.
Granat et al. 1993 Scotland Pre-post Level 4 N = 6	**Population**: 6 males and females; age 20-40 yrs; all participants had diagnosis of Frankel C and D; C3-L1 lesion level; 2 to 18 yrs post-injury. **Treatment**: Surface FES-assisted LT: quadriceps, hip abductors, hamstrings, erector spinae, common peroneal nerve, home program >30 min, 5X/week, 3 months. **Outcome Measures:** MMT, MVC, upright motor control, walking speed, stride length, cadence.	1. Significant mean increase in stride length, but not speed or cadence. 2. 3 to 4 participants had significant individual increases in gait speed, stride length and cadence.
Stein et al. 1993 Canada Pre-post Level 4 N = 10	**Population:** 10 males and females; age 20-44 yrs; all participants had an incomplete SCI; C2-T10 lesion level; 2.5-10 years post-injury. **Treatment:** Surface, percutaneous, or implanted FES of common peroneal nerve, and sometimes quadriceps, glutei, and psoas. **Outcome Measures:** Speed, gait parameters.	1. All participants improved gait speed when FES was on (mean change was 4 m/min). 2. Participants with more severe SCI were the most receptive towards the FES treatment.