



Comparison of Immediate Effects of Kinesio-taping Versus Sham Taping on Functional Mobility Among Diabetic Neuropathy Patients – A Single Blinded Randomized Control Study

Chinmayi R^{1*}, Nandakumar S² and Shanbhag S³

¹MPT in Neurological Sciences, Assistant Professor, Acharya's NR Institute of Physiotherapy, Acharya PO, Acharya College Road, Soladevanahalli, Bengaluru 560107, Karnataka, India

²MPT in Neurological Sciences, Assistant Professor, Ramaiah College of Physiotherapy, M S Ramaiah Nagar, MSRIT Post, Bangalore 560054, Karnataka, India

³MPT in Neurological Sciences, Clinical Staff, Ramaiah Memorial Hospital, M S Ramaiah Nagar, MSRIT Post, Bangalore 560054, Karnataka, India



WebLog Open Access Publications

Article ID : wjpr.2026.d0301
Author : Dr. Chinmayi Rangaraju

OPEN ACCESS

*Correspondence:

Dr. Chinmayi Rangaraju, Assistant Professor, Acharya's NR Institute of Physiotherapy, Acharya PO, Acharya College Road, Soladevanahalli, Bengaluru, Karnataka, India; Tel: +91

8088889911;

E-mail: chinmayirangaraju@gmail.com

Received Date: 06 Mar 2026

Accepted Date: 01 Apr 2026

Published Date: 03 Apr 2026

Citation:

Chinmayi R, Nandakumar S, Shanbhag S. Comparison of Immediate Effects of Kinesio-taping Versus Sham Taping on Functional Mobility Among Diabetic Neuropathy Patients – A Single Blinded Randomized Control Study. WebLog J Phys Ther Rehabil. wjpr.2026. d0301. <https://doi.org/10.5281/zenodo.19548862>

ISSN 3071-401X

Copyright© 2026 Dr. Chinmayi

Rangaraju. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Abstract

Background: Diabetes Mellitus (DM) is a major health issue, with Diabetic Peripheral Neuropathy (DPN) causing nerve damage, numbness, and balance problems, increasing fall risk. Conventional physical therapy may not suffice for older adults with severe DPN. Kinesio-taping has shown potential in enhancing proprioception and balance by stimulating skin receptors.

Aim: This study aimed to compare the immediate effects of Kinesio-taping versus sham taping on functional mobility in individuals with diabetic neuropathy.

Methods: The study included 22 individuals with diabetic neuropathy, mean age 60.27±5.159 years in the experimental group and 59.27±4.735 years in the control group. Kinesio-tape with 50% stretch was applied to the experimental group, while the control group received sham taping. Timed Up and Go (TUG) test scores were recorded pre- and post-intervention.

Results: A significant ($p=0.014$) improvement in TUG scores was observed post-taping in the experimental group compared to the control group.

