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Effect of Kinesiotaping Versus Ankle Foot Orthosis on Balance and Gait Speed in Post-Stroke Subjects

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ABSTRACT

Background and Objective: Stroke often leads to motor impairments such as balance dysfunction and reduced gait speed, which significantly limit functional independence. Restoring balance and walking ability is therefore a primary goal in stroke rehabilitation. Among the various rehabilitation approaches, Kinesio taping and ankle-foot orthosis (AFO) are commonly used interventions to enhance postural stability and gait. However, there is limited evidence directly comparing their effectiveness. Hence, the objective of this study was to evaluate and compare the effects of Kinesio taping versus ankle-foot orthosis, both in combination with conventional physiotherapy, on improving balance and gait speed in post-stroke subjects.

Methods: Quasi-experimental study design, in this study, there were 64 subjects with an average age of over 58.5±6.2 years, a clinical diagnosis of stroke with balance impairment, and who were divided into two groups at randomly. The subjects in Group A (n = 30) received Kinesio taping plus conventional physiotherapy and Group B (n =30) received Ankle foot orthosis plus conventional physiotherapy. Intervention was given to participants for 30minute 5 days a week for 6 weeks. The BBS and gait speed were used to assess the intervention effectiveness.

Results: In Group A, the mean BBS score improves from 39.92±2.19 to 50.23±1.65 ($p<0.001$), with a significant increase in gait speed of 0.432±0.0313 ($p<0.001$). In Group B, the mean BBS score improved from 40.33±2.38 to 44.83 ± 2.26 ($p <0.001$), along with significant improvement in gait speed of 0.468±0.067 to 0.710±0.0035 ($p<0.001$). Between-group comparison showed greater improvement in balance and gait speed in group A compared to group B ($P<0.05$).

Conclusion: The present study concludes Kinesio taping plus conventional physiotherapy group showed significant improvements in balance and gait speed in subjects with post-stroke. However, Kinesio taping plus conventional physiotherapy group is more effective than ankle foot orthosis along with conventional physiotherapy group. Therefore, it may be

recommended from these findings that Kinesio taping may be used as an adjunct to conventional physiotherapy for treatment of improving balance and gait speed in the rehabilitation clinics.

Keywords: Stroke, gait, balance, kinesio taping, ankle foot orthosis, conventional physiotherapy.

INTRODUCTION

A stroke is traditionally defined as a neurological impairment resulting from an acute localized injury to the central nervous system (CNS) due to a vascular origin, which encompasses cerebral infarction, intracerebral hemorrhage (ICH), and subarachnoid hemorrhage (SAH). It stands as a significant contributor to disability and mortality on a global scale.[1]

The World Health Organization characterized stroke as the 'swift onset of clinical symptoms indicating a focal (or global) disruption of cerebral function, persisting for over 24 hours or resulting in death, with no evident cause other than that of vascular origin.2 The incidence of stroke varies from 84-262 per 100,000 individuals in rural regions to 334-424 per 100,000 individuals in urban regions. [2-3]

The occurrence of stroke in men and women also depends on age. It is higher at younger ages in women, whereas incidence increases slightly with older age in men.[4] In addition to balance and gait speed, stroke results in several neuromuscular impairments such as spasticity, muscle weakness, and poor coordination, abnormal tone, impaired proprioception, and an increased risk of falls.[5] These deficits contribute to decreased mobility and functional independence, which subsequently exacerbate balance dysfunction and limit overall motor performance. [4-6]

Balance pertains to the maintenance of the body's center of mass (COM) within its base of support (BOS), which is crucial for ensuring postural stability during both static and dynamic activities. Balance impairment (BI) is frequently observed in individuals who have survived a stroke. This condition has been associated with more severe physical impairments, increased disability, and a diminished quality of life. In stroke patients, balance impairment often arises from several common factors, such as inadequate standing ability, uneven weight distribution, challenges with weight shifting, compromised coordination and somatosensory function, muscle weakness, and heightened postural sway. Moreover, the consequences of balance impairment in stroke survivors can lead to feelings of isolation and depression, a greater likelihood of falls that may cause fractures and other injuries related to falls, a fear of falling, significant restrictions on their activities, a reduced quality of life, and decreased mobility.[7]

The possible factors for balance impairment reported in different literature are severity of stroke, being depressed, older age, female gender, post-stroke duration, abnormal speed of mobility, and decreased level of activity.[8]

Multiple reports have been issued thus far on the prevalence of balance impairments post-stroke, with values ranging from 16.7% to as high as 83%.[9]

