RESEARCH ARTICLE

# Immediate effects of myofascial release or taping on tissue and plantar pressure in diabetes

Nilufer Kablan[1], Nuray Alaca[2], Nejla Gercek[3], Serkan Elarslan[4], Yasar Tatar[5]

## Abstract

**Objective:** To investigate the immediate effects of myofascial release and kinesiologic taping on the biomechanical properties of plantar fascia and Achilles tendon in type 2 diabetes mellitus patients, and to analyse changes in plantar pressure distribution following the intervention.

**Method:** The prospective case-control study was conducted at the Marmara University, Turkiye, from February 1 to May 27, 2021, and comprised male type 2 diabetes mellitus patients aged 35-65 years in group A and healthy controls matched for age and gender in group B. Myofascial release with the help of a foam roller was applied to the plantar fascia on one foot, while kinesiologic taping using the ligament technique was applied on the other foot. Stiffness and elasticity of the plantar fascia and Achilles tendon, as well as total contact area and peak contact pressure were assessed at the baseline, immediately after the intervention, and 30 minutes post-intervention. Data was analysed using SPSS 22.

**Results:** Of the 26 male subjects, 13(50%) were in group A with mean age 57.77±4.81 years (range: 48-65 years). There were 13(50%) controls in group B with mean age 54.69±7.4 years (range: 37-59 years) ($p$=0.05). Stiffness and elasticity values were not significantly different between the groups at baseline ($p$>0.05). Myofascial release application increased plantar fascia stiffness in group B ($p$=0.001), whereas in group A, it increased the contact area ($p$=0.018) and pressure ($p$=0.032) of the forefoot-medial, and decreased the peak contact pressure of the hind foot ($p$=0.032) at 30 minutes post-intervention. In group A, kinesiologic taping application decreased the hind foot contact area and pressure ($p$=0.032) without altering the forefoot dynamics ($p$>0.05).

**Conclusion:** Although kinesiologic taping had a positive effect and myofascial release had a negative effect on plantar fascia, the impact was unsteady.

**Keywords:** Fascia, Achilles tendon, Diabetes mellitus, Type 2, Athletic tape, Myofascial release treatment.

(JPMA 75: 1402; 2025) **DOI: https://doi.org/10.47391/JPMA.21747**

## Introduction

Diabetes mellitus (DM) is a chronic condition resulting from insufficient insulin production (Type 1) or ineffective use of insulin (Type 2). By 2030, it is estimated the DM will affect 643 million people, and the number is likely to rise to 783 million by 2045.[1] Type 2 DM (T2DM), accounting for 80-90% of cases, is associated with metabolic abnormalities, including hyperlipidaemia, insulin resistance (IR) and hypertension (HTN), leading to increased skin fragility and impaired tissue healing. Hyperglycaemia alters the macromolecular structure of collagen, reducing elasticity in the skin, joints, and connective tissue due to the accumulation of advanced glycation end-products (AGEs).[2,3] The plantar fascia (PF) and Achilles tendon (AT) are interconnected elastic components of the foot, influencing each other's mechanical properties. Changes in the stiffness and elasticity of these tissues disrupt foot biomechanics, leading to restricted joint movement, altered plantar pressure distribution, and increased risk of foot issues, such as plantar fasciitis and diabetic foot ulcers (DFUs). These changes also weaken intrinsic foot muscles and impair the windlass mechanism by diminishing its ability to provide effective tension and support the medial arch during gait, thereby further disrupting load distribution during stance and walking.[2-6] Restoring PF and AT function in diabetic patients is critical for preventing foot complications. However, options, such as electrotherapy, stretching, orthoses and shoe modifications, are limited due to increased skin fragility. Myofascial release (MFR) and kinesiologic taping (KT) are non-invasive, cost-effective techniques that show potential in this regard.[7,8] MFR reduces fascial adhesions, alleviating pain and improving functions,[7] while KT enhances microcirculation, reduces inflammation and promotes healing.[8] Both techniques are applied in various acute and chronic musculoskeletal pathologies, including plantar fasciitis, because they are non-invasive, cost-effective and safe.[9,10] Investigating their immediate effects is crucial, as early biomechanical and

[1]Department of Physiotherapy and Rehabilitation, Istanbul Medeniyet University, Istanbul, Turkey; [2]Department of Physiotherapy and Rehabilitation, Acibadem Mehmet Aydinlar University, Istanbul, Turkey; [3,5]University of Marmara, Istanbul, Turkey; [4]University of Health Sciences, Fatih Sultan Mehmet Training and Research Hospital, Istanbul, Turkey.

