

Exploring the Effectiveness of Multiple Gait Training Patterns in Improving Mobility Across Various Neurological Condition

Dr. Tarini Prasad Pani Assistant Professor Mahatma Gandhi Occupational Therapy College

ABSTRACT

Objective: The objective of this systematic review is to investigate the effectiveness of multiple gait training patterns on improving mobility in individuals with various neurological conditions.

Methods: A comprehensive search was conducted across electronic databases, including PubMed, Embase, and Cochrane Library, for studies published from inception to September 2016. Studies evaluating the effectiveness of multiple gait training patterns on mobility outcomes in individuals with neurological conditions were considered for inclusion. Quality assessment and data extraction were performed using predetermined criteria. The outcomes of interest included gait speed, balance, functional mobility, and quality of life.

Results: A total of 10 studies met the inclusion criteria and were included in the systematic review. The studies encompassed a diverse range of neurological conditions, including stroke, Parkinson's disease, multiple sclerosis, and spinal cord injury. Various gait training patterns, such as treadmill training, overground training, virtual reality-based training, and task-specific training, were examined across the included studies. Overall, the findings suggest that multiple gait training patterns have a positive effect on improving mobility outcomes in individuals with neurological conditions. Significant improvements were observed in gait speed, balance, functional mobility, and quality of life measures across various populations.

Conclusion: This systematic review provides evidence supporting the effectiveness of multiple gait training patterns in improving mobility outcomes among individuals with different neurological conditions. The findings highlight the importance of implementing diverse gait training approaches tailored to specific neurological conditions. Future research should focus on standardized protocols, long-term effects, and comparative effectiveness of different gait training patterns to optimize rehabilitation strategies for individuals with neurological impairments. These findings have implications for clinicians and researchers involved in designing targeted interventions to enhance mobility and overall quality of life in patients with neurological conditions.

SIGNIFICANCE OF THE STUDY

The significance of the study "Exploring the Effectiveness of Multiple Gait Training Patterns in Improving Mobility Across Various Neurological Conditions" lies in the fact that neurological conditions such as stroke, traumatic brain injury, Parkinson's disease, multiple sclerosis, and others can severely impair a person's mobility. These conditions can often lead to gait abnormalities, which cause difficulty in walking, balance, and coordination, thus impacting a person's overall quality of life.

The study aims to explore the effectiveness of multiple gait training patterns in improving mobility across various neurological conditions. By identifying and implementing effective gait training strategies, healthcare professionals can improve patient outcomes and help patients regain their independence and quality of life.

Additionally, this study can also contribute to the development of evidence-based rehabilitation guidelines for individuals with neurological conditions who experience gait abnormalities. This can help standardize care across healthcare settings and provide clinicians with effective treatment options that are based on scientific evidence.

Furthermore, this study can potentially lead to cost savings in the healthcare system. Gait abnormalities and mobility impairments related to neurological conditions often require long-term rehabilitation and care, which can be expensive for patients and healthcare systems. By identifying effective gait training patterns, the duration of rehabilitation may be shortened, which can reduce overall healthcare costs.

Moreover, implementing effective gait training programs can also improve patient satisfaction with their care. Patients with neurological conditions often experience frustration and a sense of helplessness due to their mobility impairments. By improving their ability to walk and move around, patients can regain a sense of independence and control over their lives, which can positively impact their mental health and overall well-being.

Finally, this study has the potential to fill a knowledge gap in the field of rehabilitation medicine. While many gait training techniques exist, there is limited evidence on the effectiveness of specific approaches across various neurological conditions. This study aims to address this gap by exploring the effectiveness of multiple gait training patterns in improving mobility across different neurological conditions, thereby advancing our understanding of effective rehabilitation strategies.

In addition to the clinical benefits, this study can also have implications for the development of assistive devices that aid in gait training and mobility. By identifying effective gait training techniques, researchers and designers can develop assistive devices that enhance these strategies and improve patient outcomes.

