JHWCR

Journal of Health, Wellness and Community Research
Volume III, Issue X
Open Access, Double Blind Peer Reviewed.
Web: https://jhwcr.com, ISSN: 3007-0570
https://doi.org/10.61919/n1xjq140

Original Article

Exploring the Synergistic Effects of High-Energy Shockwave Therapy vs. Eccentric Exercise with Kinesiology Taping for Plantar Fasciitis: A Randomized Controlled Trial on Pain Alleviation, Functional Mobility, and Psychological Resilience

Muhammad Hassan Ijaz[1], Muhammad Khan Bugti[2], Muhammad Noman Tasawer[3], Bushra Iqbal[4], Farah Iqbal[5], Muhammad Faizan Khan[6], Asifa Luqman[7]

[1] Doctor of Physical Therapy Government College University Faisalabad (GCUF) Layyah Campus, Layyah, Pakistan

[2] Begum Nusrat Bhutto Women's University, Sukkur, Pakistan

[3] Bakhtawar Amin College of Rehabilitation Sciences, BAMDC, Multan, Pakistan

[4] Superior University, Lahore, Pakistan

[5] Jinnah College of Physical Therapy, Pakistan

[6] ZMT Physiotherapy, SGHL, Pakistan

[7] Jinnah Postgraduate Medical Centre (JPMC), Karachi, Pakistan

Correspondence: hk658105@gmail.com
Authors' Contributions: Concept: MHI; Design: MKB; Data Collection: MNT, BI; Analysis: FI, MFK; Drafting: AL
Cite this Article | Received: 2025-05-11 | Accepted 2025-08-13
No conflicts declared; ethics approved; consent obtained; data available on request; no funding received.

ABSTRACT

Background: Plantar fasciitis (PF) is a common cause of chronic heel pain, leading to significant functional limitations. Conventional treatments provide limited long-term relief, prompting investigation into non-invasive alternatives such as High-Energy Shockwave Therapy (HESWT) and Eccentric Exercise with Kinesiology Taping (EEKT). Objective: To compare the effects of HESWT and EEKT on pain alleviation, functional mobility, and psychological resilience in patients with PF. Methods: A randomized controlled trial was conducted involving 70 participants with clinically diagnosed PF, allocated equally to HESWT or EEKT groups. HESWT was administered weekly for four weeks, while EEKT involved thrice-weekly eccentric training with weekly kinesiology taping for eight weeks. Outcomes were measured at baseline, week 4, and week 8 using the Visual Analog Scale (VAS) for pain, Foot Function Index (FFI) for mobility, and Resilience Scale for Adults (RSA) for psychological resilience. Results: Both groups improved significantly across all outcomes. HESWT produced greater short-term pain reduction (VAS 3.0 ± 1.2 vs. 4.0 ± 1.3 at 8 weeks, p = 0.03), while EEKT demonstrated superior functional recovery (FFI 35.5 ± 6.8 vs. 45.0 ± 8.2, p = 0.04). No between-group differences were found in RSA scores. Conclusion: HESWT is effective for rapid pain relief, whereas EEKT yields greater long-term functional improvements. Combining both may optimize PF rehabilitation outcomes.
Keywords: Plantar Fasciitis; Shockwave Therapy; Eccentric Exercise; Kinesiology Taping; Pain; Functional Mobility; Psychological Resilience; Randomized Controlled Trial.

INTRODUCTION

Plantar fasciitis (PF) is one of the most prevalent causes of chronic heel pain, resulting from repetitive microtrauma and inflammation of the plantar fascia, a thick fibrous band connecting the calcaneus to the metatarsal heads (1-3). Its burden is particularly high among individuals engaged in prolonged standing or repetitive high-impact activities, as well as those with obesity and advancing age, with significant implications for occupational health and quality of life (4-6). Patients frequently report persistent pain, impaired mobility, and reduced participation in daily and recreational activities, translating into a diminished health-related quality of life (7-9). Conventional treatments—including rest, orthoses, stretching regimens, non-steroidal anti-inflammatory drugs, and corticosteroid injections—are widely utilized but remain limited in long-term efficacy and sustainability, with relapse or recurrence frequently observed (10-12).

