INDIAN JOURNAL OF SCIENCE AND TECHNOLOGY

RESEARCH ARTICLE

Efficacy of Cushioned Insoles and Magnetic Insoles in the Treatment of Chronic Plantar Fasciitis

S Veena Kirthika[1]*, Bernard Ebenezer Cyrus[1], R N V Deepthi[1], K Saraswathi[1], S Sathya[2], K Arthishwari[3]

1 Faculty of Physiotherapy, Dr. M.G.R. Educational and Research Institute, Maduravoyal, Chennai, 600095, Tamil Nadu, India
2 Faculty of Allied Health Sciences, Madras Medical Mission, Chennai, Tamil Nadu, India
3 Bio Medical Engineer, PVR Ortho Neuro Clinic, Chennai, Tamil Nadu, India

OPEN ACCESS

Received: 19-09-2023
Accepted: 28-09-2023
Published: 11-11-2023

Citation: Kirthika SV, Cyrus BE, Deepthi RNV, Saraswathi K, Sathya S, Arthishwari K (2023) Efficacy of Cushioned Insoles and Magnetic Insoles in the Treatment of Chronic Plantar Fasciitis. Indian Journal of Science and Technology 16(41): 3657-3664. https://doi.org/10.17485/IJST/v16i41.2373

* **Corresponding author**.

veena.physio@drmgrdu.ac.in

Funding: None

Competing Interests: None

Published By Indian Society for Education and Environment (iSee)

ISSN
Print: 0974-6846
Electronic: 0974-5645

Abstract

Objectives: This present study aims to compare the efficacy of Cushioned Insoles and Magnetic Insoles in managing Chronic Plantar Fasciitis. **Methods:** The study involved 40 participants aged between 30 and 45, all diagnosed with Chronic Plantar Fasciitis and meeting the specified criteria for inclusion and exclusion. These participants were divided into two groups randomly. Group A underwent treatment with Cushioned Insoles, wearing them for a minimum of 4 hours per day, four days a week, over an 8-week period. Conversely, Group B received treatment with Magnetic Insoles, also wearing them for at least 4 hours daily, four days a week, for 8 weeks. Furthermore, both sets of participants participated in stretching activities designed to address plantar fascia tightness and also calf muscles. The level of pain was assessed using the Visual Analog Scale (VAS), and the evaluation of functionality was performed using the Foot Function Index (FFI). **Findings:** Following the two-month intervention period, Participants in both Group A as well as Group B observed a decrease in pain levels and an enhancement in foot function. Group B, which utilized Magnetic Insoles, exhibited a more pronounced reduction in pain intensity, achieving a mean VAS score of 2.86, while Group A, which used Cushioned Insoles, had a mean VAS score of 4.20 ($p \leq 0.001$). Group B (Magnetic Insole) also showed a greater improvement, with a mean FFI score of 53.73, in comparison to Group A (Cushioned Insole) with a mean FFI score of 63.00 ($p \leq 0.001$). **Novelty:** The novel contribution of this study is to evaluate the efficacy of Cushioned Insoles and Magnetic Insoles in managing Chronic Plantar Fasciitis in terms of VAS and FFI both together which were not significantly addressed in the existing literature.

Keywords: Plantar Fasciitis; Heel Pain; Cushioned Insoles; Magnetic Insoles; Foot Function Index; Visual Analog Scale; Stretching Exercises

