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| **CRITICALLY APPRAISED TOPIC** |

**FOCUSED CLINICAL QUESTION**

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| Is body support treadmill training (I) more effective than overground training (C) for improvement in gait motor outcomes in a 48-year-old man with left hemiparesis due to stroke (P)? |

**AUTHOR**

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**CLINICAL SCENARIO**

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| The patient is a 48 y.o. man who recently obtained a right sided CVA resulting in a left hemiparesis affecting both left-sided upper and lower extremities. This patient was in acute care for one month prior to discharging to Acute Inpatient Rehabilitation (AIR) due to his complications in his medical condition. This patient was admitted to AIR with hopes of going home after his stay. This patient is making small gains and currently transferring using a slide board with minimal assistance and just began taking steps in parallel bars with maximum assistance (+1 PT). Furthermore, he only has a couple more weeks left of rehabilitation. His goal is to increase his independence and get back to walking to be able to return to work to provide for his family.  Thousands of patients are like this one, where they have slow progress from a stroke and want to enhance their motor ability to get back to their life. PTs have an abundance of interventions to choose from especially in AIR, but what if one intervention was proven to be better to enhance gait outcomes? Being able to walk is a major determinant of whether a patient returns home. Thus, in pursuit of helping the patient reach his goal of going home and enhance knowledge for stroke intervention for gait return, I would like to know whether body support treadmill training (BWS TT) is more effective than overground training for gait motor outcomes to assist in increased independence to discharge home. |

**SUMMARY OF SEARCH**

[Best evidence appraised and key findings]

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| Eights studies met the inclusion and exclusion criteria and closely resembled the clinical question including 7 randomized controlled trials and 1 systematic review/meta-analysis   * BWS TT may help improve a patient’s walking capacity through distance walked in 6 minutes, walking perception, and walking endurance compared to assisted overground walking.1,2 * BWS TT and overground assisted walking have similar positive results in subacute stroke population in terms of walking quality through stride length and walking speed.1 * Regarding interventions to help patients regain walking early in rehabilitation for stroke patients, BWS TT and overground walking are comparable options to use with similar improvements in relation to motor performance and balance in both short-term and long-term.3–7 * Overground training group improved step length symmetry ratio and self-selected walking speed compared to BWS TT, however, there was inconclusive data regarding speed suggesting the importance of integrating both interventions.2,5,6,8 |

**CLINICAL BOTTOM LINE**

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| Patients in AIR who have recently had a stroke resulting in hemiparesis that wish to enhance their walking ability to assist in safely discharging home could use either assisted overground walking or bodyweight support treadmill training to achieve similar improvements in gait outcomes (stride length, walking speed, FIM, FAC, and Fugl-Meyer). BWS TT only surpasses overground walking when addressing walking capacity through meters walked in the 6MWT, and patient perception of walking which could influence decision making to choose this intervention over ground walking if those outcomes are the goals for the patient. However, using both overground and BWS TT is best to cover improvement in gait motor outcomes. |

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| ***This critically appraised topic has been individually prepared as part of a course requirement and has been peer-reviewed by one other independent course instructor*** |

*The above information should fit onto the first page of your CAT*

**SEARCH STRATEGY**

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| **Terms used to guide the search strategy** | | | |
| **P**atient/Client Group | **I**ntervention (or Assessment) | **C**omparison | **O**utcome(s) |
| CVA, stroke\*, cerebrovascular accident\*, cerebrovascular AND accident, cerebrovascular apoplexy, brain vascular accident, cerebrovascular stroke, apoplexy, cerebral stroke\*, acute stroke\*, acute cerebrovascular accident\* | treadmill training AND body weight support, human body, human body AND support\*, human body AND support\* AND treadmill\*, (human body AND support\* AND treadmill\*) AND (education OR train\*) | Overground\*, overground trai\*, overground rehab\*, gait train\* | Motor activity, Program evaluation, Rehabilitation, motor assessment scale AND outcome AND stroke, motor assessment scale AND outcome, outcome measure, motor\* AND learn\*, motor function AND outcome measure AND stroke, motor function AND outcome measure\* |

**Final search strategy (history):**

*Show your final search strategy (full history) from PubMed. Indicate which “line” you chose as the final search strategy.*

**Text

Description automatically generated**

*Graphical user interface, text, application

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Graphical user interface, text, application

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**(stroke\* OR cerebrovascular accident OR CVA) AND (treadmill training) AND (overground) AND gait** Filters: **Meta-Analysis, Randomized Controlled Trial, Systematic Review, Humans, English, Male, Middle Aged: 45-64 years, Middle Aged + Aged: 45+ years**

*In the table below, show how many results you got from your search from each database you searched.*

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| **Databases and Sites Searched** | **Number of results** | **Limits applied, revised number of results (if applicable)** |
| PubMed   * (stroke\* OR cerebrovascular accident\* OR CVA) AND ((treadmill training AND body weight support) OR (human body AND support\* AND treadmill\*)) AND (mirror\* AND therap\* AND neuromuscular AND stimulation) AND (motor function AND outcome measure\*) * (stoke\*) AND ((human body AND support\* AND treadmill\*) AND (education OR train\*)) AND (electric\* stimulation AND lower extremit\*) AND (motor function AND outcome measure) * (stroke\* OR cerebrovascular accident\* OR CVA) AND ((treadmill training AND body weight support) OR (human body AND support\* AND treadmill\*)) * (stroke\* OR cerebrovascular accident\* OR CVA) AND (mirror\* AND therap\* AND neuromuscular AND stimulation) * (stroke\* OR cerebrovascular accident\* OR CVA) AND ((treadmill training AND body weight support) OR (human body AND support\* AND treadmill\*)) AND (mirror therapy combine with neuromuscular electrical stimulation) AND (motor function AND outcome measure) * (stroke\* OR cerebrovascular accident\* OR CVA) AND ((treadmill training AND body weight support) AND (neuromuscular electrical stimulation) AND (motor function AND outcome measure) * (stroke\* OR cerebrovascular accident) AND (treadmill training AND body weight support) AND (electrical stimulation) AND (motor function AND outcome measure) * (stroke\* OR cerebrovascular accident) AND (treadmill training AND body weight support) AND (treadmill training AND body weight support with electrical stimulation) AND (gait coordination) * (stroke OR cerebrovascular accident) AND (treadmill training AND body weight support) AND (functional electrical stimulation) AND motor function * (stroke OR cerebrovascular accident) AND ((treadmill training AND body weight support versus (functional electrical stimulation)) AND motor function * (stroke OR cerebrovascular accident) AND ((treadmill training AND body weight support versus (functional electrical stimulation)) AND gait coordination) * (stroke\* OR cerebrovascular accident OR CVA) AND (treadmill training) AND (overground) AND gait   PEDro   * stroke\* body support treadmill training\*electrical stimulation\*motor function\* * stroke\* body weight support\*FES\*motor function\* * stroke\* repetitive train\*electrical stimulation\*motor function\* * stroke\* body weight support\*overground\*gait\* * stroke\* body weight support treadmill\*overground training\*gait rehab\*   Cochrane Library   * stroke and overground and treadmill   CINAHL   * stroke or cerebrovascular accident or cva AND treadmill training AND overground | 0  0  240  14  0  1  0  7  12  1  0  123  2  60  22  98  31  12  71 | This only included 1 intervention, so I tried to add my inclusion filters and then got it down to 50.  I limited to only RCT and narrowed down to 5  I got rid of mirror + e-stim and went to NES  I decided to do e-stim only and after seeing the results here I decided to focus my outcome measure on gait coordination as outcome measure wasn’t going well  I tried to change my factors slightly (C) and (O) so that I could find more articles  None of these articles were comparing what I wanted so I adjusted working.  This is a good article but only brought 1 up  I added the filters of my inclusion criteria (men, humans, English, meta-analysis, RCT, systematic review, and middle aged (45+, 45-64 years) and it brought it down to 36. After reviewing the articles there were a handful that were relevant that I could use for my 8 articles!  I widened the outcome looked at and got 2 good articles to look at motor function in general instead of an outcome measure  A lot of these weren’t looking at comparisons instead were combining the interventions.  I was finding a lot of decent articles on various repetitive training types such as overground and treadmill, so I decided to change my PICO to look at those as it still relates to my patient.  After looking at PEDro and PubMed without much success, I finally changed my PICO, and this was my new search. This was too many, so I added more detail into my search.  I decided to not include clinical trials with <6/10 on the PEDro Scale  It helped that I searched here after narrowing and changing my PICO from PubMed and PEDro, so I knew what to search here and came up with a reasonable number to look through!  I edited to academic journals only which narrowed it to 68 and then narrowed to age 45-64 and 65+, which brought it down to 28 results. I also went to this site after searching long and hard on PEDro and Pubmed which made this search much easier. |

## INCLUSION and EXCLUSION CRITERIA

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| **Inclusion Criteria** |
| -article type: RCTs, systematic reviews and meta-analyses  -language: English  -sex: male  -age: (middle aged + aged: 45+ years) and (middle aged: 45-64 years)  -species: humans  -stroke patients  -overground training  -treadmill training |
| **Exclusion Criteria** |
| -case studies, case series  -abstracts, conference proceedings, letters to the editor, blog posts, dissertations, narrative review articles, qualitative research, guidelines |

**RESULTS OF SEARCH**

**Summary of articles retrieved that met inclusion and exclusion criteria**

*For each article being considered for inclusion in the CAT, score for methodological quality on an appropriate scale, categorize the level of evidence, indicate whether the relevance of the study PICO to your PICO is high/mod/low, and note the study design (e.g., RCT, systematic review, case study).*

