CRITICALLY APPRAISED TOPIC

FOCUSED CLINICAL QUESTION

For pediatric patients with cerebral palsy that are using their preferred method of ambulation, will ambulation training using a partial weight-bearing treadmill or an above ground gait trainer, increase their distance ambulated during a timed walk test.

AUTHOR

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CLINICAL SCENARIO

A 12-year-old female with cerebral palsy is coming to physical therapy for difficulties ambulating with and without her gait trainer. The patient is able to ambulate ~ 100ft using a posterior gait trainer, but when placed on a partial weight-bearing treadmill and she can ambulate > 500ft at 0.2mph.

When looking just at her distance walked, it would seem that the partial weight-bearing treadmill would help build muscle and endurance at a faster rate. However, the important question is whether or not the treadmill training will actually transfer to her ability to walk on the ground. If the treadmill training does show greater distance walked on ground, then this is an important treatment for therapists to incorporate in their training sessions.

SUMMARY OF SEARCH

[Best evidence appraised and key findings]

- Eight articles were found using the inclusion/ exclusion criteria. These articles included 2 systematic reviews, 3 randomized controlled trials, 1 quasi- RCT, and 2 cohort studies without controls.
- Both of the systematic reviews that looked directly at the PICO question. Both of these reviews were published in 2009, excluding a lot of recent data.
- Two RCT scored an 8/10 and 6/10 on the PEDRO scale. These were the only two randomized controlled trials that matched the PICO question directly and had matching intervention groups.
- Both the cohort controlled (not randomized) articles matched the PICO question, however, there was no control groups consisting of above ground gait training.
- The other articles were missing the inclusion of "body weight-supported" treadmill training.

CLINICAL BOTTOM LINE

There is a plethora of evidence in support of using treadmill training in children with cerebral palsy. However, there are only a few good quality randomized controlled trials that currently exist. Therefore, the research available does suggest that children with cerebral palsy would improve ambulation endurance and speed after the intervention of body-weight supported treadmill training. Also, frequency, intensity, and duration for treadmill training has not been established. Therefore, additional high-quality evidence is needed to create treatment protocols for therapist.

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

Terms used to guide the search strategy			
Patient/Client Group	**I**ntervention (or Assessment)	**C**omparison	**O**utcome(s)
Pediatric Child Adolescent Juvenile Spastic CP Spastic cerebral palsy Spastic paralysis	Partial weight-bearing treadmill training (PWB-TT) Partial weight-bearing gait training (PWB-GT) LiteGait Training	Body weight supported over-ground training BWS gait training Body weight supported gait training (PWS-GT) Gait trainer Over-ground training	Distance ambulated Meters ambulated Walking distance Walking speed 6-minute walk test Timed walk test

Final search strategy (history):

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

1. **(children AND "cerebral palsy")**
2. (pediatric AND "cerebral palsy")
3. **("body weight supported" OR "partial weight-bearing") AND treadmill)**
4. ("body weight supported" OR "partial weight-bearing") AND gait training)
5. (walk* OR ambulat*) AND distance
6. **(walk* OR ambulat*)**

((((children AND "cerebral palsy"))) AND ((("body weight supported" OR "partial weight-bearing") AND treadmill))) AND ((walk* OR ambulat*))

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

Databases and Sites Searched	**Number of results**	**Limits applied, revised number of results (if applicable)**
PubMed	**17**	**11 - Applied Filters: Clinical Trial, last 10 years.**
CINAHL	**21**	**3 – Applied Filter: RCT.**
Pedro	**7**	**NA**

INCLUSION and EXCLUSION CRITERIA

Inclusion Criteria
Pediatric patients: individuals under 21. Rehabilitative intervention is the task of walking. Outcome measure is limited to walking distance/ and speed. Ambulatory patients with or without AD.

Exclusion Criteria
Extremely high tone patients/ greatly involved quadriplegia. Inability to bear at least partial-weight in bilateral LE. Excluded if orthotics were the primary intervention rather than ambulation. Comorbidities affecting current ability to ambulate; severe contractures, pressure sores, some respiratory conditions.

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).

