

Randomized Controlled Trial

Comparison of the efficacy of Kinesiology Taping versus Therapeutic Ultrasound in the management of Plantar Fasciitis

Karishma ¹, Amir Muhammad ², Shaikh Hajra Ameer ³, Zaidi Syeda Wajeeha Raza ³

¹“College of Physiotherapy”, JPMC, Pakistan

²“Orthopedic workshop”, JPMC, Pakistan

³“Department of Physical Therapy and Rehabilitation Sciences”, Indus University, Pakistan

*Correspondence: Shaikh Hajra Ameer, hajraameer90@gmail.com

Citation: Karishma et al., Comparison of the efficacy of Kinesiology Taping versus Therapeutic Ultrasound in the management of Plantar Fasciitis. *Balneo and PRM Research Journal* 2022, 13(1): 481.

Academic Editor(s):
Constantin Munteanu

Reviewers:
Ilie Onu
Saad Iqbal

Received: 07.09.2021
Accepted: 18.03.2022
Published: 21.03.2022

Publisher's Note: Balneo and PRM Research Journal stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Copyright: © 2022 by the authors. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

ABSTRACT: Plantar fasciitis (PF) is one of the most common musculoskeletal complain of the foot affecting a huge population. However there is a scarcity of evidence regarding treatment efficacy, therefore this trial aimed to compare the efficacy of Kinesiotaping (KT) vs. Ultrasound Therapy (UT) in the management of pain and physical functioning of foot/ankle in patients with PF.

Methodology: Two arms, parallel-group design RCT was conducted on PF patients. Participants aged between 25-60 years, having symptoms of PF for at least 6 months, presenting with unilateral and/or bilateral heel pain were included. However, patients with fractures, dislocations, or open wounds around ankle/soles and patients allergic to taping were excluded. 30 patients were randomly divided into group A (KTG=15): received KT and group B (UTG=15): received Ultrasound Therapy (UT). Both the groups also received cold pack with stretching exercises. Treatment was provided on an alternate days for 30 minutes to each group for two weeks. Visual Analogue Scale (VAS) was used to determine pain and Foot/Ankle disability index (FADI) was used to assess foot and ankle functioning. Readings were taken pre and post intervention.

Results and discussion: The mean pain score before treatment was 8.00 but after treatment was reduced to 1.13, in KTG. However, in UTG mean pain score before treatment was 9.13 and after treatment reduced to 4.20. The mean FADI score before treatment was 52.80 but after treatment decreased to 11.46 in KTG. However, in UTG the mean score of FADI before treatment was 58.53 and after treatment, it was decreased to 39.46.

Conclusion: The results concluded that KT and UT both are effective techniques for reducing pain and improving ankle/foot physical functioning in patients with PF. However, KT was found to be more effective than UT.

Keywords: *Foot/ankle disability index, Plantar Fasciitis, Pain, Kinesiotaping, Therapeutic ultrasound*

1. INTRODUCTION

Plantar Fasciitis (PF) also known as heel pain syndrome, heel spur syndrome, or painful heel syndrome is defined as inflammation of the plantar fascia, it usually worsen on arising in the morning and after periods of prolonged standing and sitting (1). PF is one of the most common musculoskeletal complain of the foot as it accounts for about 85% of all the cases of heel pain, however, researchers observed that 10% of the general population experience it at least once in their lifetime (2). The prevalence of PF in the security forces of Peshawar, Pakistan was reported to be 13.2% (3). Previous researches show that PF mostly affect athletes; however, current literature shows that people with a sedentary lifestyle are also commonly affected. PF can occur at any age and both genders are equally prone (4, 5).

PF is considered the most common cause of foot pain and is estimated to account for 11–15% of all foot problems in adults (6). The exact pathology is still unknown (7). This

disorder is reported to be multifactorial in origin and can be triggered by obesity, excessive periods of weight-bearing activity and decreased ankle range of motion (8).

Evidence reported numerous non-surgical treatments as effective in relieving symptoms associated with PF including anti-inflammatory agents (NSAIDs, steroid injections), modalities (iontophoresis, ultrasound, extracorporeal shock wave therapy, electrical stimulation, cryotherapy, and whirlpool), manual therapy (joint and neural mobilizations, massage), stretching and external support (orthotics, night splints, and taping) (9, 10). Most treatments endeavor to resolve the symptoms caused by PF; while orthotics and taping aim to repair the poor biomechanics of the foot (11).