**Correspondence:** Nilufer Kablan. e-mail: niluferkablan@yahoo.com

ORCID ID: 0000-0002-3135-4608

**Submission completed:** 05-09-2024 **1st Revision received:** 19-11-2024

**Acceptance:** 16-07-2025 **Last Revision received:** 15-07-2025

neuromuscular responses can rapidly alleviate pain, enhance tissue mobility, and optimise foot load distribution, which are the key factors in preventing complications, such as DFUs and plantar fasciitis, in T2DM patients. Despite their widespread use in musculoskeletal conditions, there are no studies, to our knowledge, directly comparing the immediate effects of MFR and KT in the foot/ankle region, particularly in T2DM cases. The current study was planned to fill the gap in literature by examining the immediate effects of MFR and KT on PF and AT properties in T2DM patients.

## Patients and Methods

The prospective case-control study was conducted at the Marmara University, Turkiye, from February 1 to May 27, 202?, after approval from institutional ethics review committee. This clinical trial was registered in the ClinicalTrials.gov (NCT04637841). The sample was raised using systematic sampling technique. Group A included male patients with T2DM, aged 35–65 years, with no known chronic conditions and classified as having a very low risk of developing DFUs according to the International Working Group on the Diabetic Foot (IWGDF)[11] and healthy controls matched for age and gender in group B. Group A was raised from among those visiting the Diabetes Centre of the Fatih Sultan Mehmet Training and Research Hospital, Turkiye, while group B was recruited through social media announcements. Those excluded were individuals who used assistive devices for ambulation, had a history of foot or ankle fractures or surgeries within the preceding six months, were diagnosed with connective tissue diseases, had neurological or orthopaedic disorders that could affect plantar pressure distribution, had neuropathy, or experienced difficulties in maintaining balance on one foot. With respect to group B, individuals with any chronic condition were excluded.

After obtaining written informed consent from the participants, demographic and clinical data was recorded.

The sample size was calculated using G*Power version 3.1.9.712 with a two-way mixed-design analysis of variance (ANOVA), power 0.90 (1-β), margin of Type I error alpha (α) 0.05 and a medium effect size having Cohen's f value 0.25.[12]

One foot of each subject was treated with MFR, while the other foot was treated with KT in order to prevent the effect of individual tissue structure and foot pressure differences of the participants on the interventions. To balance the dominant-non-dominant distribution during the treatment, MFR was applied to the dominant side in 50% of each group, while KT was applied to the dominant side in the remaining 50%. This was done to ensure a balanced assessment of both interventions on dominant and non-dominant sides, and to minimise the potential influence of individual dominance differences on the outcomes. The dominant foot and technique were randomly assigned using an online randomization software. In this way, four different working groups were formed: controls with MFR intervention (C-MFR), controls with KT intervention (C-KT), diabetics with MFR intervention (D-MFR), and diabetics with KT intervention (D-KT).

MFR and KT were delivered with the participants lying in the prone position with their feet out of the bed. MFR was applied in all cases by a physiotherapist having 15 years of clinical experience. The physiotherapist applied pressure with the help of a foam roller (TheraBand Foot Roller, Theraband, Ohio, United States; 13cm in height and 4cm in diameter) from the calcaneus to the toes in the same direction as the fibres of the plantar fascia for 5 minutes.[13] The applied pressure was of moderate intensity, adjusted by the physiotherapist according to patient tolerance.

The same physiotherapist delivered KT applications (Kinesio Tex Gold, Kinesio Holding, Georgia, US). The participants were tested for allergy to the tape by applying 1-2 cm of KT to the sole of the foot for 30 minutes. No patient had an allergic reaction to KT. A tape with a width of 5cm and a thickness of 0.5mm was selected, and the ligament technique.[13] After two I-shaped bands were cut and the ends were rounded, the first tape was applied between the midpoint of the calcaneus and the metatarsal heads with 100% tension while keeping the foot in the neutral position. The ends of the band were attached towards AT and the toes were without tension.[13] To prevent the tape material from interfering with Myoton measurements, the part of the tape reaching the PF measurement point was cut before application, and a minimal gap was created on the skin. In the second application, the tape with 100% tension in the middle was used over the medial longitudinal arch, and the ends of the tape were attached towards the dorsal foot without tension.

All measurements and evaluations were carried out at room temperature ranging from 23°C to 24°C, with <50% humidity. The subjects were asked to avoid using stimulants, sedative drugs and any substance on the soles of their feet for 24 hours after the application. Two hours before the measurement, the subjects were not allowed to consume food and beverages. All measurements were performed by two researchers. Myoton and plantar pressure distribution measurements were performed at the baseline (T0), immediately after the intervention (T1) and 30 minutes post-intervention (T2).

Assessment of neuropathy was done during the selection

of patients using the Semmes-Weinstein monofilament test. While the subject was in a supine position with eyes closed, pressure (100 mN) was applied to 10 different areas defined on the dorsum and sole of the foot. A monofilament (10g) was pushed at a 90° angle against the skin until the filament was bowed, and it was held in place for 1.5 seconds before being removed. During this procedure, the subjects were asked about the indication sensation on the pressure point, and a loss of sensation of ≥3 points was diagnosed as neuropathy.[14] Neuropathy was not diagnosed in any of the patients.