Author (Year)	Risk of bias (quality score)*	Level of Evidence**	Relevance	Study design
Damiano, 2009.	**AMSTAR (7/11)**	**2a**	**Mod**	**Systematic Review**
Mattern-Baxter, 2009.	**AMSTAR (8/11)**	**2a**	**Mod**	**Systematic Review**
Swe, 2015.	**PEDRO (8/10)**	**1b**	**High**	**RCT**
Willoughby, 2010.	**PEDRO (6/10)**	**1b**	**High**	**RCT**
Dodd, 2007.	**PEDRO (5/10)**	**2b**	**Mod**	**Cohort with Control**
Su, 2013.	**PEDRO (3/10)**	**4**	**Mod**	**Cohort without control**
Emara, 2016.	**PEDRO (6/10)**	**1b**	**Low**	**RCT**
Mattern-Baxter, 2013.	**PEDRO (3/10)**	**2b**	**Low**	**Quasi RCT**

*Indicate tool name and score

**Use Portney & Watkins Table 16.1 (2009); if downgraded, indicate reason why

BEST EVIDENCE

- **Willoughby, 2010.** This study also matched my PICO well and scored a decent score on the PEDRO. It was missing blind therapist, assessor, subjects and intention-to-treat analysis. This was a RCT (high level of evidence).
- **Swe, 2015.** This study matched my PICO question well. The study compared weight-supported treadmill training with overground training in children with CP. It was an RCT and had a high score on the PEDRO (8/10). The only two things missing from the PEDRO were blinding of the therapist and blinding of the subjects. Also, both of these studies were published within the last 10 years.

SUMMARY OF BEST EVIDENCE

(1) Description and appraisal of "Efficacy of partial body weight-supported treadmill training compared with overground walking practice for children with cerebral palsy: a randomized controlled trial" by Willoughby et al. 2010.

Aim/Objective of the Study/Systematic Review:

The aim of this study was to determine if body weight-supported treadmill training 2X/week for 9 weeks for children with cerebral palsy would improve ambulation ability. The comparison being ambulation overground.

Study Design

[e.g., systematic review, cohort, randomized 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.

- Randomized controlled trial
- Participants were divided into two groups to determine if ambulation ability improved more using treadmill training or above ground training.
- 26 children were recruited (15 females and 11 males) aged 5-18 years old.
- Individuals were randomly assigned to the experimental and control group with blocked randomization. Both participants and team members were blinded to the assignments.
- Inclusion criteria included: age 5-18, diagnosis of CP, gross motor function level III or IV. Able to understand simple directions, reliably indicate yes and no.
- Exclusion criteria: need assistance from another person in order to ambulate, concurrent medical condition that posed a safety concern, lower limb orthopedic surgery or Botox in past 6 months.
- Training and interventions were completed with the assistance of two physical therapist who was not blinded to the study.
- Outcome measures were taken at baseline, after completion of interventions (10 weeks) and at follow-up (14 weeks). Outcome measures were done by therapist who were blinded to group allocation.
- To determine baseline differences among groups independent t tests were performed.
- Intention to treat analysis was done for any individuals that dropped out of completed less than 30% of the expected sessions.
- "Effect sizes and 95% CIs were calculated for any comparisons approaching statistical significance. Consistent with Cohen's convention, effect sizes of d less than .20 were considered small, d between .20 and .50 were considered medium, and effect sizes greater than .80 were considered large." (pg 335)

Setting

[e.g., locations such as hospital, community; rural; metropolitan; country]

Metropolitan school for children with physical and intellectual disabilities.

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.

- 26 patients were recruited from school for children with special needs.
- 15 females and 11 males age range 5-18, mean age 10 years old. Experimental group had 6 males and 6 females. Control group had 9 males and 5 females.

- All children were similar eight (mean 32.14-33.44 kg)
- Eight participants were GMFCS level III and 18 were GMFCS level IV.
- Experimental group (n=17) 5 within experimental group withdrew due to surgeries and developmental of cranial cysts. At the 10 week mark the experimental group (n=12)
- Control group (n=16). Two withdrew for control group due to back pain and surgery. At week 10 (n=14). At 24-week follow-up both groups had n=11.

Intervention Investigated

[Provide details of methods, who provided treatment, when and where, how many hours of treatment provided]

Control

Participants in the control group used their usual assistive device used to ambulate. These individuals attended session 2X/week for 9 weeks at school. They were supervised by a physical therapist or assistant and the children ambulated in the hallway of the school. The therapist provided assistance and facilitation as needed. Children were encouraged to walk farther and faster at each session.

