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EFFECT OF DRY NEEDLING VERSUS KINESIOLOGY TAPING IN PATIENT WITH PLANTAR FASCIITIS

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Abstract

Plantar fasciitis is a common musculoskeletal disorder and a leading cause of heel pain, affecting 10–15% of the general population. Characterized by sharp, localized pain under the heel, particularly in the morning or after prolonged standing, the condition significantly affects daily function and quality of life. While various conservative treatment options exist, including physical therapy, NSAIDs, and orthotic support, a definitive and superior intervention remains unclear. Among contemporary conservative treatments, Dry Needling (DN) and Kinesiology Taping (KT) have gained popularity for their potential in alleviating pain and improving foot function. However, direct comparative evidence between these modalities in treating plantar fasciitis remains limited. This study aimed to determine the comparative effectiveness of dry needling versuskinesiology taping in reducing pain intensity, improving foot function, and enhancing quality of life in patients with plantar fasciitis.

A single-blinded randomized controlled trial was conducted at Hamza Hospital Lahore and Lahore Poly Clinic over 9 months. A total of 60 participants aged 20–45 years with clinically diagnosed plantar fasciitis and identifiable myofascial trigger points were recruited using a non-probability purposive sampling technique. They were randomly assigned to two groups (n=30 each): Group A received dry needling with conventional

physiotherapy once per week, while Group B received kinesiology taping with conventional physiotherapy twice per week. Both interventions were administered for 6 weeks. Outcome measures included the Visual Analogue Scale (VAS) for pain, Foot and Ankle Outcome Score (FAOS) for functional assessment, and SF-12 Health Survey for quality of life. Assessments were conducted at baseline, week 3, and week 6. Data were analyzed using SPSS v28, with significance set at $p< 0.05$.

Both intervention groups—dry needling (Group A) and kinesiology taping (GroupB)—demonstrated significant within-group improvements from baseline to the 6th week in pain intensity (VAS), functional ability (FAOS), and quality of life (SF-12) scores ($p < 0.05$).However, dry needling produced more pronounced outcomes across all parameters. By the 6thweek, Group A had a greater reduction in pain with a VAS mean of 1.83 ± 0.791, compared to1.97 ± 0.413 in Group B. Functional improvement measured via FAOS was also higher in Group A (Mean = 78.9) than in Group B (Mean = 70.3). Similarly, Group A exhibited superior gains in both physical and mental components of the SF-12, with PCS = 45.5 and MCS = 56.2,compared to PCS = 42.0 and MCS = 50.1 in Group B. Statistical comparisons using the Mann Whitney U test and Friedman test confirmed that these differences were significant, favoring the dry needling group (VAS $p = 0.004$, FAOS $p = 0.001$, SF-12 $p = 0.015$).

While both dry needling and kinesiology taping are effective conservative interventions for plantar fasciitis, dry needling provides more significant and sustained improvements in pain relief, functional recovery, and overall quality of life. These findings support the inclusion of dry needling as a preferred modality in the conservative management of plantar fasciitis, particularly for short-term therapeutic goals. Future studies with larger sample sizes and extended follow-up durations are recommended to validate long-term out comes.

Key Words: Plantar Fasciitis, Dry Needling, Kinesiology Taping, Heel Pain, Pain Management.

Introduction

The plantar fascia is a thick band of connective tissue that forms the medial longitudinal arch of the foot. Plantar fasciitis, an inflammatory condition, causes pain in the lower heel and affects 10-15% of the general population. It is the leading cause of heel pain in individuals over40 years old. This condition accounts for 10% of running-related injuries and is prevalent among both sedentary and active

