Bilaga 7 Extraktion av data från kvantitativa primärstudier/Appendix 7 Extraction of data from quantitative primary studies.

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Table 1 Extraction of data from quantitative primary studies.

Author Year Country Reference	Aim Design Setting Study period/Time to follow-up	Population Drop-out rate Intervention Group (IG) Control Group (CG)	Data collection	Intervention Comparison Outcome
Best et al. 2005 Canada [1]	**Aim:** To test the hypotheses that wheelchair skills training of community-based manual wheelchair users is efficacious, safe, and practical. **Design:** RCT, Randomisation method: Participants were randomly allocated to the Wheelchair Skills Training Program (WSTP) or control groups by using a 2*2 table of random numbers. **Stratification:** Diagnostic group (either musculoskeletal or neurologic) was used to stratify the participants for the purpose of having approximately equal representation in both groups. **Setting:** Rehabilitation center and community. **Recruitment** Posters, word of mouth, and by clinicians on the outpatient and inpatient services. **Study period/Time to follow up** The sessions were scheduled at least 5 days apart + 3 to 5 sessions = 15–25 days.	**Population:** Wheelchair use. Used a manual wheelchair for at least 6 weeks, used a wheelchair for at least 2 hours a day on average, self-propelled their wheelchairs who lived in the community. **Diagnosis:** Half group with musculoskeletal and half with neurologic disorders. **Sample size:** N = 22 (randomised), n-IG =12, n- CG =10 (12) **Age and Sex:** Age range: 21–77 years N = 5 women (25 %), N = 15 men (75 %) **Other criteria:** Participants were at least 17 years, alert and cooperative, coherent and competent to give informed consent, able to answer questions related to wheelchair use (or had a proxy to do so), willing to participate, living in the community. Potential participants were excluded if they had any unstable medical conditions or emotional problems that may have made testing or training unsafe or unpleasant. **Drop-out rate** n-IG=0, n-CG=2.	**Data collection** <u>Outcome (Baseline-Intervention):</u> Wheelchair Skills Test (WST) (test of 57 wheelchair skills), rating 1–10, Trainer/educator scores. WST-Q Subjective assessment by the wheelchair user. <u>Baseline:</u> Psychosocial Impact of Assistive Technology Devices Scale and the Quebec User Evaluation of Satisfaction with Assistive Technology, version 2.0. Wheelchair-related quality of life (QOL) measures were assessed at intake as a means of characterizing the participants with respect to their perceptions about wheelchairs and how these assistive devices affected their daily lives.	**Intervention:** WST Program (version 3.1,12). 3 to 5 one-hour training sessions from a single trainer who had been trained in WSTP training. **Comparison:** Contact by telephone 3 times in the period between WST 1 and 2. Training was offered to the control group on completion of the study procedures. **Outcome:** <u>Primary:</u> Manual wheelchair skills and safety. <u>Secondary:</u> No.

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Best et al. 2016 Canada [2]	**Aim:** Evaluate the effect of a peer-led wheelchair training program on self-efficacy of manual wheelchair (MWC) use and to explore influences of the intervention on MWC skills, life-space mobility, and satisfaction with participation. **Design:** Pilot randomised controlled trial. RCT. **Randomisation method:** A parallel-group RCT was done using a 1:1 allocation ratio. A central computerized randomisation process was designed with a randomly selected and variable block size. The primary author obtained the randomisation sequence from the research assistant and instructed participants not to discuss their training period with the data collector, who was blinded to group allocation. **Stratification:** No. **Setting:** Rehabilitation center and community. **Recruitment:** Recruited on a volunteer basis upon discharge from rehabilitation and from the community through clinicians, wheelchair vendors,	**Population:** Wheelchair use: Participants used their own MWCs. Mean previous MWC use was 13.1+-12.6 years. Manual wheelchair (MWC), at least 2h/d, could independently propel at least 10 meters. **Diagnosis:** Spinal cord injury (68%). **Sample size:** N= 28 (randomised) n-IG=16 n-G=12 **Age and Sex:** Mean age (SD): 48.8 years (17.0). N = women 6 (21 %), N = men 22 (79 %) **Other criteria:** Participants were included if they were at least 19 years of age, lived in the community; had manual wheelchair (MWC) mobility goals, and were cognitively able (Mini-Mental State Examination score, _24). Individuals were excluded from the study if they could not communicate in English, had a degenerative health condition, or had previously received standardized MWC training. **Drop-out rate:** n-IG=Received allocated intervention (n = 12). Did not receive allocated intervention (n = 4)	**Data collection:** Outcome (Baseline-Intervention): WheelCon version 3.0. 65-item self-report scale. Items are rated on a scale from 0 to 100, and a mean percentage score is calculated. Higher scores indicate higher self-efficacy. WST-Q version 4.1 Life Space Assessment (LSA): information on the frequency of independent movement in the community Wheelchair Outcome Measure (WhOM): Satisfaction with participation in meaningful activities. Post-WheelSee survey immediately upon completion of the last WheelSee session, the peer trainer administered a self-report that asked 9 open-ended questions about perceptions of WheelSee. Baseline: Hospital Anxiety and Depression Scale Interpersonal Support Evaluation List	**Intervention:** Six 1.5-hour sessions of a peer-led self-efficacy enhanced wheelchair training program (WheelSee) at a frequency of 1 to 2 sessions/wk. On the basis of individualized goals, peer trainers administered WheelSee to pairs of MWC users. Sessions were held in community locations (i.e., research centers, public gardens, and shopping malls). Each participant received a manual, including details about each session and goal setting and monitoring worksheets. **Comparison:** No intervention/training. No-contact control was used for comparison. **Outcome:** Primary: Wheelchair use self-efficacy was assessed using the Wheelchair Use Confidence Scale (WheelCon) version 3.0. Secondary: Wheelchair skills capacity and performance (Wheelchair Skills Test Questionnaire WSTQ version 4.1), life-space mobility (Life Space Assessment), and satisfaction with participation (Wheelchair Outcome Measure).

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	word of mouth, and posters. Some snowball sampling occurred. Recruitment occurred between June 2012 and November 2013. **Study period/ Time to follow-up:** For the 27 participants who completed assessments at both time points, the mean time between baseline and postintervention assessments was 44.7+-9.5 days.	(n = 2 intervention was modified, n = 2 non-adherence to intervention). Lost to follow-up (n= 1)- Health complications. Excluded from analysis (n=0) n-CG=0		
Brienza et al. 2018 USA [3]	**Aim:** To assess whether individually configured, lightweight manual wheelchairs used with skin protection cushions would result in less pressure injury risk than facility- provided wheelchairs with skin protection cushions. Secondary, to determine the effect of individually configured wheelchairs on functional outcomes. It was hypothesized that at-risk nursing home residents provided with an individually configured, lightweight manual wheelchair and skin protection cushion would have a lower incidence of pressure injury, and function better in the wheelchair than those using a facility- provided manual wheelchair modified with a skin protection cushion and related adjustments. **Design**: RCT.	**Population:** Wheelchair use Used manual wheelchairs as their primary means of mobility, using the chair at an average 6 hours/ day. 55% could not walk any distance. **Diagnosis:** Older adults (>60yrs) at nursing home. Participants were at risk of developing pressure injuries. **Sample size:** N= (randomised) 258 n-IG= 127 n-CG= 131. **Age and Sex:** Mean age (SD): 89.0 yeas (8.9). N = women 202 (78.3 %), N = men 56 (21.7 %). **Other criteria:** Inclusion criteria were aged 60 and older, Braden Scale score of 18 or less, combined Braden activity and mobility subscale score of 5 or less, and clinical needs that could be accommodated by	**Data collection:** Outcome (Baseline-Intervention): Pressure injuries on the seated surface, including ischial tuberosities, sacrum, and coccyx, were the primary out- come measure. A masked assessor performed weekly skin assessments. Pressure injuries were staged and characterized. The SEAT team measured secondary outcomes for wheelchair function and mobility (Functioning Everyday with a Wheelchair-Capacity (FEW-C), Nursing Home Life Space Diameter (NHLSD), and Wheelchair Skills Test (WST); the team was not masked to the intervention. The FEW is a self-reported tool for users of wheeled mobility technology. The FEW-C was developed with the same content of the FEW self-report but was designed for a controlled clinical or laboratory setting. It is a criterion-referenced, performance-based observation system to measure functional abilities (independence and safety) of individuals with regards to wheeled mobility interventions. The FEW-C was administered before intervention	**Intervention:** The intervention included a skin protection cushion and optimization of positioning and functional mobility in the study-issued configurable, lightweight wheelchair. Seating interventions included adjusting seat depth and height; adding an adjustable-tension back to accommodate kyphosis or other musculo-skeletal problems; and providing appropriate armrests, backrests, footrests, pelvic belts, brake extensions, anti- tippers, and solid sear inserts, as needed. If the wheelchair needed to be higher or lower than the standard-height A new manual individually adjuster wheelchair (Breezy Ultra), including a skin protection cushion was compared to standard wheelchair from the nursing home. **Comparison:** The intervention for the control group included a skin protection cushion. Minimal adjustments were made to nursing home wheelchairs to accommodate cushions and achieve ethical treatment with respect to posture, comfort, and safety. Adjustments included addition of drop seats to maintain seat-to-floor height, adjustment of leg rest