*Both groups walked for as long as the child would tolerate for a maximum of 30 minutes. Sessions ended when child indicated they wanted to stop or they stop actively stepping.

Experimental

The experimental participants were fitted for a harness and positioned on a hoist over a treadmill. They were given a specific treadmill training program. These children attended a session 2X/week for 9 weeks. Speed at initial visit were determined by starting at lowest speed and gradually increasing until the child could step comfortably forward. All future sessions started at the maximum speed of the previous session. A mirror was placed in front to provide postural feedback to the child.

Key components of the protocol were "(1) systematically reduce body weight support, (2) progressively increase treadmill speed, and (3) emphasize upright standing posture and facilitate the normal kinematic components of the gait cycle." (pg 334)

Training was done in the school during normal hours. The interventions were overseen by physical therapists or supervised assistants.

*Both groups walked for as long as the child would tolerate for a maximum of 30 minutes. Sessions ended when child indicated they wanted to stop or they stop actively stepping.

Outcome Measures

[Give details of each measure, maximum possible score and range for each measure, administered by whom, where]

10-minute walk test: The 10-minute walk test was chosen to measure walking endurance. This test was tested in a 20m oval track with 1m markings. The child was instructed to walk for 10 minutes around this oval and was verbally encouraged to walk as fast as they could. Time per lap was measured and total distance walked was measured. The longer the distance walked the greater the walking speed and endurance.

10-meter walk test: The 10-meter walk test was used to measure speed and walking performance. This test reflects community distances that a child walks in everyday activities like going to the bathroom, changing classrooms, and household distances. This test was completed on a 14m walkway. Children were verbally encouraged to walk as fast as they could without running. Time was recorded. Lower the time to complete 10m the faster the child could ambulate.

School function assessment: The travel subscale of the school function test was used to measure ambulatory functioning. This test was completed by the child's usual school PT who was not blinded in order to ensure familiarity with child's normal function. This test measures ADLS, aerobic capacity, balance, and gait.[11]

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.]

Adherence to training sessions was similar in both groups. The total number of sessions for 9 weeks was 18. The experimental group attended a mean of 14 (range 10-17) and the control group attended a mean of 13 (range 11-17). Absence was mostly due to sickness.

The experimental and control group demonstrated a significant within-group increase in session duration and overall distance walked. No significant difference was found between the groups for the 10-minute walk test or 10-meter walk test or the school function test.

A small, not significant difference was found in walking endurance (10-minute walk test) between 10 weeks and 24 weeks. (P=.097).

Table 4: Results of Walking Assessments at Baseline to 24 Weeks

Outcome Measure	Baseline		24 Weeks		Mean Difference (95% CI)	
	Experimental n=12	Control n=14	Experimental n=12	Control n=14	Experimental	Control
10 MWT (m)	244.33±115.41	118.36±88.89	215.67±142.99	148.43±103.52	−28.67 (−78.10 to 21.66)	30.07 (−6.54 to 66.68)
10m walk (m/s)	0.56±0.34	0.30±0.23	0.49±0.41	0.35±0.26	−0.07 (−0.25 to 0.11)	0.05 (−0.03 to 0.14)
SFA (Travel)	39.17±14.41	42.07±15.04	39.00±12.90	44.50±15.04	0.16 (−7.17 to 6.83)	2.43 (−6.28 to 11.14)

NOTE. Values are mean ± SD.
Abbreviation: SFA (Travel), School Function Assessment Travel scale.

Table 3: Results of Walking Assessments at Baseline to 10 Weeks

Outcome Measure	Baseline		10 Weeks		Mean Within Group Difference (95% CI)	
	Experimental n=12	Control n=14	Experimental n=12	Control n=14	Experimental	Control
10MWT (m)	244.33±115.41	118.36±88.89	219.38±123.71	135.82±95.65	−24.96 (−54.95 to 5.04)	17.46 (−10.66 to 45.59)
10-m walk test (m/s)	0.56±0.34	0.30±0.23	0.56±0.39	0.34±0.27	0.01 (−0.12 to 0.14)	0.04 (−0.04 to 0.13)
SFA (Travel)	39.17±14.41	42.07±15.04	40.00±13.28	47.64±17.29	0.83 (−4.78 to 6.44)	5.57 (−.072 to 11.87)

NOTE. Values are mean ± SD.
Abbreviation: SFA (Travel), School Function Assessment Travel scale.