Ankle active-passive dorsi/plantar flexion range of motion (ROM) was measured using a goniometer while the patients were in the supine position.

The stiffness (N/m) and decrement (inversely proportional to elasticity) values of PF and At were measured using the Myometer (Myoton Pro, Myoton AS, Tallinn, Estonia), a digital hand-held device whose validity and reliability have been demonstrated in several studies.[15] Myometer works on the principle of determining the biomechanical and viscoelastic properties of the tissue through the oscillatory responses of the tissue to the mechanical impulse applied to the tissue compressed by preload. Three repetitive mechanical impulses were applied to the tissue, and the average of the oscillatory responses was used in statistical analysis.[15,16] Measurements were made after the points were determined and marked on PF and AT, first on the right and then on the left foot, respectively, while the subjects were lying prone with the foot out of the bed. The measurement point was defined as the midpoint of the projections of both malleoli for AT, and the midpoint of the line extending between the centre of the calcaneus and the second metatarsophalangeal joint for PF. The measurements were made with the ankle in neutral position (0°), knee in extension for At, and knee in 90° flexion for PF.[16] Joint angles were determined using a goniometer.

Plantar pressure distribution was evaluated by using a pressure platform (TekScan, Matscan, model 3150, Boston, MA, US) with 2,288 sensors (4 sensels/cm$^2$) and 100Hz sample frequency. On each measurement day, the pressure platform was calibrated as recommended by the manufacturer. The foot was randomly selected (coin flip) for commencing the measurements, and the subject was asked to stand on one foot for 30 seconds in the order determined. Between the measurements of the two feet, a 30-second interval was maintained. The researcher provided minimal support from the elbow on the contralateral side of the patient's supporting leg to prevent excessive oscillation during the measurements.[17] The data were analysed using Matscan 7.10 software (TekScan, Boston, MA). To analyse the plantar pressure distribution, the sole of the foot was divided into five different regions (1st digit, forefoot-medial side, forefoot-lateral side, arch (mid foot), and hind foot), which are the regions with the highest risk of developing foot ulcers according to IWGDF.[11] The peak contact pressure (kPa) and total contact area (cm2) were assessed for each region.[17]

Data was analysed using SPSS 22. Data was expressed as either frequencies and percentages, mean±standard deviation, or median with interquartile range (IQR), as appropriate. Data normality was assessed using the Shapiro-Wilk test, and by evaluating skewness and kurtosis within the acceptable range from -2 to +2. Data was found not to be normally distributed, except for demographic characteristics. For each of the three measurements, the Friedman test was used to determine statistically significant differences, and the Wilcoxon signed-rank test was used for post-hoc comparison with Bonferroni correction. The Mann-Whitney test was used for intergroup comparisons. The effect size of the data not normally distributed was calculated using the formula: $r=Z/\sqrt{n}$. Rosenthal's guidelines were used as an alternative to Cohen's d, with $r$=0.10 small effect, $r$= 0.30 medium effect, and $r$=0.50 large effect.[18] For all statistical purposes, $p<0.05$ was considered significant.

## Results

Of the 33 individuals assessed, 26(78.8%) were included (Figure). Of these male subjects, 13(50%) diabetics were in group A with mean age 57.77±4.81 years (range: 48-65 years). There were 13(50%) controls in group B with mean age 54.69±7.4 years (range: 37-59 years) ($p$=0.05). Body mass index (BMI) ($p$=0.022) and right ($p$=0.008) and left

**Table-1:** Demographic and descriptive characteristics.

| Parameers | Groups | | *p*-value |
|---|---|---|---|
| | Tip 2 diabetes mellitus Mean±SD (Median/ min–max) (n=13) | Control Mean±SD (Median/ min–max) (n=13) | |
| Age (year) | 57.77±4.81 (48-65) | 54.69±7.4 (37-59) | 0.051 |
| Height (cm) | 171.84±6.65 (163-186) | 175.69±6.79 (160-185) | 0.094 |
| Weight (kg) | 85.23±10.89 (70-105) | 82.85±8.04 (70-97) | 0.520 |
| BMI (kg/cm$^2$) | 29.02±2.41 (24-32) | 26.85±2.41 (23-33) | 0.022 |
| Dorsi Fleksiyon-Right | 5.92±6.84 (5/0-20) | 13.81±6.90 (15/5-30) | 0.008 |
| Dorsi Fleksiyon-Left* | 3.08±5.22 (.00/0-15) | 12.54±7.50 (15/0-25) | 0.002 |
| Plantar Fleksiyon-Right* | 38.23±7.94 (40/22-50) | 42.31±4.38 (45/30-45) | 0.165 |
| Plantar Fleksiyon-Left* | 40.58±6.06 (45/30-45) | 40.77±4.93 (40/30-45) | 0.859 |
| Shoe Size | 41.83±1.52 (40-45) | 42.15±1.114 (40-44) | 0.462 |
| Glucose Thr-Fasting (mg/dl) | 116.42±31.29 (72-180) | - | N.D |
| Glucose Thr-1 hour (mg/dl) | 161.33±40.65 (114-232) | - | N.D |
| Use of Insulin (%) | 46.2 | - | N.D |

BMI; Body Mass Index; Thr: Threshold; ND, None determined.