Kinesio-taping (KT) is a common clinical intervention utilized in physical therapy facilitating pain reduction, joint support, proprioception, and muscle tone normalization with a simple procedure requiring no more than ten minutes to implement, resulting in an immediate positive effect on pain and occasionally on function (12). The rigidity of the tape allows a mechanical correction in joint position (13), changing patellar inclination (14), and foot position (15).

Evidence shows that most health care professionals also recommend Ultrasound Therapy (UT) for the treatment of PF and proved it to be effective in reducing pain and enhancing the quality of life (16).

A plethora of studies were conducted to compare the various treatment modalities for PF and highlighted the positive effects (17). Although many researchers have reported KT and UT as effective in the management of PF complications. However no research to date has compared the efficacy of KT with UT, therefore this Randomized Controlled Trial (RCT) aimed:

- To compare the efficacy of KT vs. UT in the management of pain using the Visual Analogue Scale (VAS) in patients with PF after two weeks of intervention.
- To compare the efficacy of KT vs. UT in improving foot/ankle function through Foot and Ankle Disability Index (FADI) in patients with PF after two weeks of intervention.

2 Methodology:

A two-arm, parallel-group design RCT was conducted on the patients suffering from PF at the outpatient physiotherapy Department of Jinnah Post Graduate Medical Centre and KK Rehabilitation Centre and Consultant Clinics Karachi, Pakistan. The trial was completed from February to August 2021. The inclusion criteria of this trial was voluntary participants aged from 25 to 60 years, having symptoms of PF for at least 6 months, presenting with the pain that worsens when the step is placed on the floor or walking after rest or increasing with activity, presenting with unilateral and/or bilateral heel pain, pain localized to the inferior heel or plantar surface of the foot. However patients with fractures, dislocations, or open wound around ankle/soles of feet, elderly individuals with weakened connective tissue such as (ligaments sprain and muscles strain, marked osteoporosis, history of lower limb congenital or traumatic deformity, congenital anomalies, patients allergic to taping were excluded from the study. VAS was used to determine PF pain intensity and FADI was used to assess foot and ankle functioning. VAS is marked between 0-10. Patients mark on it considering the intensity of pain, '0' representing 'no pain' and '10' maximum pain. The FADI is a 34-item questionnaire. Both the assessment parameters establish good reliability. ICC value of VAS= 0.92 (18) and ICC value of FADI= 0.89 (19).

A total of 30 PF patients were included in the study. This sample was calculated by using online software OPEN EPI version 3. Participants whose have given written informed consent and fulfill the eligibility criteria were randomly divided into group A=15 (KTG group) and group B=15 (UTG). Group A received KT and cold pack with stretching exercises (see figure 1), and group B received UT (Ultrasound at 0.5 w/cm², 3 MHz, pulsed 1:4, for eight minutes) and cold pack with stretching exercises (see figure 2). Treatment was provided on an alternate days for 30 minutes to each group for two weeks. All

patients were examined for pain and foot/ankle function before and after 2 weeks of treatment.



Figure 1: Application of KT (Group A)

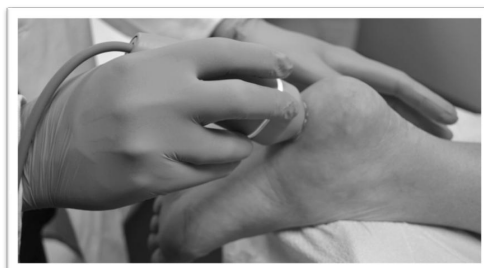


Figure 2: Application of UT (Group B)

Data were stored and analyzed using IBM-SPSS version 20.0. Counts with percentages and mean were reported for baseline characteristics of studied samples. P-values less than equal to 0.05 were considered significant at 95% CI.

3 Results:

This trial was conducted on 30 PF patients. Randomly divided into group A (KTG=15) and group B (UTG=15). The age of the participants ranges from 25 to 60 years. 33.3% of the participants were male and 66.7% were female (see table 1).

Table 1: Gender Distribution (N=30)

Gender	Frequency	%
Male	10	33.3%
Female	20	66.7%
Total	30	100%

The results show that the mean pain score of VAS before treatment was 8.00 ± 1.06 but after treatment was decreased to 1.13 ± 1.06 , in group A. The mean pain score of VAS before treatment was 9.13 ± 0.63 and after treatment, it was decreased to 4.20 ± 0.56 in group B. (see table 2).