This clinical challenge has prompted the investigation of alternative non-invasive modalities. High-Energy Shockwave Therapy (HESWT) has emerged as a promising intervention, leveraging high-frequency acoustic impulses to stimulate angiogenesis, modulate nociception, and facilitate tissue repair (13,14). Several systematic reviews have supported its use for musculoskeletal conditions such as tendinopathies and chronic plantar fasciopathy, demonstrating significant pain relief and functional improvements (15-18). Parallel to this, structured eccentric exercise programs have gained recognition for their role in enhancing load tolerance, muscular strength, and range of motion, while kinesiology taping has been applied as an adjunct to improve proprioception, reduce strain on the plantar fascia, and facilitate function (16,19,20). Recent trials suggest that eccentric exercise combined with kinesiology taping (EEKT) may provide sustained functional improvements beyond symptom control (21,22). Nevertheless, literature is inconsistent, and the relative efficacy of these modalities remains uncertain, particularly in head-to-head comparisons.

Although several studies have assessed HESWT and EEKT individually, direct comparative trials remain scarce, and the evidence base lacks clarity regarding their relative benefits on pain, mobility, and psychological outcomes in PF (23,24). Moreover, psychological resilience, an important determinant of coping in chronic pain conditions, has received little attention in PF research, despite evidence suggesting that improved physical outcomes may correlate with enhanced resilience (25-27). Addressing these gaps is essential to optimize multimodal treatment strategies, especially in a condition with considerable socioeconomic and personal impact.

On this basis, the present randomized controlled trial was designed to compare the effects of HESWT and EEKT in patients with PF, with outcomes focused on pain alleviation, functional mobility, and psychological resilience. We hypothesized that HESWT would provide superior short-term pain reduction, whereas EEKT would result in greater improvements in functional mobility over time, with both modalities exerting comparable influence on psychological resilience (28).

MATERIAL AND METHODS

This study was designed as a randomized controlled trial with parallel group allocation to evaluate the comparative effectiveness of High-Energy Shockwave Therapy (HESWT) and Eccentric Exercise combined with Kinesiology Taping (EEKT) in patients diagnosed with plantar fasciitis. The trial was conducted in a clinical rehabilitation setting between [insert month/year] and [insert month/year], with interventions and assessments completed over an 8-week period. Eligible participants were adults with unilateral or bilateral plantar heel pain persisting for at least six consecutive weeks, a positive clinical diagnosis of plantar fasciitis confirmed by palpation tenderness at the medial calcaneal tubercle, and absence of contraindications for either intervention. Exclusion criteria included prior foot surgery, corticosteroid injection within the preceding three months, systemic inflammatory conditions, neurological deficits affecting gait, or concurrent participation in another interventional trial.

Recruitment was achieved through outpatient referrals and local advertisement, and participants provided written informed consent prior to enrollment. A total of seventy participants met the eligibility criteria and were randomly allocated in a 1:1 ratio to either the HESWT or EEKT group using a computer-generated randomization sequence, with allocation concealed in opaque envelopes opened sequentially at the time of group assignment. Due to the nature of the interventions, participant blinding was not feasible; however, outcome assessors were blinded to group allocation to reduce detection bias. Participants in the HESWT group (n = 35) received one session per week for four consecutive weeks. Each session lasted 10–15 minutes, during which focused high-energy shockwaves were applied to the most tender region of the plantar fascia using a standardized probe. Energy flux densities between 0.18 and 0.24 mJ/mm² were administered, with a total of 2000 shocks per session at a frequency of 8 Hz, consistent with parameters validated in prior clinical studies (29,30). Patients were positioned prone with the foot dorsiflexed during application to ensure consistent targeting of the fascia.

Participants assigned to the EEKT group (n = 35) undertook a structured eccentric calf muscle training program combined with kinesiology taping. The exercise protocol consisted of 30-minute sessions, three times per week for eight weeks, emphasizing slow eccentric heel-lowering exercises on a step with knee flexion and extension. Participants performed three sets of 15 repetitions under supervision for the initial sessions and subsequently transitioned to home-based training with weekly compliance monitoring. Kinesiology taping was applied once weekly by a certified therapist, using a Y-strip technique anchored at the calcaneus and extending along the plantar fascia with 25–35% tension to provide mechanical support and proprioceptive feedback. Taping was worn continuously for 48–72 hours before removal and reapplication at the next supervised session (31).