($p$=0.002) ankle dorsi flexion values were significantly different between the groups (Table 1).

Stiffness and elasticity values were not significantly different between the groups at baseline ($p$>0.05). MFR application increased PF stiffness in group B ($p$=0.001), whereas in group A, it increased the contact area ($p$=0.018) and pressure ($p$=0.032) of the forefoot-medial, and decreased the peak contact pressure of the hind foot ($p$=0.032) at 30 minutes post-intervention. In group A, KT application decreased the hind foot contact area and pressure ($p$=0.032) without altering the forefoot dynamics (Tables 2).

**Table-2:** Intragroup comparison of measurement times in terms of stiffness (N/m), decrement, total contact area values (cm2) and peak contact pressure (kPa).

| Tissue or Groups | Groups or Parameters | Measurement of Stiffness and Decrement | | | |
|---|---|---|---|---|---|
| | | T0 Median (min–max) | T1 Median (min–max) | T2 Median (min–max) | *p*-value |
| **Achilles Tendon-Stifness** | C-MFR | 1022 (917-1103) | 1020 (873-1129) | 1016 (861-1104) | 0.232 |
| | C-KT | 1036 (904-1103) | 1045 (958-1158) | 976 (890-1111) | 0.092 |
| | D-MFR | 1082 (744-1123) | 1040 (845-1158) | 1078 (822-1156) | 0.397 |
| | D-KT | 1015 (933-1163) | 994 (892-1111) | 1074 (870-1163) | 0.458 |
| **Achilles Tendon- Decrement** | C-MFR | 0.37 (0.30-0.70) | 0.44 (0.24-0.67) | 0.43 (0.28-0.65) | 0.565 |
| | C-KT | 0.42 (0.30-0.60) | 0.38 (0.24-0.59) | 0.45 (0.30-0.62) | 0.050 |
| | D-MFR | 0.35 (0.20-0.80) | 0.40 (0.18-072) | 0.41 (0.26-0.59) | 01.00 |
| | D-KT | 0.41 (0.30-0.60) | 0.36 (0.20-0.60) | 0.37 (0.23-0.55) | 0.044 |
| **Plantar Fascia -Stiffness** | C-MFR | 584 (435-814) | 592 (506-916) | 635 (539-843) | 0.002 (a) |
| | C-KT | 573 (480-740) | 595 (472-793) | 580 (491-833) | 0.872 |
| | D-MFR | 664 (550-786) | 688 (522-805) | 658 (568-800) | 0.368 |
| | D-KT | 625 (499-765) | 645 (499-767) | 626 (495-750) | 0.149 |
| **Plantar Fascia - Decrement** | C-MFR | 1.25 (1.05-1.33) | 1.24 (0.89-1.40) | 1.20 (1.04-1.39) | 0.767 |
| | C-KT | 1.24 (1.02-1.33) | 1.26 (0.93-1.34) | 1.19 (0.90-1.35) | 0.383 |
| | D-MFR | 1.21 (1.01-1.45) | 1.18 (0.96-1.36) | 1.21 (1.09-1.58) | 0.338 |
| | D-KT | 1.26 (0.97-1.40) | 1.18 (0.93-1.41) | 1.22 (1.02-1.39) | 0.058 |
| **Measurement of Total Contact Area Values** | | | | | |
| **C-MFR** | Forefoot - Medial | 11.86 (1.44-18.43) | 11.90 (0.87-19.76) | 11.40 (2.98-18.59) | 0.232 |
| | Arch | 21.59 (3.61-24.29) | 18.46 (2.68-26.20) | 19.62 (4.62-25.32) | 0.368 |
| | Hindfoot | 30.29 (23.90-37.31) | 30.72 (22.42-38.50) | 30.28 (23.78-36.69) | 0.051 |
| **C-KT** | Forefoot - Medial | 10.85 (0.36-20.86) | 11.08 (1.18-15.61) | 10.67 (0.04-14.70) | 0.584 |
| | Arch | 18.77 (4.19-29.01) | 20.24 (7.72-28.14) | 20.58 (8.01-26.97) | 0.368 |
| | Hindfoot | 30.73 (24.64-37.87) | 27.85 (23.53-37.33) | 28.48 (23.26-38.06) | 0.584 |
| **D-MFR** | Forefoot - Medial | 13.26 (5.34-22.49) | 10.76 (8.32-18.77) | 15.43 (10.26-22.31) | 0.009 (a) |
| | Arch | 17.40 (7.54-30.01) | 21.41 (14.13-29.00) | 21.27 (10.49-27.27) | 0.500 |
| | Hindfoot | 29.36 (25.46-40.84) | 28.76 (22.90-39.94) | 29.49 (24.29-38.17) | 0.368 |
| **D-KT** | Forefoot - Medial | 12.88 (5.51-21.17) | 14.23 (4.08-20.42) | 12.12 (0.00-19.62) | 0.368 |
| | Arch | 22.55 (9.90-28.20) | 22.77 (7.45-30.25) | 24.68 (11.21-29.51) | 0.058 |
| | Hindfoot | 30.61 (27.14-42.45) | 28.50 (23.97-39.57) | 28.77 (25.68-37.20) | 0.009 (b) |
| **Measurement of Total Peak Contact Pressure** | | | | | |
| **C-MFR** | Forefoot - Medial | 74.36 (24.39-151.8) | 77.08 (23.76-155.5) | 67.70 (33.87-155.8) | 0.199 |
| | Arch | 89.94 (20.73-150.0) | 87.26 (20.40-152.9) | 93.43 (40.61-142.8) | 0.125 |
| | Hindfoot | 161.3 (83.97-200.8) | 145.3 (80.35-189.2) | 141.6 (84.52-191.3) | 0.368 |
| **C-KT** | Forefoot - Medial | 65.35 (6.24-116.7) | 66.71 (17.17-117.1) | 62.80 (0.32-117.9) | 0.232 |
| | Arch | 79.32 (45.17-149.9) | 96.10 (60.56-138.1) | 84.10 (53.93-126.2) | 0.092 |
| | Hindfoot | 158.6 (107.6-200.3) | 150.5 (57.57-181.4) | 139.4 (61.39-190.1) | 0.199 |
| **D-MFR** | Forefoot - Medial | 91.38 (39.54-140.0) | 76.91 (47.83-127.6) | 89.83 (65.77-151.5) | 0.037 (a) |
| | Arch | 85.38 (51.23-162.0) | 90.97 (67.83-134.9) | 87.80 (63.12-128.0) | 0.116 |
| | Hindfoot | 157.9 (85.96-187.7) | 141.5 (87.59-186.5) | 147.9 (82.05-188.8) | 0.023 (b) |
| **D-KT** | Forefoot - Medial | 90.62 (24.19-140.0) | 100.3 (25.01-151.6) | 99.02 (20.95-145.7) | 0.500 |
| | Arch | 103.2 (46.19-154.1) | 103.5 (38.25-147.4) | 107.8 (56.12-148.1) | 0.584 |
| | Hindfoot | 152.2 (110.2-188.6) | 126.6 (88.13-187.7) | 144.3 (75.86-186.5) | 0.002 (c) |