1 Introduction

Chronic Plantar Fasciitis (CPF) causes pain in the inner area of the heel bone and significantly affects the quality of life for a considerable number of individuals globally. Statistics indicate that around 7% of individuals aged 65 and above report experiencing discomfort in the heel region. Furthermore, identification and management of this pain originating from the plantar area contribute to over a million medical visits annually in India[1,2]. Patients commonly describe experiencing pain at the front-inner part of the heel bone. These symptoms can persist for several weeks or even months before seeking medical attention. Particularly, pain is most intense when standing up following a rest period, often in the early morning. Once walking begins, the pain tends to diminish. Nevertheless, it continues to linger throughout the day and intensifies with physical activities like prolonged walking or engaging in exercise routines, especially on hard surfaces. Risk factors recognized for this condition include obesity and limited flexibility of the ankle joint[3]. Foot biomechanical abnormalities, such as taut Achilles tendon or elevated arches (pes cavus), and flat feet (pes planus), have been demonstrated to be linked with the occurrence of plantar fasciitis[4]. During the night, the foot typically adopts a downward-pointing position (plantar flexion), upon waking up in the morning, when an individual gets out of bed, the foot transitions into an upward-pointing position (dorsiflexion) while walking. The plantar fascia experiences a slight contraction during sleep, and the initial stretching that occurs upon getting up in the morning likely contributes to the onset of pain[5]. More than 80% of heel region pain is attributed to plantar fasciitis, and initial treatment often involves conservative measures, including rest, anti-inflammatory medicines that are not steroids, or the use of foot orthotics[6].

Magnetic insoles find recommendations for alleviating a range of health concerns, including migraines, asthma, back pain, indigestion, and the persistent pain associated with Plantar Fasciitis. The inclusion of magnetic acupressure points facilitates the enhancement of specific bodily functions, bolstering not only foot health but also overall body wellness. Boasting materials that prioritize both safety and longevity, these insoles offer a massaging effect during walking. Optimal comfort is ensured through the availability of thicker insoles. Furthermore, these insoles can be tailored to the appropriate size, ensuring the utmost care and comfort[7]. Shoe insoles are occasionally employed as a means of addressing lower back pain, particularly in individuals experiencing foot dysfunction or imbalances[8]. The prevailing medical hypothesis posits that issues with the foot or ankle can contribute to misalignment or imbalances in the lower back, which, over time, may result in lower back pain. To mitigate the forces generated during running and prevent overuse injuries, the application of insoles with cushioning or shock-absorption properties has been proposed.

The utilization of magnetic fields for pain relief has witnessed a significant surge in popularity over the past decade. A substantial number of individuals resort to magnets as a method of alleviating their pain[9]. Remarkably, the global expenditure on magnetic devices designed for pain treatment has reached an estimated $5 billion. The objective related to our study is to conduct a comparative analysis of the effects yielded by the utilization of cushioned insoles and magnetic insoles in managing Chronic Plantar Fasciitis (CPF).

2 Methodology

The experimental research was performed with a comparative pre-post-test approach. It was carried out within the Outpatient Physiotherapy Department at the Faculty of Physiotherapy, Dr. MGR Educational and Research Institute, India. This study involved a total of 40 participants, selected using a simple random sampling method. Over a span of 2 months, the research investigated the effects of using cushioned insoles and magnetic insoles in managing Chronic Plantar Fasciitis. Inclusion criteria encompassed individuals aged 30 to 45, both males and females, with stabbing pain alongside the bottom of the foot and experiencing severe pain in the foot for a minimum of 6 months. Exclusion criteria were applied to those with recent injuries, fractures, prior foot surgeries, ankle joint disorders, and diabetes. In this study, the materials employed included Cushioned Insoles and Magnetic Insoles. The main evaluation criteria selected for assessment were the Visual Analog Scale (VAS) and the Foot Function Index (FFI). The Visual Analog Scale (VAS), introduced by Hayes and Patterson, serves as a pain rating scale widely used in clinical and epidemiological research. Its purpose is to gauge the intensity and frequency of various symptoms, particularly pain. This scale allows patients to express their pain perception on a continuum that stretches from no pain to the highest degree of pain. The VAS was designed to capture the concept of a seamless and continuous spectrum of pain experience, as opposed to rigid categories like mild, moderate, and severe.