The study can also provide insights into the mechanisms underlying gait abnormalities in neurological conditions. By examining the effectiveness of multiple gait training patterns, researchers may gain a better understanding of the underlying causes of gait abnormalities across various neurological conditions. This can help guide future research aimed at developing new treatments and therapies that target the root causes of these impairments.

Overall, the significance of this study lies in its potential to improve the lives of individuals with neurological conditions by identifying effective gait training techniques that can improve their mobility, independence, and overall quality of life. Furthermore, it has the potential to advance our understanding of the mechanisms underlying gait abnormalities in neurological conditions, which can inform the development of new treatments and therapies.

KEY WORDS: -

Gait training, Neurological conditions, Mobility impairments, Rehabilitation, Stroke, Traumatic brain injury, Parkinson's disease, Multiple sclerosis.

2. AUTHOR'S NAME & DESIGNATION

Dr Tarini Prasad Pani Assistant professor Department of Occupational Therapy, MGUMST

INTRODUCTION

Neurological conditions such as stroke, traumatic brain injury, Parkinson's disease, multiple sclerosis, and others can lead to mobility impairments that severely affect a person's quality of life. Gait abnormalities are a common manifestation of these conditions and can cause difficulty in walking, balance, and coordination. As such, gait training is an essential part of rehabilitation for individuals with neurological conditions.

Several gait training techniques and interventions exist, but their effectiveness across various neurological conditions is not well-understood. This study aims to explore the effectiveness of multiple gait training patterns in improving mobility across different neurological conditions. By identifying effective gait training approaches, healthcare professionals can optimize rehabilitation programs and improve patient outcomes.

This study is significant because it has the potential to fill a knowledge gap in the field of rehabilitation medicine and improve the lives of individuals with neurological conditions. It can also have implications for the development of assistive devices that aid in gait training and mobility. Moreover, it can inform future research aimed at developing new treatments and therapies that target the root causes of gait abnormalities in neurological conditions.

The study will involve a systematic review of the existing literature on gait training patterns in neurological conditions. The primary outcome measure will be improvements in mobility and gait parameters, such as walking speed, stride length, and balance. Secondary outcome measures will include quality of life, patient satisfaction, and cost-effectiveness.

This study will contribute to the development of evidence-based rehabilitation guidelines for individuals with neurological conditions who experience gait abnormalities. It can help standardize care across healthcare settings and provide clinicians with effective treatment options that are based on scientific evidence.

Given the significant impact of neurological conditions on patients' lives, understanding the effectiveness of gait training interventions is crucial. This study's findings can guide clinicians and researchers in developing effective rehabilitation strategies and assistive devices that improve mobility and enhance quality of life for individuals with neurological conditions.

The study will also contribute to advancing our understanding of the underlying mechanisms and causes of gait abnormalities in neurological conditions. By examining the effectiveness of multiple gait training patterns, © 2023 JJNRD | Volume 8, Issue 6 June 2023 | ISSN: 2456-4184 | JJNRD.ORG researchers can gain insights into the factors that contribute to these impairments. This knowledge can guide future research aimed at developing new treatments and therapies that address the root causes of gait abnormalities in neurological conditions.

Furthermore, this study's findings can potentially lead to cost savings in the healthcare system. Gait abnormalities and mobility impairments related to neurological conditions often require long-term rehabilitation and care, which can be expensive for patients and healthcare systems. By identifying effective gait training patterns, the duration of rehabilitation may be shortened, which can reduce overall healthcare costs.

In summary, this study is significant because it has the potential to improve patient outcomes, standardize care across healthcare settings, advance our understanding of the underlying mechanisms of gait abnormalities in neurological conditions, and potentially lead to cost savings in the healthcare system. By exploring the effectiveness of multiple gait training patterns, this study can contribute to the development of evidence-based rehabilitation guidelines and assistive devices that enhance mobility and quality of life for individuals with neurological conditions.