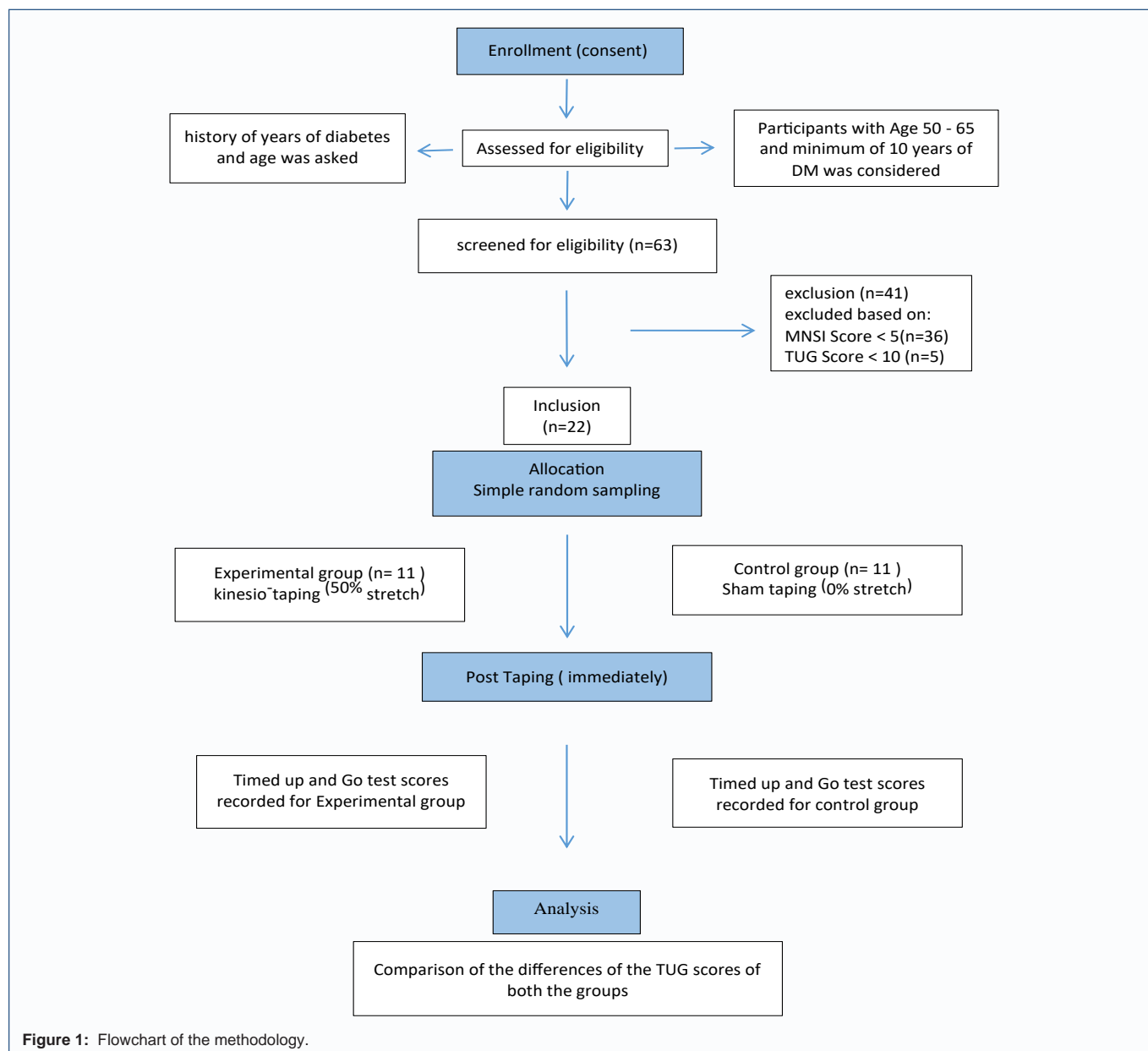
Conclusion: Kinesio-tape with 50% stretch on the lower legs improves functional mobility, dynamic balance, and reduces fall risk in individuals with diabetic neuropathy.

Keywords: Diabetes Mellitus; Diabetic Neuropathy; Falls; Dynamic Balance; Kinesio-Taping

Introduction

Diabetes Mellitus (DM) has become a major health challenge in the 21st century, with more people being diagnosed and treatment costs soaring. India ranks second worldwide in the number of diabetic patients, with 74.9 million individuals aged 20-79 affected in 2021 [1]. Diabetic peripheral neuropathy (DPN) stands out among various diabetes complications [2]. DPN is characterized by symptoms and/or signs of peripheral nerve damage arising due to long periods of hyperglycemia and metabolic abnormalities that touch on both microvascular and metabolic functions [3]. Between 50%-66% of people having diabetes will develop DPN at some point, with those having type 2 diabetes being more predisposed compared to their counterparts with type-1 diabetes according to research [4]. It is a painful sensory condition that starts from sensory changes in lower limbs resulting in significant morbidity like numbness or loss of sensation, weakness in muscles, and burning sensations. Excessive blood glucose levels stimulate cellular stress and insulin resistance that cause inflammation leading to nerve injury because they also trigger poor blood supply as well as impaired regeneration process. At first small C-fibers start burning causing hypersensitivity followed by impairment myelin sheath which results into slow degeneration of nerves thus gradual loss or absence for feeling beginning from toes [5].