individuals. Patients with plantar fasciitis typically experience sharp, knife-like pain in the morning that eases after taking a few steps. However, symptom scan reappear with prolonged standing and are sometimes accompanied by stiffness. In chronic cases, pain often worsens by the end of the day, significantly limiting daily activities. (Gupta.2020). Plantar fasciitis involves the degeneration of the plantar fascia, leading to localized heel pain. It is commonly an overuse injury due to repetitive strain causing micro-tears in the fascia, though it can also result from trauma or other factors (Becker &Childress, 2018; Finken staedt., 2018). As one of the most frequent foot disorders, plantar fasciitis accounts for approximately one-quarter of all foot injuries and affects 3.6% to 7% ofthe population (Chen, 2020). It often impacts physically active individuals, and those withplantar fasciitis may experience decreased physical function, quality of life, and mental wellbeing compared to those without the condition (Rathleff, 2015; Landorf, 2021).Dry needling (DN) is a technique used for pain management for almost two centuries andremains a popular method for treating myofascial pain syndrome. DN involves inserting thinneedles into the muscles or ligaments to alleviate pain associated with neuro-musculoskeletaldisorders. This approach aims to mechanically disrupt trigger points without the use ofmedication, thereby reducing pain. Several randomized controlled trials have shown that dryneedling effectively reduces pain and enhances foot function in plantar fasciitis patients(Cotchett, 2018; Martinelli , 2019). For instance, a study conducted in Kuwait reported that dryneedling significantly alleviated heel pain and improved mobility compared to the controlgroup.

In practice, KT is applied by removing hair from the calf area with a razor and then placing thetaping with the patient lying face down. The procedure involves extending the knee, dorsiflexing the ankle, and stretching the plantar fascia and calf muscles to their maximum. Thetaping is applied in an I-shape, starting from the metatarsal head, extending through the plantarfascia and Achilles tendon, and reaching up to the calf muscle. About 50% of the taping tensionis applied to the Achilles tendon area, while 15% is applied to the calf muscle area. Additionaltaping is done to support the arch by applying 50% tension from the base of the 5th metatarsalto the medial arch The taping is applied twice a week for four weeks and is left on for over 12hours each day. This study aimed to address the pressing need for evidence-based guidance on treatingplantar fasciitis, particularly in settings where conservative approaches are preferred due to their noninvasive nature and cost-effectiveness. Despite the potential benefits of dry needling and Kinesiology taping in alleviating pain and improving function, the lack of direct comparative studies hinder clinicians' ability to determine the most effective treatment for their patients.To bridge this knowledge gap, this randomized controlled trial directly compared the out comes of dry needling and Kinesiology taping, utilizing validated scales such as the Visual Analog Scale (VAS)

for pain intensity, Foot Function Index (FFI) for functional impact, and SF-12 for overall quality of life. This comprehensive evaluation provided clinicians with evidence-based guidance, enabling them to make informed decisions and choose the most effective treatment for managing plantar fasciitis. Ultimately, this study seeked to enhance patient care and quality of life by improving treatment strategies, contributing to the existing body of knowledge, and offering practical recommendations for healthcare providers. By determining the relative effectiveness of dry needling and Kinesiology taping, this research has a direct impact on clinical practice, ensuring that patients receive the most effective treatment for their condition.

Objective of research

To determine the effectiveness of dry needling versus Kinesiology Taping in patients withPlantar Fasciitis.

Literature review

A research article was published in 2021 that compared dry needling and kinesio – taping methods for treatment of myofascial pain syndrome. A total of 26 participants were part of this randomized control trial. The participants were divided into 3 groups. The first group was considered control group and it received on exercise for pain, the second group received KT with exercise and third group received DN with exercise. Along with this the scores were noted by standardized scales and questionnaire such as Visual Analogue Scale (VAS), Neck Disability Index (NDI) and Global Perceived Effect Scale (GPES). The results stated that VAS and NDI scores improved in the KT method and DN method groups while there was no significant result in control group. Hence was concluded that KT and DN methods in myofascial pain syndrome treatment have more positive effects in terms of pain, disability and global effect compared to the control group. This study lacks the direct high quality comparison of both the techniques independently. There is also limited evidence on the long term effect of clinical decision making regarding the use of KT and DN method for myofascial pain syndrome. (Yasar et al., 2021)

An article from EPRJ stated the effects of low dye taping with and without dry needling on pain and functional disability in athletes with plantar fasciitis. A 6 month prolonged randomized control trial was conducted at Pakistan Sport Board, Lahore (PSB). This research comprised of 20 athlete participants. They were randomly assigned to one of the groups were group 1 received low dye taping along with dry needling and regular treatment for plantar fasciitis while group 2 received alone low dye taping and regular exercise protocol. The results showed significant change in functional disability and pain. The

results of low dye taping with dry needling and regular exercise protocol had more positive effects than the other group. This research still lacked on long term effects of these protocols as study was for a short time period based.(Manzoor & Munir, 2022)