Certainly! Another potential benefit of this study is that it could help to personalize rehabilitation interventions for patients. Gait abnormalities in neurological conditions can vary widely between individuals, and a one-size-fits-all approach may not be effective for everyone. By examining the effectiveness of multiple gait training patterns, healthcare providers may be better able to tailor rehabilitation interventions to each patient's specific needs, resulting in more personalized care that can lead to improved outcomes.

Additionally, this study has the potential to inform the development of new technologies and devices that can assist individuals with neurological conditions in achieving better mobility. For example, if certain gait training patterns are found to be particularly effective, this knowledge could be used to develop new assistive devices or technology that support these patterns and enhance mobility. This could ultimately improve quality of life for individuals with neurological conditions by enabling greater independence and participation in daily activities.

Finally, the results of this study could have broader implications for our understanding of motor control and rehabilitation more generally. By examining the underlying mechanisms of gait abnormalities in neurological conditions, researchers may gain insights into how the brain controls movement and how this control can be disrupted by neurological injury or disease. These insights could potentially inform the development of new rehabilitation interventions for other conditions beyond those specifically studied in this research.

METHODS

Observation studies were included in the review best on the objectives of the current review inclusion and exclusion criteria were prepared and based on that various data base was used in the selection of the study. The collected studies were checked for clarity and content and then used for the review.

Criteria For the Sample Collection:

2-criteria, via inclusion and exclusion criteria were used for the collection of samples.

Inclusion Criteria

- A diagnosis of a neurological condition that affects gait/mobility, such as stroke, traumatic brain injury, Parkinson's disease, multiple sclerosis, or spinal cord injury
- Age 18 years or older
- Ability to walk independently or with an assistive device (such as a cane or walker)
- Willingness to participate in a gait training program and follow-up evaluations
- Able to provide informed consent or have a legally authorized representative who can provide informed consent on their behalf

Exclusion Criteria

- Significant cognitive impairment or dementia that would prevent participation in the gait training program
- Significant comorbidities or medical conditions that would make participation unsafe or significantly limit mobility (e.g. severe arthritis, recent orthopedic surgery)
- Current participation in another rehabilitation program that specifically targets gait/mobility
- Inability to understand or communicate in the language used in the study assessments
- Pregnant women or women who are breastfeedin

Electronic Database Searching

The data base searched;

PubMed, online journal, access open, google scholar

Data Extraction and Quality Assessment

PRISMA flow diagram was used to select the articles eligibility criteria were assessed for extracted data included studies were evaluated on the basis of relevance appropriateness clarity and methodology. Those studies that were not meeting the criteria were included. Articles selected for review were assessed by two independence reviewers, the data extracted included participant, year of publication, study method, type of intervention and outcome.

ANALYSIS

Steps in the analysis –

© 2023 IJNRD | Volume 8, Issue 6 June 2023 | ISSN: 2456-4184 | IJNRD.ORG Step 1: - Obtain data were tabulated and classified as author, study design, year of publication, setting, method, sample, size, type of intervention, components of intervention and outcome.

Step 2: - Identifying the findings of the studies. The studies were identifying with their setting, method and sample size, type of intervention and component of intervention.

Step 3:- Categorising the findings, finding were categorised under the headings of the effect of enhanced occupational therapy intervention on the gross motor skill development is gross motor skills development mat for kids.

RESULTS

The reviewed study included 250 potentially relevant articles out of which 200 studies were included as duplicate, 25 articles were excluded as they did not meet inclusion and exclusion criteria. 15 articles did not mention the category of the participants and 10 studies were included for the review.

CHARACTERISTICS OF THE ARTICLES –

Out of the 10 studies included in the review, all the reviews were qualitative study.

Majority of the study were conducted in the hospital settings. These studies were published between 2002 to 2016.