Original Authors' Conclusions

[Paraphrase as required. If providing a direct quote, add page number]

"This randomized controlled study demonstrated that, for children with moderate to severe walking disability, PBWSTT under supervision is safe and feasible to conduct in a special school setting. However, with no statistically significant difference between the two training groups, PBWSTT was found to be no more effective for improving walking speed, endurance, and walking function at school than practicing overground walking." (pg 336)

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.]

PEDRO 6/10

Strengths: This study provided randomization into experimental and control groups with double-blinding. There was an intervention protocol and the interventions were done at the same school during the same 9 weeks. Two pediatric physical therapists were used throughout the whole study.

Weaknesses: "Power analysis revealed that if this effect size was maintained, a sample size of 25 in each group would be required to detect a significant difference between the groups for the 10MWT." (pg 336). N=11 for both groups is a small sample size with a significant amount of drop out or missed sessions. No direct carry-over with walking environment. GMFCS level IV rely heavily on support to ambulate therefore severity of disability could be a limiting factor. Training intensity and duration was not uniform across groups.

Internal validity: Outside activities, recreation and therapy was not reported therefore limiting the confidence that increase came exclusively from the training.

Positive factors for internal validity are randomization in participation selection and allocation. Drop out was not due to the difficulty of the interventions and instead surgeries and sickness. Measurements pre and post were consistent.

External validity: Inclusion criteria was slightly vague. Exclusion criteria was clear. Situational factors can affect the generalizability (same school, same therapists, time, noise, environment).

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.]

Overall it has been suggested that treadmill training for individuals with cerebral palsy may show more benefits than overground training. However, according to this RCT, both treadmill training and above ground training show similar improvements in ambulation endurance, distance and walking ability. Due to the limitation of this study including sample size, drop out percentage, and lack of definite intervention protocol further study is needed. An additional study should be completed with a larger population of children and more rigorous exercise protocol to determine if significant differences in group could be found. Even without this research it can be concluded that treadmill and overground training work equally for ambulation interventions.

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 fit the clinical question and compared a body weight supported treadmill training with an above ground intervention. The inclusion and exclusion criteria were appropriate for the clinical question. The study design was feasible but requires a lot of follow through from patients and specific protocols for the therapists. It may be slightly unfeasible to obtain a population of children with cerebral palsy with similar GMFM levels, disability, age, gender, and functional level. Therefore, it is hard to generalize this to a clinical setting in which children vary widely.

(2) Description and appraisal of "Over ground walking and body weight supported walking improve mobility equally in cerebral palsy: a randomized controlled trial" by Swe et al. 2015.[3]

Aim/Objective of the Study/Systematic Review:

The aim of this randomized controlled trial is to assess body weight supported treadmill training versus over ground ambulation training for walking ability in children with cerebral palsy.

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.

- Randomized controlled trial
- 30 participants were recruited with cerebral palsy, aged 6 – 18 years old. Participants were randomly allocated to a group by opening envelopes containing group number. The team member giving the envelopes was blinded.
- A power calculation utilizing a clinically acceptable change in walking speed of 0.1m/s and a standard deviation of 0.09 from the literature indicated that with a power of 0.8 and an alpha of 0.05, 14 participants per group would be required.
- Exclusion criteria included visual impairments, medical conditions that posed threat to child's safety, lower limb orthopedic surgery, Botox injections in last 6 months.
- Training consisted of 2 X 30 minutes interventions per week for 8 weeks. Protocol for intervention was (i) systematically reduce body weight support, (ii) progressively increase treadmill speed, and (iii) emphasize upright standing posture and facilitate the normal kinematic components of the gait cycle.
- Six-minute walk test, ten-meter walk test, endurance, functional gait, GMFM were performed by two physical therapist that were blinded to the study. Repeated at 4 weeks and 8 weeks.
- The treadmill and over ground training groups were compared for gender and Gross Motor Function Classification System level using Chi Squared analysis, and for age and total number of minutes spent in training using independent samples t-tests.
- 1- meter walk speed, 6-minute walk time and Gross Motor Function Measures were compared using independent samples t-tests.
- A general linear model analysis of variance (GLM ANOVA) with time and group allocation as factors.
- For outcome measures where no differences were found between groups, data for the two groups were combined and repeated measure ANOVAs were then used to assess the changes over the three time points of baseline, week 4 and week 8. For all tests significance was set to an alpha of 0.05.