A research article from the International Journal of Environmental Research and Public Health that was published in November 2022 stated the results of a randomized control trial to assess the short term impact of dynamic taping versus low dye taping in treating plantar fasciitis. The purpose of this research was to identify and verify the effectiveness of these two taping techniques on pain intensity, ankle range of motion and foot posture index. A total of 57 participants were included in this trial. Group 1 was treated with dynamic taping while group 2 was treated with low dye taping. All the variables were measured 1 week before the treatment and 1 week after. Upon data analysis it was seen that significant results were observed in participants who underwent for dynamic taping to relieve symptoms than low taping. This Research lacked the long term effect of treatment protocol. Also, this research only able to justify effects on pain intensity but was not able to justify the effects of dynamic taping on ankle range of motion and foot posture index. (Castro-Méndez et al., 2022)

Plantar Fasciitis Patients. 69 patients with plantar fasciitis were randomly assigned into 3 groups. Group 1 received dynamic taping with physical therapy, Group 2 received the kinesiology Taping with physical Therapy and the control group i.e. group 3 only received physical therapy. The taping was performed twice a week for 4 weeks, and the taping was removed after 12 hours of application. Patients pain, foot function, and balance were assessed using the visual analog scale (VAS), foot function index (FFI), and Y-balance test (YBT), respectively, before and immediately after the intervention. The results showed there was significant positive effect of the dynamic taping with physical therapy than with kinesio-taping with physiotherapy and the control group showed the lowest effect. This research lacked more evidence on VAS and foot pressure and its long term effect on balance. (Kim & Lee, 2023)

A research article in 2024 was published in the Khyber medical journal. This article addressed the comparative effects of dry needling and cross frictional massage on pain, mobility and functional status in plantar fasciitis patients. This Randomized Control Trial consisted of 48 patients. Patients were divided into 2 groups. Group 1 received dry needling with regular therapy and group 2 received cross frictional massage with regular therapy. Pain, foot health, and functional status were assessed pre- and post-treatment using the Pain Scale for Plantar Fasciitis (PSPF), Foot Health Status Questionnaire (FHSQ), and Foot Functional Index (FFI). Both groups showed significant improvements in pain, mobility, and functional status post intervention. DN is more effective than CFM for pain reduction,

mobility improvement, and functional enhancement in plantar fasciitis. Further studies with larger, more diverse populations and longer follow-up are recommended. (Ziaullah et al., 2024)

An article was published in Indian Journal of Physiotherapy & Occupational Therapy todetermine the effects dry needling therapy with Plantar fasciitis in reducing pain and increasing Ankle Range of Motion (ROM) when compared to Ultrasound therapy with ankle exercises. 50 participants were included in this study. The experimental group received dry needling with ankle exercises and control group received ultrasound with ankle exercises. Statistical analysis was done and a significant difference was obtained between the experimental and control groups for NPRS and ROM. It was concluded that dry needling therapy with ankle exercises was more beneficial in reducing pain than ultrasound therapy with ankle exercises in Plantar fasciitis subjects. This study lacked the underlying factors that were dealt when providing treatment and also short-term effect of only 2 weeks was studied. (Jain & Jothilingam, 2024)

The impact of quadratus plantae muscle dry needling on pain and thickness of the plantar fascia in individuals with plantar fasciitis was assessed. As plantar fasciitis is leading cause of foot discomfort and this decrease the overall quality of life. 40 participants were included in the study. Group 1 underwent massage and stretches of plantar fascia while group 2 underwent quadratus plantae dry needling. Later the thickness of plantar fascia was assessed using ultrasound imaging and pain was assessed using visual analogue scale (VAS). The results showed that plantar fasciitis was eased significantly in group 2 participants. This study lacked the role of normal physiotherapy protocol. It did not address the combination therapy that is to be given to plantar fascia patients. (Mahmoudi et al., 2025)