Table 2: VAS score pre and post-treatment

VAS scale		Mean	SD	P-value
Group A	Before	8.00	1.06	0.00
	After	1.13	1.06	
Group B	Before	9.13	0.63	0.00
	After	4.20	0.56	

The results show that the mean FADI before treatment was 52.80 ± 4.36 but after treatment was decreased to 11.46 ± 3.20 in group A. The mean score of FADI before treatment was 58.53 ± 1.35 and after treatment, it was decreased to 39.46 ± 4.61 in

group B. (table 3).

Table 3: FADI Scale pre and post-treatment

FADI Scale		Mean	SD	P-value
Group A	Before	52.80	4.36	0.00
	After	11.46	3.20	
Group B	Before	58.53	1.35	0.00
	After	39.46	4.61	

4 Discussion:

This trial compared the effectiveness of KT vs. UT for PF, which showed that both the treatment strategies are significantly effective in reducing PF pain and improving foot/ankle function. However, more improvement was found in the KT technique.

The findings of this trial are comparable to the study by Radford which showed that low dye taping decrease pain and improve functional outcome (20). Similarly the results of this study are in line with the findings of a study conducted in 2018 by Robert A (21). Furthermore a study endorsed KT to be easier, cost effective and faster to apply for therapist, than other techniques (22).

In September 2019, a RCT was conducted by Aishwarya A et al. to find out the comparative effectiveness of low dye taping in conjunction with conventional treatment, it was found that KT improves heel pain and disability in subjects with PF (23).

Another study by Apr, Banu Ordahan et al. aimed to compare the efficacy of extracorporeal shockwave therapy (ESWT) and KT in the treatment of PF and concluded that both ESWT and KT treatments improved pain levels, function and quality of life in individuals with PF. Neither method was superior in treating PF (24).

Research published in the Journal of Orthopaedic & Sports Physical Therapy by Yigal Katzp, aimed to evaluate the additive effect of UT in the treatment of PF in terms of pain, function, and quality of life, study concluded that addition of therapeutic ultrasound did not improve the efficacy of conservative treatment for PF. Therefore, the authors recommend excluding therapeutic ultrasound from the treatment of PF and agree with the results of previous studies that stretching may be an effective treatment for healing PF (25). Among all the positives discussed above, it is worth mentioning that this study provided specific results with the easier determination of cause and effect relationships. On the other hand, small sample size, human error, and short follow-up duration were the few limitations that need to be addressed in the future.

5 Conclusion:

The results concluded that KT and UT both are effective techniques for reducing pain and improving ankle/foot physical functioning in patients with PF (26,27). However, KT was found to be more effective than UT. Hence calcaneal taping is found to be an effective tool for the relief of plantar heel pain and may act as a precursor to long-term management through the use of tape. It is easy and quick for the therapist to apply, and creates immediate symptom relief.

Acknowledgements:

We would like to acknowledge all the research participants.

Conflict of Interest:

No conflicting interests were declared.

Source of Funding:

This trial was self-funded by authors.

References

1. Dimou ES, Brantingham JW, Wood T. A randomized controlled trial (with blinded observer) of chiropractic manipulation and Achilles stretching vs. orthotics for the treatment of plantar fasciitis. *J Am Chiro Assoc.* 2004;41(9):32-42.
2. Nahin RL. Prevalence and pharmaceutical treatment of plantar fasciitis in United States adults. *The Journal of Pain.* 2018 Aug 1;19(8):885-96.
3. Abidin SZ, Haneef K, Malik NR, Mashal M, Zeb A, Rahman MU. PREVELANCE AND Associated Risk Factors For Plantar Fasciitis Among Security Forces Personnel In Peshawar. *Annals Of Allied Health Sciences.* 2019 Dec 31;5(2):20-3.
4. Trojian T, Tucker AK. Plantar fasciitis. *American family physician.* 2019 Jun 15;99(12):744-50.
5. Kibler W, Goldberg C, Chandler T. Functional biomechanical deficits in running athletes with plantar fasciitis. *Am J Sports Med.*1991;19:66-71.

