Table 1. *Search Strategy: MEDLINE (Ovid)*

01.	tetraplegi*.mp
02.	exp Quadriplegia/ or quadripleg*.mp
03.	exp Spinal Cord/ or exp Spinal Cord Injuries or spinal cord injur*.mp
04.	exp Paraplegia/ or parapleg*.mp
05.	("spinal cord impaired" or "spinal cord lesion").mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
06.	1 or 2 or 3 or 4 or 5
07.	limit 6 to (english language and humans)
08.	exp Exercise Therapy/ or exp Exercise/ or exercis*.mp.
09.	train*.mp.
10.	exp Rehabilitation/ or rehab*.mp.
11.	physical therap*.mp.
12.	physiotherap*.mp.
13.	8 or 9 or 10 or 11 or 12
14.	pelvic floor muscle training.mp.
15.	kegel*.mp.
16.	PFMT.mp.
17.	(pelv* adj4 (exerci* or train* or muscle* or rehab*)).mp.
18.	14 or 15 or 16 or 17
19.	exp Gait/ or gait.mp.
20.	exp Walking/
21.	(gait rehab* or gait training).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
22.	treadmill*.mp.
23.	assisted ambulation.mp.
24.	("body-weight* support" or "exosuit" or "exoframe" or "power* armour" or "power* gait orthosis" or PGO or "robotic suit" or "driven gait orthosis").mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
25.	exp Robotics/
26.	exp Locomotion/ or locomot*.mp.
27.	exp Exoskeleton Device/ or exoskeleton.mp.
28.	19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27
29.	13 or 18 or 28

30.	limit 29 to (english language and humans)
31.	bladder.mp. or exp Urinary Bladder/
32.	exp Urinary Bladder, Overactive/ or exp Lower Urinary Tract Symptoms/ or urinary.mp. or exp Urinary Catheters/ or exp Urinary Incontinence/ or exp Urinary Bladder, Neurogenic/ or exp Urinary Tract Infections/
33.	sex*.mp. or exp Sex/
34.	exp Sexual Dysfunctions, Psychological/ or exp Sexual Health/ or sexual*.mp. or exp Sexual Dysfunction, Physiological/
35.	(genitourinary or urogenital).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
36.	exp Erectile Dysfunction/ or exp Penile Erection/ or erecti*.mp.
37.	void*.mp.
38.	pelvic floor.mp. or exp Pelvic Floor/
39.	31 or 32 or 33 or 34 or 35 or 36 or 37 or 38
40.	limit 39 to (english language and humans)
41.	7 and 30 and 40

Table 2. Study Characteristics and Interventions.

Study	Participant Characteristics[a]	Intervention and Training Protocol
PFMT		
Elmelund et al. (2018) [36] Study Design: RCT N=36	Sex: 27 females Age: **PFMT:** 47 (36-56)[b] y.o. **PFMT+IVES:** 59 (49-67)[b] y.o. Injury characteristics: **PFMT:** - TPI: 11 (3-21)[b] yrs - NLI: cervical - lumbar - AIS-C=3, D=10, E=0 **PFMT+IVES:** - TPI: 10 (3-19)[b] yrs - NLI: cervical - lumbar - AIS-C=3, D=10, E=1	Daily practice for 12 weeks: **PFMT:** approx. 30 near-maximal contractions of 5-10s duration followed by 10s of pause **PFMT+IVES:** - concurrent PFM contractions guided by intermittent IVES, 7.5-10min in total, 30 stim cycles, each including 5-10s of stim followed by 10s breaks (frequency 20Hz, pulse width 250us) - continuous stim of 10-20min after, with PFM relaxed (10Hz, 250 us)
Shendy et al. (2015) [37] Study Design: RCT N=30	Sex: 30 males Age: **PFMT+TENS:** 28.1 y.o. **PFMT+PFBFB:** 28.3 y.o. Injury characteristics: **PFMT+TENS**: - TPI: 11.5 mos - NLI: T4-T12 - AIS-C=7, D=8 **PFMT+PFBFB:** - TPI: 11.1 mos - NLI: T4-T12 - AIS-C=6, D=9	12 sessions, twice weekly for 6 weeks: **PFMT** (30 contractions, morning, afternoon, evening) - initial contractions 5-10s with 10-20s rest - endurance: maintain contraction @65-75% of max strength for 20-30s, 8-10 reps - speed: sets of quick repetitive contractions in a 10s span with a 20s rest - purposeful control: gradual recruitment to maximal contraction with a 5s hold and a slow release with 15-30s rest **TENS:** empty bladder, 2 surface electrodes over the skin of S3; 50 Hz, 250 μs, 30-min duration, biphasic continuous rectangular waveform **PFBFB:** visual feedback from computer screen and sound of PFM contractions
Vasquez et al. (2015) [38] Study Design: Case report N=2	Sex: 2 males Age: 59.0 y.o. Injury characteristics: - TPI: 19.0 yrs - NLI: C3-T11 - AIS-C=1, D=1	3 times daily for 6 weeks: up to 40 PFM contractions divided into 4 sets (3 sets of prolonged contractions + 1 set of short contraction); lying down, sitting and standing
LT		
Lam et al. (2019) [45] Study Design: RCT N=5	Sex: 4 males Age: 36.8 y.o. Injury characteristics: - TPI: 7.9 yrs - NLI: C6-T5	36 sessions of 45 mins, 3/week for 12 weeks: Lokomat or Ekso walking