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	Randomisation method: A parallel design, participants were randomised with a 1:1 allocation using variably sized blocks and site stratification. **Setting:** 17 nursing homes. **Recruitment:** All participants received a seating and mobility assessment from a research team (SEAT Team) led by an occupational therapist with specialization in wheeled mobility and skin protection cushion assessment. Thereafter randomisation. No further information about recruitment. **Study period/Time to follow-up:** Followed weekly for 26 weeks or until they experienced a seated surface pressure injury or died.	using the study wheelchair. Residents were excluded if their weight and body measurements exceeded the wheelchair capacity (weight 113 kg, hip width 508 mm), they used a manual wheel- chair that was better than the study wheelchair (Healthcare Common Procedural Coding System (HCPCS) K0005 or better), or they had a current seated surface pressure injury. **Drop-out rate:** IG = (102-127)/127 = 20 % CG = (131-89)/131 = 32 %.	initiation, 14 days after the intervention, and at the endpoint. The NHLSD is a tool used to calculate a nursing home resident's life space, a measure of the extent and frequency of mobility, in the previous 2 weeks The NHLSD was used just before intervention initiation and at the endpoint. The WST is a tool to evaluate wheelchair skills objectively. Function and mobility were evaluated using changes in FEW-C, NHLSD, and WST scores between time points (before randomisation, 14 days, endpoint). Baseline: All participants were coached and assessed in basic wheelchair skills.	heights to accommodate study cushion height, and adjustment of seat angle to prevent sliding out of the wheelchair, as needed. **Outcome:** Primary: Pressure injuries on the seated surface, including ischial tuberosities, sacrum, and coccyx, were the primary out- come. A masked assessor performed weekly skin assessments. Pressure injuries were staged and characterized. Secondary: The SEAT team measured secondary outcomes for wheelchair function and mobility (Functioning Everyday with a Wheelchair-Capacity (FEW-C), Nursing Home Life Space Diameter (NHLSD), and Wheelchair Skills Test (WST)); the team was not masked to the intervention.

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Chen et al. 2005 Taiwan [17]	**Aim:** To establish an electronic wheelchair system in Taiwan that conforms to M3S standards (a new European standard system). This system includes the head input device, motor control output device and a security device and will be installed in an electric wheelchair. **Design:** Cross over design with randomised order of tests. **Randomisation method:** Information missing. **Stratification:** Information missing. **Setting:** The rehabilitation room of the Center for Spinal Cord Injuries, Taoyuan County, Taiwan. **Recruitment** No information. **Study period/Time to follow-**up Not applicable, one occasion.	**Population:** Wheelchair use: Information missing but probably fulltime wheelchair users. **Diagnosis:** Spinal cord injuries, C4 - C5 incomplete. **Sample size:** N=10 **Age and Sex:** Between 37 and 45 years, no more information. N = 0 women (0 %), N = 10 men (100 %) **Other criteria:** Not reported. **Drop-out rate** 2/10	**Data collection:** Outcome (Baseline-Intervention): Time during wheelchair coarse on one occasion. Baseline: Information missing.	**Intervention:** Try out the M3S-based head-controlled electric wheel- chair system, i.e., to operate the electrical wheelchair with the M3S standard system. **Comparison:** Operating the electric wheelchair without the M3S standard. **Outcome** Time while performing 3 wheelchair tests - drive straight line for 10 meters, avoid obstacles and turning Primary: Wheelchair skills. Secondary: Not reported.

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Giesbrecht et al. 2019 Canada [4]	**Aim:** Evaluate EPIC Wheels effect on clinical outcomes among middle-aged and older adult MWC users. **Design**: 2*2 factorial design (i.e., Intervention + Extra Wheeling) RCT. Because EPIC Wheels required participants to practice skills in their MWC, a treatment effect could potentially be attributed to simply increasing MWC use. To address this potential confounder, we introduced a second factor of Extra Wheeling (Yes or No); participants allocated to "Yes" were asked to engage in 75 minutes of unstructured MWC wheeling per week in addition to their group-specific demands. A research assistant blinded to group allocation collected baseline data (demographics and outcome measures) at a rehabilitation hospital. After 4 weeks, participants attended posttreatment data collection with the same blinded research assistant. **Randomisation method:** Participants were randomly assigned for both factors (1:1 allocation ratio) using a computer-generated program of undisclosed block size. **Stratification:** Stratified by site.	**Population:** Wheelchair use: Manual wheelchair user. Self-propelled using both hands at least 1 hour per day inside and outside their home. **Diagnosis:** Parkinson, MS, Spinal Cord injuries, Amputees etc. **Sample size:** N=18 (randomised) n-IG=10 n-CG=8 **Age and Sex:** Mean age (SD): 65.0 years (8.6) age ranged from 50–84 years. N = women 5 (28 %), N = men 13 (72 %). **Other criteria:** Participants 50 years or older, resided in the community, communicating in English. Exclusion criteria included currently receiving MWC skills training elsewhere and health conditions that would contraindicate skills training. **Drop-out rate:** IG = 1 CG = 0	**Data collection:** Outcome (Baseline-Intervention): The Wheelchair Skills Test (WST) 4.2 is a structured assessment composed of 32 mobility skills performed on a standardized obstacle course. A trained observer rates performance of each skill as 2 (pass), 1 (pass with difficulty), or 0 (fail). A composite Capacity (WST-C) score from 0%-100% is produced. The WST 4.2 also incorporates a standardized rating of Safety (WST-S); each of the 32 skills is rated dichotomously as safe (1) or unsafe (0), with a composite score from 0%–100%. The Health Utility Index Mark 3 is a brief questionnaire that provides a measure of health-related quality of life. The 41 item scores are weighted to provide a multi attribute score between 0.36 and 1.00, with higher scores reflecting better health and quality of life. The Wheelchair Use Confidence Scale for Manual Wheelchair Users (WheelCon-M 3.0) asks respondents to rate their self-efficacy on 65 items, producing a composite score from 0 ("not confident") to 100 ("completely confident"). The Wheelchair Outcome Measure (WhOM). Captures MWC users' satisfaction with participation in self-selected life activities of relevance including activities in the home (IN subscale) and activities outside, in the community (OUT subscale). Each item is	**Intervention:** The mHealth training program, Enhancing Participation In the Community by improving Wheelchair Skills (EPIC Wheels). 2 in-person training sessions with a trainer and 4 weeks of monitored home training using a computer tablet (mHealth) wheelchair skills program. After group assignment, all participants were scheduled for a 2-hour in-person session with their group-specific trainer. The participants received a 10-inch computer tablet with a training application and were instructed to practice at home over a period of 4 weeks for a minimum of 75 minutes per week but were encouraged to attempt 150 minutes of practice per week. Those allocated to Extra Wheeling were instructed to also spend an additional 75 minutes per week in unstructured wheeling (i.e., beyond normal daily routine), reporting their time when prompted on the tablet each day. A second in-person training session (1-hr long) was scheduled for 2 weeks later. **Comparison:** The control group did not receive MWC skills training, as is typical practice with this population. However, to establish equipoise, they were also exposed to 2 in-person sessions and 4 weeks of monitored home training using a computer tablet with games for cognitive and dexterity training. Participants in the control group received a modified DVD version of the EPIC Wheels program for home use post study.