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| **Author (Year)** | **Risk of bias (quality score) \*** | **Level of Evidence\*\*** | **Relevance** | **Study design** |
| Lura DJ, Venglar MC, van Duijn AJ, Csavina KR (2019) | PEDro: 6/10 🡪 good (Eligibility criteria: Yes; Random allocation: Yes; Concealed allocation: No; Baseline comparability: No; Blind subjects: No; Blind therapists: No; Blind assessors: Yes; Adequate follow-up: Yes; Intention-to-treat analysis: Yes; Between-group comparisons: Yes; Point estimates and variability: Yes] – it was difficult to determine some of these variables so when unsure I said “No” | Level 2 (quantitative individual study w/ strong design) | High: ((acute CVA population, BWSTT vs conventional (overground)PT, looked at FIM and gait measures including stride length, step width, step asymmetry, gait speed, met inclusion criteria (more men than women and greater than 48 y.o. avg age)). | Randomized Controlled Trial (RCT) |
| Gama GL, Celestino ML, Barela JA, Forrester L, Whitall J, Barela AM (2017) | PEDro: 6/10 🡪 good (Eligibility criteria: Yes; Random allocation: Yes; Concealed allocation: No; Baseline comparability: Yes; Blind subjects: No; Blind therapists: No; Blind assessors: No; Adequate follow-up: Yes; Intention-to-treat analysis: Yes; Between-group comparisons: Yes; Point estimates and variability: Yes) | Level 2 (quantitative individual study w/ strong design) | Moderate: (inclusion criteria met but focuses on chronic stroke and the groups were overground w/ BWS vs treadmill and BWS when I wanted to look at BWS vs overground without BWS, Additionally the population and measures looked at seemed a little too high level for the patient I originally had in mind for my PICO). | Randomized Controlled Trial (RCT) |
| Bonnyaud C, Zory R, Robertson J, Bensmail D, Vuillerme N, Roche N (2013) | PEDro: 4/10 🡪 fair (Eligibility criteria: Yes; Random allocation: Yes; Concealed allocation: No; Baseline comparability: Yes; Blind subjects: No; Blind therapists: No; Blind assessors: No; Adequate follow-up: No; Intention-to-treat analysis: No; Between-group comparisons: Yes; Point estimates and variability: Yes) | ~~Level 2 (quantitative individual study w/ strong design)~~ 🡪 Level 3 (study with less rigorous design) – based on the fair grading on the PEDro and design I graded it down | Low: a single session isn’t reflective of the setting (AIR) I was thinking of for this patient, population was more mobile than patient I had in mind (able to walk w/o AD), was looking more at gait parameters instead of outcome measures so did not fit my PICO very closely. | Randomized Controlled Trial (RCT) |
| Bonnyaud C, Zory R, Robertson J, Bensmail D, Vuillerme N, Roche N (2014) | PEDro: 4/10 🡪 fair (Eligibility criteria: Yes; Random allocation: Yes; Concealed allocation: No; Baseline comparability: No; Blind subjects: No; Blind therapists: No; Blind assessors: Yes; Adequate follow-up: No; Intention-to-treat analysis: No; Between-group comparisons: Yes; Point estimates and variability: Yes) | ~~Level 2 (quantitative individual study w/ strong design)~~ 🡪 Level 3 (study with less rigorous design) -based on the fair grading on the PEDro and design I graded it down | Low:population was not acute stroke and were far more mobile than the patient I had in mind for my PICO, the treadmill group did not use the BWS, it was only a single training session instead of multiple sessions so not relevant to acute treatment of stroke but did consider a gait outcome measure. | Randomized Controlled Trial (RCT) |
| Dean CM, Ada L, Bampton J, Morris ME, Katrak PH, Potts S (2010) | PEDro: 8/10 🡪 good (Eligibility criteria: Yes; Random allocation: Yes; Concealed allocation: Yes; Baseline comparability: Yes; Blind subjects: No; Blind therapists: No; Blind assessors: Yes; Adequate follow-up: Yes; Intention-to-treat analysis: Yes; Between-group comparisons: Yes; Point estimates and variability: Yes) | ~~Level 2 (quantitative individual study w/ strong design)~~ 🡪 level 1 (strong design) | High: population was sub-acute and in inpatient rehab so matched really well as well as age and gender, the intervention was looking at exactly what I was thinking (BWST vs overground or even just standing and swaying if individuals couldn’t walk), and the outcome measures were related to gait including 10m walk test, 6MWT and questionnaires. | Randomized Controlled Trial (RCT) |
| Nilsson L, Carlsson J, Danielsson A, et al (2001) | PEDro: 7/10 🡪 good (Eligibility criteria: Yes; Random allocation: Yes; Concealed allocation: Yes; Baseline comparability: Yes; Blind subjects: No; Blind therapists: No; Blind assessors: Yes; Adequate follow-up: Yes; Intention-to-treat analysis: No; Between-group comparisons: Yes; Point estimates and variability: Yes) | Level 2 (quantitative individual study w/ strong design) | High: population was acute in rehab unit with age a little younger fitting my patient as well as having m>f, interventions were exactly what I had in mind, outcome measures were related to gait and had other functional measures including FIM, walking velocity (10m), FAC, Fugl-Meyer stroke assessment, and Berg balance. However, this was an old study. Additionally, the avg stay in the rehab unit for the participants was 67 days which I think is not representative of today. | Randomized Controlled Trial (RCT) |
| Mehrholz J, Thomas S, Elsner B. (2017) | AMSTAR: 14/16 (1-9 = yes, 10 = no, 11-15 = yes, 16 = no) The nos were regarding including funding information. | Level 1 (systematic review/meta-analysis) | Moderate: population was >48 and was looking at stroke populations but it was including acute, subacute and chronic stages of stroke when I was really wanting more acute/subacute for rehab purposes. Additionally, it did include intervention and comparison that I was looking at but also included other comparisons that I was not looking at, the study did look at outcomes related to gait as well as other outcomes. | Meta-analysis |
| Combs-Miller SA, Kalpathi Parameswaran A, Colburn D, et al. (2014) | PEDro: 8/10 🡪 good (Eligibility criteria: Yes; Random allocation: Yes; Concealed allocation: Yes; Baseline comparability: Yes; Blind subjects: No; Blind therapists: No; Blind assessors: Yes; Adequate follow-up: Yes; Intention-to-treat analysis: Yes; Between-group comparisons: Yes; Point estimates and variability: Yes) | Level 2 (quantitative individual study w/ strong design) | Moderate: (was looking at the right intervention and comparison, but the population in this study was a convenient sample of chronic stroke patients ~4/5 years post injury and were able to walk independently so not the population I had in mind. Also, the age and gender fit the population I had in mind. The outcome utilized fit my PICO) | Randomized Controlled Trial (RCT) |

\*Indicate tool name and score

\*\*Use Portney Table 36-1: Summary of Levels of Evidence (2020). If downgraded, indicate reason why.

**BEST EVIDENCE**

The following 2 studies were identified as the ‘best’ evidence and selected for critical appraisal. Rationale for selecting these studies were:

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| Dean CM, Ada L, Bampton J, Morris ME, Katrak PH, Potts S. Treadmill walking with body weight support in subacute non-ambulatory stroke improves walking capacity more than overground walking: a randomised trial. *J Physiother*. 2010;56(2):97-103. doi:10.1016/s1836-9553(10)70039-4   * This article looked at treadmill walking with body weight support in subacute non-ambulatory stroke which was exactly the intervention, comparison, and individual I had in mind when I made my PICO. Additionally, this study had the most participants in all the RCTs I looked at with 126 people. Furthermore, it had the highest PEDro score of 8/10 showing low risk of bias. Although this was the second oldest study I looked at (2010), it met my PICO perfectly making me choose it over others. This study also allowed for adjustments to the interventions to allow individuals to participate in this timeframe of stroke recovery. For instance, these patients may have difficulty walking overground or on a treadmill immediately, so the study allowed for the patients to use orthotics, or parallel bars, etc. Although this may reduce consistency in the protocol and could have been confounding variables in the study, I think it’s more realistic and applicable to physical therapy practice. Additionally, I really appreciated how this article had set standards of positioning for the BWSTT (15 deg of extension in mid-stance for set-up) as well as having a protocol for how to know when to reduce support (swing their affected leg through without help, maintain a straight knee during stance phase without hyperextension, and maintain an adequate step length without help) helping enhance consistency in the treadmill training as there are many factors that can be changed. Also, this study had 94.4% retention 6 months after the study which increases confidence in the intervention as well as being realistic at looking at outcomes once these patients are home. The outcomes utilized in this study included 10m walk test, 6MWT, walk, and questionnaires about walk perception, falls, and community participation. Overall, this article provided a quality study looking at the exact PICO question I had in mind with great participation and protocols to follow.   Nilsson L, Carlsson J, Danielsson A, et al. Walking training of patients with hemiparesis at an early stage after stroke: a comparison of walking training on a treadmill with body weight support and walking training on the ground. *Clin Rehabil*. 2001;15(5):515-527. doi:10.1191/026921501680425234   * Similar to the article above, this study was looking at the effect of walking training on a treadmill with body weight support and walking training on the ground at an early stage of rehabilitation in patients with hemiparesis. Thus, this article again met my PICO perfectly and was similar to the patient I had in mind when I wrote it. I will be honest I was having a hard time choosing between this study and the Lura et al.1 article. I ended up choosing this one because it had baseline similarity in the participants unlike the Lura et al.1 article reducing the bias of the study and enhancing the results seen from the intervention. Although this study was the oldest one (2001), I thought having it relate to my PICO, having less bias, and having higher number of participants mattered more than choosing the Lura et al.1 article that was more recent. This study also was the second highest in terms of the PEDro scale with a 7/10 and was only missing blind subjects, therapists, and intention-to-treat. This study was also similar to the above study in terms of 30-minute sessions 5x a week, both looked at 10m walk test, and had long follow ups (6 month and 10 months). Additionally, this study had 82% retention rate which was reduced from the study above, but this study had a longer follow-up time potentially impacting this. Overall, this article provides a quality study looking at the PICO I had in mind, had reduced bias compared to other studies, and had similar measures that could allow for comparison between the two. |