DPN can cause disability such as foot ulcers, amputations, gait issues and a high risk of falling with an incidence reaching 40%. DPN patients have impaired balance and are more likely to be



involved in falls. Auditory and vestibular side effects of drugs used for diabetes mellitus could also influence balance, with visual impairment being the most common presentation [11]. Balance is dependent upon sensory input from the legs and feet; however, peripheral neuropathy impairs this function increasing fall risk. Light fingertip contact offers passive sensory feedback that could reduce postural sway. This is done by Kinesio-taping which mimics human skin which when applied with stretch, that enhances sensory feedback from legs by sensorimotor stimulation and improves circulation [13]. The purpose of this examination was to determine if Kinesio-taping has immediate effects on functional mobility using TUG test in DPN patients. It is aimed at assessing whether Kinesio-taping may lower fall risk and increase quality of life among these individuals.

Materials And Methods

This study was carried out over a period of one year from July 2023 to June 2024 at M.S. Ramaiah Teaching Hospital and Endocrine OPD, Ramaiah Memorial Hospital in Bangalore. The ethical clearance

was obtained from the Institutional Ethics committee was obtained (MSRMC/EC/PG-08/06-2023). The aim was to achieve similar balance changes observed previously by selecting 22 participants, assuming alpha=5% and power=80%.

Inclusion Criteria was participants' age between 50-65 years, duration of diabetes more than or equal to ten years, MNSI score ≥ 5 and TUG score ≥ 10 seconds were included. Exclusion Criteria was individuals with orthopedic abnormalities, MNSI < 2 scores, gait disturbances due to other neurologic conditions, use of walking aids like crutches or wheel chair or had skin allergies/rashes were excluded.

Data collection was done after obtaining the ethical clearance from the Institutional Ethical committee. All the participants were explained about the study and informed consent was taken.

Materials

The study worked with measuring tape, chair, tuning fork (128 Hz), monofilament, Kinesio-tape, knee hammer, scissors and



Figure 2.1: Sham taping.
Figure 2.2: Kinesio-taping

stationary objects.

Outcome Measure: The Timed Up and Go (TUG) test had an accuracy rate of 88.9%.

Screening Instrument: The Michigan Neuropathy Screening Instrument has sensitivity of 87.5% as well as specificity of 93.6% (Figure 1).

Procedure: Participants were recruited based on their scores above two using the MNSI for screening purposes in relation to DPN. Those with TUG scores >10 s were included whereas those below that range were excluded from the study population. They were then randomized into control and experimental groups respectively where; Kinesio-tape with 50% stretch was applied to the posterior side of both legs above the lateral malleolus of the experimental group, whereas sham taping was done for the control group. Mobility changes after taping were evaluated using TUG test. The results were recorded and analyzed by outcome assessors who had no knowledge about group allocation and type of taping. This research work has sought to investigate how Kinesio-taping is able to cause a momentary effect on functional mobility in DPN patients thereby minimizing fall risk and improving general well-being (Figure 2.1 and 2.2).

Results

Collected data from all the 22 participants were analysed using SPSS 27.0. Demographics, experimental groups and control group were described in terms of descriptive statistics. The data was measured for normality by use of Shapiro-Wilk test. Non-parametric test (Mann-Whitney U test) was used to compare the two groups because the data was not normally distributed. There were 7 male and 4 female in experimental group (N=11) and 6 male and 5 female in control group (N=11).

Discussion

This study looked at how Kinesio-taping affects mobility in people with diabetic neuropathy. Kinesio-tape was applied with about 50% stretch on the lower leg, just above the ankle. This placement aimed to improve sensory feedback about body position and movement during activities like standing up, walking, and turning. The findings showed a significant difference ($p=0.014$) in the Timed Up and Go (TUG) scores. The experimental group did better than the control group, indicating that Kinesio taping improved mobility.

One explanation for this improvement could be increased

Table 1.1: Mean and Standard deviation of descriptive data of both the groups (n=22).

	Experimental_group Mean \pm SD	Control_group Mean \pm SD
Age (in years)	60.27 \pm 5.159	59.27 \pm 4.735
DM (in Years)	19 \pm 4.858	16.09 \pm 5.375

Table 1.2: Median and IQR of the difference of TUG scores between groups (n=22).