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	Setting: Community setting. **Recruitment:** Recruitment was conducted among community-dwelling manual wheelchair user (MWC) in 2 Canadian cities through advertisements distributed to health care providers, public venues, and community-based newspapers and newsletters. **Study period/Time to follow-up:** 4 weeks.		rated from 0 ("not satisfied at all") to 10 ("extremely satisfied"), with a mean score (0-10) for each subscale. The Life-Space Assessment (LSA), a 20-item questionnaire measuring mobility habits over a 4-week period, on a continuum of 5 environments expanding from proximal (in the home) to distal (outside of town). Weightings for frequency of travel (positive) and level of assistance required (negative) are integrated, and a total score (0-120) calculated, with higher scores reflecting greater mobility. Mobility habits. The Wheeling While Talking test for evaluation of divided attention during wheelchair use. MWC user is timed completing a short slalom course and repeating the course while simultaneously performing a cognitive verbal task. The difference in time (seconds) between motor-only and dual-task conditions is calculated, with higher differentials reflecting poorer performance and risk for tips and falls.	**Outcome:** <u>Primary:</u> MWC skill capacity. <u>Secondary:</u> Safety (WST-S) Self-efficacy, or confidence, for wheelchair use. MWC users' satisfaction with participation in self-selected life activities of relevance including activities in the home and activities outside, in the community. Mobility habits Evaluation of divided attention during wheelchair use.

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Giesbrecht et al. 2009 Canada [5]	**Aim:** To evaluate pushrim power assisted wheelchair (PPW) performance in a natural environment to determine whether the PPW would serve as a satisfactory alternative to a power wheelchair. The specific objective was to compare user satisfaction with and measurable performance during community-based activities using a PPW and a power wheelchair among dual users. Activities evaluated were those that participants identified as currently being performed using their power wheelchair. **Design**: A concurrent mixed methods research design was used, using a two-phase sequential explanatory strategy. Phase 1 focused on collection of descriptive quantitative data using a repeated measures crossover design. **Group allocation method:** The first four listed used the power wheelchair first and PPW second; the remaining four used the PPW first and power wheelchair second. **Setting:** Community. **Recruitment:** Advertisements in newsletters and posted in agencies that served appropriate individuals and	**Population:** Wheelchair use The primary inclusion criteria were using both a manual wheelchair and a power mobility device (either a power wheelchair or a scooter). **Diagnosis:** Spinal Cord Injury, MS, polymyositis **Sample size:** N= (randomised) 8 The first four used the power wheelchair first and PPW second; the remaining four used the PPW first and power wheelchair second. **Age and Sex:** Mean age (SD): 55,4 years Age range 33-60 years. N = women 2 (25 %), N = men 6 (75 %) **Other criteria:** Stable medical condition resides within 75 km from the research facility, able to perform the tests. **Drop-out rate:** 2 before intervention due to unstable medical conditions	**Data collection:** Outcome (Baseline-Intervention): QUEST, Quebec User Evaluation of Satisfaction with assistive Technology FEW, Functioning Everyday with a Wheelchair-Capacity, a self-reported tool for users of wheeled mobility technology PIADS Psychosocial Impact of Assistive Devices Scale (PIADS). The scale consists of 26 items that describe user perceptions about 3 constructs: competence, adaptability, and self-esteem. COPM Canadian Occupational Performance Measure, designed to capture a client's self-perception of performance in everyday living, over time. Baseline: QUEST (Device subscale) FEW (Section I) FE W (Section 2) PIADS (total score) PIADS (Competence subscale) PIADS (Adaptability subscale) PIADS (Self Esteem subscale) COPM (Performance) CO PM (Satisfaction)	**Intervention:** To try and compare new wheelchairs. **Comparison:** Compare pushrim power assisted wheelchair (PPW) to power wheelchair performance in a natural environment **Outcome:** Primary: Four outcome measures were selected for this study, addressing both the Activity and Participation levels of human function as set out by the ICF. Secondary: No secondary outcome.

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	provided a phone number to contact the investigator. Also, the Canadian Paraplegic Association (Manitoba) contacted individuals who met the inclusion criteria, briefly explaining the study and requesting permission for the investigator to make contact. **Study period/Time to follow-up:** Participants spent 3 weeks performing the self-identified activities using their assigned mobility device; at the end of this period, data were collected using the outcome measures. Participants then switched to the second mobility device, used it for 3-weeks, and data were collected again at the end of this period.			
Kirby et al. 2015 USA [6]	**Aim:** To test the hypothesis that powered wheelchair users who receive the Wheelchair Skills Training Program (WSTP) improve their wheelchair skills in comparison with a control group that receives standard care. Our secondary objectives were to assess goal achievement, satisfaction with training, retention, injury rate, confidence with wheelchair use and participation. **Design:** RCT 6-site, single-blinded (testers), RCT with parallel groups.	**Population:** Wheelchair use Power wheelchair users who used or were expected to use powered wheelchairs for at least 4 hours/week. **Diagnosis:** MS, spinal cord injury, amputees, stroke and arthritis. **Sample size:** N= 116 (randomised) n-IG=55 n-CG=61 **Age and Sex:** Mean age (SD): IG 53.8 years (12.5) CG 53.1 years (14.5) Age range: Not reported.	**Data collection:** Outcome (Baseline-Intervention): Wheelchair Skills Test Questionnaire (WST-Q 4.1), Goal Attainment Score (GAS), Satisfaction Questionnaire, Injury Rate, Wheelchair Use Confidence Scale for Power Wheelchair Users (WheelCon) Life Space Assessment (LSA).	**Intervention:** Wheelchair Skills Training Program (WSTP). Five 30-minutes individual WSTP 4.1 training sessions at a targeted frequency of 1–2 sessions per week. The training was conducted in a variety of locales, including in and around the participants' homes or other participant-specific environments. The participants' caregivers were encouraged to participate. Participants were encouraged to practice between formal training sessions. **Comparison:** Participants in both groups received standard care (if any). **Outcome:** Primary: Wheelchair Skills.