**SUMMARY OF BEST EVIDENCE**

**(1) Description and appraisal of Treadmill walking with body weight support in subacute non-ambulatory stroke improves walking capacity more than overground walking: a randomised trial by Dean et al., 2010.**

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| **Aim/Objective of the Study/Systematic Review:** |
| The aim of the study by Dean et al. was to determine walking quality comparisons including walking quality, capacity, perception of walking as well as community participation and fall prevention between treadmill walking with body weight support versus assisted overground walking in inpatient rehab setting. |
| **Study Design**  [e.g., systematic review, cohort, randomised controlled trial, qualitative study, grounded theory. Includes information about study characteristics such as blinding and allocation concealment. When were outcomes measured, if relevant]  Note: For systematic review, use headings ‘search strategy’, ‘selection criteria’, ‘methods’ etc. For qualitative studies, identify data collection/analyses methods. |
| This study by Dean et al. is a research study determining secondary outcomes from the Ada et al.9 MOBILISE trial, which was a prospective, single-blind, multicentre, randomised controlled trial. The MOBILISE trial consisted of 126 participants who were unable to walk within 4 weeks (28 days) of having a cerebrovascular accident and were now in inpatient rehabilitation. The rehabilitation protocol differed between patients depending on if they were in the experimental group (treadmill walking with body weight support system) or control group (assisted overground walking). Participants were screened by an individual independent from the study and the study had concealed randomised allocation via computer-generation into the groups for participants. Randomization occurred through stratification by centre (6 locations) and severity (tested by sitting balance [item 3] from Motor Assessment Scale for Stroke as sitting balance has been found to predict walking outcome) using randomly permuted groups of four to six participants.10 That is, individuals who scored 0-3 on the Motor Assessment Scale were randomised apart from those with scores 4-6. As most physical therapy studies go, the therapists and participants were unable to be blinded to the intervention as they were directly participating in it. The patients in the study completed outcome measures focusing on walking quality, walking capacity, perception of walking ability, community participation and falls. Walking quality and capacity were measured at 6 months after admission to the study for only the individuals who obtained independent walking and walking perception, community participation, and falls were measured on all participants despite walking status. These secondary outcome measures were analyzed using independent sample t-tests with a significance level of p<0.05 as well as determining the mean difference between the control and experimental groups and a 95% CI for all outcome measures. The study utilized intention-to-treat analysis to determine outcomes at the time of withdrawal or death using the Kaplan-Meier survival curve analysis.9 This analysis was performed by a biostatistician (MJS) who was blinded to group allocation.9 |
| **Setting**  [e.g., locations such as hospital, community; rural; metropolitan; country] |
| Rehabilitation and data collection occurred from 6 centre locations throughout Australia. These locations included the Prince of Wales Hospital, St. George Hospital, Blacktown and Mount Druitt Hospitals, Bankstown Hospital, Royal Ryde Rehabilitation Centre, and the Kingston Centre.9 Rehabilitation units were included if they met two inclusion criteria. Specifically, the rehabilitation centres had to have acute stroke units on-site or had strong links with off-site units and have recorded volumes of strokes per year and physiotherapist-to-patient ratio.9 |
| **Participants**  [N, diagnosis, eligibility criteria, how recruited, type of sample (e.g., purposive, random), key demographics such as mean age, gender, duration of illness/disease, and if groups in an RCT were comparable at baseline on key demographic variables, number of dropouts if relevant, number available for follow-up]  Note: This is not a list of the inclusion and exclusion criteria. This is a description of the actual sample that participated in the study. You can find this descriptive information in the text and tables in the article. |
| This study undertook an *a priori* power calculation from the primary outcome measures in the original study with the idea that 50% of non-ambulatory patients walk independently by discharge so the study focused on detecting a 25% increase in proportion of non-ambulatory patients walking (i.e., from 50-75%). Thus, the smallest number of participants to find this difference in proportions with 80% power and a two-tailed 5% significance level was 130 participants (65 per group). This study aimed for those 130 total participants and was able to recruit 126 participants over the timespan between August 2002 and September 2008. The individuals were screened by an independent recruit and randomly allocated in experimental or control group by stratification. Individuals were included when they met the inclusion criteria and wanted to participate. Inclusion criteria consisted of being within 28 days of their first stroke, aged between 50 and 85 years, diagnosed clinically with hemiparesis or hemiplegia, and were non-ambulatory. Non-ambulatory status was defined as scoring 0 or 1 on item 5 (walking) of the Motor Assessment Scale for Stroke.10 Patients were excluded if they had: severe cognitive and/or language deficits that disabled the individual from following instructions, clinically-evident brainstem signs, having a cardiac condition that was unstable, or any pre-morbid conditions that precluded the patient from being able to participate in rehabilitation. Once individuals were in a group, sensory loss, spasticity, and neglect was determined to assist in comparison between participants at baseline. There were 126 total participants (55 female, 71 male), with a mean age of 71 years old (SD, 9) and a mean of 17 days (SD, 7) after stroke included in the study.9 At baseline, the participants were similar regarding age, gender, days from stroke to admission to the study, side of hemiparesis, sitting balance, and impairments (sensory loss, spasticity, and neglect).9 Of the 126 participants recruited into the study, 64 individuals were allocated to the experimental group and 62 to the control group. At 6 months after admission to the study, there were 59 participants (loss of 5) in the experimental group and 60 in the control group (loss of 2). The individuals lost in the study were due to dying before discharge (n =2 for both control and experimental groups), died after discharge (n =1 for experimental), and withdrew due to anxiety (n =2 for experimental). |
| **Intervention Investigated**  [Provide details of methods, who provided treatment, when and where, how many hours of treatment provided] |
| *Both Control and Experimental:*  Both groups underwent a maximum of 30 minutes per day of walking practice with assistance from one therapist for 5 days per week until they achieved independent walking or were discharged from the unit. The 30 minutes started and ended when the participant was sitting in the wheelchair. The amount of assistance was standardized to one therapist; however, during set-up additional assistance was allocated. Additional interventions involving the lower extremities (i.e., strengthening exercises, sitting, standing, etc) was also standardized to a maximum of 60 minutes per day as to meet the insurance demands for the setting (AIR). The therapists were given written guidelines that described progression regimes and all PTs were trained in both control and experimental protocols. Years since graduation, highest qualification, and previous research experience was recorded for all physiotherapists to assist in comparisons. 25 PTs were a part of the study with an average of 10 years (SD, 9) since graduation, 6 had postgraduate qualifications (24%), and 12 (48%) had research experience.9 On average, the therapists contributed to the study for 3 years (SD, 2; range, 1-6) and trained 5 participants (SD, 5; range, 1-19) with the majority training both control and experimental groups, except 8 (32%) PTs who only trained 1.9 To verify adherence to these guidelines routine review of recording sheets (information describing features of walking sessions [treadmill speed, weight support or use of aids, distance travelled, amount of assistance]) as well as spot observations were performed.  *Control* |
| The control group involved the intervention of assisted overground walking. Aids were allowed for participants and included knee splints, AFOs, parallel bars, forearm support frames, and walking sticks. If an individual participating in the study was unable to walk with the assistance of the one allowed therapist per the protocol, the therapist would work on practicing similar tasks that could be used to progress walking including standing, shifting weight, and stepping forwards and backwards. Once the participant could walk with the assistance of one therapist, progression began by being instructed to increase their speed, and assistance from both the PT and aids was reduced as able. |
| *Experimental* |
| The experimental group involved the intervention of walking on a treadmill while supported in a body weight supported (BWS) harness. To standardize the initial body weight support, the knee was set within 15 degrees of extension in mid-stance prior to starting as well as having the initial speed of the treadmill so the PT had time to assist the hemiparetic limb during swing phase while the patient maintained a reasonable step length. Similar to the control group, if the individual was unable to walk on the moving treadmill with one person assistance, the study allowed the individual to work on a pre-walking task of stepping on a spot on the treadmill. Once the participant could walk in this BWS harness, the amount of support provided by the harness was reduced. This was determined in a standardized manner. The amount of weight reduced was only allowed when participants could (i) swing their affected leg through without help, (ii) maintain a straight knee during stance phase without hyperextending it, and (iii) maintain an adequate step length without help. Further progression included when a participant attained a speed of 0.4 m/s without the BWS harness, then the individual would work on 10 minutes of the session devoted to overground walking in conjunction with the BWS. These guidelines have been tested for feasibility by Crompton et al.11 |
| **Outcome Measures**  [Give details of each measure, maximum possible score and range for each measure, administered by whom, where] |
| All outcomes were measured by an investigator who was blinded to group allocation. Location not specified.  On entry into the study, the participants had three outcome measures looked at to help determine similarity at baseline. These measures looked at sensory loss, spasticity, and neglect. The presence of sensory loss was measured using the Nottingham Sensory Assessment. This assessment examines tactile sensation, kinaesthesia, and stereognosis.12 For tactile and stereognosis scoring, Dean et al’s study decided to reverse the scores so 0 = normal, 1 = impaired and 2 = absent sensation. Additionally, the Kinaesthesia scoring was reversed as well so 0 =joint position sense, 1 = direction of movement sense, 2 = appreciation of movement taking place, and 3 = absent.12 Spasticity of the ankle plantarflexors was measured using the Ashworth Scale. The Ashworth scale has scores 0 through 4 where 0 = no increase in muscle tone (normal), 1 = slight increase in muscle tone (manifested by a catch and release or by minimal resistance at end-range), 1+ = slight increase in muscle tone (manifested by catch, followed by minimal resistance throughout less than ½ of the ROM), 2 = more increase in muscle tone through most of ROM, but the limb is easily moved, 3 = considerable increase in muscle tone and passively difficult to move, and 4 is a rigid limb.13 Neglect was measured by the line bisection test where 0 is < 5 mm from midline and 2 is > 20 mm.  Additional outcomes were looked at after the study was completed at 6 months. These outcomes looked at walking quality, walking capacity, perception of walking ability, community participation and falls. Only in participants who were able to walk was walking quality and capacity determined. Quality of walking was measured by quantifying speed (m/s) and stride length (cm) during a 10-meter walk test. The timed 10-meter walk test was performed on a 15 m track to allow for acceleration and deceleration and number of steps were counted while the patient walked at their comfortable speed over the 10-meter distance. Walking capacity was measured by quantifying the meters walked on a 6-Minute Walk Test (6MWT). The instructions for the 6MWT were standardised follow Lipkin and colleague protocol. This protocol involves telling participants “Walk as far as possible in six minutes. You can slow down and rest if necessary but at the end of the six minutes you should aim to have been not able to have walked any further in the time,” as well as not providing any encouragement, informing patients at the 3 min mark and at the 1-minute remaining timepoint. For the 6MWT, the individuals in the study could wear shoes and use assistive devices if desired. Rests were permitted and recorded if taken, but the timer did not stop. The range of scores depends on how far the participant goes. However, in stroke populations a suggested minimally clinically important difference (MCID) is 34.4 meters and there has been normative data determined for stroke individuals with a mean of 408 meters and a range from 133-700 meters.14 Walking perception and falls were all measured using a self-reported questions created by Dean et al. Participants were asked on a self-rated question “On a scale of 1 to 10, how do you rate your walking compared with before the stroke?' to determine walking perception. Number of falls was determined by asking the participant “Have you had any falls since discharge from the rehabilitation unit? If yes, how many?” Community participation was measured using a valid measure of lifestyle activities in elderly: the Adelaide Activities Profile. The questions in this outcome measure reflect activities of domestic chores, household maintenance, service to others and social activities over the last 3 months. For every activity, the rating has 4 possible responses (0-3) where a higher score means the individual participated in it more. Scores for this outcome measure range from 0-72 with 72 being the individual participating the most in all areas tested. |