Gait speed, which is defined as the rate at which a person walks over a designated distance, serves as a vital measure of functional mobility. In the general population, the average comfortable walking speeds are typically between 1.2 and 1.4 meters per second (m/s). Conversely, individuals who have experienced a stroke frequently demonstrate diminished gait speeds, generally ranging from 0.2 to 0.8 m/s, which is considerably lower than that of their age-matched peers. From a mechanical perspective, to enhance walking speed, it is necessary to make rapid adjustments to the position of the center of mass (CoM), CoM velocity, and body momentum.[10] These modifications necessitate similarly swift adaptations of the base of support (BoS) to prevent falling. Researchers have suggested that falls can be averted by maintaining the center of mass

(CoM) within the feasible stability region (FSR) and the margins of stability (MoS). The FSR is defined as a space where the neuromuscular system can effectively prevent falls by making the required adjustments. The MoS delineates the limits of the FSR, beyond which a fall is likely to happen. [10-11]

Approximately 54–80% of individuals who have experienced a stroke exhibit gait dysfunction. Stroke affects the neural control necessary for the intricate process of walking, resulting in a range of gait alterations, such as a decrease in walking speed. In comparison to the 0.8 meter/second (m/s) threshold needed for safe ambulation, individuals in the acute and subacute phases post-stroke typically have an average gait speed ranging from 0.36 to 0.46 m/s, whereas those with chronic stroke may have a mean gait speed as low as 0.53 m/s. [12]

In stroke rehabilitation, a variety of physiotherapy techniques, including task-oriented training, neurodevelopmental techniques (such as the Bobath approach), proprioceptive neuromuscular facilitation (PNF), and functional electrical stimulation (FES), have been employed to enhance balance and gait speed in individuals recovering from a stroke. These approaches contribute to the improvement of motor control, coordination, and postural stability. Nevertheless, due to challenges in sustaining continuous muscle activation and sensory feedback, supplementary methods like Kinesio Taping (KT) have been introduced to offer additional support, enhance balance, and improve gait performance.

Dr. Kenzo Kaze developed Kinesio taping in 1979, and it has since gained widespread use in rehabilitation. Typically, this involves applying adequate tension along the elastic therapeutic tape while extending the targeted muscle. Kinesio taping can enhance the functional use of both the upper and lower extremities by providing support to weak muscles, alleviating overstretched muscles, and reducing discomfort, thereby improving balance. Kinesio taping has been utilized for a long time as a supplementary method during rehabilitation programs for various conditions to fortify weakened muscles, regulate muscle tone, enhance active range of motion, balance, functional capabilities, and gait performance.[13]

The utilization of KT can diminish the hyperactivity of the gastrocnemius while enhancing the activity of the tibialis anterior (TA) in addressing foot drop (such as neutralizing the foot), and it assists in correcting equinus deformity. Additional benefits of KT include its affordability and straightforward application. KT is primarily utilized on the anterior tibial muscle groups, which encompass the ankle dorsi-flexor and extensor muscles of the big toe and the toes located in front of the tibia. Compared to other treatment methods, KT is relatively simple to apply; when combined with exercise, it may help alleviate pain and improve posture. Furthermore, KT is a technique predominantly employed for the lower extremity rehabilitation of post-stroke patients. In individuals who have survived a stroke, there is an increase in gastrocnemius tension, a weakening of the anterior tibial muscle groups, and inversion of the ankle, which leads to compromised walking ability. Consequently, the application of ankle KT (A-KT) is utilized to rectify foot deformities in stroke patients, and KT is implemented through gastrocnemius inhibition, facilitation of ankle dorsiflexion, and correction of eversion function, which has resulted in enhanced walking capabilities for the patients.[14]

Ankle foot orthosis (AFO) is commonly used to restore a normal, safe walking pattern and to support those who have abnormal gait patterns.[15] AFOs come in a variety of forms and are utilized in a range of models, including articulated, non-articulated, rigid, and dynamic. The most often used brace is the Thermoplastic solid AFO, which is composed of carbon fiber and worn on the lower thigh to hold the foot and ankle in the correct position [15, 16]