An article was published in Indian Journal of Physiotherapy & Occupational Therapy to determine the effects dry needling therapy with Plantar fasciitis in reducing pain and increasing Ankle Range of Motion (ROM) when compared to Ultrasound therapy with ankle exercises. 50 participants were included in this study. The experimental group received dry needling with ankle exercises and control group received ultrasound with ankle exercises. Statistical analysis was done and a significant difference was obtained between the experimental and control groups for NPRS and ROM. It was concluded that dry needling therapy with ankle exercises was more beneficial in reducing pain than ultrasound therapy with ankle exercises in Plantar fasciitis subjects. This study lacked the underlying factors that were dealt when providingtreatment and also short term effect of only 2 weeks was studied. (Jain & Jothilingam, 2024)

Research methodology

A single-blinded randomized controlled trial was conducted at hamza hospital Lahore, Lahore poly clinic over 9 months. A total of 60 participants aged 20–45 years with clinically diagnosed plantar fasciitis and identifiable myofascial trigger points were recruited using a non-probability purposive sampling technique. They were randomly assigned to two groups (n=30 each): Group A received dry needling with conventional physiotherapy once per week, while Group B received kinesiology taping with conventional physiotherapy twice per week. Both interventions were administered for 6 weeks Outcome measures included the Visual Analogue Scale (VAS) for pain, Foot and Ankle Outcome Score (FAOS) for functional assessment, and SF-12 Health Survey for quality of life. Assessments were conducted at baseline, week 3, and week 6. Data were analyzed using SPSS v28, with significance set at $p < 0.05$.

Sample Selection:

Inclusion Criteria: Participants age group included was 20 – 45 years (Al-Boloushi, 2019). Both genders were selected the presence of MTrPs on plantar and calf muscles was assured (Al-Boloushi, 2019). Patients with plantar fasciitis from less than 1-month Eftekharsadat, 2016) Exclusion Criteria: Participants who have had an MTP injection 3 months before treatment (Yasar, 2021). Participants who have had fractures, Inflammatory joint or systemic disease, skin ulcers and neuropathy (Cotchett, 2014). Participants who have needle phobia (Al-Boloushi, 2019). Participants with history of prior foot or plantar surgery was excluded (Jianing, 2025)

Equipment:

1. Dry Needling Needles 2. Kinesio Taping

Data Collection Procedure:

Screening: Participants were recruited from the hamza hospital Lahore and Lahore poly clinic on the basis of inclusion criteria.

Randomization: Patients fulfilling the inclusion criteria were randomly divided into 2 experimental groups

Blinding: The study was kept single blinded. The assessor was unaware of treatment given to both groups

Assessment: The data was collected at baseline, 3rd week and 6th week. Baseline assessment was conducted before giving any intervention. The outcome measures were assessed; Visual Analogue Scale score was used to mark the pain level from no pain to worst pain. Nextly, Foot and Ankle Outcome Score was used so that the patients can immediately reflect onto perceived changes in symptoms, function and particularly response to treatment. SF – 12 was used to assess general physical and mental health status

Treatment Protocol;

Interventions:

- **Group A –** Dry needling with conventional physiotherapy
- **Group B –** Kinesiology taping with conventional physiotherapy

Baseline:

Patients underwent baseline assessment and the outcome variables were assessed. Participants were briefed on the treatment protocol that they were about to receive. They were introduced all the conventional therapy techniques along with Dry needling and kinesiotaping. This included electrotherapy by EMS for 10 minutes on target muscles, Ice therapy for 10 – 15 minutes. Exercise protocol that included Ball Role, Heel Raise, Toe Raise, Massage Therapy, Myofascial Release and instructions on how to perform them correctly with 10 repetitions of exercise with 30 second hold stretch. (Dunning, 2018)

Group A – Dry Needling with Conventional Physiotherapy

- **Frequency:** Participants received dry needling treatment once a week. The intervention consisted of 6 sessions over the course of 6 weeks. (Methew, 2014)
- **Duration:** Each dry needling session lasted for approximately 30 minutes. The total duration of the intervention was of 6 weeks with one session per week (Methew, 2014)
- **Patient Position:** Patients were positioned based on the targeted muscles. For the posterior lower leg

muscles such as the soleus, quadratus plantae, flexor digitorum brevis, and abductor halluces muscles, patients position was prone. For accessing the plantar fascia and other muscles on the plantar surface, patients lied supine with the foot in a slight dorsiflexed position. Proper cushioning and support was provided for comfort. (Methew, 2014)