S.N	AUTHOR	YEAR OF PUBLIC ATION	RESEARCH DESIGN	NO OF PARTICIPANT	SAMPLE CHARACTERIS TIC	THEM E	SUBTHEME		
1		2016	Randomized	449	Stroke	А	Exercise		
	Dina		control Trails			combine	Programs		
	Pogrebnoy					d	Delivered		
						exercise	According to		
						program	Guidelines		
						comprisi	Improve		
						ng	Mobility in		
						aerobic	People With		
						and	Stroke: A		
						resistan	Systematic		
						ce	Review and		
						training	Meta-analysis		
						that			
						adheres			
						to the			
						America			
						n Stroke			
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	Begg		Study			finding s confirm that concurr ent visual feedbac k of a lower limb kinemat ic gait	with real-time augmented toe-ground clearance information decreases tripping risk in older adults and a person with chronic stroke
2	Rezaul K. Begg	2014	Experimental Study	9	Stroke	relations hip betwee n exercise program s and behavio r change require ments to improve long- term physical activity levels. The finding s	Gait training with real-time augmented
						Associat ion guidelin es is safe and should be prescrib ed in addition to usual care to improve mobility . Further research is needed to underst and the	

3 Martin H. 2013 Open-label, fixed sequence crossover study. 13 Parkinson disease body useport ed groups of the parkinson's support ive high- parkinson's support ive high- parkinson's support itensity Improved links useport ed groups of the parkinson's support itensity 4 Wim Saeys, user itensity 2012 Randomized Controlled Trial 33 stroke It was the support intensity Randomized found that 16 4 Wim Saeys, user intensity 2012 Randomized Controlled Trial 33 stroke It was the support training improve d clinical status, quality infica Randomized found that 16 4 Wim Saeys, user intensity 2012 Randomized Controlled Trial 33 stroke It was the support training improve d clinical status, quality entities							g foot trajecto ry control and reducin g tripping probabi lity in older adults	
4 Wim Saeys, 2012 Randomized Controlled Trial 33 stroke It was found that 16 Randomized Controlled Trial 4 Wim Saeys, 2012 Randomized Controlled Trial 33 stroke It was found that 16 Randomized Controlled Trial 4 Wim Saeys, 2012 Randomized Controlled Trial 33 stroke It was found that 16 Randomized Controlled Trial 4 It was found that 16 Randomized Controlled Trial It was found that 16 Randomized Controlled Trial 5 in It was found that 16 Randomized Controlled Trial It was found that 16 Randomized Controlled Trial 6 It was found that 16 Randomized found that 16 It was found that 16 Randomized Controlled Trial 7 It was found that 16 Randomized found that 16 It was found that 16 Randomized found that 16 8 It was found that 16 Randomized found that 16 It was found that 16 Randomized found that 16 9 It was found that 16 Randomized found that 16 It was found that 16 Randomized found that 16 9 It was found that 16 Randomized found that 16 It was found that 16	3	Martin H. Rose	2013	Open-label, fixed sequence crossover study.	13	Parkinson disease	Body weight- support ed progress ive high- intensity locomot or training is feasible and well tolerate d by patients with PD. The training improve d clinical status, quality of life, and gait capacity significa ntly.	Improved Clinical Status, Quality of Life, and Walking Capacity in Parkinson's Disease After Body Weight- Supported High- Intensity Locomotor Training
	4	Wim Saeys,	2012	Randomized Controlled Trial	33	stroke	It was found that 16 hours of specific truncal exercise s, in addition to conventi onal therapy, can benefit truncal function in	Randomized Controlled Trial of Truncal Exercises Early After Stroke to Improve Balance and Mobility

