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Original Article

Effect of Dry Cupping With and Without Neural Glides on Pain, Sensory Functions and Functional Mobility in Individuals with Diabetic Neuropathy: A Randomized Clinical Trial

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ABSTRACT

Background: Diabetic peripheral neuropathy is a common complication of type 2 diabetes mellitus and is associated with pain, sensory impairment, reduced walking capacity, and functional limitation. Non-pharmacological rehabilitation strategies such as dry cupping and neural gliding may help address neuropathic symptoms through local circulatory, mechanical, and neurodynamic mechanisms. Objective: To compare the effects of dry cupping with versus without neural glides on pain intensity, sensory function, functional mobility, and neuropathy severity in individuals with diabetic peripheral neuropathy. Methods: This randomized clinical trial included 30 participants aged 30–70 years with type 2 diabetes mellitus and mild to moderate diabetic peripheral neuropathy. Participants were allocated to dry cupping with neural glides or dry cupping without neural glides. Both groups received conventional physiotherapy and a home plan for four sessions per week over one month. Outcomes included the Visual Analogue Scale, Semmes–Weinstein Monofilament Test, 6-Minute Walk Test, and modified Toronto Clinical Neuropathy Score. Data were analyzed using Shapiro–Wilk, Wilcoxon signed-rank, and Mann–Whitney U tests. Results: Significant within-participant improvements were observed in pain, sensory testing, walking capacity, and neuropathy-related outcomes. Post-intervention between-group comparisons favored dry cupping with neural glides for VAS ($p = 0.001$), SWMT ($p = 0.043$), 6MWT ($p < 0.001$), and mTCNS ($p < 0.001$). Conclusion: Dry cupping combined with neural glides showed more favorable rank-based outcomes than dry cupping without neural glides, although larger trials with complete clinical outcome reporting are required. Keywords: Diabetic peripheral neuropathy; dry cupping; neural glides; sensory function; functional mobility; randomized clinical trial.

INTRODUCTION

Diabetes mellitus is one of the most common chronic metabolic disorders worldwide and is associated with substantial long-term microvascular and macrovascular complications. Type 2 diabetes accounts for most cases and is characterized by persistent hyperglycemia, progressive β-cell dysfunction, insulin resistance, and complex metabolic disturbances that contribute to peripheral nerve injury over time (1). Among diabetes-related neurological complications, diabetic peripheral neuropathy is particularly important because it commonly presents with pain, numbness, tingling, sensory loss, impaired balance, reduced walking capacity, and increased risk of foot complications. Diabetic peripheral neuropathy can substantially limit functional independence and quality of life, especially when symptoms affect both sensory function and mobility (2).

The clinical burden of diabetic peripheral neuropathy is increased by the limited curative options available for established nerve dysfunction. Standard management focuses on glycemic control, cardiometabolic risk modification, foot care, exercise, patient education, and pharmacological treatment for neuropathic pain; however, medication-based management may provide incomplete relief and may be associated with adverse effects or poor adherence in some patients (2). Rehabilitation-based interventions are therefore clinically relevant because they may target pain modulation, peripheral circulation, soft-tissue mobility, neural mechanosensitivity, and functional performance through non-pharmacological mechanisms. In this context, physiotherapy approaches that are safe, accessible, low-cost, and feasible in routine clinical settings may offer practical value for individuals with mild to moderate diabetic neuropathy.

Dry cupping therapy is a non-invasive intervention that applies negative pressure to the skin and superficial soft tissues. It is proposed to improve local blood flow, influence nociceptive processing, reduce soft-tissue sensitivity, and promote short-term analgesic effects. Preliminary clinical evidence suggests that dry cupping applied to the foot may reduce symptoms and improve clinical neuropathy scores in patients with diabetic distal polyneuropathy, although available evidence remains limited and requires further controlled trials (4). Neural gliding, also referred to as neural mobilization, is another conservative therapeutic approach intended to restore the dynamic relationship between peripheral nerves and surrounding tissues. By promoting nerve excursion, reducing mechanosensitivity, improving intraneural circulation, and supporting axoplasmic flow, neural gliding may help reduce neuropathic symptoms and improve functional movement. Existing evidence on neural mobilization in diabetic peripheral neuropathy is still limited and heterogeneous, but available studies suggest potential benefits for pain, nerve-related symptoms, sensory function, and functional activity (3).