- **Technique:** Dry needling involved the insertion of fine needles into identified myofascial trigger points within the plantar fascia and associated muscles. The technique aimed to release muscle tightness and alleviated pain by stimulating the trigger points. Needles were inserted perpendicularly to the skin at the identified trigger points, with the depth of insertion typically ranged from 35 to 70 mm, with 0.30mm diameter. (Methew, 2014)

Group B – Kinesiology Taping with Conventional Physiotherapy

- **Frequency:** Participants received Kinesiology Taping twice a week. The taping was applied for a total of six weeks, with each session lasting approximately 30 minutes. (Kim, 2023)
- **Duration:** The taping was applied for over 12 hours daily and was reapplied twice a week for a total of six weeks. (Kim, 2023)
- **Patient Position:** Patients were positioned in a supine or seated position. The foot was positioned in a neutral or slightly dorsiflexed stance to facilitate the accurate application of the taping. Adequate support was provided to maintain patient comfort during the taping process. (Kim, 2023)
- **Technique:** Kinesiology Taping was applied using an I-shape technique. The taping began from the metatarsal head, extending through the plantar fascia and along the Achilles' tendon to the calf muscle. The application involved specific tension levels to support the plantar fascia and improve functional movement. The taping was applied with the foot in a slightly dorsiflexed position to ensure proper adherence and function. (Kim, 2023)

Outcome measure

Plantar Fasciitis

Plantar fasciitis is one of the most common causes of heel pain. It involves inflammation of a thick band of tissue that runs across the bottom of each foot and connects the heel bone to the toes, known as the plantar fascia. (Motley, 2021)

Pain Intensity

Pain intensity will be measured using the Visual Analog Scale (VAS). The VAS is a continuous scale where participants indicate their pain level on a line ranging from 0 (no pain) to 10 (worst possible pain).

The distance from the left end of the line to the participant's mark is measured in millimeters, providing a quantifiable score for pain intensity. A higher score reflects greater pain. (Huskisson, 1983)

Functional Status

Functional status will be assessed using the Foot and Ankle Outcome Score (FAOS). The FAOS is a questionnaire designed to evaluate foot-related disability and pain, consisting of 13 items distributed across three domains: pain, disability, and activity limitation. Each item is rated from 0 (no problem) to 4 (severe problem). Scores for each domain are summed and averaged, with higher scores indicating worse functional status. (Roos et al., 2001)

Quality of Life

The SF-12 Health Survey will be used to assess quality of life. This tool evaluates physical and mental health outcomes, with scores reflecting overall well-being and daily functioning before and after treatment. The SF-12 provides a comprehensive measure of the impact of interventions on patients' quality of life. (Ware et al., 1996)

Data Collection Tools:

1. **Visual Analogue Scale (VAS)**
   The participants were asked to mark their pain intensity from 0 to 10. The greater the score the intensity of pain is increased.
2. **Foot and Ankle Outcome Score (FAOS)**
   The FAOS is a valid and reliable questionnaire for evaluating foot and ankle symptoms and functional limitations. It includes a 42-item questionnaire that is divided into 5 subscales. (Van den Akker – Scheek, 2013)
3. **SF – 12:** A tool used to measure quality of life.

Data Analysis Procedure:

Data was analyzed using Statistical Package of the Social Sciences (SPSS) version 28.0 that was suitable for both descriptive and inferential statistical analysis. Pain intensity was measured using Visual Analogue Scale (VAS) with which mean, standard deviation and range was calculated for each group at baseline, post – intervention and follow up. Functional Status was assessed using FAOS and quality life was assessed by SF – 12, with the same descriptive statistics computed for these measures. Inferential Statistics was included. As the data was not normally distributed hence Friedman and Man – Whitney U

Test was used to compare scores within each group from baseline to post intervention and follow up. Upon analysis it was seen that P – value was less than 0.05 and hence was statistically significant for all the tests applied and 95% confidence interval was reported.

The results were interpreted in the context of study's objective and hypothesis with significant differences discussed in terms of their clinical relevance and implication for management of plantar fasciitis.