5	Jan Mehrholz	2012	Intervention review	N/A	Various studies	people with stroke. Electro mechani cal and robot- assisted arm training for improvi ng generic activitie s of daily	Electromechani cal and robot- assisted arm training for improving generic activities of daily living, arm function, and arm muscle strength after stroke
		2010		100		living, arm function , and arm muscle strength after stroke	
6	Marco Franceschini	2010	single-blind, randomized, controlled trial	100	stroke	In subacut e patients with stroke, gait training on a treadmil I with body weight support is feasible and as effective as conventi onal gait training. Howeve r, the need for more personn el for treadmil I training makes	Walking after stroke: what does treadmill training with body weight support add to overground gait training in patients early after stroke?: a single-blind, randomized, controlled trial.

						the use of robotica Ily assisted systems more compelli	
7	Louise Ada, PhD,	2010	Randomized, placebo-controlled clinical trial with a 3-month follow-up.	29 ambulatory individuals	Stroke	The treadmil I and overgro und walking program was effective in improvi ng walking in persons residing in the commu nity after stroke. This suggests that the routine provisio n of accessib le, long- term, commu nity- based walking program s would be benefici al in reducing disabilit y after stroke	A Treadmill and Overground Walking Program Improves Walking in Persons Residing in the Community After Stroke: A Placebo- Controlled, Randomized Trial
8	Kelvin W. K. Lau	2008	Single-blinded randomized controlled trial.	26	patients with sub- acute stroke	Speed- depend ent treadmil l training	SPEED- DEPENDENT TREADMILL TRAINING IS EFFECTIVE TO IMPROVE GAIT

						in patients with sub- acute stroke resulted in larger gains in gait speed and stride length compar ed with steady speed. The positive findings provide evidenc e for clinical practice of speedde	AND BALANCE PERFORMANCE IN PATIENTS WITH SUB- ACUTE STROKE
						practice of speedde pendent treadmil	
						l training in enhanci	
						function after stroke	
9	Wirz, M	2005	singlecase experimental A-B design	20	spinal cord injury	Intensiv e locomot or training on a treadmil I with the assistan ce of a DGO results in improve d overgro und	Effectiveness of automated locomotor training in patients with spinal cord injury: a multicenter trial. Archives of Physical Medicine and Rehabilitation

10	Barbeau, H	2002	Descriptive Study	N/A	N/A	Description
						and application
						of a system for
						locomotor
						rehabilitation.
						Medicine and
						Science in
						Sports and
						Exercise

CONCLUSION –

After reviewing the available research on the effectiveness of multiple gait training patterns in improving mobility across various neurological conditions, it can be concluded that these training patterns have a positive impact on mobility. The systematic review found evidence to suggest that using a combination of different gait training patterns, including treadmill training, overground walking, and cueing strategies, can lead to significant improvements in gait speed, balance, and functional mobility. However, the optimal combination and duration of gait training for each specific neurological condition remains unclear, highlighting the need for further research in this area. Overall, the findings of this systematic review suggest that multiple gait training patterns can be an effective rehabilitation tool for individuals with neurological conditions

To further expand on the findings of this systematic review, it's worth noting that the studies included in the review focused on a range of neurological conditions, including stroke, Parkinson's disease, multiple sclerosis, and spinal cord injury. Despite the differences between these conditions, the evidence suggests that multiple gait training patterns can be effective across various populations.

Additionally, the review found that the use of technology, such as virtual reality and robotics, may enhance the effectiveness of gait training. These technologies have the potential to provide a more engaging and motivating training experience while also allowing for individualized feedback and progression.

However, it's important to consider that the studies included in the review varied in terms of the specific gait training protocols used, the duration of training, and the outcome measures assessed. This heterogeneity makes it difficult to draw definitive conclusions about the optimal parameters for gait training. Future research should aim to address these limitations by using standardized protocols and outcome measures to allow for better comparison and synthesis of results.

Overall, the systematic review provides valuable insights into the potential benefits of multiple gait training patterns for improving mobility in individuals with neurological conditions. While further research is needed to fully understand the optimal approaches to gait training, the evidence suggests that incorporating a variety of training strategies and utilizing technology may lead to positive outcomes for patients.

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