Although dry cupping and neural gliding have individually been investigated in neuropathic and musculoskeletal conditions, limited randomized evidence is available regarding their combined effect in individuals with diabetic peripheral neuropathy. This gap is clinically important because diabetic neuropathy involves multiple impairments, including pain, sensory dysfunction, and reduced functional mobility; therefore, a combined intervention targeting both local tissue circulation and neural mechanosensitivity may be more beneficial than dry cupping alone. The present randomized clinical trial was designed to compare the effects of dry cupping combined with neural glides versus dry cupping without neural glides on pain intensity, sensory function, neuropathy severity, and functional mobility in individuals with diabetic peripheral neuropathy. The study hypothesized that dry cupping combined with neural glides would produce greater improvement in pain, sensory function, neuropathy severity, and functional mobility than dry cupping without neural glides.

MATERIAL AND METHODS

This randomized clinical trial was conducted at the University of Management and Technology, Sialkot, Pakistan, over a total study duration of six months. The intervention phase consisted of four treatment sessions per week for one month. The study was designed to compare the effects of dry cupping combined with neural glides versus dry cupping without neural glides on pain intensity, sensory function, neuropathy severity, and functional mobility in individuals with diabetic peripheral neuropathy. Participants were recruited using a non-probability convenience sampling technique and were then randomly allocated into two treatment groups. Group A received dry cupping therapy combined with neural gliding exercises, conventional physiotherapy, and a home plan, whereas Group B received dry cupping therapy, conventional physiotherapy, and a home plan without neural gliding exercises.

The sample included 30 participants aged 30–70 years with clinically diagnosed type 2 diabetes mellitus and mild to moderate diabetic peripheral neuropathy. Participants were eligible if they had a duration of diabetes greater than five years, stable glycemic control during the preceding three months, and clinical

evidence of diabetic peripheral neuropathy based on the study assessment tools. Participants were included regardless of gender. Individuals were excluded if they had severe diabetic peripheral neuropathy with ulceration, deformity, or amputation; peripheral neuropathy of non-diabetic origin; uncontrolled systemic disease; active wound or skin infection; use of anticoagulant therapy; history of neurological illness such as seizure or epilepsy; cognitive impairment or communication difficulty; or participation in cupping therapy or nerve mobilization during the previous three months. Participants who were already receiving physiotherapy or other complementary therapies for neuropathy were also excluded to reduce treatment-related confounding.

After screening for eligibility, informed consent was obtained from all participants before enrollment. Baseline demographic and clinical information was recorded, including age, gender, occupation, duration of diabetes mellitus, current medication use, and known complications. Participants were then assigned to the intervention groups and assessed before and after completion of the treatment period. The primary clinical outcome was pain intensity, measured using the Visual Analogue Scale. Secondary outcomes included sensory function assessed through the Semmes–Weinstein Monofilament Test, functional mobility assessed through the 6-Minute Walk Test, and neuropathy severity assessed through the modified Toronto Clinical Neuropathy Score. The Semmes–Weinstein Monofilament Test was used to assess sensory loss at predefined hand and foot sites because it is a practical clinical tool for evaluating cutaneous sensory threshold in neuropathic conditions (5). Functional mobility was assessed using the 6-Minute Walk Test by recording the total distance walked in meters over six minutes, reflecting submaximal walking capacity and functional endurance (6,7). The modified Toronto Clinical Neuropathy Score was used to quantify neuropathic symptoms, reflex changes, and sensory impairment, with higher scores indicating greater neuropathy severity.