An ankle foot orthosis (AFO) is a supportive device designed to regulate the position and movement of the ankle by offering assistance to weak limbs or aligning a limb into a more typical position. AFOs have been utilized in individuals who experience challenges in walking following a stroke, aiming to enhance gait patterns, increase gait speed, and reduce energy expenditure. A key feature of AFOs is their stiffness, which refers to the resistance against rotation at the ankle joint within the sagittal plane, illustrated by the slope of the ankle moment in relation to the ankle angle curve of the AFO. The stiffness of the AFO in the dorsiflexion direction facilitates the storage and subsequent return of energy during the late stance phase of gait, whereas the stiffness in the plantarflexion direction restricts the angle of ankle plantarflexion.[17] There have been numerous studies on using Kinesio taping in post-stroke, but very few studies on comparing the effect of Kinesio taping and ankle foot orthosis on balance and gait speed in post-stroke, so the goal of this study is to determine the effect of Kinesio taping versus ankle foot orthosis on balance and gait speed in post-stroke. Therefore, this study aims to assess The Effect of Kinesio taping and Ankle-Foot Orthosis on Balance and Gait Speed in Post-Stroke Subjects.

MATERIALS & METHODS

This quasi-experimental study was approved by the Ethical committee of GSL Medical College & General Hospital. The study was conducted at Department of physiotherapy, tertiary care teaching hospital affiliated to DR.NTR University during the period of one year. A total 70 subjects were screened in that 64 subjects were recruited to participate in the study and randomized into two groups with 32 subjects in Group-A received Kinesio taping along with conventional rehabilitation and 32 subjects in Group-B received Ankle foot orthosis along with conventional rehabilitation.

Inclusion Criteria: Subjects who had experienced first incidence of stroke clinically confirmed by computerized tomography or magnetic resonance imaging diagnosed by a Neurologist or General physician, Subjects with post-stroke < 6 months, subjects without an allergic reaction to Kinesio taping, subjects who were able to walk for at least 8 meters, Mini-mental state examination score 24-30, Subjects who gave consent to participate in the study.

Exclusion Criteria: Balance impairment not caused by stroke, Cognitive impairment, Cardiorespiratory disorder, Skin disease, Recent fractures in the lower limb were excluded.

Outcome measures: BERG BALANCE SCALE (BBS) [18]: The Berg balance scale quantitatively assesses balance in older adults. In this 14-item scale, patients must maintain positions and complete moving tasks of varying difficulty. Patients receive a score from 0-4 on their ability to meet these balance dimensions. A global score can be calculated out of 56. A 0-20 on the BBS represents balance Impairement,41-56 score on the BBS represents a good balance.

GAIT SPEED [19]:

The subject will be asked to walk for six meters, which includes: one meter for acceleration, four meters with normal speed, and one meter for deceleration. The time was recorded, after three trials, by a stopwatch in the four meters of the normal walking speed. Then, the speed which equals the four-meter distance divided by the time was calculated.

INTERVENTION:

The study consisted of 6 weeks of intervention which includes Kinesio Taping for Group – A and Ankle Foot Orthosis for Group -B. The outcomes were measured by the Berg balance scale and gait speed. All the subjects who were eligible for the criteria were randomly allocated into Group A and Group B.

GROUP A: KINESIO TAPING ALONG WITH CONVENTIONAL REHABILITATION.[20]

The Kinesio taping was given to the muscles of the lower limb which includes tibialis anterior, and gastrocnemius. Facilitating the tibialis anterior muscle. Inhibiting the gastrocnemius muscle.

TIBIALIS ANTERIOR MUSCLE: The Kinesio taping for the tibialis anterior taping method was attached from the origin (2/3 of the outer upper part of the tibia) to the insert (cuneiform bones). Once the length of the muscles was measured with the subject in the supine position, the tape was cut, and then 1/4 of the tape was removed. The proximal end of the tape was attached to the origin by dorsiflexion of the subject's ankle joint at 90◦, and the distal end of the tape was attached to the insertion. The tape was then applied to the skin by sweeping from the distal tape to the proximal tape.

GASTROCNEMIUS MUSCLE [21]: The Kinesio taping for the gastrocnemius muscle was applied in a Y-shaped configuration to facilitate muscle function and control excessive plantarflexion. The base of the Y-tape was anchored at the calcaneus (heel) while the ankle was placed in maximum dorsiflexion to pre-stretch the gastrocnemius muscle. The two tails of the tape were then applied upward along the medial and lateral heads of the gastrocnemius, following their muscle pathways toward the distal femoral condyles. The tape was applied with 15–25% tension, ensuring smooth adhesion without wrinkles. The final step involved gently rubbing the tape from distal to proximal to activate the adhesive and improve circulation beneath the skin. The taping was applied once daily for five consecutive days per week, and this procedure was continued for a total duration of six weeks as part of the rehabilitation program.