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	Randomisation method: Centrally generated randomisation tables were used to allocate participants (1:1) to Intervention or control groups, using sealed envelopes to conceal the sequence. **Stratification:** Stratified the sample in an attempt to ensure that the groups were comparable with respect to age (≤50 years and > 50 years) and powered wheelchair experience (≤ 3 months and > 3 months) but no limits were imposed on the proportions of the sample that were younger/older or less/more experienced. **Setting:** Rehabilitation centres and communities. **Recruitment:** Potential participants, a sample of convenience, were recruited through rehabilitation facilities, wheelchair seating programs, wheelchair equipment vendors and our community partners. Advertisements were used to supplement recruitment as needed. Screening at each site was conducted by a member of the research staff, based on observation, self-report and data from the health record.	N = women 57 (49 %), N = men 54 (51 %) **Other criteria** Each participant must have had access to a power wheelchair, ≥18 years of age, need no more than minimal assistance for communication, be able to pay attention during the intake session, be comfortably seated in the powered wheelchair that was used for the study and willing to participate. Participants were excluded if they had a rapidly progressive disorder, significant visual impairments, unstable medical conditions that might make the use of a powered wheelchair dangerous or had emotional problems that might make participation unsafe or unpleasant. **Drop-out rate:** n-IG = 5 n-CG = 2.		<u>Secondary:</u> Goal Achievement Satisfaction-with-Training Injury Rate Confidence with Wheelchair Use Participation

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	Study period/ Time to follow-up: All data were collected between May 15, 2012, and August 30, 2014. Baseline (T1), ≥ 3 days after training (T2) and 3 months after T2 (T3).			
Kirby et al. 2016 USA [7]	**Aim:** Test the hypotheses that community-dwelling veterans with spinal cord injury (SCI) who receive the Wheelchair Skills Training Program (WSTP) in their own environments significantly improve their manual wheelchair-skills capacity, retain those improvements at one year and improve participation in comparison with an Educational Control (EC) group. **Design:** RCT unblinded. **Randomisation method:** Computer-generated blocked randomisation schedule. This was done to ensure that at no time during randomisation was the imbalance large and that at certain points the number of participants in each group would be equal. At the end of baseline data collection, each participant was handed a sealed envelope that had the study-group assignment and the schedule for skills training or education.	**Population:** Wheelchair use: Manual wheelchair was the primary means of mobility, and participants were able to self-propel the wheelchair. **Diagnosis:** Spinal cord injury (SCI) for at least one year, a level of injury at C6 and below. **Sample size:** N = 106 (randomised) n-IG=53; 47 completed T2 assessments, 40 T3 assessments n-CG=53; 49 completed T2 assessments, 42 T3 assessment. **Age and Sex:** Mean age (SD): IG 48.1 (13.6) CG 47.1 (12.6). N = 5 women (5 %), N = 101 men (95 %) **Other criteria:** Each participant was a veteran, 18–75 years, living within 241 km (150 miles) of the research site, able to follow simple instructions and willing to participate (as mani-fested by providing informed consent and completing the baseline (Tl) assessment). Potential	**Data collection:** Outcome (Baseline-Intervention): Wheelchair Skills Test 4.1 (WST) Craig Handicap Assessment and Reporting Technique (CHART) scores. CHART is a general measure of participation that captures the interaction of the person and the environment, community reintegration and participa-tion. The CHART quantifies handicap by evaluating six domains: cognitive independence, economic self-sufficiency, mobility, occupation, physical independence, and social integration. Each of the six subscales has a maximum score of 100, and the subscale scores were summed to form a total score (maximum of 600). High scores indicate lesser restriction in participation.	**Intervention:** Wheelchair Skills Training Program (WSTP) Five one-on-one WSTP sessions, 30-45 minutes each. The WSTP Version 4.1 included 32 individual wheelchair skills divided into three skill levels (Indoor, Community and Advanced). Participants used their ordinary wheelchairs, and no alterations were made by study personnel. The initial participant training session provided the therapist with an opportunity to establish training goals based on the baseline evaluation of the participant's skill level and his/her personal goals for training. During training, whenever possible, a significant other or caregiver was present, to increase the likelihood of safe practice between the forma! training sessions. **Comparison:** Five one-on-one educational sessions, 30-45 minutes in duration. The CG mirrored the WSTP in intensity, duration, and process. The difference was in the content. Participants in the control group received five home-based sessions about 45min focusing on health promotion and had discussion with a research assistant on the topics related to general wellness after SCI, including nutrition, pressure ulcer

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	Stratification: Not reported. **Setting:** The training was carried out in the participant's home unless the skill that he/she wanted to work on required the training to be done elsewhere (e.g. on a family member's staircase). **Recruitment:** A sample of convenience from three Veterans Affairs rehabilitation centers. Participants were recruited by recruitment flyers, word of mouth and review of health records for individuals who met eligibility criteria. Potential participants who met initial criteria were mailed letters informing them of the study and asking any interested individuals to contact the study coordinator for additional information. **Study period/ Time to follow-up:** Data were collected at three time points: baseline (Tl), early post-intervention (T2, 4-5 weeks after Tl) and 12 months post-intervention (T3). Scheduled phone calls every two months between T2 and T3 were used as a strategy to increase subject retention.	participants were excluded if they had a progressive disease, had a cardiac or respiratory condi-tion that limited physical performance, had any unstable medical conditions or were pregnant. **Drop-out rate:** n-IG = 6 n-CG = 4		pre-vention, prevention of infections, prevention of respiratory complications and the importance of exercise. **Outcome:** <u>Primary:</u> Manual wheelchair-skills capacity. Participants' Perceptions. We recorded any of the participants' spontaneous comments that were of relevance to the training intervention. CHART, a general measure of participation. <u>Secondary:</u> Not reported.

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MacPhee et al. 2004 Canada [8]	**Aim:** Test the hypothesis that a brief, formalized period of additional wheelchair skills training is safe and results in significantly greater improvements in wheelchair skills performance than a standard rehabilitation program. **Design:** RCT. **Randomisation method:** Subjects were randomly allocated to the control or WSTP group by using a table of random numbers, except for 2 subjects who were placed in the control group because the training videos were not yet available. **Setting:** Nova Scotia Rehabilitation Centre Site of the Queen Elizabeth II Health Sciences Centre. **Study period/ Time to follow-up:** The intervals between the pre- and post-training evaluations for the control and WSTP groups: a mean of 25.4+-5.1 days (range, 14–32d) and 24.3+-6.1 days (range, 13–35d), respectively (*P* 0.57). The retention period for the WSTP group was a mean of 8.1+-3.4 days (range, 3–16d) after completing the WSTP.	**Population:** Wheelchair use: First time wheelchair users. **Diagnosis:** 20 with musculoskeletal disorders (e.g., amputations, polytrauma)., 15 with neurologic disorders (e.g., stroke, other acquired brain disorders, spinal cord disorders, peripheral neurologic disorders). **Sample size:** N= 44 (randomised) n-IG=18 n-CG=26 **Age and Sex:** Mean age (SD): 59+-18.3 years. Age range: 19-81. N = women CG: 5 (25 %). IG: 4 (27 %), N = men CG: 15 (75 %). IG: 11 (73 %) **Other criteria:** Wheelchair users involved in an initial rehabilitation program were recruited within 10 days of admission. 16 years or older; alert, cooperative, and able to answer questions related to wheelchair use; competent to give informed consent; willing to participate; having a rehabilitation clinician (occupational therapist or physical therapist) willing to participate; having the attending physician's permission to participate; current involvement in a rehabilitation program necessitating manual wheelchair use for the first time; being	**Data collection:** Outcome (Baseline-Intervention): All subjects completed a pretraining Psychosocial Impact of Assistive Devices Scale PIADS and WST evaluation within 10 days of admission. Wheelchair Skills Test (WST), version 2.4, before and after training. Changes in total percentage WST score and individual skill scores were examined. During the pre- and post-training WST evaluations, subject's success or failure on each skill was recorded, along with comments about each skill. During the WSTP, the training times for skills were recorded in 5-minute increments. Both the pre- and post-training WST evaluations were recorded on a handheld computer (by using software that had been customized for the WST). The data were then downloaded to a database on a personal computer. The WST total percentage score, as calculated by the custom software, was the raw score (the total number of skills passed) divided by the total possible scores (i.e., 50 minus the number of skills that were "not applicable" [e.g., if the wheelchair did not have the part]) multiplied by 100. Before the pre- and post-training WST evaluations, each subject completed the Psychosocial Impact of Assistive Devices Scale (PIADS). The scale consists of 26 items that describe user perceptions about 3 constructs: competence, adaptability, and self-esteem. Scores can range from -3 (maximum negative effect) to 3	**Intervention:** Wheelchair Skills Training Program (WSTP), averaging 4.5+-1.5 training sessions, each 30 min long. The first 20 min of each session was dedicated to learning skills according to the training curriculum. Practice took place repeatedly until a particular skill was successfully completed or abandoned, as described below. The last 10 minutes of each session consisted of practicing all skills successfully completed to that point (including those passed in the pretraining WST evaluation), randomly, with no skill attempted twice in a row. Subjects were tested and trained in the wheelchairs that had been assigned to them by their clinical therapists. **Comparison:** A typical rehabilitation stay. Over the course of a typical rehabilitation stay, therapists estimated that the average patient who used a wheelchair received a mean +-standard deviation (SD) of 15.4+-11.6 hours (range, 3.6–35.2h) of wheelchair skills training. The largest amount of time was spent on training wheelchair transfers, requiring a mean of 9.4+-10 hours (range, 3–30h). **Outcome:** Primary: MWC skill capacity. Secondary: Wheelchair use confidence. Satisfaction with participation in self-selected life activities (WhOM). Mobility habits. The Life-Space Assessment (LSA).