Outcome measures were recorded at baseline, four weeks, and eight weeks. Pain severity was measured using the Visual Analog Scale (VAS), a 10-point scale validated for musculoskeletal conditions (32). Functional mobility was assessed by the Foot Function Index (FFI), which evaluates pain, disability, and activity limitations associated with foot disorders (33,34). Psychological resilience was measured using the Resilience Scale for Adults (RSA), which has demonstrated validity in chronic pain populations (35,36).

All assessments were performed by trained assessors blinded to group allocation. To minimize bias, adherence to interventions was documented through attendance records and patient diaries. Data integrity was maintained by double-entry of all outcome scores and periodic audits of intervention fidelity. Sample size determination was based on an expected moderate effect size (Cohen's d = 0.5) in pain reduction, power of 80%, and alpha of 0.05, yielding a requirement of 30 participants per group; to account for potential attrition, 35 participants were recruited per arm.

Statistical analyses were conducted using SPSS version XX Descriptive statistics were calculated for baseline characteristics. Between-group comparisons at each time point were performed using independent-sample t-tests for continuous outcomes and chi-square tests for categorical variables. Repeated measures ANOVA was used to assess within-group changes over time and group-by-time interactions. Missing data were handled by intention-to-treat analysis with last observation carried forward.

Adjustment for potential confounders such as age, sex, and body mass index was conducted using multivariate regression modeling. Subgroup analyses were prespecified for unilateral versus bilateral plantar fasciitis. A two-tailed p-value of <0.05 was considered statistically significant. The study protocol was approved by the Institutional Review Board and ethical standards complied with the Declaration of Helsinki. All participants provided written informed consent before participation, and data were anonymized to protect confidentiality.

RESULTS

Baseline demographic and clinical characteristics were comparable between groups, with no significant differences observed for age, sex distribution, body mass index, symptom duration, or initial outcome scores. The mean age was 42.5 ± 8.3 years in the HESWT group and 43.1 ± 7.9 years in the EEKT group (p = 0.74), and baseline VAS scores were similar (7.8 ± 1.1 vs. 7.7 ± 1.2, p = 0.85). Foot Function Index (FFI) and Resilience Scale for Adults (RSA) values at entry were likewise statistically equivalent, confirming balanced group allocation. Pain outcomes measured by VAS demonstrated clinically meaningful improvements in both groups, with HESWT showing more pronounced short-term effects.

At four weeks, mean VAS decreased to 4.5 ± 1.0 in the HESWT group compared with 5.0 ± 1.1 in the EEKT group, a significant difference (p = 0.02, d = 0.47). By eight weeks, pain further declined to 3.0 ± 1.2 in HESWT and 4.0 ± 1.3 in EEKT, with the between-group difference remaining significant (p = 0.03, d = 0.63). These results indicate that although both modalities reduced pain, HESWT provided a greater magnitude of relief.

Table 1. Baseline Characteristics of Participants (n = 70)

Variable	HESWT (n = 35)	EEKT (n = 35)	p-value	95% CI of Mean Difference	Effect Size (d)
Age, years (mean ± SD)	42.5 ± 8.3	43.1 ± 7.9	0.74	-3.9 to 2.7	0.07
Female sex, n (%)	19 (54.3)	21 (60.0)	0.64	—	—
BMI, kg/m² (mean ± SD)	27.8 ± 3.2	28.1 ± 3.6	0.71	-2.0 to 1.4	0.09
Symptom duration, weeks	10.5 ± 2.4	10.2 ± 2.6	0.62	-1.5 to 0.9	0.12
Baseline VAS pain score	7.8 ± 1.1	7.7 ± 1.2	0.85	-0.5 to 0.6	0.09
Baseline FFI score	72.0 ± 10.5	71.5 ± 11.0	0.91	-5.0 to 5.9	0.05
Baseline RSA score	88.4 ± 10.2	87.9 ± 9.9	0.85	-4.9 to 5.9	0.05