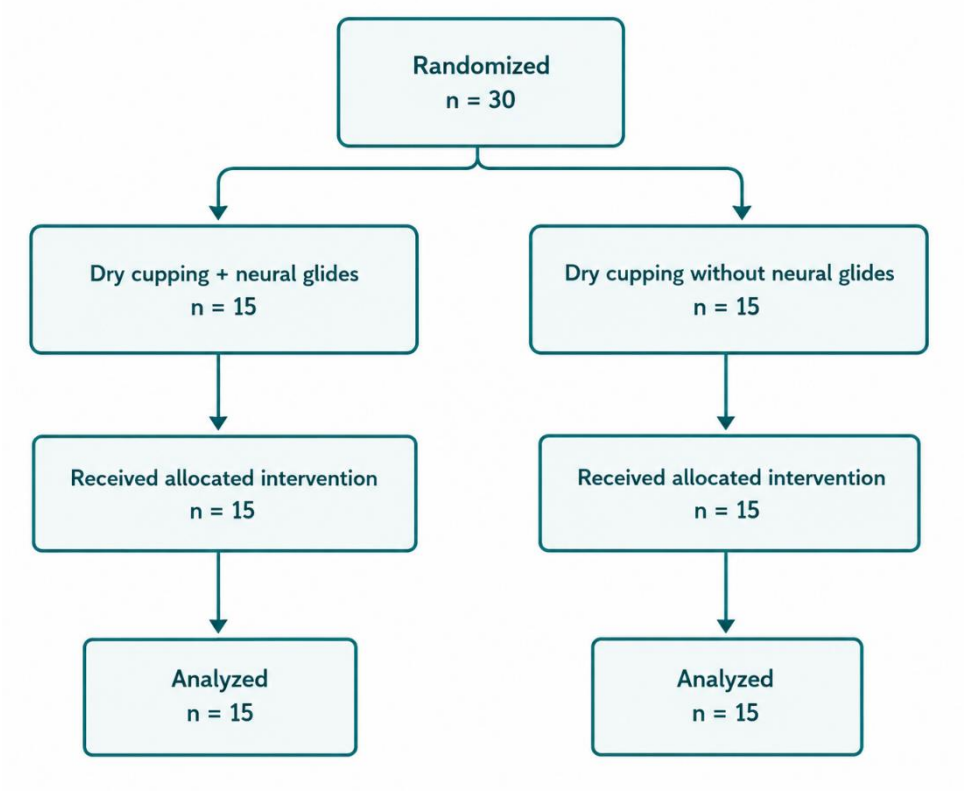

Figure 1 CONSORT Flowchart

Participants in Group A received dry cupping therapy with neural gliding exercises in addition to conventional physiotherapy and a structured home plan. Participants in Group B received dry cupping therapy with conventional physiotherapy and the same home plan, but without neural gliding exercises. Conventional physiotherapy consisted of lower-limb stretching exercises, strengthening or isometric exercises, balance and proprioceptive training, and transcutaneous electrical nerve stimulation.

Stretching and strengthening exercises were performed for 10 repetitions per session. Transcutaneous electrical nerve stimulation was applied at a frequency of 80–100 Hz for 10–15 minutes. The home plan included foot-care education, self-directed stretching, and balance practice to support continuity of rehabilitation outside supervised sessions. Both groups received four supervised sessions per week for one month to ensure comparable treatment exposure across groups.

Pain intensity, sensory function, functional mobility, and neuropathy severity were recorded at baseline and after completion of the intervention. Data were entered and analyzed using IBM SPSS Statistics version 21. The Shapiro–Wilk test was used to assess the normality of continuous outcome data. Because the outcome data did not consistently meet normality assumptions, non-parametric tests were applied. The Wilcoxon signed-rank test was used to evaluate within-group pre-post changes, while the Mann–Whitney U test was used to compare between-group differences. Statistical significance was set at $p < 0.05$. Participant confidentiality was maintained throughout the study, and collected data were used only for research and statistical analysis. The study was conducted after institutional permission, and participants were informed about the purpose of the study, voluntary participation, confidentiality of their information, and their right to withdraw at any stage without penalty.

RESULTS

A total of 30 participants with diabetic peripheral neuropathy were included in the analysis. Participants were allocated into two groups: dry cupping with neural glides and dry cupping without neural glides. The available demographic data showed that 10 participants were male and 20 were female. The age range of the sample was 30–70 years, with the manuscript indicating a higher concentration of participants between 50 and 60 years. Duration of diabetes ranged from 5 to 16 years, with the highest frequency reported at 12 years. Exact group-wise demographic values were not available in the supplied manuscript; therefore, only the directly reported overall demographic values are presented.