In contrast, the Foot Function Index (FFI), focuses on measuring the impact of foot disorders on functional aspects such as pain, disability, and activity limitations. Comprising 23 self-administered items grouped into three sub-scales, the FFI generates both total and sub-scale scores. The index has proven to be a valuable tool, suitable for assessing individuals with foot pathologies and non-traumatic foot or ankle conditions. Its versatility extends to both clinical and research settings. However, it may not be suitable for individuals who already maintain a level of independence in their daily activities. The study incorporated 40

individuals diagnosed with Chronic Plantar Fasciitis, aged between 30 and 45 years, who met the defined criteria for including or excluding subjects. The study's need was thoroughly elaborated to all participants, and their informed consent was obtained. The study received ethical clearance from the University Research and Ethics Committee as well as adhered meticulously to guidelines mentioned in the 2013 Helsinki Declaration, which is endorsed by the World Medical Association. Demographic data, including age, gender, duration of symptoms, and occupation, were gathered using uniform history-taking procedures.

For pain intensity assessment, participants were requested to indicate their level of experienced pain on a 10 cm VAS scale provided in the data collection sheet, using numbers between 0 to 10. Here, 0 denotes no pain, while 10 represents severe pain. The outcome measures, encompassing the VAS and FFI, were meticulously documented before and after treatment, serving as pre and post-test scores.

Participants in Group A were instructed to utilize Cushioned Insoles, necessitating their usage for a minimum of 4 hours daily, across 4 days per week, spanning an 8-week duration. Conversely, Group B received instructions to employ Magnetic Insoles, requiring the same usage frequency and duration. Both groups were engaged in stretching protocol for calf muscles and also Plantar Fascia. These exercises, involving a duration of 15 minutes, were scheduled 4 days per week for an 8-week period.

2.1 Cushioned Insoles

Cushioned insoles (Figure 1 a) have been proposed as a means of alleviating the impact of Chronic Plantar Fasciitis. This study sought to investigate whether the implementation of cushioned insoles could effectively mitigate impact forces in individuals engaging in running activities. These insoles are designed with two vice pads and a main pad, enabling the adjustment of shoe height.

Fig 1. (a) Cushioned Insoles, and (b) Magnetic Insoles

With a reduced airbag, they serve the purpose of decompression shock absorption and offer enhanced loading capacity. Enhanced interface buckles ensure a secure fit, preventing slippage and ensuring optimal load-bearing resilience without deformation. Also, the design incorporates breathability, delivering comfort, Odour resistance, and sharp stability.

2.2 Magnetic Insoles

Constructed from premium materials, magnetic insoles (Figure 1 b) are equipped with integrated magnets that leverage magnetic field technology, providing a self-massage to the feet. This massage stimulates nerve endings that correspond to various organs, leading to the alleviation of discomfort and the promotion of regenerative processes. These insoles, employing magnetic field technology, adhere to the principles of plantar reflexology, wherein specific points on the foot's sole correlate with organs, glands, nerves, and joints. The gentle massage exerted by the insoles yields therapeutic benefits, rendering them a recommended option for alleviating a range of health issues like migraines, asthma, back pain, indigestion, and notably, chronic pain associated with conditions such as Chronic Plantar Fasciitis.

The magnetic acupressure points not only contribute to targeted body function enhancement but also bolster overall foot and body wellness. These insoles are meticulously crafted from top-quality, non-toxic, and resilient materials. Additionally, they provide a massaging effect while walking and feature enhanced comfort through thicker insoles. Tailored to suit individual needs, the insoles can be conveniently cut to the appropriate size using scissors, ensuring optimal care and comfort.

2.3 Stretching Exercises

Stretching exercises were done by Groups A and B for 15 minutes each day for four days a week. Stretching exercises for the calf muscles, tennis ball rollouts, towel stretches, seated plantar fascia stretches, and toe stretches are included.