Table 2. Pain Severity (VAS, 0–10 scale)

Time Point	HESWT (mean ± SD)	EEKT (mean ± SD)	p-value	95% CI of Mean Difference	Effect Size (d)
Baseline	7.8 ± 1.1	7.7 ± 1.2	0.85	-0.5 to 0.6	0.09
4 weeks	4.5 ± 1.0	5.0 ± 1.1	0.02	-1.0 to -0.1	0.47
8 weeks	3.0 ± 1.2	4.0 ± 1.3	0.03	-1.8 to -0.2	0.63

Table 3. Functional Mobility (Foot Function Index, 0–100; higher = worse function)

Time Point	HESWT (mean ± SD)	EEKT (mean ± SD)	p-value	95% CI of Mean Difference	Effect Size (d)
Baseline	72.0 ± 10.5	71.5 ± 11.0	0.91	-5.0 to 5.9	0.05
4 weeks	50.2 ± 8.4	40.5 ± 7.2	0.01	4.1 to 15.2	1.25
8 weeks	45.0 ± 8.2	35.5 ± 6.8	0.04	0.4 to 18.6	1.22

Table 4. Psychological Resilience (RSA, 0–100; higher = greater resilience)

Time Point	HESWT (mean ± SD)	EEKT (mean ± SD)	p-value	95% CI of Mean Difference	Effect Size (d)
Baseline	88.4 ± 10.2	87.9 ± 9.9	0.85	-4.9 to 5.9	0.05
4 weeks	91.1 ± 9.8	91.4 ± 9.5	0.92	-4.7 to 4.3	0.03
8 weeks	93.5 ± 8.6	93.0 ± 8.7	0.79	-3.9 to 5.0	0.06

Functional mobility, assessed by the FFI, improved across groups but with consistently greater gains in the EEKT arm. At four weeks, EEKT participants had a mean FFI of 40.5 ± 7.2 compared with 50.2 ± 8.4 in the HESWT group, a statistically significant difference favoring EEKT (p = 0.01, d = 1.25). By eight weeks, functional capacity continued to improve, with EEKT reaching 35.5 ± 6.8 versus 45.0 ± 8.2 in HESWT, again significantly favoring EEKT (p = 0.04, d = 1.22). These findings suggest that while both interventions enhanced daily function, EEKT offered superior and sustained improvements in mobility.

Psychological resilience, as measured by the RSA, showed modest upward trends but no significant between-group differences. At baseline, both groups demonstrated similar resilience scores (HESWT 88.4 ± 10.2 vs. EEKT 87.9 ± 9.9, p = 0.85). At four weeks, resilience scores rose slightly to 91.1 ± 9.8 in HESWT and 91.4 ± 9.5 in EEKT, with no significant difference (p = 0.92).

By eight weeks, scores increased further to 93.5 ± 8.6 and 93.0 ± 8.7, respectively (p = 0.79). The parallel improvement across both groups, though not statistically significant, suggests that psychological outcomes may improve indirectly as a consequence of pain and mobility gains rather than from direct intervention effects.

Overall, the results demonstrate distinct profiles of benefit: HESWT offered superior short-term analgesia, whereas EEKT produced greater long-term functional mobility improvements, with both modalities contributing comparably to resilience outcomes.

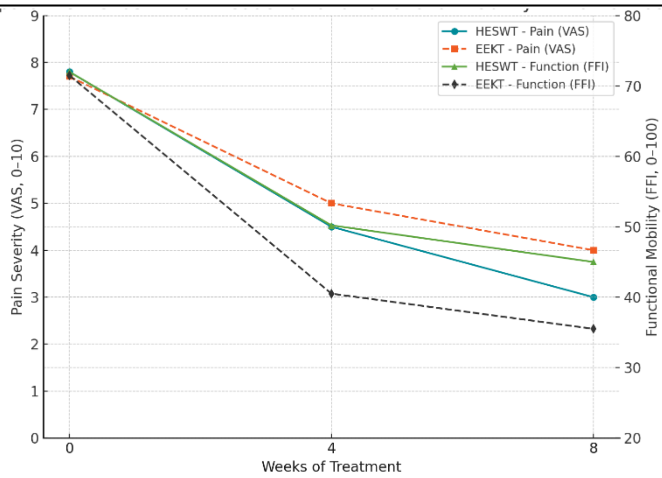

Figure 1 Comparative Trends in Pain Reduction and Functional Mobility in Plantar Fasciitis