RESULTS:

Table 1: Friedman Test

Visual Analogue Scale (VAS)			
Groups	**Chi – Square**	**df**	**Sig.**
Dry Needling	54.612	2	0.001
Kinesiology Taping	51.387	2	0.001
Quality of Life (SF -12)			
Groups	**Chi - Square**	**df**	**Sig**
Dry Needling	42.987	2	0.001
Kinesiology Taping	39.745	2	0.001
Foot Ankle Outcome Score (FAOS)			
	Chi - Square	**df**	**Sig.**
Dry Needling	46.128	2	0.001
Kinesiology Taping	44.659	2	0.001

This shows that the Friedman test was employed to assess the effectiveness of the interventions over time within each group—Dry Needling (Group 1) and Kinesiology Taping (Group 2). This non-parametric test is suitable for comparing repeated measures across three time points: baseline, 3rd week, and 6th week. It was used for each of the three outcome measures: Visual Analogue Scale (VAS) for pain, SF-12 for quality of life, and the Foot and Ankle Outcome Score (FAOS) for foot function. The results revealed that in both groups, all three variables showed statistically significant improvements across the treatment duration. For VAS, the chi-square values were 54.612 for the Dry Needling group and 51.387 for the Kinesiology Taping group, both with p-values less than 0.001, indicating significant reductions in pain over time. Similarly, SF-12 scores improved significantly in both groups, with chi

square values of 42.987 (Dry Needling) and 39.745 (Kinesiology Taping), again with p-values below 0.001, reflecting enhanced quality of life. Lastly, FAOS scores also showed significant improvements, with chi-square values of 46.128 and 44.659 for Dry Needling and Kinesiology Taping groups respectively ($p < 0.001$). These findings suggest that both interventions were effective over time in reducing pain, enhancing functional capacity, and improving the overall well-being of patients with plantar fasciitis.

Table 2; Mann – Whitney U

Outcome Measure	Groups	U Statistic	Z – Score	P - Value
VAS	DN vs KT	287	2.82	0.004
SF – 12	DN vs KT	324	2.42	0.015
FAOS	DN vs KT	263	3.28	0.001

T is the test used to compare the effectiveness of the two interventions at the end of the 6th week, the Mann–Whitney U test was applied. This non-parametric test is appropriate for evaluating differences between two independent groups when data is not normally distributed. The analysis focused on comparing the final scores of the Visual Analogue Scale (VAS), SF-12, and FAOS between the Dry Needling and Kinesiology Taping groups. The results indicated significant differences between the two treatment groups for all outcome measures. For pain reduction (VAS), the U statistic was 287.000 with a Z score of -2.882 and a p-value of 0.004, showing that the Dry Needling group experienced significantly

greater pain relief than the Kinesiology Taping group. For quality of life as measured by SF-12, the U value was 324.000 with a Z score of -2.429 and a p-value of 0.015, indicating superior improvement in the Dry Needling group. Lastly, for functional outcomes measured by FAOS, the U statistic was 263.000 with a Z score of -3.287 and a highly significant p-value of 0.001, again favoring Dry Needling. These results suggest that although both interventions were effective, Dry Needling produced significantly better outcomes in terms of pain reduction, functional improvement, and quality of life at the end of the treatment period.

Discussion:

The aim of this study was to compare the effectiveness of dry needling and kinesiology taping in the treatment of plantar fasciitis (PF), a prevalent cause of heel pain particularly among runners, athletes, and individuals with prolonged weight-bearing activities. The findings revealed that both dry needling and kinesiology taping significantly reduced pain and improved function; however, dry needling demonstrated superior outcomes in pain relief and long-term functional gains. These findings align with current evidence but also contribute novel insights regarding treatment duration, onset of effect, and sustainability of benefits.

Participants receiving dry needling reported a more pronounced and faster reduction in pain levels compared to those treated with kinesio taping. This is consistent with studies by Cotchett et al. (2014) and Kalichman & Vulfsons (2010), which support the analgesic effects of dry needling through mechanisms such as local twitch response, decreased muscle tension, and modulation of inflammatory mediators. The puncturing of myofascial trigger points in the intrinsic foot muscles and calf muscles likely disrupted the pain-spasm-pain cycle, providing immediate relief.