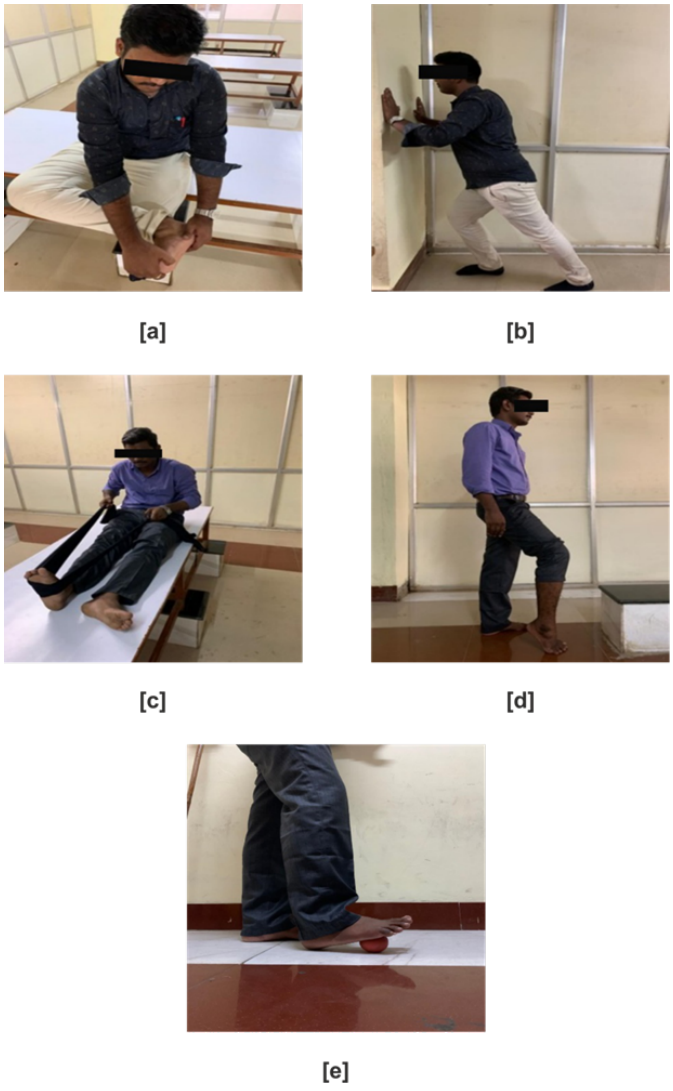

Fig 2. (a) Seated Plantar Fascia Stretch, (b) Calf Muscle Stretch, (c) Towel Stretch, (d) Toe Stretch, and (e) Tennis Ball Rollout

Towel Stretch : Stretching the calf muscles with a towel is a simple and effective method. Sit or lie down and loop a towel around the ball of one foot, just below the toes. Gently flex the foot, pointing the toes towards the chest while holding the towel in both hands. Pull the towel towards you to increase the stretch, feeling a comfortable pull in the calf. Maintain the position for 20-30 seconds, then release and switch to the other leg. Repeat 2-3 times per leg, incorporating this stretch into the daily routine or exercise warm-up and cool-down to improve calf flexibility and relieve tension. Always stretch gently to avoid strain or injury (Figure 2 c).

Toe Stretch : Performing the toe stretch is a straightforward way to relieve tension and enhance flexibility in the toes. Begin by sitting or standing comfortably, focusing on one foot at a time. Extend the leg and gently curl the toes downward, trying to touch the tips to the floor, feeling a stretch along the tops of the toes. Hold the stretch for about 20-30 seconds, release, and repeat this process 2-3 times for each foot (Figure 2 d).

Tennis Ball Rollout : The tennis ball rollout is a simple yet effective self-massage technique for managing plantar fasciitis. Begin by standing in a comfortable position and placing the tennis ball under the affected foot while ensuring that the heel maintains to be in the ground. Apply gentle pressure and roll the ball and move from heel to ball of foot and back. Focus on tight or tender spots, spending 5-10 minutes on each foot (Figure 2 e).

3 Results and Discussion

In this study, the collected data underwent tabulation and analysis utilizing both descriptive as well as inferential statistical methods. All parameters were evaluated using the statistical package for social science (SPSS) version 24, with a significance level set at $p < 0.05$ and a 95% confidence interval applied to all analyses. To assess data normality, the test of Shapiro-Wilk was employed. The results of this test indicated that data for the dependent variables, VAS (significance 0.313), and FFI (significance 0.441), exhibited normal distribution with p-values greater than 0.05.