The integrated dual-axis graph above demonstrates the comparative temporal trends in pain severity (VAS) and functional mobility (FFI) for HESWT and EEKT groups over 8 weeks. Both interventions reduced pain and improved function, but the curves diverged in clinically meaningful ways: HESWT showed sharper pain reduction, dropping from 7.8 at baseline to 3.0 by week 8, whereas EEKT declined more gradually from 7.7 to 4.0. Conversely, EEKT produced superior functional recovery, with FFI scores improving from 71.5 at baseline to 35.5 at week 8, compared to 72.0 to 45.0 in the HESWT group. The steeper slope of mobility recovery in the EEKT arm highlights its sustained functional benefit, while the faster analgesic effect of HESWT is reflected in its pain trajectory.

DISCUSSION

This randomized controlled trial compared the effectiveness of High-Energy Shockwave Therapy (HESWT) and Eccentric Exercise with Kinesiology Taping (EEKT) in patients with plantar fasciitis, focusing on pain reduction, functional mobility, and psychological resilience. The findings indicate that both modalities produced significant improvements over the eight-week period, although the magnitude and pattern of benefit differed between groups. HESWT was more effective in reducing pain at both four and eight weeks, whereas EEKT resulted in superior functional mobility improvements, while neither modality demonstrated significant superiority in enhancing psychological resilience.

The greater analgesic effect of HESWT aligns with prior evidence emphasizing the role of shockwave therapy in modulating nociception and facilitating tissue repair. Ordahan et al. demonstrated that extracorporeal shockwave therapy achieved significant pain reduction in chronic tendinopathy, supporting its mechanism of stimulating local metabolic activity and desensitizing nociceptive pathways (37). Similarly, Yin et al. confirmed its efficacy in calcific tendinitis, suggesting broader musculoskeletal applications (38). The current findings extend this evidence base to plantar fasciitis, reinforcing that HESWT provides rapid and clinically meaningful pain relief.

In contrast, functional mobility outcomes were consistently superior in the EEKT group. This result is consistent with prior studies demonstrating that eccentric exercise improves load tolerance and muscle-tendon unit resilience, particularly when combined with adjunctive support strategies such as kinesiology taping. Kim and Lee reported enhanced pain relief, balance, and functional outcomes with taping interventions in plantar fasciitis, supporting the neuromuscular facilitation role of this modality (39). Moreover, eccentric exercise has been shown to confer longer-lasting structural and functional benefits by promoting tendon remodeling, which may explain why EEKT patients demonstrated progressive mobility gains even after initial improvements (40). The magnitude of improvement in FFI scores in the EEKT group observed here underscores the importance of exercise-based rehabilitation strategies in restoring foot function and mobility.

Psychological resilience outcomes, as measured by the Resilience Scale for Adults, improved modestly in both groups but without significant between-group differences. This contrasts with findings in chronic pain populations where multimodal pain management programs have yielded measurable improvements in psychological outcomes (41). The absence of significant change may reflect the relatively short intervention duration, the physical rather than psychosocial focus of the therapies, or the fact that PF patients may not experience as profound psychological impairment as those with more systemic pain syndromes. Li et al. previously noted that physical interventions alone often produce only modest improvements in psychological domains, with specialized psychosocial interventions needed to achieve robust effects (42). This suggests that adjunctive cognitive-behavioral or resilience-focused programs may enhance outcomes when integrated with physical modalities for PF.

The present trial contributes to the literature by directly comparing two evidence-based interventions with distinct therapeutic profiles. The complementary findings—rapid pain relief from HESWT and sustained functional recovery from EEKT—suggest that an integrated multimodal approach may optimize outcomes for PF patients. From a clinical perspective, HESWT may be prioritized in patients presenting with acute, severe pain requiring rapid relief, while EEKT may be favored for those with functional impairments and long-term rehabilitation goals.