Group	Pre-Post TUG score (in secs) Median (IQR)
Experimental group	2.11 (1.14, 3.20)
Control group	0.65 (0.39, 0.93)

Table 1.3: Comparison of the difference of the TUG scores between the groups (n=22).

Mann-Whitney U	23.000
Asymp. Sig. (2-tailed)	$P=0.014$
Exact Sig. [2*(1-tailed Sig.)]	0.013 ^b

stimulation of mechanoreceptors. Mechanoreceptors are sensory receptors that respond to mechanical stimuli like stretch, pressure, and vibration. They provide key information about body position and movement. More stimulation of these receptors might give the central nervous system additional sensory input, helping to make up for the reduced feedback linked to peripheral neuropathy. This extra sensory input could enhance proprioception and postural control in people with diabetic peripheral neuropathy.

Previous research has shown that extra sensory feedback can help balance when plantar sensation decreases. For instance, studies found that when sensory input from the soles of the feet is low, individuals tend to sway more. However, their balance improves when they receive extra sensory input from other parts of the leg or trunk. The current study supports these findings, as Kinesio-taping may have delivered extra sensory stimulation that led to better balance and mobility, as seen in the improved TUG results. Moreover, studies on vibration and gentle touch have shown improved balance in people with diabetic neuropathy. The results of this study align with these findings, suggesting that increased sensory feedback could significantly aid postural control. Evidence from studies involving healthy individuals shows that light touches can greatly reduce swaying by providing the central nervous system with more sensory data.

These results imply that the central nervous system can combine various sensory inputs to maintain stability. In this study, the stretching from Kinesio-taping may have consistently stimulated skin receptors, allowing participants to continuously get information about their leg position and movement. This could help with proper foot placement and better movement during the TUG test. Thus, the mechanical stimulation from Kinesio-taping may be a beneficial addition for people with diabetic peripheral neuropathy. By improving feedback from healthy skin receptors, this method might help compensate for poor peripheral sensation, leading to improved coordination, mobility, and balance. Ultimately, this could lower the risk of falls and enhance the quality of life for those with diabetic neuropathy.

Limitations of the study include small sample size, short-term focus and failure to evaluate combined therapy. Future studies should consider using larger samples sizes, long term assessments as well as

gait analysis as an objective measure to understand better Kinesio-tape's effect.

Conclusion

This research found that Kinesio-tape (50%) significantly improved functional mobility in diabetic neuropathy patients by decreasing TUG test times through enhanced sensory input. The use of Kinesio-tape which compensated for a decreased sensory input resulted into an improvement in balance and proprioception. These findings suggest a practical intervention like Kinesio tape to improve mobility among neuropathy patients.

Acknowledgement

I am particularly grateful to Ms. Anjali, Department of Community Medicine, Ramaiah Medical College and Hospital, for lending their precious time for helping with the statistical analysis of my study. I would like to express my gratitude to Jyothi, receptionist at the endocrine OPD, my classmates and juniors. Thank you for helping me with the recruiting the participants and finish my study on time. Also thank you to all the participants who showed high enthusiasm and corporation for taking part in this study.

Clinical Trial Registration

Clinical trial registration was done from Clinical Trials Registry -India (CTRI), National Institute of Medical Statistics, ICMR New Delhi (Trial REF/2023/10/074273).

Ethical approval

The study was approved by the Ethical Review Board (MSRMC/EC/PG-08/06-2023) of the Ramaiah medical College, Bangalore.