Table 1. Overall Demographic Characteristics of Participants

Variable	Category/Measure	Value
Sample size	n	30
Sex	Male, n (%)	10 (33.3)
Sex	Female, n (%)	20 (66.7)
Age	Range, years	30–70
Diabetes duration	Range, years	5–16
Diabetes duration	Most frequent value, years	12

The study sample contained a higher proportion of female participants, with females representing 20 of 30 participants and males representing 10 of 30 participants. The available age and diabetes-duration data indicate that the sample primarily represented middle-aged to older adults with established diabetes, although exact mean, standard deviation, median, interquartile range, and group-wise baseline values were not available.

Normality was assessed using the Shapiro–Wilk test for the main outcome variables. The available results indicated non-normal distribution for VAS and SWMT in both groups. For mTCNS, one group showed $p = 0.200$ and the other showed $p = 0.030$, indicating that normality assumptions were not consistently met across groups. Therefore, non-parametric tests were used for inferential analysis.

Table 2. Shapiro–Wilk Normality Assessment for Main Outcome Variables

Variable	Group	Statistic	p-value
VAS	Dry cupping with neural glides	0.86	0.031
VAS	Dry cupping without neural glides	0.85	0.018
SWMT	Dry cupping with neural glides	0.85	0.023
SWMT	Dry cupping without neural glides	0.81	0.006
mTCNS	Dry cupping with neural glides	0.85	0.200
mTCNS	Dry cupping without neural glides	0.94	0.030

VAS, SWMT, and mTCNS did not consistently satisfy normality assumptions across treatment groups. On this basis, Wilcoxon signed-rank tests were used for within-participant pre-post comparisons, and Mann–Whitney U tests were used for between-group comparisons.

Pain intensity showed a significant within-participant reduction after intervention. In the Wilcoxon signed-rank analysis, all 30 participants had lower post-intervention VAS scores compared with baseline pain intensity scores.

Table 3. Within-Participant Change in Pain Intensity Using Wilcoxon Signed-Rank Test

Outcome comparison	Negative ranks, n	Positive ranks, n	Ties, n	Mean rank	Sum of ranks	Z	p-value
Post-intervention VAS − baseline VAS	30	0	0	15.50	465.00	-4.836	<0.001

Pain intensity decreased after intervention across the full sample, with 30 negative ranks and no positive ranks or ties. The Wilcoxon signed-rank test showed a statistically significant pre-post change in VAS scores, indicating overall reduction in pain intensity after treatment.

Between-group comparison showed that pain scores differed significantly between groups both before and after intervention. The post-intervention comparison showed a lower mean rank in the dry cupping with neural glides group than in the dry cupping without neural glides group.

Table 4. Between-Group Comparison of Pain Intensity

Outcome	Group	Mean rank	Sum of ranks	Mann–Whitney U	Z	p-value
Pre-intervention pain score	Dry cupping with neural glides	12.13	182.00	62.00	-2.169	0.030
Pre-intervention pain score	Dry cupping without neural glides	18.87	283.00	62.00	-2.169	0.030
Post-intervention pain score	Dry cupping with neural glides	10.47	157.00	37.00	-3.211	0.001
Post-intervention pain score	Dry cupping without neural glides	20.53	308.00	37.00	-3.211	0.001

The post-intervention pain comparison favored the dry cupping with neural glides group, with a lower mean rank of 10.47 compared with 20.53 in the dry cupping without neural glides group. However, the baseline pain comparison was also statistically different between groups, which should be considered when interpreting the post-intervention finding because baseline imbalance may have influenced the final comparison.

Sensory function assessed through SWMT showed statistically significant within-participant changes across several hand and foot testing sites. Because some Z-values in the supplied manuscript contained apparent decimal-formatting errors, only interpretable and directly reported values are presented.

Table 5. Within-Participant SWMT Change at Hand Sites

SWMT site	Negative ranks, n	Positive ranks, n	Ties, n	Mean rank	Sum of ranks	Z	p-value
Right thumb	9	0	21	5.00	45.00	-3.000	0.003
Left thumb	8	0	22	4.50	36.00	-2.828	0.005
Right index finger	12	0	18	6.50	78.00	-3.464	0.001
Left index finger	6	0	24	3.50	21.00	-2.449	0.014
Right little finger	14	0	16	7.50	105.00	-3.742	<0.001
Left little finger	13	0	17	7.00	91.00	-3.606	<0.001
Dorsum of right hand	14	0	16	7.50	105.00	-3.606	<0.001

SWMT hand-site analysis showed significant pre-post improvement across all reported hand testing sites. The number of negative ranks ranged from 6 to 14 across hand sites, while no positive ranks were reported, indicating a consistent direction of sensory score change after intervention.