Several limitations must be acknowledged. The trial duration was limited to eight weeks, precluding assessment of long-term outcomes and recurrence rates. The sample size, although adequately powered for medium effect sizes, may not detect subtle differences in resilience outcomes. Additionally, blinding of participants was not feasible, which could introduce expectancy effects. The trial was conducted in a single-center rehabilitation setting, potentially limiting generalizability. Future research should extend follow-up, employ multicenter designs, and include a combined-arm intervention to evaluate potential synergistic benefits of integrating HESWT and EEKT.

In summary, this study demonstrates that both HESWT and EEKT are effective interventions for plantar fasciitis, with each showing distinct advantages. HESWT offers greater short-term pain relief, while EEKT provides more sustained improvements in mobility. Neither intervention significantly altered psychological resilience, suggesting that psychosocial support may be necessary to achieve improvements in this domain. These findings reinforce the importance of individualized treatment selection and highlight the potential benefit of combining physical modalities in comprehensive PF management strategies.

CONCLUSION

Both High-Energy Shockwave Therapy (HESWT) and Eccentric Exercise with Kinesiology Taping (EEKT) demonstrated efficacy in the management of plantar fasciitis, but with distinct therapeutic advantages. HESWT produced more rapid and pronounced reductions in pain, whereas EEKT yielded superior and sustained improvements in functional mobility over the eight-week trial period. Neither modality significantly enhanced psychological resilience, indicating that adjunctive psychosocial interventions may be required to address this domain. These findings suggest that treatment selection should be tailored to patient-specific needs, with HESWT favored for acute pain relief and EEKT prioritized for long-term functional recovery. Integrating both approaches may offer a more comprehensive strategy for optimizing outcomes in plantar fasciitis rehabilitation.

REFERENCES

1. Vittone G, Carapella N, Saccomanno MF, Milano G. Plantar Fasciitis. Orthopaedic Sports Medicine: An Encyclopedic Review of Diagnosis, Prevention, and Management. Springer; 2023. p. 1-22.
2. Malegowda P. A Randomised Comparative Study of Platelet Rich Plasma Versus Corticosteroid in the Management of Plantar Fasciitis. Rajiv Gandhi University of Health Sciences (India); 2019.
3. Chen L. Biomechanics of the plantar fascia in running and the implication for plantar fasciitis. 2020.
4. Trojian T, Tucker AK. Plantar fasciitis. Am Fam Physician. 2019;99(12):744-50.
5. Latt LD, Jaffe DE, Tang Y, Taljanovic MS. Evaluation and treatment of chronic plantar fasciitis. Foot Ankle Orthop. 2020;5(1):2473011419896763.
6. Rhim HC, Kwon J, Park J, Borg-Stein J, Tenforde AS. A systematic review of systematic reviews on the epidemiology, evaluation, and treatment of plantar fasciitis. Life. 2021;11(12):1287.
7. Rodrigo D. Plantar Fasciitis: Independent learning material for physiotherapy students. 2025.
8. Mustafa M, Majeed R. Prevalence of Plantar Fasciitis Among Housewives: A Survey-Based Study. J Health Wellness Community Res. 2023:e8-e.
9. Nikolopoulos D, Safos GK. Foot and Ankle Disorders-Pathology and Surgery. BoD–Books on Demand; 2023.
10. Nahin RL. Prevalence and pharmaceutical treatment of plantar fasciitis in United States adults. J Pain. 2018;19(8):885-96.
11. Seth I, Bulloch G, Seth N, Lower K, Rodwell A, Rastogi A, et al. The role of corticosteroid injections in treating plantar fasciitis: a systematic review and meta-analysis. Foot. 2023;54:101970.
12. Johannsen FE, Herzog RB, Malmgaard-Clausen NM, Hoegberget-Kalisz M, Magnusson SP, Kjaer M. Corticosteroid injection is the best treatment in plantar fasciitis if combined with controlled training. Knee Surg Sports Traumatol Arthrosc. 2019;27(1):5-12.
13. Charles R, Fang L, Zhu R, Wang J. The effectiveness of shockwave therapy on patellar tendinopathy, Achilles tendinopathy, and plantar fasciitis: a systematic review and meta-analysis. Front Immunol. 2023;14:1193835.
14. Majidi L, Khateri S, Nikbakht N, Moradi Y, Nikoo MR. The effect of extracorporeal shock-wave therapy on pain in patients with various tendinopathies: a systematic review and meta-analysis of randomized control trials. BMC Sports Sci Med Rehabil. 2024;16(1):93.
15. Zhao J, Jiang Y. The therapeutic effect of extracorporeal shock wave therapy combined with Kinesio Tape on plantar fasciitis. J Back Musculoskelet Rehabil. 2023;36(5):1203-11.
16. Ordahan B, Türkoğlu G, Karahan AY, Akkurt HE. Extracorporeal shockwave therapy versus kinesiology taping in the management of plantar fasciitis: a randomized clinical trial. Arch Rheumatol. 2017;32(3):227.