Table 1. Comparison of Visual Analogue Scale Score Between Group – A and Group - B in Pre and Post-Test

Test	Group - A		Group - B		t-test	df	Significance
	Mean	S.D	Mean	S.D			
Pre- Test	8.20	.676	8.26	.703	-.265	28	.793*
Post- Test	4.20	.676	2.86	.743	5.14	28	.000***

(*- P > 0.05), (***- P ≤ 0.001)

Consequently, parametric tests were utilized. Specifically, paired t-tests were employed to determine statistical differences within groups, while independent t-tests (Student t-tests) were used to identify statistical differences between groups. Table 1 displays the Mean, Standard Deviation (S.D), t-test results, degrees of freedom (df), and p-values for comparisons between Group A and Group B during both the pre and post-test weeks. There was no statistical difference in significance in scores of pre-tests between Groups A and B (P > 0.05). However, it is important to highlight that the table reveals a high statistical difference in the significance of post-test values between Group A and B (**- P ≤ 0.001). This suggests that while the two groups exhibited similar baseline values, there was a substantial divergence in their outcomes following the intervention.

Table 2. Comparison of Foot Function Index Score Between Group – A and Group - B in Pre and Post-Tests

Test	Group - A		Group - B		t-test	df	Significance
	Mean	S.D	Mean	S.D			
Pre- Test	79.53	3.48	79.93	3.73	-.304	28	.764*
Post- Test	63.00	2.13	53.73	2.46	11.00	28	.000***

(*- P > 0.05), (***- P ≤ 0.001)

Table 2 displays the Mean, Standard Deviation (S.D), t-test results, degrees of freedom (df), and p-values for comparisons the Group A and Group B during both the pre and post-test weeks. There was no statistical difference in significance in values of the pre-test between Groups A and B (P > 0.05). However, it is important to highlight that the table reveals a high statistical difference in the significance of post-test values between Group A and B (**- P ≤ 0.001).

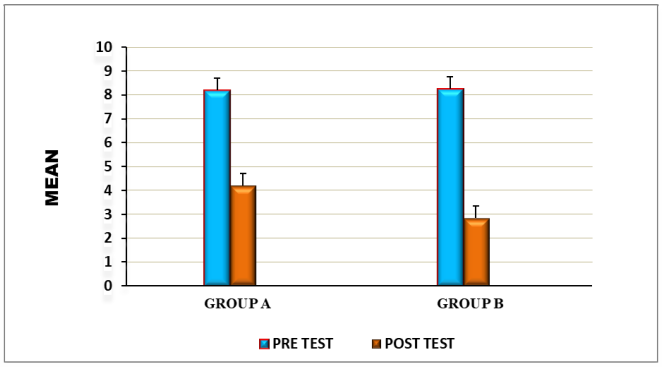

Fig 3. Comparison of Visual Analogue Scale Score within Group – A and Group - B Between Pre-Test and Post-Test

Figure 3 displays the Mean, Standard Deviation (S.D), t-value, and p-value for comparisons between pre and post-test scores within Groups A and B. It is important to note that there is a highly significant statistical difference between pre and post-test scores within both Group A and B (***- P ≤ 0.001). This indicates there was a substantial change in the measured variables within each group from the pre and post-test, highlighting the effectiveness of the intervention applied to both groups.

Figure 4 displays the Mean, Standard Deviation (S.D), t-value, and p-value for comparisons between pre and post-test values within Groups A and B. It's crucial to note that there is a highly significant statistical difference between pre and post-test scores within both Group A and B (***- $P \leq 0.001$). This finding underscores that a meaningful change occurred in the measured variables within each group from the pre and post-test assessments, indicating the effectiveness of the applied intervention for both groups.