Setting

[e.g., locations such as hospital, community; rural; metropolitan; country]

A Special Needs school in Singapore.

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.

- 37 children were screened for inclusion and 30 children enrolled. Children were aged 6 – 18 years old with cerebral palsy and classified on the gross motor function classification system score at II or III. They were recruited from a special needs school.
- 20 (66%) of the children were male with a mean age of 13.2 years.
- No significant difference between the two groups for demographic characteristics or baseline outcome measure.
- Inclusion criteria included diagnosis of cerebral palsy, GMFCS level II or III. Exclusion criteria included visual impairments, medical conditions that posed threat to child's safety, lower limb orthopedic surgery, Botox injections in last 6 months.
- Ethical approval was obtained, and informed consent was provided from the parents or guardians of each participant.
- All participants were receiving physical therapy in the schools setting and continued to receive therapy outside of this study.

Intervention Investigated

[Provide details of methods, who provided treatment, when and where, how many hours of treatment provided]

Control

Each participant practice over ground walking using their usual ambulation assistive device.

Participants were assisted into their walking device and practice walking in the school hallways outside the physical therapy room.

The physical therapist provided assistance and facilitation of gait when needed. At each session children were encouraged to walk faster and for longer.

Children walked for a maximum of 30 minutes and the sessions finished before 30 minutes only if the participate indicated to stop or stop stepping.

Experimental

Each participant was fitted with a harness which was attached to the hoist and positioned over the treadmill. The child's feet were positioned centrally on the treadmill. A physical therapist was providing assistance throughout session.

Treadmill speed at first session was determined by starting at the lowest speed and gradually increasing until the child could step comfortably (0.1km/h increments).

At future sessions, the treadmill speed started at the maximum speed the child walked at the previous session. The speed was increased as tolerated.

Warming-up and cooling- down were provided for 30 seconds each before and after the session. Children were allowed to take rests breaks during session if needed.

Children walked for a maximum of 30 minutes and the sessions finished before 30 minutes only if the participate indicated to stop or stop stepping.

Outcome Measures

[Give details of each measure, maximum possible score and range for each measure, administered by whom, where]

All outcome measures were performed by the same two experienced pediatric physical therapists. Assessments were performed at baseline, 4 weeks, and 8 weeks.

Six Minute Walk: The six-minute walk test measures walking endurance in children. Participants are encouraged to walk as quickly as possible along a 30m corridor. During the test a physical therapist walks beside the child to verbally encourages them. Participants are encouraged to cover as much distance as possible, while allowing for individual to vary pace and rest as needed. Total distance walked is recorded. The longer the distance recorded the great the child's walking endurance.[9]

Ten Meter Walk: The ten-meter walk test has been shown to be a reliable and valid measure of walking ability in children with neuromuscular disabilities. This test represents the typical distance a child needs to walk with everyday activities (between classrooms, to bathroom, within home). Participants are encouraged to walk as quickly as they can without running along a 10m hallway. A physical therapist walks along side to encourage child. Time the child walks 10m is recorded. The less time is takes to walk 10 m, the greater the child's speed of walking and ability to walk. [10]

Gross Motor Function Measure (GMFM): This measure is a standardized observational assessment designed to measure change in gross motor function in children with cerebral palsy. The original 88-item measure (GMFM-88), used in this study. There is a four-point scoring system for each of the items on the scale and the assessment is divided into five categories: lying and rolling, sitting, crawling and kneeling, standing, and walking, running and jumping. The scores can be summed to calculate raw and percent scores for each of the five dimensions. Only the categories of standing and walking (items 52–88) was administered to the participants at the baseline, week 4 and 8, as they relate to aspects of standing and walking.

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.]

There was no effect of group allocation on any of the outcome measures, however all outcome measures showed a significant change with time as the factor.