Table 6. Within-Participant SWMT Change at Foot Sites

SWMT site	Negative ranks, n	Positive ranks, n	Ties, n	Mean rank	Sum of ranks	p-value
Right plantar hallux	21	0	9	11.00	231.00	<0.001
Left plantar hallux	17	0	13	9.00	153.00	<0.001
Right 1st metatarsal head	15	0	15	8.00	120.00	<0.001
Left 1st metatarsal head	16	0	14	8.50	136.00	<0.001
Right 3rd metatarsal head	10	0	20	5.50	55.00	0.002
Left 3rd metatarsal head	11	0	19	6.00	66.00	0.001

SWMT site	Negative ranks, n	Positive ranks, n	Ties, n	Mean rank	Sum of ranks	p-value
Right 5th metatarsal head	15	1	14	8.50	127.50	<0.001
Left 5th metatarsal head	15	3	12	9.50	142.50	0.005
Right heel	17	0	13	9.00	153.00	<0.001
Left heel	16	0	14	8.50	136.00	<0.001
Dorsum of right foot	14	0	16	7.50	105.00	<0.001
Dorsum of left foot	14	0	16	7.50	105.00	<0.001

SWMT foot-site analysis showed significant pre-post change at all reported foot testing sites. The largest number of negative ranks was observed at the right plantar hallux, with 21 participants showing post-intervention change. Positive ranks were reported only at the 5th metatarsal head sites, with one positive rank on the right and three on the left.

Between-group comparison of overall SWMT scores showed a statistically significant difference at baseline and after intervention. The post-intervention mean rank was higher in the dry cupping with neural glides group.

Table 7. Between-Group Comparison of SWMT Scores

Outcome	Group	Mean rank	Sum of ranks	Mann–Whitney U	Z	p-value
Pre-intervention SWMT	Dry cupping with neural glides	13.97	209.50	89.00	-1.001	0.030
Pre-intervention SWMT	Dry cupping without neural glides	17.03	255.50	89.00	-1.001	0.030
Post-intervention SWMT	Dry cupping with neural glides	18.70	280.50	64.50	-2.022	0.043
Post-intervention SWMT	Dry cupping without neural glides	12.30	184.50	64.50	-2.022	0.043

Post-intervention SWMT scores differed between groups, with the dry cupping with neural glides group showing a higher mean rank of 18.70 compared with 12.30 in the dry cupping without neural glides group. Because the baseline SWMT comparison also showed a reported p-value of 0.030, interpretation of the post-intervention difference should account for possible baseline imbalance.

Functional mobility assessed by the 6-Minute Walk Test showed significant within-participant improvement after intervention. Twenty-nine participants had higher post-intervention walking distance, while one participant had a lower post-intervention value.

Table 8. Within-Participant Change in 6-Minute Walk Test Distance

Outcome comparison	Negative ranks, n	Positive ranks, n	Ties, n	Mean rank	Sum of ranks	Z	p-value
Post-intervention 6MWT − baseline 6MWT	1	29	0	15.84	459.50	-4.683	<0.001

Functional mobility improved after intervention across the full sample, with 29 positive ranks and no ties. The Wilcoxon signed-rank test showed a statistically significant pre-post increase in 6MWT distance.

Between-group comparison of 6MWT showed no statistically significant baseline difference, while the post-intervention comparison showed a significant between-group difference favoring the dry cupping with neural glides group.

Table 9. Between-Group Comparison of 6-Minute Walk Test Distance

Outcome	Group	Mean rank	Sum of ranks	Mann–Whitney U	Z	p-value
Pre-intervention 6MWT	Dry cupping with neural glides	18.40	276.00	69.00	-1.817	0.074
Pre-intervention 6MWT	Dry cupping without neural glides	12.60	189.00	69.00	-1.817	0.074
Post-intervention 6MWT	Dry cupping with neural glides	23.00	354.00	0.00	-4.682	<0.001
Post-intervention 6MWT	Dry cupping without neural glides	8.00	120.00	0.00	-4.682	<0.001

The pre-intervention 6MWT comparison did not reach statistical significance. After intervention, the dry cupping with neural glides group had a higher mean rank of 23.00 compared with 8.00 in the dry cupping without neural glides group, indicating a stronger post-intervention functional mobility outcome in the combined-intervention group. Neuropathy severity assessed by mTCNS showed significant within-participant changes across multiple symptom, reflex, and sensory components. The supplied manuscript reported p-values for the component-level Wilcoxon analyses but did not provide complete Z-values for all components.