| **Main Findings**  [Provide summary of mean scores/mean differences/treatment effect, 95% confidence intervals and p-values etc., where provided; you may calculate your own values if necessary/applicable. You may summarize results in a table, but you must explain the results with some narrative.] |
| Table 1. Mean (SD) or numbers of participants (%) for each outcome in each group and mean or risk difference (95% CI) between groups at 6 months after admission to study1   |  |  |  |  | | --- | --- | --- | --- | | Outcome | Groups | | Difference between groups | | Experimental Group (n = 64) | Control Group (n =62) | Experimental group relative to Control group | | Independent walkers, n (%) | 42/59 (71) | 36/60 (60) | RD 11 (-6 to 27) | | **Walkers only (n = 78)** |  | | | | Walking speed (m/s), mean (SD) | 0.57 (0.36)  n = 38 | 0.47 (0.28)  n = 32 | MD 0.10 (-0.06 to 0.26) | | Walking stride (cm), mean (SD) | 73 (31)  n = 38 | 67 (24)  n = 32 | MD 6 (-7 to 19) | | Walking capacity (m), mean (SD) | 240 (130)  n = 37 | 183 (99)  n = 33 | MD 57 (1 to 113) | | **All participants (n =119)** |  | | | | Walking self-rating (0 to 10), mean (SD) | 5.0 (2.3)  n = 45 | 4.0 (2.3)  n = 53 | MD 1.0 (0.1 to 1.9) | | Adelaide Activities Profile (0 to 72), mean (SD) | 16 (12)  n = 44 | 15 (8)  n = 49 | MD 1 (-3 to 5) | | Falls, n yes (%) | 28/46 (61) | 25/49 (51) | RD 10 (-10 to 28) | | Falls (n), mean (SD) | 1.2 (1.5)  n = 46 | 1.3 (1.9)  n = 49 | MD -0.1 (-0.8 to 0.6) |   This chart shows all the secondary outcome measures determined at 6 months after the study. Over the six-month period after admission to the study 42 out of the 59 participants (71%) in the experimental group achieved independent walking as compared with 36 out of the 60 individuals (60%) in the control group. Although this is meaningful information, it was not statistically significant as noted by the RD (-6 to 27) including zero in the range. Regarding walking quality and capacity of the independent walkers, the experimental group walked with a mean speed that was 0.10 m/s faster and had a mean stride that was 6 cm longer than the control group. Again, neither of these were statistically significant as -7 to 19 and -0.06 to 0.26 both include zero in the range. However, the experimental group did have statistically significant walking distance in the 6MWT where the experimental group walked a mean distance of 57 m further. Furthermore, there was no statistically significant data for falls and community participation through the Adelaide Activities Profile. At 6 months, the experimental group rated themselves a mean score of 5 on the walking self-rating scale as compared to the control group with a mean of 4.0 which was statistically significant showing that the individuals in the BWS group thought they were walking better compared to the individuals who only performed overground walking. |
| **Original Authors’ Conclusions**  [Paraphrase as required. If providing a direct quote, add page number] |
| The conclusions from this study propose that in acute inpatient rehabilitation, individuals who are non-ambulatory, treadmill walking with body weight support is not detrimental to walking quality compared to assisted overground walking. There was found to be no difference between the groups in relation to speed or stride length. However, despite a wide CI, treadmill walking with body weight support resulted in a greater capacity for walking as seen on the 6MWT. This increased capacity is accompanied by a higher rating of walking by the experimental group compared to the control group by 10%. Although individuals have higher self-report of walking ability with treadmill walking with bodyweight support, there was no difference in community participation and falls between the groups. |
| **Critical Appraisal** |
| **Validity**  [Summarize the internal and external validity of the study. Highlight key strengths and weaknesses. Comment on the overall evidence quality provided by this study.] |
| This study is a prospective, single-blind, multicentre, randomised controlled trial making it a level 2 study design based on the Portney rating scale. However, with the study’s good validity as noted by its’ 8/10 PEDro scoring and its strategic and elaborate design, it could be ranked higher at a level 1 study. The 8/10 PEDro scoring was determined by the study having eligibility criteria, random allocation to groups, concealed allocation, similar groups at baseline, blinding of assessors, outcomes obtained from more than 85% of participants, intention-to-treat, between-group statistical comparison, point measures, and measures of variability. One of the main strengths of this study relative to the clinical question in mind, is that the entire population utilized in this study (n = 126) were at the same motor level (non-ambulatory) and in the same setting (acute inpatient rehabilitation) as the patient in question enhancing the generalizability to the PICO. Additionally, the clinical question in mind was after gait motor outcomes and this study utilized multiple outcomes such as stride length, speed, walking capacity enhancing the generalizability as well as considering additional measures that would be beneficial to know for determining discharge (like walking ability) such as falls risk, walking perception, and community participation. However, a weakness of the study is the participants were aged between 50-85 years old with the mean age of 71 (SD, 9).9 The patient in question was only 48 years old, so despite this being close to the range of ages utilized in this study, the mean age and range differences could reduce the relevance and external validity of the study. Another weakness of this study is the lack of data of walking outcomes at the beginning of the study as well as follow-up after 6 months reducing the internal validity of the study. Having this data would have helped have a comparison too to see if the interventions truly were helping the outcomes seen occur or if the individual had those results to begin with. Furthermore, if the study had looked at the outcomes further out from 6 months, perhaps it could have assisted in determining the benefits of the intervention long-term and if the benefits last over time. This could have assisted in enhancing the accuracy of the data and decreased the amount of attrition. Another weakness of this study was a lack of control group who did not receive either overground or body weight support treadmill training to see if the interventions were truly the reason the outcomes were seen rather than the additional rehabilitation provided in the rehab setting. This reduced the internal validity of the study as one cannot fully give credit of the results to solely the interventions provided when the participants were getting additional interventions too. Despite the lack of additional times for measuring outcomes, the internal validity was enhanced as the Dean et al. study provided compliance with the program data. 85% of possible sessions were completed in the experimental group and 89% of possible sessions in the control group showing that the participants and therapists were sticking to the protocol and study enhancing the likelihood the results were from the interventions provided. This study overall had valuable external validity as the intervention, population, comparison, and outcome were directly related to the clinical question, but could have been slightly more similar in age. Additionally, the internal validity of the study could be improved with further outcome measures both at the beginning of the study and further after the study but was enhanced by providing compliance data for the intervention as well as providing very strict protocols and training, so all therapists were providing the same treatments to reduce variation. Overall, the evidence quality regarding validity was good as seen in the PEDro scoring which was only missing blinding of subjects and therapists as that is virtually impossible in physical therapy and the internal and external validity of the study but could have been made better with the suggestions provided above. |
| **Interpretation of Results**  [This is YOUR interpretation of the results taking into consideration the strengths and limitations as you discussed above. Please comment on clinical significance of effect size / study findings. Describe in your own words what the results mean.] |
| The results of the study showed that when comparing overground assisted walking and bodyweight support treadmill training, they produce similar increases in terms of stride length, walking speed, community participation, and number of falls. However, both groups had very low levels of community participation which is a concern when thinking of the clinical question and how the goal is to discharge home for this patient in mind and community participation is integral to success at home. Thus, perhaps these interventions should be involved with additional items to enhance that aspect of home-life. There were statistically significant differences in walking capacity at almost 60m and perception of walking in the experimental group showing that those who received treadmill training with bodyweight support were able to walk farther. This could enhance their independence to be more likely to discharge home meeting the goal of the PICO and enhance the confidence of patients similar. However, the 0.57 m/s speed achieved by the treadmill group on average is still 0.2 m/s slower than mean walking speed of people after stroke who are considered community ambulators as determined by Perry and colleagues.15 This makes me question the clinical significance of the data and is this speed still meaningful for patients despite not being community ambulators. Furthermore, the almost 60m increase in walking distance in the treadmill group had a confidence interval that was wide suggesting potential uncertainty about the size of the effect of the intervention. Dean et al. also only did walking outcomes on those at 6 months who were independent walkers which loses data from those who were not yet there/may not get there. Stroke recovery can take years and many people do not regain independent walking, so providing additional motor outcomes for those who could not walk by themselves would have been beneficial to assist in determining differences between measures for a wider population of stroke patients. The study utilized questionnaires that required cognitive ability to understand which reduced the participants who could join. Strokes can affect any part of the brain which means cognition is often impacted so this exclusion criteria made this study less generalizable and less meaningful to the stroke population as a whole. Overall, the meaning of the results to a physical therapist show that when deciding how to enhance gait outcomes for stroke patients similar to this study, using treadmill with bodyweight support or assisted overground walking can both be beneficial, but if enhancing confidence and walking capacity is the main focus then treadmill training is the better option. |
| **Applicability of Study Results**  [Describe the relevance and applicability of the study to your clinical question and scenario. Consider the practicality and feasibility of the intervention in your discussion of the evidence applicability.] |
| This study is highly applicable to this clinical scenario as the population in this study consists of non-ambulatory stroke patients. The patient I had in mind fit that description exactly. Additionally, the study took place in acute inpatient rehabilitation which was the setting I was helping the patient and where I was curious of the implementation of these two different interventions (overground vs treadmill training). The patient I had in mind was also in his late 40’s and this study included a range of ages that were closer to his age as compared to other studies I looked at. The aims of the study align with my clinical question as the researchers investigated different gait motor outcomes including walking quality byway of stride length and walking speed, but also walking capacity and perception of walking. One of the findings of this study was that treadmill training had similar outcomes to overground assisted walking and even surpassed overground walking regarding distance travelled in the 6MWT and self-perception of walking ability which could help my patient in mind reach his goals of getting home and being more independent due to walking ability being related to increased possibility of discharging home. Lastly, this study’s results would be practicable and feasible for implementation as most rehab settings have both areas for overground walking as well as BWS treadmills or could get them |