FIG 1: Facilitation Technique for Tibialis Anterior Taping Method and Inhibition Technique for the Gastrocnemius Muscle

GROUP B: ANKLE FOOT ORTHOSIS ALONG WITH CONVENTIONAL REHABILITATION [22]

Subjects in group B was received ankle-foot orthosis along with conventional rehabilitation.

An Ankle Foot Orthosis (AFO) is an external supportive device designed to provide alignment, stability, and controlled mobility to the ankle and foot. The AFO used in this study consisted of a lightweight design with three soft adjustable straps, ensuring a secure and comfortable fit for the patient's foot. It can be easily applied and adjusted according to the individual's ankle position. The orthosis effectively restricts excessive ankle movements, particularly plantarflexion, thereby enhancing stability during the stance phase and allowing greater freedom during the swing phase of gait. Regular use of an AFO helps in maintaining ankle stability and alignment, preventing

foot drop, and improving gait parameters, including walking speed, endurance, and balance. Additionally, it contributes to reducing pain and energy expenditure during ambulation. The AFO was prescribed for regular use over a period of six weeks as part of the rehabilitation program.[15]

Fig 2: Ankle Foot Orthosis

CONVENTIONAL REHABILITATION PROGRAM [23]**:** In the conventional rehabilitation program, upper and lower limb exercises were incorporated to improve post-stroke functional recovery. Strengthening exercises for the upper limb were performed using dumbbells, focusing on shoulder abduction and adduction, and elbow flexion and extension, while lower limb strengthening included exercises targeting hip, knee, and ankle muscles. These exercises enhance muscle force, motor unit recruitment, and neuromuscular coordination through repetitive activation, promoting neuroplasticity and improved voluntary control.

FIG 3: Subject was performing strengthening exercises for right lower limb (hip flexion -extension, abduction -adduction by using weight cuffs

FIG 4: Subject was performing knee flexion and extension by using weight cuffs

FIG 5: subject was performing strengthening exercise for upper limb

FIG 6: Subject was performing strengthening exercises for upper limb

Stretching exercises were applied to the upper limb muscles, including biceps, triceps, flexors, and extensors, lower limb muscles, including quadriceps, hamstrings, calf, gluteus muscle to maintain joint mobility, reduce spasticity, and prevent contractures, thereby normalizing muscle tone and facilitating smooth movement.

FIG 7: stretching for upper limb muscles

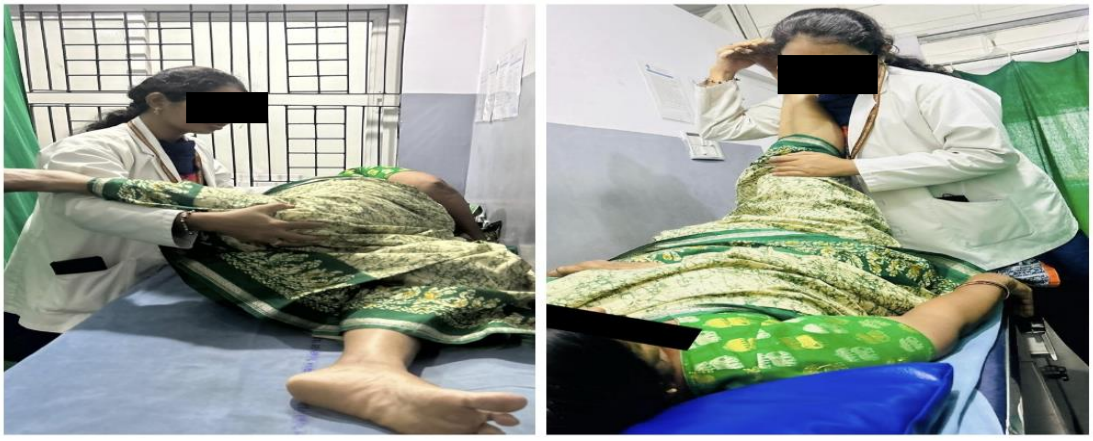

FIG 8: stretching for lower limb muscles

FIG 9: stretching for lower limb muscles

Balance training exercises includes sitting balance exercises (sitting, standing, single leg stance) and dynamic balance exercises (weight shifting, tandem walking, stepping

exercises). Exercises for balance was involve standing with your feet together (a "narrow base support"), standing with one foot directly in front of the other (a "tandem position"), standing with your eyes open and your eyes closed, heel raises, and other similar movements like walking.