	- AIS-A=2, B=2	
D'Ancona et al. (2010) [39] Study Design: Quasi-experiment N=8	Sex: 8 males Age: 33.5 y.o. Injury characteristics: - TPI: 6.2 yrs - NLI: C4-C7 AIS: NA	**Treadmill gait training:** 20-min session, twice a week for 6 months after having quadriceps and tibialis anterior muscles stimulated for 5 months **NMES:** four-channel electrical stimulator delivering a 25 Hz signal with monophasic rectangular pulses of 300-μs duration, maximum intensity of 200V (1kΩ load)
Shokur et al. (2018) [40] Study Design: Quasi-experiment N=8	Sex: 6 males, 2 females[c] Age: 31.1 y.o. Injury characteristics: - TPI: 6.9 yrs - NLI: T4-T11 AIS-A=7, B=1	- IDCTT and training with an over-ground fixed track BWS system - task-specific BWSTT and overground exoskeleton walking using a 3D virtual avatar
Baunsgaard et al. (2018) [41] Study Design: Cohort study N=60	Sex: 36 males, 16 females Age: 38.9 y.o. Injury characteristics: - TPI: 3.4 yrs - NLI: C2-L2 - AIS-A=21, B=4, C=8, D=19	24 robotic exoskeleton gait training sessions of 1h, 3 times per week for 8 consecutive weeks
Hubscher et al. (2018) [42] Study Design: Cohort study N=8 (LT group)	Sex: 5 males, 3 males Age: 27.4 y.o. Injury characteristics: - TPI: 4.3 yrs - NLI: C4-T5 - AIS: A=4, B=1, C=2, D=1	80 daily sessions of BWSTT (1 hour per session) or BWSTT plus stand (weight bearing without stepping) training (1 hour of each per day, separated by at least 3 hours)
Morrison et al. (2018) [43] Study Design: Cohort study N=69	Sex: 49 males, 20 females Age: 41.0 y.o. Injury characteristics: - TPI: NA - NLI: NA - AIS-C=35, D=34	120 sessions which occurred during mean ± SD of 11.3 ± 9.3 months: Manually assisted BWSTT (Therastride), overground standing and stepping activities, and community integration tasks
Beck et al. (2020) [44] Study Design: Case report N=2	Sex: 2 males Age: 31.5 y.o. Injury characteristics: - TPI: NA - NLI: T3-T6 - AIS-A=2	**Pre-intervention:** 6 months of BWSTT without any form of neuromodulation, 3 times per week **Intervention:** 12 months of EES enabled task-specific training (electrodes on T12-L1 dorsal surface of spinal cord) at lab, 3 sessions per week; home use of EES device on other days of the week to complete supine, seated and standing activities for no more than 3 hours per day