The 10-meter walk test underwent a further analysis from baseline to 4 weeks and 8 weeks. Mean score change differed significantly between the two groups after 4 weeks but was similar at 8-week follow-up.

There was no significant difference between the two groups for change in scores from baseline to 4 weeks to 8 week in any other outcome measures (P<0.1).

Table 3. Outcome measures at weeks 4 and 8 of training, and results of the ANOVA comparison with baseline. All results are mean (SD).

		Treadmill group (n=15)	Overground group (*n*=15)	Time	Group	Time*grou *P*
10 mwt (m/s)	Week 4	1.031 (0.357)	0.853 (0.266)	F = 48.408, *P*<0.001	F=1.417, *P*=0.244	F=5.185, P=0.012
	Week 8	1.082 (0.352)	0.978 (0.299)			
6mwt (m)	Week 4	236.93 (96.12)	233.73 (98.77)	F=26.057, *P*<0.001	F=0.092, *P*=0.764	F=1.090, *P*=0.350
	Week 8	250.60 (110.86)	249.27 (107.84)			
GMFM (D)	Week 4	71.47 (22.93)	71.27 (15.42)	F=117.259, *P*<0.001	F<0.001, *P*=0.967	F=1.472, *P*=0.247
	Week 8	77.73 (21.73)	79.13 (14.22)			
GMFM (E)	Week 4	46.73 (27.89)	47.40 (20.56)	F=47.843, *P*<0.001	F=0.008, *P*=0.931	F=0.433, *P*=0.653
	Week 8	54.13 (28.25)	56.33 (23.05)			

GMFM: Gross Motor Function Measure.

Original Authors' Conclusions

[Paraphrase as required. If providing a direct quote, add page number]

"This study has shown that both over ground and partial body weight supported treadmill training provide comparable functional improvements in mild to moderately disabled children with cerebral palsy over an 8-week intervention period. Both our intervention and control groups showed improved walking speed, walking endurance, and Gross Motor Function Measure sub-scores D and E. Additionally, we have shown that improvements can be seen after a short 4 week intervention, and that continuing the intervention for a further 4 weeks provides further significant improvements in these outcome measures." (pg. 1113)

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.]

PEDRO 8/10.

Strengths: Allocation into groups was blinded and randomized. Each participant was assessed at the same school, similar times, by the same two physical therapists. All children participated in the 8 weeks study at the same time and used the same outcome measures. No participants dropped out, and all participants missed two sessions due to closing of the school.

Weaknesses: Average time spent walking varied greatly between groups due to allowing the children to decide when the intervention sessions would end. Carry-over effects were not addressed. Only 3 outcome measures were used, and specific gait parameters were not recorded. Outside physical therapy interventions was not monitored or controlled for. Physical therapists were not blinded to the treatment and levels of assistance and facilitation were not uniform in all participants.

Internal Validity: In this study one cannot be confident that other variables explain the findings. For example, time spent walking during sessions varied greatly, outside therapy was being performed, and it is possible the children were involved in outside activities. Survey should have

been administered to determine outside activity level. Randomization, blinding, and study protocol did improve internal validity.

External Validity: This study included detailed exclusion criteria and decent inclusion criteria. Situational factors such as time of day, location, noise could have reduced external validity.

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.]

Both body weight supported treadmill training and over ground ambulation training shown significant improvements in children with cerebral palsy's walking endurance, speed and ability. However, there is not a significant difference in improvement between treadmill training and above ground training in an 8-week program. Overall, it can be concluded that ambulation training in children with CP 2/week for 8 weeks can improve their ambulation ability. However due to significant variations in intervention protocols, situational factors, and possible outside environmental factors, further research should be conducted to determine if one is better than the other. Also, a longer intervention duration should be assessed.

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 has high applicability to my clinical question. The aim of this study and y clinical questions are the same (does body weight supported treadmill training or above ground ambulation training shown ambulation improvements in children with CP). The patient demographics and the intervention and control group were appropriate. Outcome measure used and intervention frequency and duration were feasible. It can be concluded that both the groups stated in the clinical questions showed improvements in this study. Further research is needed with improvements in protocol to ensure that both are equally beneficial interventions.

REFERENCES

[List all references cited in the CAT]

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