**(2) Description and appraisal of Walking training of patients with hemiparesis at an early stage after stroke: a comparison of walking training on a treadmill with body weight support and walking training on the ground by Nilsson et al., 2001.**

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| **Aim/Objective of the Study/Systematic Review:** |
| Nilsson et al. conducted a multicentre randomized control trial to determine an understanding relative to walking ability, balance, and sensorimotor function by comparing the effects of walking training with bodyweight support treadmill training versus walking training on the ground in the early stage of recovery in patients with hemiparesis after stroke. |
| **Study Design**  [e.g., systematic review, cohort, randomised controlled trial, qualitative study, grounded theory. Includes information about study characteristics such as blinding and allocation concealment. When were outcomes measured, if relevant]  Note: For systematic review, use headings ‘search strategy’, ‘selection criteria’, ‘methods’ etc. For qualitative studies, identify data collection/analyses methods. |
| This study by Nilsson et al. has a multicentre design and is a randomized controlled trial. This study consisted of 73 first stroke patients admitted to a rehabilitation clinic who had hemiparesis. The rehabilitation protocol differed between patients depending on if they were in the experimental group (bodyweight support [BWS] treadmill training) or control group (overground walking group follow the Motor Relearning Program [MRP]). The patients in the study were randomly allocated with sealed envelopes to their groups. Due to the nature of physical therapy where both the clinician and patient are directly involved in physical interventions, it makes blinding near impossible, so the patients and therapists were not blinded in the study. However, the assessor of the outcome measures was blinded. The participants in the study completed various outcome measures related to walking ability, balance, and sensorimotor function at admission, discharge from the rehab, and 10 months after the study. The specific outcomes used were the Functional Independence Measure (FIM), walking velocity for 10 m, Functional Ambulation Classification (FAC), Fugl-Meyer Stroke Assessment and Berg’s Balance Scale. For all the outcome measures, distributions of the variables were given by way of means, SD, medians, and ranges. Additionally, for comparison between BWS treadmill training and overground walking, Fisher’s nonparametric permutation test was used with paired observations using a p < 0.05 (2-tailed) to determine statistical significance. |
| **Setting**  [e.g., locations such as hospital, community; rural; metropolitan; country] |
| Data collection for Nilsson et al.’s study occurred from three hospital and rehabilitation centres in their corresponding inpatient rehabilitation setting in Sweden. Of the 73 total patients, 44 (60.3%) of them came from the Department of Rehabilitation Medicine at Sahlgrenska University Hospital in Goteborg, 17 patients (23.3%) came from the Department of Rehabilitation Medicine at Uppsala University Hospital and the remaining 12 participants (16.4%) came from the Department of Rehabilitation at Lund University Hospital. |
| **Participants**  [N, diagnosis, eligibility criteria, how recruited, type of sample (e.g., purposive, random), key demographics such as mean age, gender, duration of illness/disease, and if groups in an RCT were comparable at baseline on key demographic variables, number of dropouts if relevant, number available for follow-up]  Note: This is not a list of the inclusion and exclusion criteria. This is a description of the actual sample that participated in the study. You can find this descriptive information in the text and tables in the article. |
| This study was able to recruit 73 patients during the years 1995-1999 from 3 hospitals in Sweden. The study did not mention how the participants were recruited specifically or the type of sample. The patients in this study had inclusion criteria including being younger than 70 years of age, having their first stroke with residual hemiparesis, and who were admitted to rehabilitation clinic. Exclusion criteria included patients who had heart disease, such as angina pectoris or congestive heart failure, a psychiatric illness or patients incapable of cooperating, and patients with other severe disabilities (e.g., rheumatoid arthritis) that could interfere with the interventions and training protocol. The study began with 73 total participants with 36 in the treatment group and 37 in the control group. Throughout the study 8 patients dropped out from the treatment group and 5 dropped out from the control group for a total of 28 individuals in the experimental group and 32 in the control group for follow-up. Drop out reasoning included medical reasons, dying, patients refusing to walk on the treadmill, moving, and being no longer interested. Furthermore, one patient who was allocated to the overground group refused that intervention and would only participate in the treadmill group changing their position in the study. Before implementing the interventions for both groups, there was no significant differences between the groups with respect to the patient characteristics (sex, age, type of stroke, lesion location, time post-stroke, time in rehab department) NIH stroke scale score, or the outcome measures examined (FIM, Fugl-Meyer Stoke Assessment, FAC, walking speed, and Berg’s Balance Scale). The demographics for the participants included a mean age of 54 years old in the treatment group and 56 in the control group, ratio (F:M) of 16:20 in the experimental group versus 17:20 in the control, and 22 mean days post stroke for the experimental group and 17 days for the control group. |
| **Intervention Investigated**  [Provide details of methods, who provided treatment, when and where, how many hours of treatment provided] |
| *Both groups:*  Both groups spent an equal amount of duration performing the walking training during the rehabilitation period. Being in a rehab setting, the participants had other types of physical therapy training to improve motor control and to strengthen functionally weak muscles (transfers, ROM, exercises/techniques to help paretic side). Both groups received the same duration of treatment from the rehab team members. LOS in the rehab department varied depending on the participant from 1-4 months, thus the treatment time for the 2 groups varied between 3 and 19 weeks with a median of 68 days in the treatment group and 66 days in the control group.  *Control* |
| The control group received walking training on ground according to the Motor Relearning Programme (MRP) by Carr and Shephard.16 The MRP details were not disclosed in the study or easily accessible to view on other databases. Each participant received individual training by a PT for 30 minutes 5x/wk. This intervention group only walked on the ground and did not train on a treadmill. For the individuals who were not able to walk, additional weight-bearing activities were used: exercises in standing and training to maintain appropriate segmental alignment for balance. The study allowed individuals in this group to use assistive devices and aids when appropriate. |
| *Experimental* |
| The experimental group received walking training through bodyweight support treadmill training. This study utilized the TR SpacetrainerTM and TR equipment AB. The details of the treadmill used include measuring 0.5 x 1.6 m, speed 0-2 m/s, BWS varied between 0-100% of user’s weight. Following the vertical displacement of the body in the BWS, the selected level was chosen to assist in keeping the position constant throughout the gait cycle. To obtain BWS, there were specific tools and set-up. Specifically, the patient wore a harness with adjustable belt around their pelvis attached at 3 points (ventral, lateral, dorsal) to the belt around each thigh, there was shoulder straps to the harness that attached to a lifting strap on a bar at a central point above the participant’s head, adjustable crossbar for hand support in front of patient if needed, emergency stop bottom on the bar to assist in control and safety, speed and distance were monitored on the treadmill screening display, and a wheelchair ramp could be mounted on the treadmill for those individuals who were unable to walk.  The experimental group received 30 minutes of walking training 5x/wk on the BWS treadmill described above. The PT assisted with lifting of the paretic limb if needed as well as additional PT (2 PT’s total) to assist the patient in movements of the leg and trunk during early rehabilitation. If two PTs were used, 1 sat at the side of the treadmill helping guide the hemiparetic leg through the gait cycle (swing phase, extension at hip and knee during stance phase) while the other PT was behind the participant to assist in pelvis movement and weight-bearing of hemiparetic limb during stanch phase. To stimulate the automatic walking through neural circuitry in the body, no verbal instructions were given to the patient. BWS was gradually reduced as able. The BWS level and speed were individually chosen and adjusted to improve at PT’s decision. Resting breaks were allowed to enhance quality of walking. Training occurred in a separate room and individuals were required to wear shoes for safety on the tread. |
| **Outcome Measures**  [Give details of each measure, maximum possible score and range for each measure, administered by whom, where] |