Table 10. Within-Participant Change in mTCNS Components

mTCNS component	Negative ranks, n	Positive ranks, n	Ties, n	Mean rank	Sum of ranks	p-value
Foot pain	25	0	5	13.00	325.00	<0.001
Foot numbness	27	0	3	14.00	378.00	<0.001
Foot tingling	25	0	5	13.00	325.00	<0.001
Foot weakness	28	0	2	14.50	406.00	<0.001
Foot ataxia	0	0	30	0.00	0.00	<0.001
Upper-limb symptoms	15	0	15	8.00	120.00	<0.001
Right patellar reflex	20	0	10	10.50	210.00	<0.001
Left patellar reflex	15	0	15	8.00	120.00	<0.001
Right Achilles reflex	24	0	6	12.50	300.00	<0.001
Left Achilles reflex	18	0	12	9.50	171.00	<0.001
Pinprick test	28	0	2	14.50	406.00	<0.001
Temperature test	30	0	0	15.50	465.00	<0.001
Light-touch test	30	0	0	15.50	465.00	<0.001
Vibration test	26	0	4	13.50	351.00	<0.001
Position sense test	29	0	1	15.00	435.00	<0.001
Monofilament test	30	0	0	15.50	465.00	<0.001

Most mTCNS components showed consistent pre-post change, with no positive ranks reported across the listed components. The strongest rank patterns were observed for temperature, light touch, and monofilament testing, each showing 30 negative ranks and no ties. The ataxia component showed 30 ties, so its reported p-value should be verified against the original statistical output before final submission. Between-group comparison of total mTCNS showed no statistically significant baseline difference and a statistically significant post-intervention difference. The post-intervention mean rank was lower in the dry cupping with neural glides group.

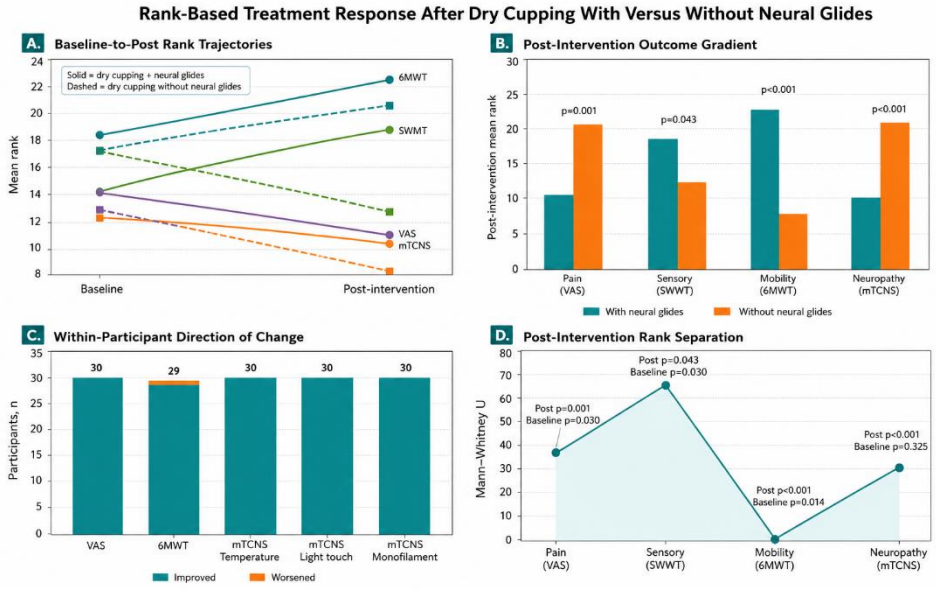

Figure 2 Rank-Based Treatment Response After Dry Cupping With Versus Without Neural Glides. The panelled figure summarizes comparative treatment response using reported aggregate statistics. Panel A shows baseline-to-post mean-rank trajectories across pain, sensory function, mobility, and neuropathy severity. Panel B presents post-intervention between-group mean-rank gradients, showing significant differences for VAS, SWMT, 6MWT, and mTCNS. Panel C displays within-participant response direction based on Wilcoxon signed-rank outputs. Panel D presents post-intervention Mann–Whitney U values with baseline and post-intervention p-values. The figure should be interpreted as rank-based because raw clinical outcome scores were not available.