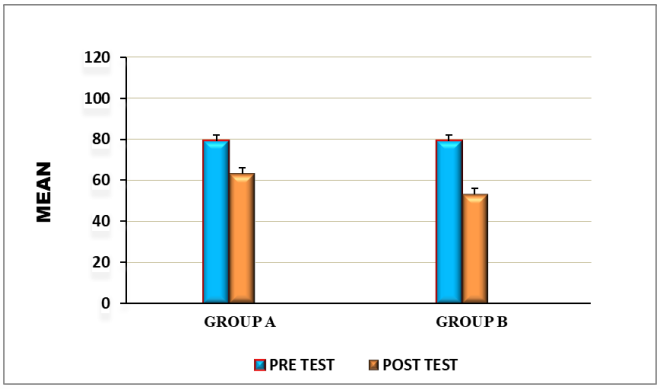

Fig 4. Comparison of Foot Function Index Score within Group – A and Group – B Between Pre and Post-Test Values

The mean values comparison between Groups A and B on the VAS Score for pain levels reveals a significant decrease in post-test means for both groups. However, Group B, utilizing Magnetic Insoles, showed a lower mean value of 2.86, indicating greater effectiveness compared to Group A, which used Cushioned Insoles with a mean value of 4.20. This difference is significant statistically at $P \leq 0.001$, proving the rejection of the null hypothesis.

Similarly, when evaluating the values of mean values in Groups A and B on the Foot Function Index (FFI) score, a significant decrease in post-test mean scores is observed in both groups. However, Group B (Magnetic Insole) achieved a lower mean value of 53.73, signifying greater effectiveness than Group A (Cushioned Insole) with a mean value of 63.00. This difference is significant statistically at $P \leq 0.001$, proving the rejection of the null hypothesis.

Furthermore, in comparison of pre and post-test values within both Groups A and B for VAS and Foot Function Index scores, a high difference of significance of mean values is observed at $P \leq 0.001$. This suggests that both interventions, Magnetic Insoles in Group B and Cushioned Insoles in Group A, were beneficial in pain level reduction and improved foot function in individuals with the respective conditions.

Chronic Plantar Fasciitis (CPF) is one such condition presented by persistent pain at the medial plantar prominence of the calcaneum (heel bone), affecting millions of individuals worldwide. Patients commonly report experiencing discomfort at the anteromedial aspect of the calcaneum [10]. Symptoms can endure for weeks or even months before seeking medical attention. Notably, the pain is most pronounced when initially standing after a period of rest, typically during early morning. However, as the patient begins to walk, the pain often subsides. While the discomfort may ease throughout the day, it rarely completely resolves and can be aggravated by activities like extended periods of walking or exercise, especially on firm surfaces [11]. This condition can significantly impact the daily lives of those affected, making proper diagnosis and management essential for improved quality of life.

This study represents the first attempt to compare the effectiveness of Cushioned Insoles and Magnetic Insoles in managing Chronic Plantar Fasciitis. Cushioned Insoles, equipped with well-structured arch support, play a crucial role in assisting fallen arches by elevating them to an optimal level during movement. This support aids in redistributing pressure across the soles of the feet, effectively reducing excessive stress on the painful areas [12]. On the other hand, Magnetic Insoles are shoe inserts designed to provide static magnetic energy, which is believed to enhance blood flow to the feet and lower legs, increase oxygen circulation to bodily tissues, lower the acidity of bodily fluids, and potentially modify nerve impulses [13]. These distinct approaches to managing Chronic Plantar Fasciitis offer unique mechanisms of action, making it essential to investigate their comparative effectiveness in addressing this challenging condition.

In our study, we observed positive effects associated with the use of both Cushioned Insoles and Magnetic Insoles for managing Chronic Plantar Fasciitis. Cushioned Insoles operate on a mechanism aimed at mitigating the impact of Chronic Plantar Fasciitis [14]. These insoles are equipped with two vice pads and a main pad that can be adjusted to modify the height of the shoes, offering a customized fit. They incorporate a reduced airbag feature, which serves multiple purposes, including

decompression, shock absorption, and enhanced load-bearing capacity.

This study demonstrated more favorable outcomes with Magnetic Insoles, and their effectiveness is grounded in a noteworthy mechanism. Magnetic Insoles function by providing static magnetic energy believed to have several positive effects on the body. These effects encompass increasing blood flow to the feet and lower legs, enhancing oxygen circulation in bodily tissues, reducing the acidity of bodily fluids, and potentially modifying nerve impulses.