| To determine similarity between groups at baseline, the National Institute of Health Stroke Scale (NIH Stroke Scale) was performed at admission to the department by a physician in the corresponding rehab unit depending on the centre. The NIH Stroke Scale measures the severity of symptoms associated with cerebral infarcts using a retrospective scoring algorithm regarding aphasia, behaviour, cognition, dysarthria, vision, and perception.17 The scale used in this study had a range of scores from 0 to 36 where higher scores indicate greater severity.17 Each item is graded on a 3- or 4-point ordinal scale (depending on which one used) and 0 means no impairment.17 Very severe is considered > 25, severe: 15-24, mild to moderately severe: 5-14, and mild: 1-5.17  The outcomes looked at in the study were chosen due to their established reliability and validity and include the Functional Independence Measure (FIM), walking velocity for 10 m, Functional Ambulation Classification (FAC), Fugl-Meyer Stroke Assessment and Berg’s Balance Scale to examine walking ability, balance, and sensorimotor function. The measurements were taken during admission during the 1-2 days after admission to the rehabilitation department. Furthermore, the Fugl-Meyer Stroke Assessment, FAC, walking test, and BBS were repeated each month (2-3 times in rehab period). Then at discharge and ten months after the onset of stroke, the patient came back to the rehabilitation department for the final assessment. Despite the repetitions during each month for examination of the outcome measures the 3 timeframes of admission, discharge, and 10-mo follow up were used for data analysis. For the FIM outcome measure, the assessment was by observation for admission and discharge by the rehab team (PTs and physician) and by interview at 10-month follow up by the physician. The other outcome measures (walking velocity for 10 m, FAC, Fugl-Meyer, BBS) at admission, discharge and 10-mo follow up were all performed by one of three physiotherapists (one at each centre) who had previously established an understanding of assessment criteria. To reduce bias, all investigators were blinded with respect to allocation of patients after randomization occurred. On average, the time to perform outcomes each timeframe was about one hour.  The Functional Independence Measure (FIM): The FIM Manual number 4.0 of the Swedish translation was used by trained PT observers. This measure consists of 13 motor (eating, grooming, bathing, upper body dressing, lower body dressing, toileting, bladder and bowel management, bed to chair, toilet, and shower transfer, locomotion, stairs) and 5 social-cognitive items (cognitive comprehension, expression, social interaction, problem solving, memory).18 These tasks are rated on a 7-point ordinal scale ranging from total assistance to independence with scores ranging from 18 (lowest) to 126 (highest) indicating level of function.18  The Fugl-Meyer Stroke Assessment: This outcome measure evaluates and measures recovery in post-stroke hemiplegic patients by assessing motor function, sensory function, balance, joint ROM, and joint pain.19 The three-point ordinal scale ( 0 = cannot perform, 1 = performs partially, 2 = performs fully) involves direction observation of the task.19 Scores range from 0 to 226 where 0 is unable to perform any task and 226 is highest motor functioning.19  Functional Ambulation Classification (FAC): The FAC assesses the amount of human assistance needed for ambulation and classifies the assistance level into 6 categories with a score ranging from 0 to 6. The 6 categories are: 0 = patients cannot walk (need help from 2+ people), 1 = patient needs firm continuous support from 1 person to help carry weight and assist in balance, 2 = patient needs continuous or intermittent support of 1 person for balance/coordination, 3 = patient requires verbal supervision or stand-by assist from 1 person with no physical contact, 4 = patient walks independently on level ground but needs help with stairs/slopes/uneven surfaces, and 5 = independent walking by patient despite surfaces.20  Walking test: This outcome measure required the participants to walk 10 metres in a corridor in the rehabilitation setting where the participant wore their desired shoes and assistive devices/aids were allowed. Patients were told to walk comfortably. Time was measured using a stopwatch and number of steps were counted. The speed scores ranged depending on how fast the participant could comfortably walk 10 meters and cadence varied depending on individual. The faster the walk, the better walking ability.  Berg Balance Scale (BBS): The BBS is a 14-item objective measure assessing balance and in turn falls risk through non-vestibular balance tasks and functional mobility.21 Items include static and dynamic activities of varying difficulty, and scores range from 0-4 depending on ability to perform the activity.21 Scores range from 0 to 56 with 0-20 = wheelchair bound, 21-40 = walking with assistance, and 41-56 = independent.21 |
| **Main Findings**  [Provide summary of mean scores/mean differences/treatment effect, 95% confidence intervals and p-values etc., where provided; you may calculate your own values if necessary/applicable. Use a table to summarize results if possible.] |
| Table 1: Outcomes regarding motor performance, walking, and balance of the patients of the 73 patients at admission. The maximum and minimum scores are given in parentheses.   |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Outcome | Treatment Group (n=36) | | | | Control Group (n = 37) | | | | |  | Mean | SD | Mean | Range | Mean | SD | Median | Range | | **FIM** | | | | | | | | | | Motor items (12-91) | 53.7 | 17.7 | 54.0 | 13-88 | 56.1 | 18.0 | 57.0 | 17-86 | | Cognitive items (5-35) | 24.7 | 9.2 | 26.0 | 5-35 | 25.8 | 8.0 | 28.0 | 9-35 | | **Fugl-Meyer Stroke Assessment** | | | | | | | | | | Total score (0-226) | 150.4 | 36.0 | 141.0 | 94-210 | 148.8 | 36.8 | 139.0 | 91-219 | | Upper extremity (0-66) | 24.8 | 22.2 | 13.0 | 0-63 | 22.1 | 22.2 | 10.0 | 4-63 | | Lower extremity (0-34) | 17.4 | 9.2 | 17.5 | 0-32 | 17.0 | 9.0 | 18.0 | 4-34 | | Balance (0-14) | 7.6 | 3.1 | 8.0 | 0-12 | 7.5 | 2.6 | 8.0 | 2-11 | | Sensation (0-24) | 17.1 | 7.7 | 20.0 | 0-24 | 18.3 | 7.7 | 22.0 | 0-24 | | Passive range of motion (0-44) | 42.2 | 2.0 | 42.5 | 36-44 | 42.2 | 2.1 | 43.0 | 35-44 | | Joint pain (0-44) | 42.3 | 1.9 | 43.0 | 38-44 | 42.2 | 2.0 | 42.0 | 35-44 | | **FAC (0-5) median, range** | --- | --- | 0 | 0-5 | --- | --- | 0 | 0-4 | | **Walking speed (m/s)** | 0.4 | 0.2 | 0.4 | 0.1-0.7 | 0.4 | 0.2 | 0.4 | 0.1-1.0 | | **Berg Balance Scale (0-56)** | 23.9 | 19.3 | 23.5 | 0-54 | 23.3 | 16.3 | 25.0 | 0-51 |   For walking speed n = 18 in the treatment group and n = 19 in the control group, the rest could not walk 10 meters.  This assessment of outcomes at admission determined the experimental and control groups did not differ with respect to the effect variables (FIM, Fugl-Meyer Stroke Assessment, FAC, walking speed, and Berg Balance Scale).  Table 2: Outcomes regarding motor performance, walking, and balance of the patients of the 60 patients at 10 months’ follow-up. The maximum and minimum scores are given in parentheses.   |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Outcome | Treatment Group (n=36) | | | | Control Group (n = 37) | | | | |  | Mean | SD | Mean | Range | Mean | SD | Median | Range | | **FIM** | | | | | | | | | | Motor items (12-91) | 81.9 | 9.6 | 86.5 | 57-90 | 80.3 | 15.9 | 86.0 | 18-91 | | Cognitive items (5-35) | 32.0 | 5.0 | 34.0 | 18-35 | 31.5 | 6.6 | 35.0 | 7-35 | | **Fugl-Meyer Stroke Assessment** | | | | | | | | | | Total score (0-226) | 175.5 | 36.9 | 183.5 | 108-226 | 177.6 | 41.0 | 191.1 | 88-221 | | Upper extremity (0-66) | 37.6 | 23.0 | 36.5 | 7-66 | 39.4 | 23.8 | 47.0 | 2-66 | | Lower extremity (0-34) | 25.4 | 5.9 | 26.5 | 16-34 | 25.3 | 7.6 | 26.0 | 4-34 | | Balance (0-14) | 11.1 | 2.2 | 11.0 | 5-14 | 11.5 | 3.3 | 12.0 | 5-14 | | Sensation (0-24) | 19.6 | 5.8 | 22.5 | 4-24 | 20.4 | 5.6 | 23.0 | 2-24 | | Passive range of motion (0-44) | 40.8 | 4.2 | 42.0 | 24-44 | 41.4 | 2.1 | 41.0 | 35-44 | | Joint pain (0-44) | 41.2 | 4.2 | 42.0 | 22-44 | 40.4 | 6.7 | 41.0 | 6-44 | | **Walking speed (m/s)** | 0.7 | 0.3 | 0.6 | 0.2-1.1 | 0.8 | 0.4 | 0.8 | 0.0-1.6 | | **Berg Balance Scale (0-56)** | 48.3 | 11.1 | 53.0 | 16-56 | 47.8 | 13.2 | 52.5 | 4-56 |   After 10 months follow-up, there was no significant difference seen between the groups in all outcome measures. Looking at tables 1 and 2, despite clinical significance, in both groups they still improved greatly in terms of walking velocity. That is, at one month the experimental group had a mean velocity of 0.5 m/s (SD 0.3) with 5 patients couldn’t walk and in the control group the mean velocity was 0.5 m/s (SD 0.3) and five patients couldn’t walk compared to at discharge where the BWS TT group at a mean of 0.6 m/s (+ 0.1 m/s) and 1 individual couldn’t walk and in the control group was 0.6 m/s (+0.1 m/s) and 2 couldn’t walk.  Table 3a: Differences between admission and discharge for outcomes in the treatment and control group. The maximum and minimum scores are given in parentheses.   |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Outcome  Measure | Admission-Discharge | | | | | | | | | Treatment group (n =32) | | | | Control group (n = 34) | | | | | Mean | SD | Median | p-level | Mean | SD | Median | p-level | | **FIM** | | | | | | | | | | Motor item (13-91) | 25.1 | 14.5 | 25.0 | \*\*\* | 20.8 | 12.4 | 21.0 | \*\*\* | | Cognitive items (5-35) | 4.2 | 4.9 | 4.0 | \*\*\* | 4.1 | 4.8 | 2.5 | \*\*\* | | **Fugl-Meyer Stroke Assessment** | | | | | | | | | | Total score (0-226) | 22.0 | 19.8 | 16.5 | \*\*\* | 22.1 | 20.8 | 19.0 | \*\*\* | | Upper extremity (0-66) | 11.1 | 12.4 | 7.0 | \*\*\* | 12.0 | 13.5 | 7.0 | \*\*\* | | Lower extremity (0-34) | 7.4 | 7.2 | 5.5 | \*\*\* | 7.0 | 5.8 | 7.0 | \*\*\* | | Balance (0-14) | 3.4 | 2.8 | 3.0 | \*\*\* | 2.6 | 2.7 | 2.0 | \*\*\* | | Sensation (0-24) | 2.5 | 3.5 | 1.0 | \*\*\* | 2.7 | 5.6 | 0.0 | 0.008 | | Passive range of motion (0-44) | -1.5 | 2.3 | -1.5 | 0.001 | -1.2 | 2.5 | -1.0 | 0.008 | | Joint pain (0-44) | -1.8 | 2.3 | -2.0 | \*\*\* | -1.0 | 2.4 | -1.0 | 0.021 | | **FAC (0-5)** | 2.8 | 1.5 | 3.0 | \*\*\* | 2.6 | 1.6 | 3.0 | \*\*\* | | **Walking m/s** | 0.4 | 0.3 | 0.3 | \*\*\* | 0.3 | 0.3 | 0.2 | \*\*\* | | **Berg Balance Scale (0-56)** | 23.6 | 17.0 | 21.5 | \*\*\* | 21.0 | 14.1 | 17.5 | \*\*\* |   For walking speed n = 14 in treatment group and n = 16 in control group. P-values for the differences are shown, \*\*\* = p<0.001.  Table 3b: Differences between admission and 10-month follow-up for outcomes in the treatment and control group. The maximum and minimum scores are given in parentheses.   |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Outcome  Measure | Admission-10 months’ follow-up | | | | | | | | | Treatment group (n =28) | | | | Control group (n = 32) | | | | | Mean | SD | Median | p-level | Mean | SD | Median | p-level | | **FIM** | | | | | | | | | | Motor item (13-91) | 28.6 | 17.8 | 23.0 | \*\*\* | 25.0 | 16.2 | 27.0 | \*\*\* | | Cognitive items (5-35) | 5.9 | 7.0 | 5.0 | \*\*\* | 6.5 | 7.2 | 8.0 | \*\*\* | | **Fugl-Meyer Stroke Assessment** | | | | | | | | | | Total score (0-226) | 27.3 | 23.6 | 22.0 | \*\*\* | 27.5 | 26.7 | 24.5 | \*\*\* | | Upper extremity (0-66) | 14.4 | 12.8 | 9.0 | \*\*\* | 17.0 | 16.9 | 9.0 | \*\*\* | | Lower extremity (0-34) | 8.6 | 7.8 | 7.0 | \*\*\* | 8.2 | 6.4 | 7.0 | \*\*\* | | Balance (0-14) | 3.7 | 3.0 | 3.0 | \*\*\* | 3.9 | 3.0 | 4.0 | \*\*\* | | Sensation (0-24) | 2.5 | 4.2 | 1.0 | 0.002 | 1.6 | 4.6 | 0,0 | 0.070 | | Passive range of motion (0-44) | -1.3 | 4.0 | 0.0 | 0.083 | -1.0 | 2.3 | -1.0 | 0.023 | | Joint pain (0-44) | -1.0 | 3.9 | 0.0 | 0.187 | -2.0 | 6.3 | -1.0 | 0.034 | | **FAC (0-5)** | 3.3 | 1.7 | 3.5 | \*\*\* | 3.3 | 1.6 | 4.0 | \*\*\* | | **Walking m/s** | 0.5 | 0.2 | 0.5 | \*\*\* | 0.4 | 0.3 | 0.4 | \*\*\* | | **Berg Balance Scale (0-56)** | 24.6 | 17.6 | 21.0 | \*\*\* | 24.3 | 14.6 | 19.0 | \*\*\* |   For walking speed n = 14 in treatment group and n = 16 in control group. P-values for the differences are shown, \*\*\* = p<0.001.  In the within-group comparisons in Table 3a and 3b, it shows the statistically significant improvement in both the both the treatment and control group as noted by all p-values being below 0.05. Utilizing tables 1,2 and 3a and 3b, the timeframe of change for outcomes can be viewed. In the BBS, the treatment group went from a median of 23.5 points to 50 points at discharge and 53 points at follow-up while the control group went from 25 at admission to 50.5 points at discharge to 52.5 points at follow-up. Although the groups did not differ much, these results show both groups improved. Similarly, the FAC had 21 participants (60%) in the experimental group and 19 patients (51%) in the control group couldn’t walk but at follow-up only 3 patients (11%) in the BWS TT group and 3 patients (9%) in the control group couldn’t walk. This is a large increase in functioning for both groups.  