Table 11. Between-Group Comparison of mTCNS Scores

Outcome	Group	Mean rank	Sum of ranks	Mann–Whitney U	Z	p-value
Pre-intervention mTCNS	Dry cupping with neural glides	13.93	209.00	89.00	-0.984	0.325
Pre-intervention mTCNS	Dry cupping without neural glides	17.07	256.00	89.00	-0.984	0.325
Post-intervention mTCNS	Dry cupping with neural glides	10.10	151.50	31.50	-3.397	<0.001
Post-intervention mTCNS	Dry cupping without neural glides	20.90	313.50	31.50	-3.397	<0.001

Baseline mTCNS scores did not differ significantly between groups. After intervention, the dry cupping with neural glides group had a lower mean rank of 10.10 compared with 20.90 in the dry cupping without neural glides group, indicating lower post-intervention neuropathy severity in the combined-intervention group.

Overall, the results showed statistically significant within-participant improvement in pain intensity, sensory testing, walking capacity, and neuropathy-related symptoms after intervention. Between-group comparisons indicated more favorable post-intervention outcomes for dry cupping combined with neural glides for pain, SWMT, 6MWT, and mTCNS. However, baseline differences were reported for pain and SWMT, and exact group-wise clinical values such as means, standard deviations, medians, interquartile ranges, change scores, confidence intervals, and effect sizes were not available in the supplied manuscript. These values should be added from the original dataset or SPSS output before final journal submission.

DISCUSSION

This randomized clinical trial compared dry cupping combined with neural glides versus dry cupping without neural glides in individuals with diabetic peripheral neuropathy and found favorable post-intervention rank-based outcomes for the combined intervention across pain intensity, sensory function, functional mobility, and neuropathy severity. The overall within-participant analysis showed improvement after intervention for VAS, SWMT, 6MWT, and multiple mTCNS components, while between-group analyses showed post-intervention differences favoring dry cupping with neural glides for pain, SWMT, 6MWT, and mTCNS. These findings suggest that adding neural gliding exercises to dry cupping may provide additional clinical benefit beyond dry cupping alone, particularly for mobility and neuropathy-related symptom severity. However, because the available results are primarily based on ranks and p-values rather than complete group-wise clinical values, the magnitude of clinical improvement should be interpreted cautiously.

The improvement in pain intensity is consistent with the proposed analgesic effects of dry cupping and neural mobilization. Dry cupping may influence pain through local mechanical stimulation, improved superficial circulation, altered nociceptive input, and modulation of soft-tissue sensitivity. Previous work has suggested that cupping therapy may reduce symptoms in diabetic distal polyneuropathy, with improvements reported in modified Toronto Clinical Neuropathy Score and sensory test scores after repeated foot cupping sessions (4). The present study extends this rationale by combining dry cupping with neural gliding, which may address not only local tissue factors but also peripheral nerve mobility and mechanosensitivity. The post-intervention pain mean rank was lower in the dry cupping with neural glides group than in the dry cupping without neural glides group, supporting the possibility of greater pain reduction with the combined approach. Nevertheless, baseline pain also differed between groups, and this imbalance should be considered when interpreting the post-intervention comparison.

The improvement in sensory function may be explained by the combined effect of local circulatory stimulation from cupping and nerve excursion promoted by neural glides. Diabetic peripheral neuropathy commonly affects sensory thresholds and protective sensation, and rehabilitation approaches that improve tissue mobility and neural physiology may help reduce sensory impairment. The SWMT findings showed significant within-participant changes across multiple hand and foot sites, while post-intervention between-group analysis favored the combined intervention. However, the baseline SWMT comparison was also reported as statistically different between groups, meaning that post-intervention superiority cannot be interpreted independently of baseline imbalance. Future studies should report baseline-adjusted between-group analyses, such as analysis of covariance or change-score comparisons, to clarify whether the observed sensory benefit is attributable to the intervention itself.