References

- Govindaswamy S, Dhivya PS. Prevalence and complications of diabetes mellitus In India-A systematic review. *Indian J Pharm Educ Res.* 2022; 57(2s): 213-221.
- Kumar P, Singh NK, Apeksha K, Ghosh V, Kumar RR, Muthaiah BK. Auditory and vestibular functioning in individuals with type-2 diabetes mellitus: a systematic review. *Int Arch Otorhinolaryngol.* 2022; 26: e281-8.
- Cho NH, Shaw JE, Karuranga S, Huang Y, da Rocha Fernandes JD, Ohlogge AW, et al. IDF Diabetes Atlas: Global estimates of diabetes prevalence for 2017 and projections for 2045. *Diabetes Res Clin Pract.* 2018; 138: 271-281.
- Baxi H, Habib A, Hussain MS, Hussain S, Dubey K. Prevalence of peripheral neuropathy and associated pain in patients with diabetes mellitus: Evidence from a cross-sectional study. *J Diabetes Metab Disord.* 2020; 19: 1011-1017.
- Bodman MA, Dreyer MA, Varacallo M. *Diabetic Peripheral Neuropathy.* StatPearls. 2024.
- Hicks CW, Selvin E. Epidemiology of peripheral neuropathy and lower extremity disease in diabetes. *Current Diab Rep.* 2019; 19:1-8.
- McCarberg BH, Billington R. Consequences of neuropathic pain: quality-of-life issues and associated costs. *Am J Manag Care.* 2006; 12(9 Suppl): S263-S268.
- Chaplin S. ADA position statement on diabetic neuropathy. *Prescriber.* 2017; 28(4): 39-40.
- Feldman EL, Callaghan BC, Pop-Busui R, Zochodne DW, Wright DE, Bennett DL, et al. Diabetic neuropathy. *Nat Rev Dis Primers.* 2019; 5(1): 1-8.
- Freire LB, Brasil-Neto JP, da Silva ML, Miranda MG, de Mattos Cruz L, Martins WR, et al. Risk factors for falls in older adults with diabetes mellitus: systematic review and meta-analysis. *BMC Geriatr.* 2024; 24(1): 201.
- Holmes CJ, Hastings MK. The application of exercise training for diabetic peripheral neuropathy. *J Clin Med.* 2021; 10(21): 5042.
- Juster-Switlyk K, Smith AG. Updates in diabetic peripheral neuropathy. *F1000Res.* 2016.
- Akbari M, Dadgoo M, Ebrahimi I, Moradi S. Effects of skin stretch sensory stimuli on balance in patients with diabetic neuropathy. *J Nov Physiother.* 2011; 1(105): 2.
- Menz HB, Lord SR, Fitzpatrick RC. A tactile stimulus applied to the leg improves postural stability in young, old and neuropathic subjects. *Neurosci Lett.* 2006; 406(1-2): 23-26.
- Anggraini RD, Sudaryanto WT, Sari DR. Effectiveness of Transcutaneous Electrical Nerve Stimulation, Exercise Therapy, and Kinesio Tape to Reduce Symptoms in Diabetic Peripheral Neuropathy Patients: A Case Report. *Acad Physiother Conference Proceed.* 2021.
- Ahmed AE, Mohamed NI, Mariam EM, Ahmed M. Effect of kinesiotape versus resistive exercise on dorsiflexors functional performance in diabetic peripheral neuropathy. *Med J Cairo University.* 2020; 88: 1777-1782.
- Christensen DH, Knudsen ST, Gylfadottir SS, Christensen LB, Nielsen JS, Beck-Nielsen H, et al. Metabolic factors, lifestyle habits, and possible polyneuropathy in early type 2 diabetes: a nationwide study of 5,249 patients in the Danish Centre for Strategic Research in Type 2 Diabetes (DD2) cohort. *Diabetes Care.* 2020; 43(6): 1266-1275.
- Cavanagh PR, Derr JA, Ulbrecht JS, Maser RE, Orchard TJ. Problems with gait and posture in neuropathic patients with insulin-dependent diabetes mellitus. *Diabet Med.* 1992; 9(5): 469-474.
- Nesreen GE, Sally AE, Louis NN, Mubarak LS, Heba R. Effects of Kinesio Tapping on Diabetic Peripheral Neuropathy Symptoms in Type II Diabetes. *Med J Cairo University.* 2022; 90(9): 1309-1315.
- Rogers MW, Wardman DL, Lord SR, Fitzpatrick RC. Passive tactile sensory input improves stability during standing. *Exp Brain Res.* 2001; 136: 514-522.
- Sivakumar VP, Doraisami B, Prabhu V, Paramanandam P. Age Related Timed Up and Go Test Values and Its Analysis among Elderly Kanchipuram District Population. *J Clin Diagnostic Res.* 2018; 12(10): YC06-YC08.