Constructed from high-quality materials, Magnetic Insoles incorporate embedded magnets that utilize magnetic field technology to offer a self-massage to the feet. This massage, in turn, impacts nerve endings associated with various organs, providing relief from discomfort and stimulating the regeneration process. The design of these magnetic insoles aligns with the principles of plantar reflexology, where specific points on the sole of the foot correspond to various organs, glands, nerve structures, and joints.

As a result, Magnetic Insoles come highly recommended for addressing a range of health issues, including migraines, asthma, back pain, indigestion, and, notably, chronic pain conditions like Chronic Plantar Fasciitis. Their comprehensive approach and potential benefits make them a valuable intervention for enhancing the overall well-being of individuals coping with diverse health concerns, including the management of Chronic Plantar Fasciitis.

Both Cushioned Insoles and Magnetic Insoles are commonly employed interventions for individuals dealing with Chronic Plantar Fasciitis. Both types of insoles have demonstrated significant effectiveness in alleviating pain associated with the condition. However, the study's final outcome indicates that Magnetic Insoles outperformed Cushioned Insoles in x Chronic Plantar Fasciitis management.

This study though contradicts the earlier findings where only marginal benefits or no benefits were obtained for patients suffering from plantar fasciitis while using magnetic insoles, studies are very much limited in this area of research. More RCTs are required to generalize and confirm the findings. The favorable results in the magnetic insole group could be probably even due to the patient's beliefs and preferences for the use of magnetic insoles. Nevertheless, the use of both insoles substantially offered excellent benefits to our study population.

4 Conclusion

This study concludes that both Cushioned Insoles and Magnetic Insoles demonstrate differences in reducing pain significantly and improving the disability associated with Chronic Plantar Fasciitis, as indicated by the Visual Analog Scale. Group B, utilizing Magnetic Insoles, showed a lower mean value of 2.86, indicating greater effectiveness compared to Group A, which used Cushioned Insoles with a mean value of 4.20. This difference is significant statistically at $P \leq 0.001$, proving the rejection of the null hypothesis. Group B (Magnetic Insole) achieved a lower mean value of 53.73, signifying greater effectiveness than Group A (Cushioned Insole) with a mean value of 63.00. This difference is significant statistically at $P \leq 0.001$, proving the rejection of the null hypothesis. Furthermore, in comparison of pre and post-test values within both Groups A and B for VAS and Foot Function Index scores, a high difference of significance of mean values is observed at $P \leq 0.001$. This suggests that both interventions, Magnetic Insoles in Group B and Cushioned Insoles in Group A, were beneficial in pain level reduction and improved foot function in individuals with the respective conditions. However, the study reveals a more pronounced improvement in Group B, which utilized Magnetic Insoles. Based on findings obtained in this comparative research, it can be inferred that Magnetic Insoles are also beneficial in Chronic Plantar Fasciitis management. In the future, similar experiments will be conducted using different insoles other than cushioned and magnetic insoles that may further help improve the disability associated with Chronic Plantar Fasciitis. Also, analysis and experimentations over open plantar fasciotomy with open gastrocnemius recession shall be carried out in the cure of Chronic Plantar Fasciitis. Moreover, experimentations concerning extracorporeal shock wave therapy and corticosteroid injection shall be carried out for effective management of Chronic Plantar Fasciitis.

Acknowledgment

The authors thank the management of Dr.MGR Educational and Research Institute, Deemed to be University, for supporting this research.

References

1) Chang AH, Rasmussen SZ, Jensen AE, Sørensen T, Rathleff MS. What do we actually know about a common cause of plantar heel pain? A scoping review of heel fat pad syndrome. *Journal of Foot and Ankle Research*. 2022;15(1). Available from: https://doi.org/10.1186/s13047-022-00568-x.
2) Ahn J, Yeo J, Lee SHH, Lee YJ, Park Y, Goo B, et al. Healthcare usage and cost for plantar fasciitis: a retrospective observational analysis of the 2010–2018 health insurance review and assessment service national patient sample data. *BMC Health Services Research*. 2023;23(1). Available from: https://doi.org/10.1186/s12913-023-09443-2.