Fig 10: Sitting balance exercises (sitting, standing, single leg stance)

FIG 11: Balance exercises (Heel raise, tandem walking)

FIG 12: Stepping exercise

Gait exercises: a) Walking on a straight line: Begin by walking next to a wall with the hand out for support. Gradually decrease the support and increase the number of steps. b) Walking with head in motion: Walk with the head in motion, going from right to left with increasing speed. c) Sitting to standing, then return to sitting: Walk from one chair to another chair, position 10 feet away. Increase difficulty by adding head movements, increasing walking speeds, and decreasing the width of the gait.

FIG 13: Gait training

FIG 14: Gait training

FIG 15: Walking with head in motion

Coordination exercises, such as Frenkel's activities, were included to refine timing, sequencing, and accuracy of movements, enhancing cerebellar-motor cortex communication and improving functional motor control. Collectively, these conventional rehabilitation exercises contribute to improved strength, flexibility, balance, coordination, gait performance, and overall independence in post-stroke patients.

FIG 16: Coordination exercises

Each session lasted 30 minutes, with strengthening exercises performed in 10–15 repetitions per set, stretches held for 15–30 seconds with equal relaxation time, and gait and coordination exercises performed continuously under supervision.

Statistical Analysis

All statistical analysis was done by using SPSS software version 20.0 and MS excel – 2019. Descriptive statistical data was presented in the form of mean ± standard deviation and mean differences, percentages were calculated and presented. Within the groups: Paired student "t" test was performed to assess the statistical difference within the groups for Berg Balance Scale for Balance and gait speed from pre- test and post- test values in post stroke. Between the Groups: Independent student "t" test was performed to assess the statistical difference in mean value between the groups for Berg Balance Scale for Balance and gait speed Data was also tabulated and graphically represented. For all statistical analysis, $P<0.05$ was considered as statistically significant.

RESULT

A total of 70 subjects were screened for eligibility; 64 subjects were included in the study trial they underwent baseline assessment and the subjects who met the inclusion criteria were randomized into two groups. In this study 30 subjects completed training in group A and 30 subjects completed training in group B. with dropouts of 4 in respective groups. The results showed that there is a statistical significance in two groups.

Table-1 Analysis of Mean Scores of Berg Balance Scale with In GROUP A

GROUP A		MEAN	SD	P VALUE	INFERENCE
BBS	PRE TEST	39.92	2.19	0.001	Highly Significant
	POST TEST	50.23	1.65		

The above Table-1 shows that the mean score of Berg Balance Scale changes from pre-test to post-test values with in Group A were found to be statistically significant ($p<0.05$). Group-A Pre-test had a mean score of 39.92, while post-test had a mean score of 50.23, indicating a highly significant difference in post-test values within group A.

Table-2 Analysis of mean scores of berg balance scale with in GROUP B

GROUP A		MEAN	SD	P VALUE	INFERENCE
BBS	PRE TEST	40.33	2.38	0.001	Highly Significant
	POST TEST	44.83	2.26		

The above Table-2 shows that the mean score of Berg Balance Scale changes from pre-test to post-test values with in Group B were found to be statistically significant ($p<0.05$). Group-B Pre-test had a mean score of 40.33, while post-test had a mean score of 44.83, indicating a significant difference in post-test values within group B.

Table-3 Comparison of pre-test mean scores of berg balance scale in between the GROUPS

GROUPS		MEAN	SD	P VALUE	INFERENCE
BBS	GROUP-A	39.92	2.19		
	GROUP-B	40.33	2.38	0.575	Insignificant

The above table-3 shows that the pre-test mean score of berg balance scale between group a and group b were found to be statistically insignificant ($p<0.05$). group-a pre-test had a mean score of 39.92, while group-b pre-test had a mean score of 40.33, indicating an insignificant difference of pre-test values between the groups.

Table-4 Comparison of post-test mean scores of berg balance scale in between the GROUPS

GROUPS		MEAN	SD	P VALUE	INFERENCE
BBS	GROUP-A	50.23	1.65	0.001	Highly significant
	GROUP-B	44.83	2.26		

The above table-4 shows that the post-test mean score of berg balance scale between group a and group b were found to be statistically significant ($p<0.05$). group-a post-test had a mean score of 50.23, while group-b post-test had a mean score of 44.83, indicating a highly significant difference of post-test values between the groups A&B.

Table-5 Analysis of mean scores of gait speed within GROUP A

GROUP A		MEAN	SD	P VALUE	INFERENCE
GAIT SPEED	PRE TEST	0.432	0.049		
	POST TEST	0.797	0.031	0.001	Highly Significant

The above Table-5 shows that the mean score of gait speed changes from pre-test to post-test values with in Group A were found to be statistically significant ($p<0.05$). Group-A Pre-test had a mean score of 0.432, while post-test had a mean score of 0.797, indicating a highly significant difference in pre-test values within group A.