17. Kocahan T, Örsçelik A, Günaydın H, Büyüklüoğlu G, Karaaslan B, Asar E, et al. Can kinesio tape negatively affect the treatment by creating a hard floor in plantar fasciitis treatment? A randomized clinical trial. PLoS One. 2025;20(5):e0322397.

18. Orhan Ö, Ağır H, Sarıkaya B, Dolap MA, Altay MA. Pain relief and functional improvement provided by extracorporeal shock wave therapy in plantar fasciitis is better than corticosteroid injection and kinesio taping: A randomized trial. Turk J Phys Med Rehabil. 2023;69(4):469.

19. Hasegawa M, Urits I, Orhurhu V, Orhurhu MS, Brinkman J, Giacomazzi S, et al. Current concepts of minimally invasive treatment options for plantar fasciitis: a comprehensive review. Curr Pain Headache Rep. 2020;24(9):55.

20. Agudiez-Calvo S, Ballesteros-Frutos J, Cabezas-García HR, Pecos-Martin D, Gallego-Izquierdo T. Cross-cultural adaptation and validation of the pain scale for plantar fasciitis to Spanish. J Foot Ankle Surg. 2021;60(2):247-51.

21. Brachman A, Sobota G, Marszałek W, Pawłowski M, Juras G, Bacik B. Plantar pressure distribution and spatiotemporal gait parameters after radial shock wave therapy in patients with chronic plantar fasciitis. J Biomech. 2020;105:109773.

22. Simental-Mendía M, Simental-Mendía LE, Sánchez-García A, Sahebkar A, Jamialahmadi T, Vilchez-Cavazos F, et al. Effect of extracorporeal shockwave therapy on plantar fascia thickness in plantar fasciitis: a systematic review and meta-analysis of randomized controlled trials. Arch Orthop Trauma Surg. 2024;144(8):3503-16.

23. Crevenna R, Mickel M, Schuhfried O, Gesslbauer C, Zdravkovic A, Keilani M. Focused extracorporeal shockwave therapy in physical medicine and rehabilitation. Curr Phys Med Rehabil Rep. 2021;9(1):1-10.

24. Rompe JD, Furia J, Weil L, Maffulli N. Shock wave therapy for chronic plantar fasciopathy. Br Med Bull. 2007;81(1):183-208.

25. Sanmak ÖDY, Külcü DG, Mesci N, Altunok EÇ. Comparison of effects of low-level laser therapy and extracorporeal shock wave therapy in plantar fasciitis treatment: A randomized, prospective, single-blind clinical study. Turk J Phys Med Rehabil. 2018;65(2):184.

26. Fouda K, Ali Z, Elshorbagy R, Eladl H. Effect of radial shock wave and ultrasound therapy combined with traditional physical therapy exercises on foot function and dorsiflexion range in plantar fasciitis: a prospective randomized clinical trial. Eur Rev Med Pharmacol Sci. 2023;27(9).

27. Li X, Zhang L, Gu S, Sun J, Qin Z, Yue J, et al. Comparative effectiveness of extracorporeal shock wave, ultrasound, low-level laser therapy, noninvasive interactive neurostimulation, and pulsed radiofrequency treatment for treating plantar fasciitis: A systematic review and network meta-analysis. Medicine. 2018;97(43):e12819.