6. Pfeffer G, Bacchetti P, Deland J, Lewis A, Anderson R, Davis W, et al. Comparison of custom and refabricated orthoses in the initial treatment of proximal plantar fasciitis. *Foot Ankle*
7. Buchbinder R. Clinical practice. Plantar fasciitis. *N Engl J Med*. 2004; 350: 2159-2166.
8. Riddle DL, Pulisic M, Pidcoke P, Johnson RE. Risk factors for plantar fasciitis: A matched case control study. *J Bone Joint Surg Am*. 2003; 85-A: 872-877.
9. Hicks JH. The mechanics of the foot. II. The plantar aponeurosis and the arch. *J Anat*. 1954; 88: 25-30.
10. Barrett SJ, O'Malley R. Plantar fasciitis and other causes of heel pain. *Am Fam Physician*. 1999; 59: 2200-2206.
11. Ordahan B. The Efficacy of Kinesiology Taping in Supporting the Medial Longitudinal Arch in Patients with Unilateral Plantar Fasciitis. *Spor Hekimligi Dergisi/Turkish Journal of Sports Medicine*. 2018 Sep 1;53(3).
12. Pinrattana S, Kanlayanaphotporn R, Pensri P. Immediate and short-term effects of kinesiotaping and lower extremity stretching on pain and disability in individuals with plantar fasciitis: a pilot randomized, controlled trial. *Physiotherapy Theory and Practice*. 2021 Jun 6:1-2.
13. Kwong PK, Kay D, Voner RT, White MW. Plantar fasciitis. Mechanics and pathomechanics of treatment. *Clin Sports Med*. 1988; 7: 119-126.
14. Ayub A, Yale SH, Bibbo C. Common foot disorders. *Clin Med Res* 2005; 3: 116-119.
15. McPoil TG, Martin RL, Cornwall MW, Wukich DK, Irrgang JJ, Godges JJ. Heel pain plantar fasciitis: Clinical practice guidelines linked to the international classification of function, disability, and health from the orthopaedic section of the American Physical Therapy Association. *J Orthop Sports Phys Ther*. 2008; 38: A1-A18.
16. Akinoğlu B, Köse N. A comparison of the acute effects of radial extracorporeal shockwave therapy, ultrasound therapy, and exercise therapy in plantar fasciitis. *Journal of exercise rehabilitation*. 2018 Apr;14(2):306.
17. Kumar S, Choudhary N, Kumar N, Nair A. To Compare The Effectiveness of Calcaneal taping Versus Conventional Therapy in the treatment of plantar fasciitis. *European Journal of Molecular & Clinical Medicine*.;7(10):2020.
18. Hale SA, Hertel J. Reliability and sensitivity of the Foot and Ankle Disability Index in subjects with chronic ankle instability. *Journal of athletic training*. 2005 Jan;40(1):35.
19. Shafshak TS, Elnemr R. The visual analogue scale versus numerical rating scale in measuring pain severity and predicting disability in low back pain. *JCR: Journal of Clinical Rheumatology*. 2021 Oct 1;27(7):282-5.
20. Lori A Bolgla, Plantar fasciitis and the windlass mechanism: a biomechanical link to clinical practice. *Journal of athletic training*, 2004;39(1):77-82.
21. Roberts A. Heel pain: how to treat plantar fasciitis fast. *Occupational Health & Wellbeing*. 2018 Feb 1;70(2):16-7.
22. Haley GJ, Coke S. Plantar Fasciitis: Low-Cost Treatment Interventions in Primary Care. *The Journal for Nurse Practitioners*. 2021 Feb 1;17(2):192-6.
23. Hossain M, Makawana N. "Not Plantar Fasciitis": The differential diagnosis and management of heel pain syndrome. *Orthopaedics and Trauma*. 2011; 25(3):198-206.
24. Batt, M.E., and Tanji, J.L. 1995. Management options for plantar fasciitis. *The Physician and Sports Medicine*, 23(6): 77-85.
25. Bistolfi A, Zanolletto J, Vannicola A, Morino L. Conservative Treatment of Plantar Fasciitis and Posterior Heel Pain: A Review. *International Journal of Physical Medicine & Rehabilitation*. 2016;04(06).
26. Ionițe C., Arotăriței D, Turnea M., Ilea M., Rotariu M., Applications of fitness function in Pubalgia affliction, *Balneo and PRM Research Journal*. 2021;12(1):77-81 [Full Text DOI 10.12680/balneo.2021.423](https://doi.org/10.12680/balneo.2021.423)
27. Condurache I., Turnea M., Rotariu M., Improving functional and motor capacity through means/resources and methods specific to acvatic activities, *Balneo and PRM Research Journal*. 2021;12(1):27-30 [Full Text DOI 10.12680/balneo.2021.414](https://doi.org/10.12680/balneo.2021.414)