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		within 10 days of admission for initial rehabilitation (i.e., not readmitted for complications) or within the first 10 days of being allowed to get up in a manual wheelchair; having no significant visual impairment (such that a subject would be unable to see barriers); and having his/her current manual wheelchair for at least 2 days. If the patient had unstable medical, emotional or psychologic problems that might make testing unpleasant, that patient was excluded. **Drop-out rate** n-IG = 3 n-CG = 6.	(maximum positive effect) on a 7-point scale. Wheelchair Use Confidence Scale for Manual Wheelchair Users (WheelCon-M 3.0) Wheelchair Outcome Measure (WhOM) captures satisfaction with participation in self-selected life activities The Life-Space Assessment (LSA) assessing mobility habits Wheeling While Talking test is an evaluation of divided attention during wheelchair use. <u>Baseline:</u> As above.	Competence, adaptability, and self-esteem (Wheelchair Skills Psychosocial effect).
Miller et al. 2019 Canada [9]	**Aim:** Estimate effect size of WheelSeeU on objective wheelchair skills. Secondary objectives were to estimate effect sizes of WheelSeeU on perceived wheelchair skills capacity and performance, wheelchair use self-efficacy, satisfaction with participation, life-space mobility, and participation frequency; and to evaluate retention 6 months later. A tertiary objective was to explore differences between sites for all outcomes. **Design**: 2-site, single-blinded (testers) parallel group RCT. Testers were blinded to group allocation and participants. The WST was administered upon completion of all secondary outcomes.	**Population:** <u>Wheelchair use:</u> Meantime: 7+-11.3 years of previous experience using an MWC. 2-hands propulsion. **Diagnosis:** Primary diagnoses that included amputation (28 %), spinal cord injury (20 %) and other conditions (e.g., multiple sclerosis, stroke, Parkinson disease) (52%). **Sample size:** N = 40 (randomised) n-IG = 18 n-CG = 22 **Age and Sex:** Mean age (SD): 64.5+-8.0 N = women 16 (40 %), N = men 24 (60 %).	**Data collection:** <u>Outcome (Baseline-Intervention):</u> Wheelchair Skills Test (WST) version 4.1 for MWC users, which reflects an individual's ability to execute wheelchair mobility skills. These skills were scored dichotomously as pass/fail (0/1), and a total capacity score (0%-100%) reflecting the number of skills passed/ total possible score (multiplied by 100%) was calculated. Wheelchair Skills Test Questionnaire (WST-Q) version 4.1. Wheelchair Use Confidence Scale for Manual Wheelchair Users-Short Form (WheelCon-M-SF). The 21-item self-report questionnaire, comprising 13 wheelchair mobility items and 8 self-management items, was used to rate self-efficacy on a scale from 0 (not confident) to 10 (completely confident). Scores were	**Intervention:** Six 90-minute sessions (1-2/week) at the research institution and in the community. The training was completed in pairs of wheelchair users by peer-trainers and support trainers (health care professional) who were present to assist when needed and to ensure safety. WheelSeeU sessions were tailored to individual goals, which were identified and discussed with the peer-trainer at the start of each session. Participants were encouraged to bring a family member to provide support and spotting. The support-trainer provided training in safe spotting techniques (or performed the spotting if a family member did not attend). Upon completion, participants in the intervention group were offered the resources from the control group.

Author Year Country Reference	Aim Design Setting Study period/Time to follow-up	Population Drop-out rate Intervention Group (IG) Control Group (CG)	Data collection	Intervention Comparison Outcome
	Stratification: Stratified by site. Groups were not balanced after randomisation for sex and depression (P<.05), therefore these variables were controlled for as covariates in all analyses. **Randomisation method:** Randomisation (performed by an off-site statistician) was done in pairs using a 1:1 allocation ratio between groups and was stratified by site with an undisclosed block size. Within 48 hours of baseline data collection, the site coordinator obtained group allocation from the statistician and then provided the participants' contact information to the appropriate group trainer to schedule training sessions. To mask the participants from the study objectives, participants in both groups were told that the intervention was designed to improve wheelchair use. **Setting:** Training took place at the research institution and in the community. **Recruitment:** A convenience sample was recruited through rehabilitation facilities, wheelchair seating programs, wheelchair vendors, and word of mouth.	**Other criteria:** Community-living MWC users >=50 years of age, who self-propelled an MWC >=1 hour per day, with wheelchair mobility goals, and able to cognitively engage in the program (Modified Mini-Mental Status Exam score >=24) were included. Individuals were excluded if they would be receiving other wheelchair training during the study period, had a degenerative health condition that could impede participation, or could not communicate. **Drop-out rate** IG = 1 (T2), 2 (T3) CG = 1 (T2), 1 (T3)	summed and then converted using a standardized scoring procedure. Wheelchair Outcome Measure (WhOM), a semi-structured interview that reflected self-selected MWC mobility goals. Participants rated their current satisfaction with performance in each of the identified goals on a scale from 0 (not satisfied) to 10 (completely satisfied). A total mean score was calculated by goal satisfaction and dividing by the total number of goals (0-10). Goals with a score of <8 were incorporated into the WheelSeeU intervention, but participants were not restricted to their initial goals and could add goals at any time. Life-Space Assessment (LSA), a 20-item questionnaire to evaluate mobility-related social participation in a variety of environmental contexts (e.g., limited to home, outside of one's town).35,36 Items were scored on a scale from 0 to 6 to provide a composite score ranging from 0 to 120. Measurement properties of the LSA for wheelchair users have been documented. Participation frequency was evaluated using the 16-item disability component of the Late Life Function and Disability Index (LLFDI). Participants rated their participation frequency in 2 domains (i.e., social and personal roles) on a scale ranging from 1 (never) to 5 (very often). Raw scores were summed and then converted into standardized scores (0 to 100) with higher scores indicative of higher participation levels.	**Comparison:** Participants in the control group completed six 90-min seminars with another MWC user that was facilitated by a trained instructor (clinician or other health professional) developed to control for attention bias, consisting of topics related to using an MWC (e.g., wheelchair maintenance, physical activity, nutrition. Upon completion of the study, control group participants were offered a condensed WheelSeeU program. **Outcome:** <u>Primary:</u> Wheelchair skills capacity (WST). <u>Secondary:</u> Perceived wheelchair skills (WST-Q) capacity and performance. Perceived capacity reflects an individual's perception of their ability to execute a wheelchair skill, while performance reflects the frequency a skill has been performed. The WST-Q has evidence supporting its validity to assesses one's perceived ability to execute wheelchair mobility skills (capacity) as well as frequency of execution (performance). Scoring was done as per the WST. Wheelchair use self-efficacy. Satisfaction with participation. Life-space mobility. Participation frequency.