Table 4: Results of the motor performance and balance at admission, discharge and 10 months’ follow-up for patients who could not walk 10 m at admission.   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | Outcome Measure | Admission | | | | | | | Treatment Group (n =18) | | | Control Group (n = 18) | | | | Mean | SD | Range | Mean | SD | Range | | **Fugl-Meyer Stroke Assessment** | | | | | | | | Total Score (0-226) | 126.6 | 22.9 | 94-182 | 128.7 | 27.1 | 91-192 | | Upper extremity (0-66) | 11.1 | 10.8 | 0-36 | 11.9 | 15.7 | 4-60 | | Lower extremity (0-34) | 10.8 | 7.1 | 0-28 | 12.8 | 7.9 | 4-28 | | Balance (0-14) | 5.6 | 2.5 | 0-9 | 5.9 | 2.5 | 2-10 | | **Berg Balance Scale (0-56)** | 11.0 | 12.0 | 0-36 | 11.3 | 11.5 | 0-40 | | Discharge | | | | | | | | Outcome Measures | Treatment group (n=17) | | | Control group (n=16) | | | | Mean | SD | Range | Mean | SD | Range | | **Fugl-Meyer Stroke Assessment** | | | | | | | | Total Score (0-226) | 158.7 | 33.1 | 116-226 | 150.6 | 37.2 | 88-215 | | Upper extremity (0-66) | 24.9 | 20.4 | 4-66 | 21.2 | 21.5 | 4-61 | | Lower extremity (0-34) | 23.1 | 5.6 | 17-34 | 21.3 | 7.5 | 4-31 | | Balance (0-14) | 10.6 | 1.7 | 8-14 | 9.4 | 2.9 | 4-14 | | **Berg Balance Scale (0-56)** | 44.0 | 13.0 | 14-56 | 40.9 | 16.7 | 5-56 | | 10 months’ follow-up | | | | | | | | Outcome Measures | Treatment group (n=14) | | | Control group (n=16) | | | | Mean | SD | Range | Mean | SD | Range | | **Fugl-Meyer Stroke Assessment** | | | | | | | | Total Score (0-226) | 163.2 | 34.7 | 122-226 | 152.9 | 42.9 | 88-221 | | Upper extremity (0-66) | 28.4 | 21.8 | 7-66 | 24.3 | 22.3 | 2-62 | | Lower extremity (0-34) | 23.7 | 5.7 | 17-34 | 22.4 | 8.6 | 4-34 | | Balance (0-14) | 10.6 | 2.2 | 5-14 | 10.1 | 2.8 | 5-14 | | **Berg Balance Scale (0-56)** | 46.0 | 11.6 | 20-56 | 43.2 | 17.3 | 4-56 |   Although these patients could not walk 10 m at admission, they still progressed at the same rate in both groups in respect to the outcomes used. This is noted by looking at the mean for each outcome measure and range. |
| **Original Authors’ Conclusions**  [Paraphrase as required. If providing a direct quote, add page number] |
| In the Nelsson et al. study, there was found to be no statistically significant difference between the groups in reference to walking ability, balance, and sensorimotor function as seen in the scores of FIM, walking velocity, FAC, Fugl-Meyer, and BBS at discharge or at the 10-month follow-up, Additionally, participants in both experimental and control groups improved in these variables throughout the duration of the study. |
| **Critical Appraisal** |
| **Validity**  [Summarize the internal and external validity of the study. Highlight key strengths and weaknesses. Comment on the overall evidence quality provided by this study.] |
| This study is a multicentre, randomized controlled trial making it a level 2 study design based on the Portney rating scale. A level 2 study design entails a quantitative individual study with a strong design. When testing this study for validity, the PEDro scoring scale was used. This article scored a 7/10 indicating good validity throughout the study. Specifically, this study had random allocation of the subjects, concealed allocation via envelopes, baseline comparability between the participants (comparing sex, age, diagnoses, brain lesion location, NIH Stroke Scale, time post stroke at start of the training, and time in the rehabilitation department), blind assessors, adequate follow-up, between-group comparisons, and point estimates and variability. However, with most PT studies it is difficult to blind subjects and therapists especially with overground and body weight support treadmill training resulting in no blinding of these individuals and potential bias reducing the internal validity of the study. Furthermore, this study did not have an intention-to-treat analysis reducing it further as not all participants were included in the data analysis. One of the main strengths of this study relative to the clinical question in mind, is that the whole population of participants (n = 73) were comparable at baseline despite differences in individuals in age, NIH score, time since stroke, type of stroke etc. as well as all individuals being in the same setting (inpatient rehab) enhancing the generalizability to the population in mind. The PICO also was after BWS TT and overground walking relative to gait motor outcomes and this study utilized multiple outcomes including FIM, walking velocity for 10 m, FAC, Fugl-Meyer, and even balance which all impact walking ability when using these interventions. Thus, the relevance of this study in comparison to the clinical question was highly correlated heightening the external validity of the study. This study was also unique as the median age of patients at admission was 55 (range 24-67) years so my patient in mind fit within the range and was close to the median age enhancing the internal validity of the study. Additionally, another strength of this article is providing multiple timeframes including baseline, one month, discharge, and ten months to look at outcome measures and comparing different time points. This allows the reader to assess how the outcomes change over time as motor learning takes place for the participant. Similar to the previous article examined, a weakness of this study was the lack of a control group who received just the typical inpatient rehabilitation PT intervention to help isolate the results seen from the bodyweight support treadmill training group and the overground walking group. Because perhaps the results found would have been seen regardless of the groups and it was the typical interventions that were causing the outcomes. This weakness reduces the internal validity of the study as it decreases the believability. Another weakness of this study was the time it was developed (2001) reducing the external validity. This study also included additional details about the treadmill and body weight support set-up to easily understand and follow the protocol which helped to understand the interventions further assisting in the believability of the intervention. It is important to mention, the potential problem of one of the participants being assigned to the control group and refusing the treatment given and insisting on being in the experimental group. This one individual could skew the results as it was not truly random allocation since this patient did not follow their placement. However, thankfully this study had a relatively large sample size of 73 so this one individual does not completely impact the internal validity of the study, but it is important to recognize. There are various factors of this study that impacted the external and internal believability of the study, but overall, it had good validity noted by the PEDro score and was highly relevant to the clinical question at hand. |
| **Interpretation of Results**  [This is YOUR interpretation of the results taking into consideration the strengths and limitations as you discussed above. Please comment on clinical significance of effect size / study findings. Describe in your own words what the results mean.] |
| The results of the study showed that when comparing overground walking training and bodyweight support treadmill training, they produce similar results over time regarding walking ability, balance, and sensorimotor function through the FIM, walking velocity in 10 m, FAC, Fugl-Meyer Stroke Assessment, and BBS. This means that either intervention could be beneficial to use for individuals subacutely after stroke to enhance gait and balance measures assisting in safe discharge home. However, as mentioned as a weakness this is a 20-year-old study. As mentioned in the study the average duration in rehab for the participants was 67 days. Today in inpatient rehabilitation, the average length of stay ranges from 1-2 weeks. Thus, perhaps the results seen from the study could be with the 2-month average stage that was seen in the study and wouldn’t be seen in a 2-week timeframe today. Thus, reducing the effect size and clinical significance of the data found. Also, a strength of the study was the good validity score with 7/10 on the PEDro score, but when examining the p-values of the measures looked at to determine the baseline comparability, the time post stroke at start of training had a p-value of 0.07. This is just barely over the significance level. This makes me question if the groups were truly similar enough at the beginning of the study impacting the clinical significance of the results found. Additionally, this study utilized the MRP programme for the overground training. Thus, for clinicians wanting to see similar outcome results by using this program, it would have been beneficial for the article to provide this data in detail as they did with the bodyweight support treadmill training set-up and protocols given. In the data provided, it did a great job showing the means, medians, ranges, and p-values. However, it did not give the confidence intervals, despite discussing it. This would have been helpful to decipher the variability of the results found to enhance the believability of the study. Lastly, the exclusion criteria of the study eliminate a lot of potential subjects that would better reflect the stroke population enhancing the generalizability and implementation of the results to patients of all kinds. Thus, it would have been helpful to decrease these criteria to reflect the true stroke population. Overall, the meaning of the results to a physical therapist show that when deciding how to enhance gait outcomes for stroke patients similar to this study, using treadmill with bodyweight support or assisted overground walking can both be beneficial. |
| **Applicability of Study Results**  [Describe the relevance and applicability of the study to your clinical question and scenario. Consider the practicality and feasibility of the intervention in your discussion of the evidence applicability.] |
| The results of the Nilsson et al. study is highly applicable to the clinical question at hand as this study aimed to compare the effects of walking training including bodyweight support treadmill training and overground walking which is the exact intervention and comparison I was after in my PICO. Additionally, this study utilized multiple gait outcome measures including FIM, walking velocity for 10m, Fugl-Meyer as well as additional measures (FAC and BBS) and was in the rehabilitation setting helping subacute stoke recovery finalizing the needs of the clinical question. Thus, the relevance of this study compared to the clinical question was highly correlated as all parts of the clinical question were addressed. Additionally, the practicality and feasibility of the intervention is high as the research study was conducted in rehab facilities showing that these tools and interventions are often in this setting where the population desired is. Furthermore, with stroke patients, a focus on return-to-walking is essential so these interventions could easily be integrated into the plan of care that is already made. |