C-MFR: Controls with myofascial release, C-KT: Controls with kinesiologic taping, D-MFR: Diabetics with myofascial release, D-KT: Diabetics with kinesiologic taping, T0: Pre-intervention, T1: Immediately post-intervention, T2: 30 minutes post-intervention, (a): T1 vs T2; (b): T0 vs T1; (c): T0 vs T2.

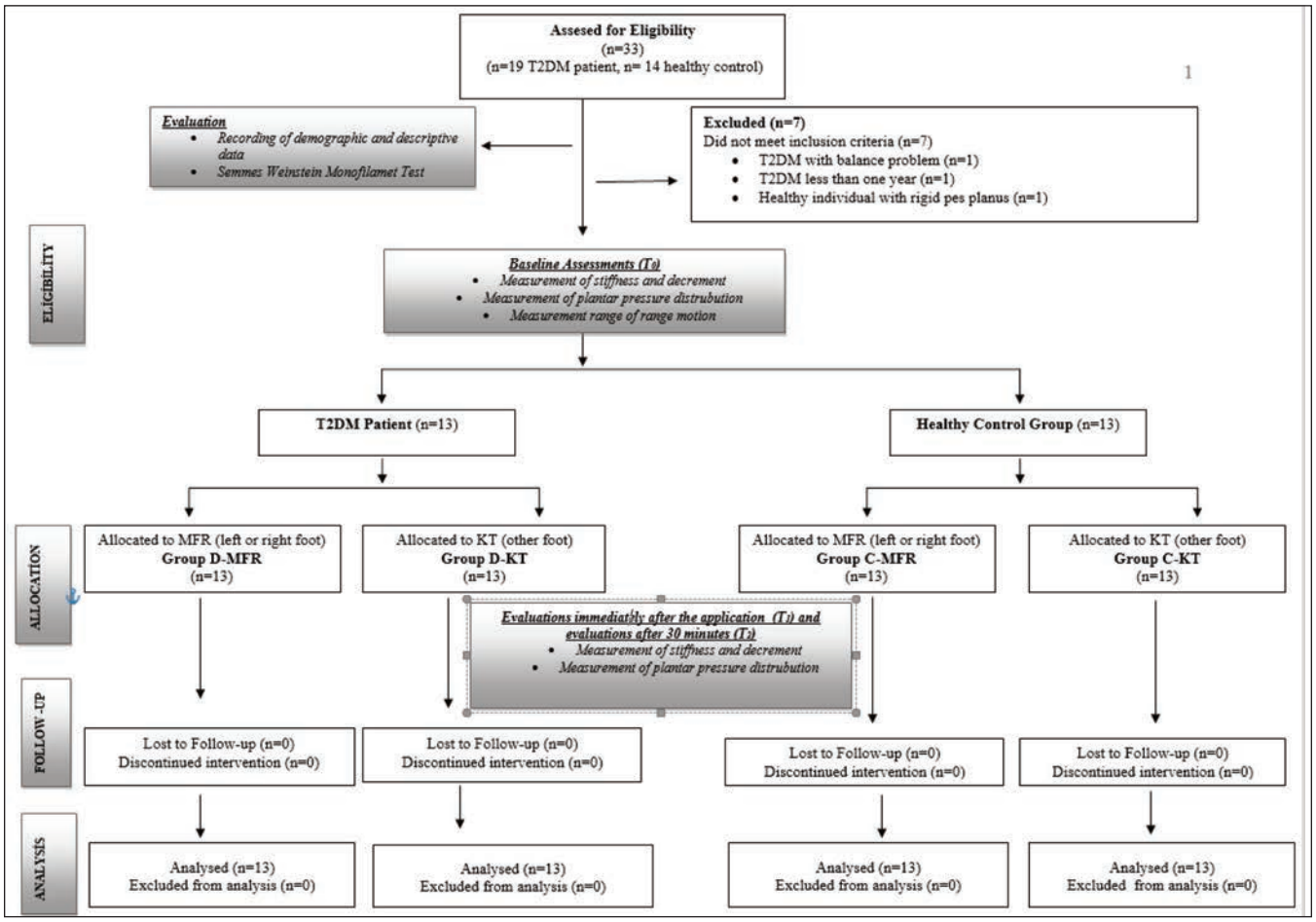


**Figure:** The flow diagram.

*T2DM: Type 2 diabetes mellitus, C-MFR: Controls with myofascial release, C-KT: Controls with kinesiologic taping, D-MFR: Diabetics with myofascial release, D-KT: Diabetics with kinesiologic taping.*

## Discussion

In the present study, MFR application increased PF stiffness in the control group. In the T2DM group, MFR application increased the contact area and contact pressure of the forefoot-medial, and decreased the contact pressure of the hind foot at 30 minutes of application. The application of KT decreased the hind foot contact area and pressure in the T2DM group without any change in the forefoot.

Priesand et al.[19] reported a 42% higher prevalence of plantar fasciitis in T2DM patients compared to T1DM patients, and 64% higher than in non-diabetic individuals. Gariani et al.[6] highlighted in a 2020 review that diabetic adults are at greater risk of plantar fasciitis than non-diabetics, but noted the retrospective design and heterogeneous nature of the study, which lacked focus on diabetic patients. They also emphasised that while diagnostic and treatment methods are generally similar across patients, plantar fasciitis in diabetics requires more tailored approaches6. Batista et al.[20] observed structural AT abnormalities in diabetics, indicating altered stiffness, increased forefoot pressure, and a risk of plantar ulcers. This study evaluated biomechanical and viscoelastic changes in PF and AT in T2DM patients to identify treatments that prevent complications. Fascial restrictions may