On the other hand, kinesio taping offered more gradual pain relief, typically becoming noticeable after several days of application. This slower response may be attributed to the mechanism by which kinesio tape lifts the skin to enhance blood and lymphatic circulation, reduce pressure on pain receptors, and improve proprioception. While effective, its pain relief is generally considered more supportive and temporary in nature, as shown by Halim- Kertanegara et al. (2019).

In terms of functional outcomes—measured by improved gait, reduced morning stiffness, and ability to perform daily activities—dry needling again demonstrated superior results. Improvement in function could be linked to the reduction of muscle tightness in the posterior chain (gastrocnemius, soleus, and foot musculature), leading to better biomechanics and reduced plantar fascia strain. The neuromuscular

benefits of dry needling, including improved motor control and reduced neural hypersensitivity, may contribute to sustained improvements.

Kinesio taping, while showing functional improvement, appeared to provide more short-term benefits, especially during the active taping period. This aligns with the findings of Słupik et al. (2007), who showed that kinesio taping improves muscle activation and joint support during movement but may lack carryover once the tape is removed. Its primary utility may be in acute or subacute management rather than long-term resolution.

Interestingly, while dry needling had better clinical outcomes, it also came with higher reports of discomfort during the procedure. A few participants expressed apprehension or mild adverse reactions such as post-treatment soreness or bruising. Kinesiology taping, conversely, was perceived as more comfortable and non-invasive, contributing to better initial patient acceptance. This finding highlights the importance of shared decision-making in clinical practice, where patient preferences and tolerance must guide intervention selection.

The findings are generally consistent with recent systematic reviews and randomized controlled trials. For instance, a meta-analysis by Tough et al. (2020) concluded that dry needling is effective in reducing myofascial pain and improving foot function in musculoskeletal conditions including PF. Similarly, González-Iglesias et al. (2011) highlighted the short-term benefits of kinesiology taping for plantar fasciitis, especially when combined with stretching and orthotics.

However, this study contributes further by directly comparing the two modalities under controlled conditions. Few previous studies have directly juxtaposed dry needling and kinesio taping, making this research valuable for physiotherapists aiming to select the most effective, evidence-based approach. The results support the integration of dry needling as a frontline intervention in persistent cases of plantar fasciitis, while acknowledging the supportive role of kinesiology taping, particularly in the early phase of pain or in needle-averse populations.

This study reinforces the value of individualized treatment plans. Dry needling should be considered especially in chronic or recalcitrant cases of plantar fasciitis, where traditional modalities have failed. Given its superior outcomes in pain and function, clinicians may use it either as a standalone therapy or in combination with stretching, strengthening, and orthotic support. Kinesiology taping may still hold value as an adjunct modality, particularly in acute flare-ups, athletic populations, or as a temporary solution during events or competition. Moreover, kinesiology taping may be more suitable for patients with low pain thresholds or contraindications to invasive procedures. The integration of both modalities at different

stages of rehabilitation could potentially yield synergistic effects, although further research is needed to substantiate combined protocol.

Conclusion

In summary, both dry needling and kinesiology taping are effective interventions for plantar fasciitis, offering pain relief and functional improvement. Dry needling showed superior outcomes in terms of speed and magnitude of recovery, making it particularly suitable for chronic and treatment-resistant cases. Kinesiology taping, while less effective long-term, remains a viable non-invasive option for short-term symptom relief and in patients who are not candidates for needling. Clinical decision-making should weigh the benefits, risks, and patient preferences to determine the most appropriate intervention. This study supports the growing body of evidence favoring dry needling as a potent treatment for plantar fasciitis, while also recognizing the practical utility of kinesiology taping in select patient populations.

Ethical Considerations: The rules and regulations set by the ethical committee of University of Lahore were followed while conducting the research and rights of the research participants were respected.

Recommendations

Future studies should focus on larger, multicenter randomized controlled trials comparing these interventions over a longer duration. Investigating the combined effect of dry needling and kinesiology taping may reveal complementary effects that enhance outcomes further. Furthermore, exploring psychological and behavioral components, such as fear of movement or needle anxiety, may offer deeper insight into patient adherence and satisfaction.

LIMITATIONS

The sample size was relatively small, potentially limiting the generalizability of the findings. The follow-up period was limited to 6 weeks; long-term sustainability of benefits, particularly for kinesiology taping, remains uncertain.

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