**SYNTHESIS AND CLINICAL IMPLICATIONS**

[Synthesize the results, quality/validity, and applicability of the two studies reviewed for the CAT. Future implications for research should be addressed briefly. Limit: 1 page.]

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| The first study included in the CAT by Dean et al. is highly relevant to the clinical question as the study population consists of non-ambulatory subacute stroke patients in inpatient rehab who underwent either overground assisted walking training or body weight support treadmill training to determine changes in walking quality and capacity, walking perception, community participation and falls. This study also was a prospective study, multicentre study which is ideal for this study as the participants were enrolled before they were able to walk helping see how the interventions utilized assisted in gaining that desired outcome that is so imperative in helping determine discharge recommendations as well as collecting data from various locations to enhance generalizability. The data from the Dean et al. study shows that in terms of independent walkers, walking speed (m/s), walking stride (cm), and communication participation as shown by the Adelaide Activities Profile (AAP), both the BWS TT and overground walking training were similar in their values and all outcomes except the AAP were improvements and positive findings. Furthermore, of importance, this study determined that the intervention group (BWS TT) showed statistical significance as compared to the control group (overground walking) regarding perception of walking and walking capacity (in 6MWT). These data collections indicates that both interventions (BWS TT and overground walking training) can be beneficial tools to utilize to enhance gait outcomes for subacute stroke patients. However, if specifically wanting to address the walking capacity and endurance of individuals with stroke as well as increasing confidence of the individual, then BWS TT should be chosen over overground training. Overall, this study has good validity showing low risk of bias can be readily applied to patients like the population. However, it would be important to examine other relevant evidence and research as well as this study had some flaws relative to lack of outcome measures at baseline, both groups having similar low community participation and prevalent falls, and lack of control group without either intervention. Thus, future prospective studies should involve a control group that does not receive BWS TT or overground training to validate the results seen aren’t from typical physical therapy given in inpatient rehabilitation and focus on helping reduce falls and promote community reintegration as well as gait outcomes.  The second study included in the CAT by Nilsson et al. is also highly correlated to the clinical question as well due to the study population consisting of subacute stroke patients < 70 years old in inpatient rehab who underwent either overground walking training or BWS TT to measure changes in disability, sensorimotor function, walking and balance at various timeframes. This study determined there was no statistically significant difference between the groups in any outcome measure. Furthermore, both groups improved in all variables. This means that when working on gait in acute inpatient rehabilitation setting on stroke patients, either BWS TT or overground training can be beneficial. Overall, this study had good validity with a 7/10 PEDro score showing low bias. However, there were multiple concerns this study showed including almost significant differences at baseline, lack of a control group who didn’t receive any additional therapy. It’s also important to mention that arguably the biggest impact on practical implication for this study is the fact this study is 20 years old, and rehab looks very different now than it did during this study. The individuals in this study were receiving these interventions on average for almost two months, while most patients now are only in rehab for ~ 2 weeks. Thus, future studies should implement this study in a rehab setting that is reflective of the current scenario as well as providing a control group who only received typical PT intervention to help determine better correlation in outcomes seen.  Based on the two studies described above, I conclude that both overground assisted and bodyweight support walking training should be considered and are recommended in the design of a rehabilitation protocol for acute/sub-acute stroke patients in the inpatient rehabilitation setting. To provide the best advice to the patient in this case, I would recommend that the physical therapist utilize both methods of interventions to be able to address gait outcomes as well as balance, sensorimotor, communication reintegration, and falls prevention, but if the there was a need for enhancing confidence in the patient for walking or specifically focusing on walking capacity/endurance then body weight support treadmill training would be the better choice. |

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