Functional mobility showed one of the clearest post-intervention patterns. The 6MWT comparison did not show a statistically significant baseline difference, whereas post-intervention ranks strongly favored

dry cupping with neural glides. This finding is clinically relevant because reduced walking capacity in diabetic peripheral neuropathy may reflect pain, sensory impairment, balance limitations, lower-limb weakness, and fear of movement. Neural gliding may improve functional movement by reducing neural mechanosensitivity and facilitating more comfortable limb motion, while conventional physiotherapy components such as stretching, strengthening, balance training, and TENS may also contribute to mobility gains. The combined treatment effect therefore likely reflects a multimodal rehabilitation response rather than the isolated effect of a single technique.

The mTCNS findings also favored the combined intervention after treatment, with no statistically significant baseline difference and a significant post-intervention difference between groups. This supports the interpretation that dry cupping with neural glides may reduce overall neuropathy severity more effectively than dry cupping without neural glides. Component-level mTCNS findings showed favorable within-participant changes in pain, numbness, tingling, weakness, reflexes, and sensory testing. These results are consistent with the theoretical role of neural mobilization in improving nerve movement, intraneural circulation, and mechanosensitivity. A scoping review on neural mobilization in diabetic peripheral neuropathy reported limited but potentially favorable evidence across outcomes such as nerve conduction, sensory thresholds, range of motion, functional activity, and quality of life (3). Similarly, a randomized trial reported improvements in nerve conduction, pain, and functional activity after neurodynamic mobilization in patients with diabetic neuropathy (10). The present findings align with this emerging evidence, although stronger conclusions require larger trials with objective neurophysiological outcomes.

The findings should also be interpreted in relation to methodological limitations. The sample size was small, which reduces statistical power and limits generalizability. The study was conducted at a single center using convenience sampling, which may restrict external validity. Although participants were randomized, the available manuscript does not fully describe the random sequence generation, allocation concealment, or assessor blinding process. The absence of blinding may increase the risk of performance and detection bias, especially for subjective outcomes such as pain intensity. The intervention protocol also requires more detailed standardization, including cup placement, suction intensity, duration of application, neural glide technique, repetitions, progression, adherence monitoring, and adverse event reporting.

Another important limitation is the lack of raw clinical outcome values. The results are mainly reported using ranks, U values, Z values, and p-values. While these are statistically useful, they do not allow full interpretation of clinical magnitude. For publication-quality reporting, the manuscript should include group-wise baseline and post-intervention values, preferably median and interquartile range for non-normally distributed data, along with change scores, between-group differences, confidence intervals, and effect sizes where appropriate. Baseline imbalances in pain and SWMT also indicate the need for adjusted analysis or change-score analysis. Without these additional analyses, the results should be presented as preliminary evidence rather than definitive proof of superiority.

Despite these limitations, the study addresses a clinically important rehabilitation question. Diabetic peripheral neuropathy is a common and disabling complication of diabetes, and conservative non-pharmacological interventions are needed to support pain control, sensory function, walking capacity, and quality of life (2). The combined use of dry cupping and neural glides is practical, low-cost, and potentially feasible in physiotherapy settings. The present findings suggest that this combined approach may be more beneficial than dry cupping alone, particularly for functional mobility and neuropathy severity. Future research should use larger multicenter randomized controlled designs, assessor blinding, prespecified primary outcomes, trial registration, standardized treatment protocols, adverse event monitoring, and longer follow-up periods. Objective measures such as nerve conduction studies, electromyography, glycemic indices, and quality-of-life scales should also be incorporated to clarify mechanisms and durability of treatment response.

CONCLUSION

Dry cupping combined with neural glides produced more favorable post-intervention rank-based outcomes than dry cupping without neural glides in individuals with diabetic peripheral neuropathy, particularly for pain intensity, functional mobility, sensory function, and neuropathy severity. The findings suggest that adding neural gliding exercises to dry cupping may enhance rehabilitation outcomes by addressing both local tissue-related and nerve-related impairments. However, because the study had a small sample size, short intervention period, limited reporting of randomization procedures, and incomplete clinical outcome values, the results should be interpreted as preliminary evidence. Larger, methodologically rigorous randomized controlled trials with standardized protocols, baseline-adjusted analyses, objective neurophysiological measures, and longer follow-up are required before firm clinical recommendations can be made.

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