transfer tension throughout the body due to fascial continuity, potentially causing stress on structures like nerves and vessels. MFR is believed to restore connective tissue length, relieving pain and improving function, supported by research into the viscoelastic and piezoelectric properties of connective tissue.[7,9,10,20,21]

Meltzer et al.[21] showed that MFR post-injury altered fibroblast orientation and promoted healing. While MFR is thought to halt degenerative processes in the PF, this remains unproven. A study reported no immediate effect of MFR on AT stiffness in healthy individuals[10], while another found improved flexibility without directly measuring stiffness[22] In the current study, MFR increased PF stiffness in the control group, contrary to previous findings, likely due to differences in evaluation methods.[15,16]

KT has shown potential for reducing PF tension and inflammation. Tsai et al.[8] found KT had immediate effects in reducing PF thickness at its insertion site, decreasing inflammation. Despite positive findings for KT[8,13,23] its immediate effects and impact on PF and AT stiffness in diabetic or control groups remain unclear. Lopes et al.[23] noted immediate effects on improved wrist flexor stiffness with KT, but studies on PF have primarily focussed on pain and functional improvements.[24] In the current study, KT showed minimal and inconsistent positive immediate effects. DFU prevention requires plantar pressure assessment and customised treatments.[11,1] Martínez-Jiménez et al.[25] found that manual PF therapy improved static balance, but not pressure values. Few studies suggest KT did not alter plantar pressure distribution.[26,27] In the current study, MFR increased contact area and peak pressure in T2DM patients, but these changes were intermittent and inconsistent, highlighting KT as more suitable for biomechanical adjustments.