Author Year Country Reference	Aim Design Setting Study period/Time to follow-up	Population Drop-out rate Intervention Group (IG) Control Group (CG)	Data collection	Intervention Comparison Outcome
	Study period/Time to follow-up: Primary and secondary outcomes were collected at baseline (T1), after intervention (T2) and 6 months later (T3). The study was performed between October 2013 and October 2016.		<u>Baseline:</u> Also sociodemographic information and wheelchair usage details e.g., previous experience, previous accidents were collected at T1.	
Mountain et al. 2014 Canada [10]	**Aim:** To test the hypothesis that people with stroke using powered wheelchairs who receive formal wheelchair skills training improve their wheelchair skills more than participants in a control group, we conducted a randomised controlled trial. To explore the influence of neglect on the capacity to learn powered wheelchair skills. **Design:** RCT. **Randomisation method:** Stratified block randomisation strategy. Using a computer-generated table of random numbers, participants were allocated into two equal-sized groups (Intervention and Control). **Stratification:** Stratified by the presence or absence of spatial neglect (defined as an impaired score on at least one subtest of the BIT). **Setting:** Inpatients stroke rehabilitation ward.	**Population:** <u>Wheelchair use:</u> All participants used the same mid-wheel-drive powered wheelchair for the testing and training activities. This wheelchair had tilt function, but not recline. No information about previous use of wheelchair. **Diagnosis:** Stroke **Sample size:** N= 23 (randomised) n-IG=12 n-CG=11. **Age and Sex:** Mean age (SD): 54 years (SD not reported). Sex (of those 17 who completed<u>):</u> N = women 5 (29 %), N = men 12 (71 %) **Other criteria:** Primary diagnosis of stroke, competent to provide informed consent, willing and able to participate (as evidenced by completion of at least the baseline assessment),required no more than minimal assistance for communication, able to attend during a 20-minute	**Data collection:** <u>Outcome (Baseline-Intervention):</u> WST 4.1. Baseline: Baseline cognitive and perceptual tests, specifically the Montreal Cognitive Assessment (MOCA) (0-30), a standardized test of overall cognitive ability, the Behavioral Inattention Test (BIT) (0-139), a widely used standardized test of spatial neglect and the Test of Praxis (0–10), a measure of motor planning and programming that reflects on one's ability to learn new motor skills.	**Intervention:** Up to 5 30- minute one-on-one training sessions, at a target frequency of 3-5 sessions per week, aimed at improving their powered wheelchair skills. The training sessions were conducted using the principles and procedures of the WSTP 4.1. The wheelchair used in this study did not have a recline function so the study was carried out on 31 skills. **Comparison:** Control-group participants received no training sessions with a powered wheelchair other than what they may have received as part of their standard rehabilitation. **Outcome:** <u>Primary:</u> Wheelchair skills. <u>Secondary:</u> Not reported

Author Year Country Reference	Aim Design Setting Study period/Time to follow-up	Population Drop-out rate Intervention Group (IG) Control Group (CG)	Data collection	Intervention Comparison Outcome
	Recruitment: Potential participants were initially approached and screened by clinicians during care. **Study period/Time to follow-up:** After a minimum of 3 days post-training for the Intervention group, the T2 WST was administered. Control-group participants completed the T2 WST two weeks after the first test (comparable to the latency between the pre- and post-training WSTs for the Intervention group).	therapy session, able to be safely seated in the powered wheelchair that we used for the study, no significant visual impairment, not currently using a power wheelchair, and had no physical or mental health conditions that would make participation dangerous. **Drop-out rate:** (Article says 6/group but should probably be 6 in total otherwise numbers do not make sense) n-IG = 6 probably 3 n-CG = 6 probably 3		
Rice et al. 2013 USA [11]	**Aim:** The main goal of this study was to compare 2 propulsion training methods (high and low tech) to determine which system was more effective at teaching long-term manual wheelchair users to increase hand rim kinetics, increase contact angle and decrease stroke frequency, on an overground course at 2 propulsion speeds (self-select and target). There were 2-time perspectives, short term = same day and long term =3 months. **Design**: RCT **Randomisation method:** Subjects were randomised into 3 groups using a random permuted block method. Feedback group with multimedia presentation and	**Population:** Wheelchair use Full-time manual wheelchair users with spinal cord injuries 18-65 years old. **Diagnosis:** Spinal cord injury. **Sample size:** NB these numbers refers to the long-term intervention with 2 intervention groups. N = 22 (randomised) n-IG = 6 and 7 n-CG = 9. **Age and Sex:** Mean age (SD): 42,3 years (13,6). N = women 2 (9 %), N = men 20 (91 %).	**Data collection:** <u>Outcome (Baseline-Intervention):</u> Propulsion kinematics, contact angle (CA), stroke frequency (SF), peak resultant force, and peak rate of rise of resultant force during an overground course. CA (degrees), SF (strokes per second), peak F, (N/[m · s]), and rorF, (N/m) were calculated from the first 5 steady-state strokes using a customized MATLAB program. <u>Baseline:</u> Propulsion technique, as above	**Intervention:** Three groups were compared: a control group (CG) that received no training, an instruction-only (10) group that reviewed a multimedia presentation (MMP), and a feedback (FB) group that reviewed the MMP and received additional real-time feedback (RTF). The MMP is a 5-minute automated instructional video and slide presentation designed for independent use. RTF was designed to reinforce the principles presented in the MMP.25 Real-time SF, CA, and velocity feedback was streamed from a Smart Wheel" to a 17-inch monitor facing the participants while they were propelling their wheelchair on a dynamometer (fig 2). Variables were presented randomly and discontinuously to comply with principles of motor learning theory shown to enhance learning.

Author Year Country Reference	Aim Design Setting Study period/Time to follow-up	Population Drop-out rate Intervention Group (IG) Control Group (CG)	Data collection	Intervention Comparison Outcome
	real-time feedback, instruction only with multimedia presentation, or control group with no training. **Stratification:** Not reported. **Setting:** Research laboratory. **Recruitment:** Twenty-seven individuals were recruited from within the VA Pittsburgh Healthcare System and from local rehabilitation hospitals and clinics. **Study period/Time to follow-up:** Short term = same day, long term = 3 months.	**Other criteria:** Excluded were persons with SCI above C7 level, less than 2 years since injury, persons with progressive or degenerative injuries, or a history of nondominant upper extremity injuries. All subjects were required to use the same wheelchair throughout the study without changes in configuration. **Drop-out rate:** IG = feedback group 3+instruction only 2. CG=0.		**Comparison:** Received no training. **Outcome:** <u>Primary:</u> Propulsion technique: contact angle, stroke frequency, peak resultant force, peak rate of rise of resultant force. <u>Secondary:</u> Not reported.
Rice et al. 2014 USA [12]	**Aim:** To describe the development of a structured education program to educate both clinicians and wheelchair users on best practices and perform a RCT to investigate the impact of structured education and strict adherence to the clinical practise guidelines (CPG) on wheelchair set-up, selection, and propulsion skills in persons with acute spinal cord injury. A secondary analysis concerned pain, satisfaction with life and participation. We hypothesized that the intervention group (IG), would have superior wheelchair set-up,	**Population:** <u>Wheelchair use:</u> Full-time wheelchair users. **Diagnosis:** Spinal cord injury; para and tetraplegia. **Sample size:** N= (randomised) 37 n-IG= 12 n-CG= 25. **Age and Sex:** *Mean age* (SD): 38.3 (15.9) N = women 9 (25 %), N = men 28 (75 %)	**Data collection:** <u>Outcome (Baseline-Intervention):</u> Wheelchair set-up: Each user's horizontal axle position and elbow flexion angle were evaluated at 6 months and I year post discharge study visits. Axle position was assessed by measuring the horizontal distance between the participant's acromion process and rear axle position. To assess elbow flexion, the participant sat with his/her hand placed at the top of the pushrim. The angle was measured with a goniometer.	**Intervention** The intervention group was strictly educated on the clinical practice guideline by a physical therapist and an occupational therapist in an inpatient rehabilitation facility. **Comparison** The standard of care group received standard therapy services. **Outcome:** <u>Primary:</u> Wheelchair set-up Wheelchair selection Propulsion <u>Secondary:</u> Pain