Table-6 Analysis of mean scores of gait speed within GROUP B

GROUP B		MEAN	SD	P VALUE	INFERENCE
GAIT SPEED	PRE TEST	0.468	0.067		
	POST TEST	0.710	0.003	0.001	Highly Significant

The above Table-6 shows that the mean score of gait speed changes from pre-test to post-test values with in Group B were found to be statistically significant ($p<0.05$). Group-A Pre-test had a mean score of 0.468, while post-test had a mean score of 0.710, indicating a highly significant difference in pre-test values within group B.

Table-7 Comparison of pre-test mean scores of gait speed in between the GROUPS

GROUPS		MEAN	SD	P VALUE	INFERENCE
GAIT SPEED	GROUP-A	0.432	0.0491	0.05	Insignificant
	GROUP-B	0.468	0.0676		

The above table-7 shows that the pre-test mean score gait speed between group a and group b were found to be statistically insignificant ($p<0.05$). group-A pre-test had a mean score of 0.432, while group-B pre-test had a mean score of 0.468, indicating an insignificant difference of pre-test values between the groups.

Table-8 comparison of post-test mean scores of gait speed in between the GROUPS

GROUPS		MEAN	SD	P VALUE	INFERENCE
GAIT SPEED	GROUP-A	0.797	0.0313	0.001	Highly significant
	GROUP-B	0.710	0.0035		

The above table-8 shows that the post-test mean score of gait speed between group A and group B were found to be statistically significant ($p<0.05$). group-A post-test had a mean score of 0.797, while group-B post-test had a mean score of 0.710, indicating a highly significant difference of post-test values between the groups A&B.

DISCUSSION

The present study aimed to evaluate the effects of Kinesio Taping and Ankle-Foot Orthosis (AFO) on balance and gait speed in post-stroke Subjects, using the Berg Balance Scale (BBS) and Gait Speed Test as outcome measures. Assessments were conducted at baseline and post-intervention. Group A (Kinesio Taping + Conventional Physiotherapy) and Group B (AFO + Conventional Physiotherapy) each experienced two dropouts due to recurrent stroke or other medical reasons. Results showed significant improvements in balance and gait speed in both groups, indicating that both interventions effectively enhanced post-stroke mobility through different physiological mechanisms.

In Group A (Kinesio Taping), there was a statistically significant improvement in balance as measured by the Berg Balance Scale (BBS) ($P < 0.001$). This finding aligns with the observations of Woo-Il Kim [24], who explained that Kinesio Taping (KT) enhances muscle activation and proprioception by stimulating cutaneous mechanoreceptors, increasing sensory feedback to the central nervous system. The tape's gentle tension lifts the skin, improving local circulation and activating the cutaneous fusi motor reflex, which enhances muscle fiber tension and sensory nerve activity. This process stimulates gamma motor neurons, improving muscle tone, postural stability, and balance control. Similarly, Shin-Jun Park, Tae-Hyun Kim, and Seunghue [25] reported that KT facilitates weak muscles while inhibiting overactive ones, promoting better agonist–antagonist coordination and postural stability through continuous sensory input and motor unit recruitment. Collectively, these mechanisms contribute to better equilibrium and improved balance in post-stroke patients.

Kinesio Taping also produced a significant improvement in gait speed ($P < 0.001$) among participants in Group A Ze Chen and Min Li [26] observed that KT applied to the tibialis anterior and gastrocnemius muscles enhances gait parameters—such as stride length, swing power, and stance phase—by improving ankle stability, proprioceptive feedback, and peripheral circulation. The tape stimulates cutaneous receptors, thereby augmenting sensory input, facilitating motor unit recruitment, and providing structural support to the ankle. Horasa [27] further demonstrated that KT applied to ankle muscles in stroke patients with foot drop improved gait symmetry by activating mechanoreceptors and aiding joint alignment correction. By facilitating dorsiflexor activity and inhibiting excessive plantar flexor tone, KT promotes better ankle stability, muscle coordination, and walking efficiency, resulting in smoother and more symmetrical gait patterns.