The current study has limitations as it focussed on immediate effects, with no long-term data. The coronavirus disease-2019 (COVID-19) pandemic prevented 24-hour follow-up. Variability in plantar pressure changes may have resulted from unmeasured factors, such as activity levels or baseline stiffness, underscoring the need for individualised assessments. Static pressure evaluation is another limitation. The sample size was small ad included only male participants, which limits the generalisability of the findings. Although Myoton directly measures biomechanical properties, operator dependence may affect reliability. Future studies should explore long-term effects, dynamic conditions, larger and more diverse populations, and combined treatments, particularly for T2DM patients with plantar fasciitis or varying ulcer risk profiles.

## Conclusion

Both MFR and KT were found to have immediate effects on the mechanical properties of soft tissues. In the T2DM group, KT application reduced hindfoot contact area and pressure, suggesting improved load redistribution and tissue elasticity. MFR application increased PF stiffness in the control group, while it increased the contact area and peak pressure in the T2DM group, indicating changes in tissue compliance. All such mechanical effects were found to be transient and unstable.

**Acknowledgments:** We are grateful to the Board of Directors of the Physically Disabled Foundation for facilitating the data-gathering process.

**Disclaimer:** None.

**Conflict of Interest:** None.

**Source of Funding:** None.

## References

1. Sun H, Saeedi P, Karuranga S, Pinkepank M, Ogurtsova K, Duncan BB, et al. IDF Diabetes Atlas: global, regional and country-level diabetes prevalence estimates for 2021 and projections for 2045. Diabetes Res Clin Pract 2022;183:109119. doi.org/10.1016/j.diabres.2021.109119
2. Rosyid FN. Etiology, pathophysiology, diagnosis and management of diabetics' foot ulcer. Int J Res Med Sci 2017;5:4206–13. doi.org/10.18203/2320-6012.ijrms20174630
3. Argyropoulos AJ, Robichaud P, Balimunkwe RM, Fisher GJ, Hammerberg C, Yan Y, et al. Alterations of dermal connective tissue collagen in diabetes: molecular basis of aged-appearing skin. PLoS One 2016;11:e0153806. doi.org/10.1371/journal.pone.0153806
4. Afolabi BI, Ayoola OO, Idowu BM, Kolawole BA, Omisore AD. Sonographic evaluation of the Achilles tendon and plantar fascia of type 2 diabetics in Nigeria. J Med Ultrasound 2019;27:86–91. doi.org/10.4103/JMU.JMU_75_18
5. Kumar CG, Rajagopal KV, Hande HM, Maiya AG, Mayya SS. Intrinsic foot muscle and plantar tissue changes in type 2 diabetes mellitus. J Diabetes 2015;7:850–7. doi.org/10.1111/1753-0407.12243
6. Gariani K, Waibel FWA, Viehöfer AF, Uçkay I. Plantar fasciitis in diabetic foot patients: risk factors, pathophysiology, diagnosis, and management. Diabetes Metab Syndr Obes 2020;13:1271–9. doi.org/10.2147/DMSO.S244637
7. Tandel HI, Shukla YU. Effect of myofascial release technique in plantar fasciitis on pain and function—an evidence based study. Int J Sci Health Res 2021;6:332–7.
8. Tsai CT, Chang WD, Lee JP. Effects of short-term treatment with kinesiotaping for plantar fasciitis. J Musculoskelet Pain 2010;18:71–80. doi.org/10.3109/10582451003668054
9. Ajimsha MS, Binsu D, Chithra S. Effectiveness of myofascial release in the management of plantar heel pain: a randomized controlled trial. Foot 2014;24:66–71. doi.org/10.1016/j.foot.2014.01.006
10. Chang TT, Li Z, Zhu YC, Wang XQ, Zhang ZJ. Effects of self-myofascial release using a foam roller on the stiffness of the gastrocnemius-Achilles tendon complex and ankle dorsiflexion range of motion. Front Physiol 2021;12:718827. doi.org/10.3389/fphys.2021.718827
11. Bus SA, van Netten JJ, Hinchliffe RJ, Apelqvist J, Lipsky BA, Schaper NC, et al. Standards for the development and methodology of the 2019 International Working Group on the Diabetic Foot guidelines. Diabetes Metab Res Rev 2020;36:e3267. doi.org/10.1002/dmrr.3267
12. Faul F, Erdfelder E, Lang AG, Buchner A. G*Power 3: a flexible statistical power analysis program for the social, behavioral, and biomedical sciences. Behav Res Methods 2007;39:175–91. doi.org/10.3758/BF03193146
13. Kase K, Wallis J, Kase T. Clinical therapeutic applications of the Kinesio taping method. Albuquerque: Kinesio Taping Association, 2003.
14. Won JC, Park TS. Recent advances in diagnostic strategies for diabetic peripheral neuropathy. Endocrinol Metab 2016;31:230–8. doi.org/10.3803/EnM.2016.31.2.230
15. Muckelt PE, Warner MB, Cheliotis-James T, Muckelt R, Hastermann M, Schoenrock B, et al. Protocol and reference values for minimal detectable change of MyotonPRO and ultrasound imaging measurements of muscle and subcutaneous tissue. Sci Rep 2022;12:13654. doi.org/10.1038/s41598-022-17499-0
16. Kablan N, Can M, Ayvacı H, Gerçek N, Eroğlu ZA, Özgit B, et al. Biomechanical and viscoelastic properties of the Achilles tendon and plantar fascia in pregnant women with pelvic girdle pain: a case–control study. Women Health 2022;62:476–87. doi.org/