AIS, American Spinal Injury Association Impairment Scale; BMI, brain-machine interface, BWS, body weight-supported; BWSTT, body weight-supported treadmill training; EES, epidural electrical stimulation; ES, electrical stimulation; IVES, intravaginal electrical stimulation; LT, locomotor training; NA, not available; NLI, neurological level of injury; NMES, neuromuscular electrical stimulation; PFBFB, pelvic floor biofeedback; PFMT, pelvic floor muscle training; RCT, randomized controlled trials; TENS, transcutaneous electrical nerve stimulation; TPI, time post-injury

[a]unless specified elsewise, age and TPI are group mean values, and data were based on participants that completed the training protocol

[b]median (interquartile range)
[c]data for sex, age and injury characteristics were based on all participants, including one participant who dropped out

Table 3. Adverse events, dropout, urogenital outcome measures and results.

Study ID	Adverse Events and Dropout	LUT Outcomes Measures	LUT Results	Sexual Outcome Measures	Sexual Results
PFMT					
Elmelund et al. (2018) [36]	Adverse events: Not reported Dropout rate: 25% (Demands of participation (n=4), leg fracture (n=1), concussion (n=1), polyuria (n=1), moving far away from hospital (n=1), dissatisfied with group allocation (n=1))	(1) Primary: ICIQ-UI-SF (2) Secondary: OUP (resting and squeezing), 3-day bladder diary (daily incontinence episodes, mean bladder capacity, maximal functional bladder capacity, number of daily voiding episodes), 24-h pad test, ICIQ-OAB	**PFMT:** (1) Primary: significant decreases in ICIQ-UI-SF score at 12 weeks and 24-week follow up (2) Secondary: significant decreases in daily incontinence episodes, significant increases in OUP-resting and OUP-squeezing at 12 weeks; significant decreases in daily incontinence episodes, maximal functional bladder capacity and 24-h pad test results at 24-week follow up; no significant changes in other measures **PFMT+IVES:** (1) Primary: no significant changes (2) Secondary: significant decreases in 24-h pad test results at 12 weeks, significant improvements on ICIQ-OAB at 24-week follow up; no significant changes in other measures		
Shendy et al. (2015)[37]	Adverse events: Not reported Dropout rate: NA	(1) cystometry (volume at first desire to void, maximum cystometric capacity, Qmax, detrusor pressure at Qmax	**PFMT+TENS**: Significant increases in all measurements **PFMT+PFBFB:** Significant increases in Qmax only	IIEF-5	**PFMT+TENS**: Significant increases in IIEF-5 score **PFMT+PFBFB:** Significant increases in IIEF-5 score

Vasquez et al. (2015)[38]	Adverse events: Not reported Dropout rate: 0%	ICIQ-UI-SF	Decreases (subject 1) or stability (subject 2) in ICIQ-UI-SF score		
LT					
Lam et al. (2019) [45]	Adverse events: Minor skin abrasion on both shins initially when using the Lokomat; wounds closed within a week and additional padding during subsequent training prevented further injury. Dropout rate: 20%	(1) Urodynamics (volume at first contraction, compliance, maximum detrussor pressure, volume before leak/cystometric capacity (2) Qualiveen-30	(1) No improvements in LUT function based on urodynamic parameters; (2) LUT symptoms & QoL: stability or improvements across all 4 domains (Ekso); stability or worsening of symptoms (except one reported improvement in the feeling domain) (Loko)		
D'Ancona et al. (2010) [39]	Adverse events: Not reported Dropout rate: 0%	Urodynamics (maximal bladder capacity, bladder compliance, IDC count, IDC amplitude, the bladder volume triggering IDC onset)	No significant changes in all measurements		
Shokur et al. (2018)[40]	Adverse events: Not reported Dropout rate: 12.5% (reason un specified; the participant who dropped out at 12-month time point still underwent end-of-intervention assessment at 28 months)	International SCI Basic Data Sets for LUT Function	Increased number of participants reporting ability to voluntary avoid urination, awareness of the need for bladder emptying, and presence of sensitivity during bladder emptying with catheter; Reduced number of participants reporting involuntary urine leakage	International SCI Basic Data Sets for Male Sexual Function; International SCI Basic Data Sets for Female Sexual and Reproductive Function	Female: increased number of participants reporting sensitivity during sexual intercourse and menstruation awareness Male: increased number of participants reporting sensitivity during sexual intercourse, ability of psychogenic erection, ejaculation; no change in the number of participants reporting presence of reflexive erection
Baunsgaard et al. (2018) [41]	Adverse events: Ankle swelling, dizziness or syncope, neurological	(1) SCIM-III, Respiration and Sphincter Management sub-domain	Recently injured group: (1) significant increases in SCIM-III-Respiration and		