In Group B (AFO + Conventional Physiotherapy), there was a significant improvement in balance ($P = 0.01$). Choo and Chang [28] reported that the use of Ankle-Foot Orthosis (AFO) enhances postural stability and functional mobility by maintaining proper ankle alignment and providing external mechanical support. The AFO controls unwanted plantarflexion and stabilizes the ankle, offering a steady base of support that minimizes postural sway and risk of falls. This stabilization facilitates improved control of the body's center of gravity and promotes symmetrical lower-limb loading. Sidra and Tsuchiyama [6,29] also found that AFOs improve balance and

functional independence by preventing foot drop and optimizing ankle–knee coordination. When combined with balance training, AFO-assisted therapy enhances proprioceptive input and joint awareness, leading to better muscle coordination and postural confidence during standing and dynamic tasks.

Furthermore, Group B showed a statistically significant improvement in gait speed (P = 0.001). According to Choo and Chang, AFOs facilitate more efficient walking by assisting dorsiflexion during the swing phase and maintaining ankle alignment throughout the gait cycle. This prevents foot drag and enhances toe clearance, reducing compensatory movements and improving stride length and cadence. Woo-Il Kim added that AFOs support the dorsiflexors and provide a controlled range of motion, enhancing gait efficiency and reducing energy expenditure. However, prolonged use of rigid AFOs may restrict natural ankle movement and decrease muscle activity due to excessive external support. Hence, AFOs should be used alongside active physiotherapy to maintain muscle strength, flexibility, and functional mobility over time.

In conventional physiotherapy, the combination of stretching, strengthening, balance and coordination exercises, and gait training further contributes to functional recovery. Stretching reduces muscle stiffness and spasticity, restoring normal muscle length and joint mobility for smoother movement. Strengthening exercises enhance muscle power and joint stability, especially in the lower limbs, improving postural control and propulsion during gait. Balance and coordination training improve sensory–motor integration, proprioceptive feedback, and interlimb coordination, helping patients maintain equilibrium during standing and walking. Gait training reinforces these gains through repetitive, task-specific practice that promotes neuroplasticity, rhythmic stepping, and symmetrical weight shifting. Together, these exercises enhance neuromuscular activation, postural stability, and movement efficiency, leading to improved balance, increased gait speed, and greater independence in post-stroke individuals.

The study findings indicating that after 6 weeks of interventions Kinesio taping along with conventional physical therapy was more effective than Ankle foot orthosis along with conventional physical therapy on improving balance and gait speed. Thus, this study concludes that Kinesio taping is a useful adjunct in post-stroke balance and gait speed, along with Rehabilitation.

Despite the favorable outcomes observed in the present study, certain limitations were identified like: a) There is no follow up in this study to evaluate the sustained effectiveness of the intervention over time, b) No blinding of evaluators of outcomes was done. Consequently, future research was recommended such as Long-term follow-up assessments could provide valuable insights into the sustained effectiveness of the intervention, Future studies could improve the strength of their findings by using a more rigorous randomization method and incorporation a large sample size.

CONCLUSION

The present study concludes that six weeks of intervention both groups were shown statistically significant improvement in post-test values. However, Kinesio taping along with conventional physiotherapy was more effective when compared to the ankle foot orthosis along with conventional physiotherapy. Thus, the study concluded that Kinesio taping was useful adjunct in physiotherapy to improve balance and gait speed in post stroke subjects.