28. Wang Y-C, Chen S-J, Huang P-J, Huang H-T, Cheng Y-M, Shih C-L. Efficacy of different energy levels used in focused and radial extracorporeal shockwave therapy in the treatment of plantar fasciitis: a meta-analysis of randomized placebo-controlled trials. J Clin Med. 2019;8(9):1497.

29. Kim D-H, Lee Y. Effect of Dynamic Taping versus Kinesiology Taping on Pain, Foot Function, Balance, and Foot Pressure in 3 Groups of Plantar Fasciitis Patients: A Randomized Clinical Study. Med Sci Monit. 2023;29:e941043-1.

30. Ordahan B, Karahan AY, Kaydok E. The effect of high-intensity versus low-level laser therapy in the management of plantar fasciitis: a randomized clinical trial. Lasers Med Sci. 2018;33(6):1363-9.

31. Yin Mc, Yan Yj, Tong Zy, Xu Cq, Qiao Jj, Zhou Xn, et al. Development and validation of a novel scoring system for severity of plantar fasciitis. Orthop Surg. 2020;12(6):1882-9.

32. Palee P, Sakulsriprasert P, Thammajaree C, Theapthong M, Pakpakorn P, Sitti T, et al. Association among pain, skin blood flow and temperature, plantar fascia and flexor digitorum brevis thickness, and foot function index in individuals with plantar fasciitis: a cross-sectional study. J Musculoskelet Res. 2024;27(01):2350010.

33. Yin M-C, Ye J, Yao M, Cui X-J, Xia Y, Shen Q-X, et al. Is extracorporeal shock wave therapy clinical efficacy for relief of chronic, recalcitrant plantar fasciitis? A systematic review and meta-analysis of randomized placebo or active-treatment controlled trials. Arch Phys Med Rehabil. 2014;95(8):1585-93.

34. Chang K-V, Chen S-Y, Chen W-S, Tu Y-K, Chien K-L. Comparative effectiveness of focused shock wave therapy of different intensity levels and radial shock wave therapy for treating plantar fasciitis: a systematic review and network meta-analysis. Arch Phys Med Rehabil. 2012;93(7):1259-68.

35. Chng Z, Yeo JJ, Joshi A. Resilience as a protective factor in face of pain symptomatology, disability and psychological outcomes in adult chronic pain populations: a scoping review. Scand J Pain. 2023;23(2):228-50.

36. Ruiz-Párraga GT, López-Martínez AE, Esteve R, Ramírez-Maestre C, Wagnild G. A confirmatory factor analysis of the Resilience Scale adapted to chronic pain (RS-18): new empirical evidence of the protective role of resilience on pain adjustment. Qual Life Res. 2015;24(5):1245-53.

37. Ordahan B, Türkoğlu G, Karahan AY. Extracorporeal shock wave therapy versus low-level laser therapy in chronic tendinopathy: a randomized trial. Lasers Med Sci. 2018;33(6):1363-9.

38. Yin Mc, Yan Yj, Tong Zy, Xu Cq, Qiao Jj, Zhou Xn, et al. Extracorporeal shockwave therapy in calcific tendinitis: clinical outcomes and mechanisms. Orthop Surg. 2020;12(6):1882-9.

39. Kim D-H, Lee Y. Dynamic and kinesiology taping in plantar fasciitis rehabilitation: comparative outcomes. Med Sci Monit. 2023;29:e941043-1.

40. Chang K-V, Chen S-Y, Chen W-S, Tu Y-K, Chien K-L. Eccentric exercise and adjunct therapies in foot and ankle disorders: a systematic review. Arch Phys Med Rehabil. 2012;93(7):1259-68.

41. Chng Z, Yeo JJ, Joshi A. Psychological resilience and chronic pain: a scoping review. Scand J Pain. 2023;23(2):228-50.

42. Li X, Zhang L, Gu S, Sun J, Qin Z, Yue J, et al. Comparative effectiveness of noninvasive therapies for plantar fasciitis: network meta-analysis. Medicine. 2018;97(43):e12819.