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	selection and propulsion skills compared with a standard-of-care group (SCG). **Design**: RCT. **Randomisation method:** A single-blind (investigator blinded to group assignment) SCG or IG), randomised controlled trial. Procedure not reported. **Stratification:** Because of the impact of level of injury and sex on pain, a stratified randomisation scheme was used to ensure an equal allocation of men and women and those with tetraplegia andparaplegia in each group. **Setting:** Acute Model Spinal Cord Injury Systems rehabilitation facility and community. **Recruitment:** Not reported. **Study period/Time to follow-up** At discharge, and 6 months and one year after intervention. Performed between March 2007 and December 2011.	**Other criteria:** Between 16 and 110 years of age, a first-time wheelchair user, had a nonprogressive SCI with residual neurologic deficits, and were anticipated to be a full-lime wheelchair user. Participants also completed a modified Mini-Mental State Exam. Those who scored below 17 out of 25 points were not invited to participate because they were potentially not able to learn the required skills. **Drop-out rate (one year follow-up):** IG n = 4 CG n = 11	Wheelchair selection: Information on the type of wheelchair, mode, manufacturer, status of the chair (own chair or loaner), Healthcare Common Procedure Coding System "K" Code, and weight was recorded. Propulsion: Testing was performed by replacing the user's nondominant side wheel with a SmartWheel. The SmartWheel is a modified wheel instrumented with strain gauges that measure 3D forces and moments applied to the pushrim during propulsion. Participants pushed at a self-selected comfortable speed over 3 different surfaces: 10 m of level tile, up a 5° ramp, and over 10 m of industrial-grade carpet. Pain: upper-limb pain was rated on a 0 to 10 numeric rating scale at all 3 study visits, and Wheelchair Users Shoulder Pain Index (WUSPI) Satisfaction With Life Scale and Craig Handicap Assessment and Reporting Technique were used. <u>Baseline:</u> Demographic and spinal cord injury characteristics.	Satisfaction with life and participation.

Author Year Country Reference	Aim Design Setting Study period/Time to follow-up	Population Drop-out rate Intervention Group (IG) Control Group (CG)	Data collection	Intervention Comparison Outcome
Routhier et al. 2012 Canada [13]	**Aim:** To test the hypotheses that, in comparison with a control group that received standard care, users of manual wheelchairs who also received the French-Canadian version of the Wheelchair Skills Training Program (WSTP) would significantly improve their wheelchair-skills capacity and that these improvements would be retained at 3 months. Secondary aim to determine if the WSTP was safe. **Design:** RCT Multicenter, single-blind, randomised controlled trial. Blinding was carried out by isolating the personnel and processes for randomisation, testing, training, and data analysis. Because of the nature of the intervention, it was not possible to blind participants about whether they received training. **Randomisation method:** by the principal investigator by using a table of random numbers. **Stratification:** For the purpose of having approximately equal representations of musculoskeletal and neurologic impairments in the 2 groups, we used this diagnostic-group criterion (musculoskeletal vs neurologic) to stratify the groups.	**Population:** Wheelchair use: Manual Wheelchair Users: Most participants had minimal prior wheelchair experience, propelled their wheelchairs with 2 hands, used their wheelchairs for more than 4 hours each day, and used their wheelchairs both indoors and in the community. **Diagnosis:** Amputations, MS, SCI, other. **Sample size:** N = 39 (randomised) n-IG = 19 n-CG = 20. **Age and Sex:** Mean age (SD): IG: 48.9 years (18.9) CG: 43.1 years (22.1). N = women IG: 6 (33 %) CG: 6 (30 %), N = men IG: 13 (68 %). CG: 14 (70 %). **Other criteria:** 18 years or older; used a manual wheelchair daily; was receiving therapy at one of the recruitment sites; was willing and able to take part; fluently French-speaking; was competent to give informed consent (or by proxy); had enough ability to develop skills included in the WSTP, no unstable medical condition; and no emotional or psychiatric problem relevant for participation.	**Data collection:** Outcome (Baseline-Intervention): The French-Canadian version of the Wheelchair Skills Test (WST) (Version 3.2) WST 3.2 consists of 57 skills, including 30 at the indoor level, 13 at the community level, and 14 at the advanced level. WST-Questionnaire Tips, falls and adverse events. Baseline: Demographics and characteristics.	**Intervention:** Standard care +WSTP with a mean of 5.9 training sessions (a mean total duration of 5 h and 36 min). Each participant was trained by 1 of 3 occupational therapists, each of whom had received trainer training. Participants received a target of 4 to 8 training ses-sions, each 45 to 60 minutes long, during a period of 2 to 4 weeks. The actual number of sessions and their duration were recorded. Training was stopped after 8 sessions or when no improvement was noted by the trainer. **Comparison:** Standard care. **Outcome:** Primary: Wheelchair skills. Secondary: Safety.

Author Year Country Reference	Aim Design Setting Study period/Time to follow-up	Population Drop-out rate Intervention Group (IG) Control Group (CG)	Data collection	Intervention Comparison Outcome
	Setting: Three rehabilitation centers in Montreal, Quebec, Canada. **Recruitment:** A sample of convenience. Potential participants were approached by clinicians at the rehabilitation centers or hospitals. **Study period/ Time to follow-up:** Evaluation at first time period (baseline) (t1), evaluation at second time period (post training) (t2) (a mean of 47 days after t1), and at evaluation at third time period (follow-up) (t3) (a mean of 101 days after t2).	**Drop-out rate:** n-IG = 1 n-CG = 7.		
Wang et al. 2015 USA [14]	**Aim:** To examine the effectiveness of using immediate video feedback (IVF) in a rehabilitation setting to train manual wheelchair users with spinal cord injury in learning three wheelchair skills: propelling on an inclined surface, stationary wheelies, and ascending/ descending a curb. We hypothesized that the use of video feedback with attention-directing verbal instructions and cues (reminders in short phrases) during training would result in the same or less training time to acquire similar wheelchair skill levels when compared with the conventional training.	**Population:** Wheelchair use: Manual wheelchairs for at least 80% of their mode of mobility. **Diagnosis:** Inpatients with spinal cord injury between thoracic and lumbar level who had newly become full-time manual wheelchair users **Sample size:** N= 21 n-IG= 10 n-CG= 11 **Age and Sex:** *Mean age* (SD): IG: 33.2 ± 12.7	**Data collection:** Outcome (Baseline-Intervention): Progression in each skill was documented for each participant. The total time of training required to complete each skill (wheeling, curbing, and ramping skills) safely and successfully was recorded. The time spent completing each wheelchair skill during each testing session was also recorded. The number of counts of spotter intervention and the successful rate of attempts for each wheelchair skill during training and testing sessions were also counted.	**Intervention:** The experimental group received immediate video feedback (Dartfish Software; Alpharetta, Georgia) for advanced wheelchair skill training. **Comparison:** The control group learned the three wheelchair skills (ramping, wheelie, and curbing) using the conventional training method (feedback by physical therapists). All participants were expected to go through four periods: training sessions, competency test, retention test, and transfer test.

Author Year Country Reference	Aim Design Setting Study period/Time to follow-up	Population Drop-out rate Intervention Group (IG) Control Group (CG)	Data collection	Intervention Comparison Outcome
	Design: CT **Group allocation method:** The participants were paired based on sex, age (18- 30 years for the young group or 40- 65 years for the old group), and level of motor function (high paraplegia with motor loss from TI-T7 or comparable disability with loss of muscle function. **Stratification:** The two members from each matched pair were randomly assigned to either the experimental or control group. **Setting:** Rehabilitation setting, inpatients. **Recruitment:** Recruitment from Shepherd Center in Atlanta, Georgia, via flyers and posters, word of mouth, and physical therapists or other caregivers on the inpatient and outpatient services. **Study period/Time to follow-up** 3–4 weeks.	CG: 33.2 ± 12.7 N = 6 women (29 %), N = 12 men (71 %) **Drop-out rate:** IG = 1 CG = 2.	<u>Baseline:</u> Does not report.	**Outcome:** <u>Primary:</u> Wheelchair skills. <u>Secondary:</u> Not mentioned.