Declaration by Authors

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REFERENCES

1. Sacco RL, Kasner SE, Broderick JP, et al. An updated definition of stroke for the 21st century: a statement for healthcare professionals from the American Heart Association/American Stroke Association. Stroke. 2025;44(7):2064-89.
2. Feigin VL, Brainin M, Norrving B, et al. World Stroke Organization: global stroke fact sheet 2025. Int J Stroke. 2025;20(2):132-44.
3. Shankaranarayana AM, Gururaj S, Natarajan M, et al. Gait training interventions for patients with stroke in India: a systematic review. Gait Posture. 2021;83:132-40.
4. Kuriakose D, Xiao Z. Pathophysiology and treatment of stroke: present status and future perspectives. Int J Mol Sci. 2020;21(20):7609.
5. Murphy SJ, Werring DJ. Stroke: causes and clinical features. Medicine. 2020;48(9):561-6.
6. Tariq S, Waris A, Iqbal J, et al. Evaluation of balance and orthotic gait training techniques for rehabilitation in hemiplegic stroke patients. Sci Rep. 2025;15(1):15059.
7. Hu Y, Zhong D, Xiao Q, et al. Kinesio taping for balance function after stroke: a systematic review and meta-analysis. Evid Based Complement Alternat Med. 2019;2019:8470235.
8. Gobezie M, Kassa T, Suliman J, et al. Balance impairment and associated factors among stroke survivors in public hospitals of Amhara regional state: a multicenter cross-sectional study. BMC Neurol. 2024;24(1):387.
9. Khan F, Chevidikunnan MF. Prevalence of balance impairment and factors associated with balance among patients with stroke: a cross-sectional retrospective case-control study. Healthcare (Basel). 2021;9(3):320.
10. Vive S, Elam C, Bunketorp-Käll L. Comfortable and maximum gait speed in individuals with chronic stroke and community-dwelling controls. J Stroke Cerebrovascular Dis. 2021;30(10):106023.
11. Capó-Lugo CE, Mullens CH, Brown DA. Maximum walking speeds obtained using treadmill and overground robot system in persons with post-stroke hemiplegia. J Neuroeng Rehabil. 2012;9(1):80.
12. Jasper AM, Lazaro RT, Mehta SP, et al. Predictors of gait speed post-stroke: a systematic review and meta-analysis. Gait Posture. 2025;121:70-7.
13. Wang M, Pei ZW, Xiong BD, et al. Use of Kinesio taping in lower-extremity rehabilitation of post-stroke patients: a systematic review and meta-analysis. Complement Ther Clin Pract. 2019;35:22-32.
14. Park D, Bae Y. Proprioceptive neuromuscular facilitation kinesio taping improves range of motion of ankle dorsiflexion and balance ability in chronic stroke patients. Healthcare (Basel). 2021;9(11):1426.
15. Rao N, Aruin AS. Role of ankle foot orthoses in functional stability of individuals with stroke. Disabil Rehabil Assist Technol. 2016;11(7):595-8.
16. Bethoux F, Rogers HL, Nolan KJ, et al. The effects of peroneal nerve functional electrical stimulation versus ankle-foot orthosis in patients with chronic stroke: a randomized controlled trial. Neurorehabil Neural Repair. 2014;28(7):688-97.
17. Sekiguchi Y, Honda K, Owaki D, et al. Classification of ankle joint stiffness during walking to determine the use of ankle foot orthosis after stroke. Brain Sci. 2021;11(11):1512.
18. Alghadir AH, Al-Eisa ES, Anwer S, et al. Reliability, validity, and responsiveness of three scales for measuring balance in patients with chronic stroke. BMC Neurol. 2018;18(1):141.
19. Stuck AK, Bachmann M, Füllemann P, et al. Effect of testing procedures on gait speed measurement: a systematic review. PLoS One. 2020;15(6): e0234200.
20. Cho KH, Park SJ. Effects of extensor digitorum longus and tibialis anterior taping on balance and gait performance in patient's post-stroke. Healthcare (Basel). 2022;10(9):1692.
21. Liu W, Wu HD, Li YY, et al. Effect of ankle-foot orthosis on paretic gastrocnemius and tibialis anterior muscle contraction of stroke survivors during walking: a pilot study. Biosensors (Basel). 2024;14(12).
22. Hegazy RM, Alkhateeb AM, Abdelmonem AF, et al. Immediate effect of Kinesio tape versus ankle foot orthosis on gait parameters in stroke patients. Turk J Physiother Rehabil. 2021;32(3).
23. Rajalaxmi V, Merlin MVJ. Effect of vestibular rehabilitation versus conventional

therapy for improving balance and gait in post-stroke patients. Int J Biol Pharm Allied Sci. 2025;14(3 Suppl):39-52.
24. Kim WI, Choi YK, Lee JH, et al. The effect of muscle facilitation using kinesio taping on walking and balance of stroke patients. J Phys Ther Sci. 2014;26(11):1831.
25. Park SJ, Kim TH, Oh S. Immediate effects of tibialis anterior and calf muscle taping on center of pressure excursion in chronic stroke patients: a cross-over study. Int J Environ Res Public Health. 2020;17(11):4109.
26. Chen Z, Li M, Cui H, et al. Effects of kinesio taping therapy on gait and surface electromyography in stroke patients with hemiplegia. Front Physiol. 2022; 13:1040278.
27. Horasart A, Klomjai W, Bovonsunthonchai S. Immediate effect of kinesio tape on gait symmetry in patients with stroke: a preliminary study. Hum Mov. 2020;21(1):73-81.
28. Choo YJ, Chang MC. Effectiveness of an ankle–foot orthosis on walking in patients with stroke: a systematic review and meta-analysis. Sci Rep. 2021;11(1):15879.
29. Tsuchiyama K, Mukaino M, Ohtsuka K, et al. Effects of ankle-foot orthoses on the stability of post-stroke hemiparetic gait. Eur J Phys Rehabil Med. 2021;58(3):352.

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