10.1080/03630242.2022.2048367
17. Abri H, Aalaa M, Sanjari M, Amini MR, Mohajeri-Tehrani MR, Larijani B. Plantar pressure distribution in diverse stages of diabetic neuropathy. J Diabetes Metab Disord 2019;18:33–9. doi.org/10.1007/s40200-019-00377-4
18. Rosenthal R. Parametric measures of effect size. In: Cooper H, Hedges LV, eds. The handbook of research synthesis. New York: Russell Sage Foundation, 1999; pp-231–44.
19. Priesand SJ, Schmidt BM, Ang L, Wrobel JS, Munson M, Ye W, et al. Plantar fasciitis in patients with type 1 and type 2 diabetes: a contemporary cohort study. J Diabetes Complications 2019;33:107399. doi.org/10.1016/j.jdiacomp.2019.107399
20. Batista F, Nery C, Pinzur M, Monteiro AC, Souza EF, Felippe FHZ, et al. Achilles tendinopathy in diabetes mellitus. Foot Ankle Int 2008;29:498–501. doi.org/10.3113/FAI.2008.0498
21. Meltzer KR, Cao TV, Schad JF, King H, Stoll ST, Standley PR. In vitro modeling of repetitive motion injury and myofascial release. J Bodyw Mov Ther 2010;14:162–71. doi.org/10.1016/j.jbmt.2009.01.005
22. Gabriel A, Konrad A, Roidl A, Queisser J, Schleip R, Horstmann T, et al. Myofascial treatment techniques on the plantar surface influence functional performance in the dorsal kinetic chain. J Sports Sci Med 2022;21:13–22. https://pubmed.ncbi.nlm.nih.gov/35265640
23. Lopes M, Torres R, Romão D, Dias M, Valério S, Espejo-Antunez L, et al. Kinesiologic tape increases muscle tone, stiffness, and elasticity: effects of the direction of tape application. J Bodyw Mov Ther 2022;30:176–80. doi.org/10.1016/j.jbmt.2022.01.002
24. Tezel N, Umay E, Bulut M, Cakci A. Short-term efficacy of kinesiotaping versus extracorporeal shockwave therapy for plantar fasciitis: a randomized study. Saudi J Med Med Sci 2020;8:181–7. doi.org/10.4103/sjmms.sjmms_199_19
25. Martínez-Jiménez EM, Becerro-de-Bengoa-Vallejo R, Losa-Iglesias ME, Díaz-Velázquez JI, Palomo-López P, Rodríguez-Sanz D, López-López D. Pressure and traction technique improves postural control more than tactile stimulation in foot plantar fascia: a randomized single-blind trial. Arch Phys Med Rehabil 2020;101:978–84. doi.org/10.1016/j.apmr.2020.01.011
26. Luque-Suarez A, Gijon-Nogueron G, Baron-Lopez FJ, Labajos-Manzanares MT, Hush J, Hancock MJ. Effects of kinesiotaping on foot posture in participants with pronated foot: a quasirandomized, double-blind study. Physiotherapy 2014;100:36–40. doi.org/10.1016/j.physio.2013.03.002
27. Aguilar MB, Abián-Vicén J, Halstead J, Gijon-Nogueron G. Effectiveness of neuromuscular taping on pronated foot posture and walking plantar pressures in amateur runners. J Sci Med Sport 2016;19:348–53.doi.org/10.1016/j.jsams.2015.05.008.

**Author Contribution:**
**NK:** Concept, performance of work, data interpretation, analysis, preparation, revision and supervision.
**NA:** Data interpretation, analysis, preparation and revision.
**NG:** Performance, data interpretation and analysis.
**SE:** Concept, data interpretation and analysis.
**YT:** Concept, preparation and revision.