3) Peterson B, Hawke F, Spink M, Sadler S, Hawes M, Callister R, et al. Biomechanical and Musculoskeletal Measurements as Risk Factors for Running-Related Injury in Non-elite Runners: A Systematic Review and Meta-analysis of Prospective Studies. *Sports Medicine - Open*. 2022;8(1). Available from: https://doi.org/10.1186/s40798-022-00416-z.
4) Albano D, Messina C, Gitto S, Serpi F, Basile M, Acquasanta M, et al. Shear-wave elastography of the plantar fascia: a systematic review and meta-analysis. *Journal of Ultrasound*. 2023;26(1):59–64. Available from: https://doi.org/10.1007/s40477-022-00770-4.
5) Nozaki S, Kinugasa R, Yaeshima K, Hashimoto T, Jinzaki M, Ogihara N. Quantification of the in vivo stiffness and natural length of the human plantar aponeurosis during quiet standing using ultrasound elastography. *Scientific Reports*. 2022;12(1). Available from: https://doi.org/10.1038/s41598-022-20211-w.
6) Gulle H, Morrissey D, Tan XL, Cotchett M, Miller SC, Jeffrey AB, et al. Predicting the outcome of plantar heel pain in adults: a systematic review of prognostic factors. *Journal of Foot and Ankle Research*. 2023;16(1). Available from: https://doi.org/10.1186/s13047-023-00626-y.
7) Rasenberg N, Dijkgraaf LJM, Bindels PJ, Bierma-Zeinstra SM, Van Middelkoop M. Can we predict which patients with plantar heel pain are more likely to benefit from insoles? A secondary exploratory analysis of a randomized controlled trial. *Journal of Foot and Ankle Research*. 2022;15(1). Available from: https://doi.org/10.1186/s13047-022-00516-9.
8) Martinelli N, Bonifacini C, Romeo G. Current therapeutic approaches for plantar fasciitis. *Orthopedic Research and Reviews*. 2014;p. 33. Available from: https://doi.org/10.2147/ORR.S43126.
9) Moneim NHA, Hemed MA, Klooster PMT, Rasker JJ, Shaarawy NKE. Chronic Plantar Fasciitis Treatment: A Randomized Trial Comparing Corticosteroid Injections Followed by Therapeutic Ultrasound with Extracorporeal Shock Wave Therapy. *Rheumato*. 2023;3(3):169–188. Available from: https://doi.org/10.3390/rheumato3030012.
10) Tătaru AI, Baritz MI, Repanovici A, Druga CN, Barbu DM, Apostoaie MG. Analysis of the Distribution of Forces and Pressures on the Plantar Surface in Different Walking Types. *IFMBE Proceedings*. 2024;2023:113–121. Available from: https://doi.org/10.1007/978-3-031-42782-4_13.
11) Menz HB, Bonanno DR. Footwear comfort: a systematic search and narrative synthesis of the literature. *Journal of Foot and Ankle Research*. 2021;14(1). Available from: https://doi.org/10.1186/s13047-021-00500-9.
12) Parker D, Andrews J, Price C. Validity and reliability of the XSENSOR in-shoe pressure measurement system. *PLOS ONE*. 2023;18(1):e0277971. Available from: https://doi.org/10.1371/journal.pone.0277971.
13) Morrissey D, Cotchett M, J'bari AS, Prior T, Griffiths IB, Rathleff MS, et al. Management of plantar heel pain: a best practice guide informed by a systematic review, expert clinical reasoning and patient values. *British Journal of Sports Medicine*. 2021;55(19):1106–1118. Available from: http://dx.doi.org/10.1136/bjsports-2019-101970.
14) Latt LD, Jaffe DE, Tang Y, Taljanovic MS. Evaluation and Treatment of Chronic Plantar Fasciitis. *Foot & Ankle Orthopaedics*. 2020;5(1). Available from: https://doi.org/10.1177/2473011419896763.