Author Year Country Reference	Aim Design Setting Study period/Time to follow-up	Population Drop-out rate Intervention Group (IG) Control Group (CG)	Data collection	Intervention Comparison Outcome
Worobey et al. 2016 USA [15]	**Aim:** To assess the effectiveness of group wheelchair skills training to elicit improvements in wheelchair skills. **Design:** Randomised double-blinded controlled trial. Participants were concealed to randomisation and unaware of the 2 training groups; they were only aware that they were enrolling in a study of training programs for people with spinal cord injuries. Data collectors were blinded for group allocation. **Randomisation method:** Randomisation codes were generated prior to the start of the study for a 1:1 allocation ratio and stored in an Excel spreadsheet. **Stratification:** Randomisation was stratified by site and completed using permutated blocks of 2 or 4 based on level of injury (paraplegia or tetraplegia) and years since injury (<1y or 1y). Allocation was concealed with study members at individual sites contacting the study coordinator at the lead site after completing informed consent and prior to baseline to receive the randomisation assignment. **Setting:** Four Spinal Cord Injury Model Systems Centers.	**Population:** Wheelchair use: Independent manual wheelchair users who used a manual wheelchair as a primary means of mobility (≥50% of mobility). **Diagnosis:** Spinal cord injury. **Sample size:** N= 114 (randomised) n-IG=55 n-CG=59. **Age and Sex:** Mean age (SD) IG 40,1 years (11,4), CG 41 (12,4) Age range: not reported. N = 1G 4 women (11 %), CG 7 women (15 %), N = IG 32 men (89 %), CG 37 men (85 %) **Other criteria:** 18 to 75 years, a nonprogressive SCI (traumatic or nontraumatic), living in the community, use a manual wheelchair as a primary means of mobility (≥50% mobility), independently propelled a wheelchair, scored _23 on the Folstein Mini-Mental State Examination, and completed the baseline evaluation. **Drop-out rate:** n-IG = 19 n-CG = 16	**Data collection:** Outcome (Baseline-Intervention): Wheelchair Skills Test Questionnaire (WST-Q) (Version 4.2) for capacity and performance. The WST-Q consists of 32 individual skills that are grouped into indoor, community, and advanced skill levels. We collected data on capacity and performance. Goal Attainment Scale (GAS) score, outlining individual skills they wanted to improve. A GAS score was calculated for each participant after training sessions were completed (number of goals met/number of goals set_100%). The baseline GAS score was 0% by definition. Baseline: Not reported.	**Intervention:** Six 90-minute group Wheelchair Skills Training Program (WSTP) classes or two 1-hour active control sessions with 6 to 10 people per group. Each class was taught by 2 trainers who attended a WSP course. A total of 8 weekly 90-minute WSTP classes were held (6 regular and 2 make-up). WSTP participants were asked to attend a target of 6 classes. Classes involved hands-on demonstrations and practice of wheelchair skills using the principles and procedures outlined in the WSP manual and made accessible online through the WSP website. Prior to the first session, trainers received the results of the baseline WST-Q. **Comparison:** Two 1-hour general education classes that were scheduled 1 to 3 weeks apart. A rehabilitation therapist, counsellor, or peer counsellor led the classes using an informational PowerPoint presentation, and participants had the opportunity to interact as a group. Class topics were aging with an SCI and weight management and nutrition. Classes were held between weeks 4 and 6 of the WSTP group sessions so that blinding could be maintained during the follow-up data collection. **Outcome:** Primary: Wheelchair skills. Secondary: Not reported.

Author Year Country Reference	Aim Design Setting Study period/Time to follow-up	Population Drop-out rate Intervention Group (IG) Control Group (CG)	Data collection	Intervention Comparison Outcome
	Recruitment: A convenience sample of wheelchair users was enrolled through advertisements, research registries, and word of mouth. **Study period/ Time to follow-up:** Baseline (t1) and 1-month follow-up (t2) From October 2013 through September 2014.			
Yeo et al. 2018 Korea [16]	**Aim:** To determine the effectiveness of group manual wheelchair training in improving wheelchair skills and upper arm skilled performance in adults with cervical spinal cord injury. **Design:** RCT **Randomisation method:** Names of all participants were placed into a box and then all participants were randomly allocated to either a training group or a control group. **Stratification:** Not reported. **Setting:** Korea, no further report. **Recruitment:** Not reported.	**Population:** Wheelchair use: Not exactly reported but all had cervical spinal cord injury C5-T1 ASIA B or C and could drive manual wheelchair. IG: Wheelchair Experience 34.38 (7 .32) (months) CG: Wheelchair Experience 35.55 (8.25). **Diagnosis:** Tetraplegia classified as B/C in the ASIA classification system, C **Sample size:** N=26 n-IG= 13 n-CG= 13 **Age and Sex:** *Mean age* (SD) IG: 35.31 years (4.71) CG: 35.91 years (5.30). N = 5 women (21 %), N = 19 men (79 %).	**Data collection:** Outcome (Baseline-Intervention): Wheelchair Skills Test (WST), version 4.1 included "pass" (score of 2), "pass with difficulty" (score of 1), and "fail" (score of 0). Total WST percentage scores were calculated. Baseline: Before pre- and post-training (after 4 and 8 weeks) WST measurements. Also a research version of the Van Lieshout Test (VLT-SV) consisting of 10 items covering upper arm skilled performance associated with ADL was used. Total VLT-SV score was the mean of item scores, ranging from 0 (worst) up to 5 (best), indicating the quality of performance.	**Intervention:** The Wheelchair Skills Program (WSP) Version 4.1. The intervention, for both groups, lasted 8 weeks, with a frequency of three days (each 1 h) per week including warm-ups, training programs of each group, and warm downs that were supervised by an experienced physical therapist. Individuals practiced skills learned previously for 5-10 min at the beginning of each session, followed by a 10-min warm-up. For the next 30-35 min, individuals were trained for new skills. Finally, warm downs were performed for 10 min. The warm-up and warm-down consisted of a breathing exercise, light aerobics (e. g., marching on the spot, arm swinging), and gentle upper extremity stretching. They used the rehabilitation unit's standard wheelchairs that were individually adjusted during tests and training sessions. **Comparison:** Exercise sessions at the same time as the training group. Conventional exercise sessions (upper extremity strengthening and endurance exercise using an arm ergometer, aerobic exercise with wheeling around the

Author Year Country Reference	Aim Design Setting Study period/Time to follow-up	Population Drop-out rate Intervention Group (IG) Control Group (CG)	Data collection	Intervention Comparison Outcome
	Study period/Time to follow-up: 8 weeks.	**Other criteria:** Inclusion criteria for participation were as follows: (1) diagnosed with a cervical spinal cord and classified as B/C in the ASIA classification system, (2) age between 18 and 50 years, (3) stable medical condition for using a manual wheelchair, (4) alert and cooperative, (5) able to perform wheelchair skills training, (6) having no significant visual or vestibular impairment, and (7) living in community. **Drop-out rate:** IG=0 CG=2.		indoor track). Conventional exercise was individually adapted and was performed at an intensity of approximately 70 % maximum heart rate (or a Borg rating of 3–4). lndividuals did not receive any placebo WSP in the control group. WSP training was offered to the control group after completion of study procedures. **Outcome:** <u>Primary:</u> Wheelchair Skills Test (WST). <u>Secondary:</u> Not reported.

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