	symptoms, medical errors and pain related to sit-to-stand, skin issues, category II pressure ulcer Dropout rate: 13.3% (time constraint (n=2), surgery unrelated to training (n=1), adverse events with ankle swelling (n=3), concurrent medical conditions (n=2))	(2) International SCI Basic Data Sets for LUT function	Sphincter management score (no change on bladder score, increase on use of toilet score); (2) no significant changes in SCI Basic Data Sets for LUT Function Chronically injured group: (1) significant increases in SCIM-III-Respiration and Sphincter management score (largest change in "use of toilet"); (2) no significant changes in SCI Basic Data Sets for LUT Function		
Hubscher et al. (2018) [42]	Adverse events: Not reported Dropout rate: 0%	(1) Urodynamics (Maximum bladder capacity, bladder compliance, MDP, LPP, voiding efficiency, bladder contraction area and duration) (2) International SCI Basic Data Sets for LUT Function	(1) significant increases in bladder capacity, voiding efficiency, bladder contraction area & duration; significant decreases in LPP (2) increased number of participants with awareness of bladder need and reduced incontinence; reduced number of participants experiencing nocturia	(1) IIEF (2) FSFI	(1) (2): significant increases in sexual desire domain score; increases (not significant) in overall satisfaction domain score
Morrison et al. (2018)[43]	Adverse events: Not reported Dropout rate: NA Urogenital data were based on individuals who completed each measure at enrollment and end-of-training evaluations (leak prevention (n=24), voluntary sphincter control (n=24), awareness of bladder need (n=24), ejaculation (n=12), psychological arousal	Autonomic Standards Assessment Form (leak prevention, awareness of bladder need, voluntary sphincter control)	Most patients experienced either no change or improvement	Autonomic Standards Assessment Form (ejaculation, psychological arousal, reflex arousal, orgasm)	Most patients experienced either no change or improvement, with significant improvements in psychological arousal

	(n=21), reflex arousal (n=20), orgasm (n=15))				
Beck et al. (2020)[44]	Adverse events: One participant (P2) developed an additional symptomatic UTI at 6-month time point of MMR sessions and treated with antibiotics; both had symptomatic UTI within 2 weeks after EES implant, P2 received antibiotics. Dropout rate: 0%	(1) Urodynamics (2) NBSS survey (incontinence, storage and voiding, urinary complications)	(1) Urodynamics: P1 had no detectable changes in voiding habits; substantial alteration from underactive, compliant bladder to overactive, poorly compliant bladder; P2 had minimal change in compliance and MDP (2) NBSS: P1 had increased UI episodes; P2 had reduced UI episodes and UTI		

EES, epidural electrical stimulation; FSFI, Female Sexual Function Index; ICIQ-OAB, International Consultation on Incontinence Questionnaire-Overactive Bladder; ICIQ-UI-SF, International Consultation on Incontinence Questionnaire-Urinary Incontinence-Short Form; IDC, involuntary detrusor contraction; IIEF, International Index of Erectile Function; IVES, intravaginal electrical stimulation; LPP, leak point pressure; LT, locomotor training; LUT, lower urinary tract; MDP, maximum detrusor pressure; NA, not available; NBSS, Neurogenic Bladder Symptom Score; OUP, opening urethral pressure; PFBFB, pelvic floor biofeedback; PFMT, pelvic floor muscle training; Qmax, maximum flow rate; QoL, quality of life; SCI, spinal cord injury; SCIM-III, Spinal Cord Independence Measure; TENS, transcutaneous electrical nerve stimulation; UI, urinary incontinence; UTI, urinary tract infection.