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Effectiveness of Myofascial Release Techniques in the Management of Plantar Fasciitis: A Meta-Analysis

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Abstract

Introduction

Myofascial Release Techniques (MFRT) are manual therapies that target soft tissues by using long, low-amplitude stretches to increase tissue flexibility. Despite its efficacy in a variety of diseases, perspectives on its biomechanical and physiological consequences remain mixed in foot disorders. The purpose of this analysis is to distribute evidence-based insights for researchers, physicians and other professional looking for effective therapies for this common foot problem.

Methodology

This study comply with the guidelines of PRISMA. Articles were retrieved from PubMed, Google Scholar, Medline, Cochrane and BioMed Central databases with the keywords “Myofascial Release Techniques,” “Stretching,” “Pain,” “Manual Therapy,” and “Plantar Fasciitis.” Studies based on English that had been published from 2019 to 2022 examining the efficacy of MFRT on improving pain and foot function index among plantar fasciitis patients were selected.

Results

Total 170 subjects with plantar fasciitis from seven randomized controlled trials were added in this meta-analysis. MFRT had been shown to have a significant pooled effect when the groups were being compared on lowering pain and improving foot function index, with a SMD of -0.924 (95% CI: -1.470 to -0.378, $p = 0.001$) for pain and -0.915 (95% CI: -1.409 to -0.420, $p = 0.001$) for foot function index respectively.

Conclusion

MFRT was found to be more effective in diminishing pain and enhancing foot function index as compared to the control therapies in lowering pain and increasing foot function index. These findings provide evidence-based insights that support the inclusion of MFRT as the intervention for common foot condition.

Keywords

Manual Therapy, Myofascial Release Techniques, Stretching, Pain, Plantar Fasciitis.

Introduction

Myofascial Release Technique (MFRT) encompasses a wide range of manual physiotherapy methods that aim at structures like soft tissue components, including muscles and fascia¹. Such techniques are based on the protocol of applying sustained, low-amplitude stretches to the muscles and fascia; nullifying prolonged, continuous stimulation to one area for more than 2 minutes is a fundamental component²⁻³. Preserving tissue flexibility is the primary goal of MFRT, especially when it comes to structures like fascia that might experience changes in their mechanical characteristics, such as losing their natural elasticity and consistency⁴⁻⁵. The elimination of waste and the reduction of mechanical strain on blood arteries and nerves are two positive changes researchers believe MFRT can cause. These changes may also enhance the local inflammatory response. The effectiveness of MFRT has been shown in several conditions, including carpal tunnel syndrome, severe asthma, migraine, fibromyalgia, ankle fractures and lower back pain⁶. Although MFRT has been successful in various conditions, opinions on the biomechanical, structural, and physiological effects are divided⁷. A complete model still needs to be discovered despite advances in understanding the intersections between the pathways of the biomechanical, cognitive, and autonomic nervous systems in the context of manual therapy. Improving soft tissue suppleness is the primary goal of the direct MFRT, which applies a purposeful, controlled mechanical force directly into a restriction⁸. Pain in the heel is typically caused by inflammation of the plantar aponeurosis at the place where it connects to the calcaneal tuberosity, known as plantar fasciitis. The pain usually peaks in the wee hours of the morning and goes down with more movement.

Plantar fasciitis is a condition that is caused by repeated stress to the plantar fascia at the calcaneum, where it originates⁹. Plantar fasciitis is the cause of around 15% of foot-related problems that need to be seen by medical specialists. Furthermore, 8% of injuries sustained by athletes participating in running-related activities are attributable to this condition¹⁰. The most

prevalent age range for plantar fasciitis ranges from 40-60 years, with no gender preference¹¹. Pain on the foot sole, particularly in the inferior portion of the heel, is the classic sign of plantar fasciitis. The discomfort worsens when the first few steps are taken in the morning. Afterwards, the pain gradually decreased, eventually fading after a few steps and during the day. The heel pain may be migratory or widespread initially, but it eventually settles near the calcaneus's medial tuberosity¹². Given plantar fasciitis's extensive frequency and effect, research into the relationship between MFRT and plantar fasciitis therapy is crucial. A meta-analysis to systematically assess the efficacy of MFRT methods as the treatment technique of plantar fasciitis is highly warranted, given the success of MFRT in resolving soft tissue disorders and the need for effective therapies for the condition. A study of this kind could provide insightful information to researchers, physicians, and people looking for evidence-based methods to lessen the impact of this prevalent and crippling foot condition.

Methodology

Search Strategies

A comprehensive search was conducted by independent reviewers using a vast database, including Google Scholar, PeDro, MEDLINE, Cochrane Library, EMBASE, and Web of Science. The researchers utilized MeSH phrases like **“Myofascial Release Techniques,” “Plantar Fasciitis Management,”** and **“Meta-Analysis”** to locate and aggregate research that evaluated the efficacy of MFRT in plantar fasciitis management.

Criteria for Eligible Studies and Participants

The focus on inclusion criteria had been explicitly kept to explore the impact of MFRT methods in treating Plantar Fasciitis. Studies conducted from 2015 to 2023 mainly addressed the efficacy of myofascial release methods. Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) standards were followed (Figure-1).

Trials centered on training procedures unrelated to the essential principle of Myofascial Release methods were excluded. Furthermore, publications not available in English and those without open

access were removed from the meta-analysis despite attempts to contact corresponding authors via email. A standardized data mining form was created to draw out critical research information such as names of authors, years of publications, demographics, and intervention durations (Table-1).

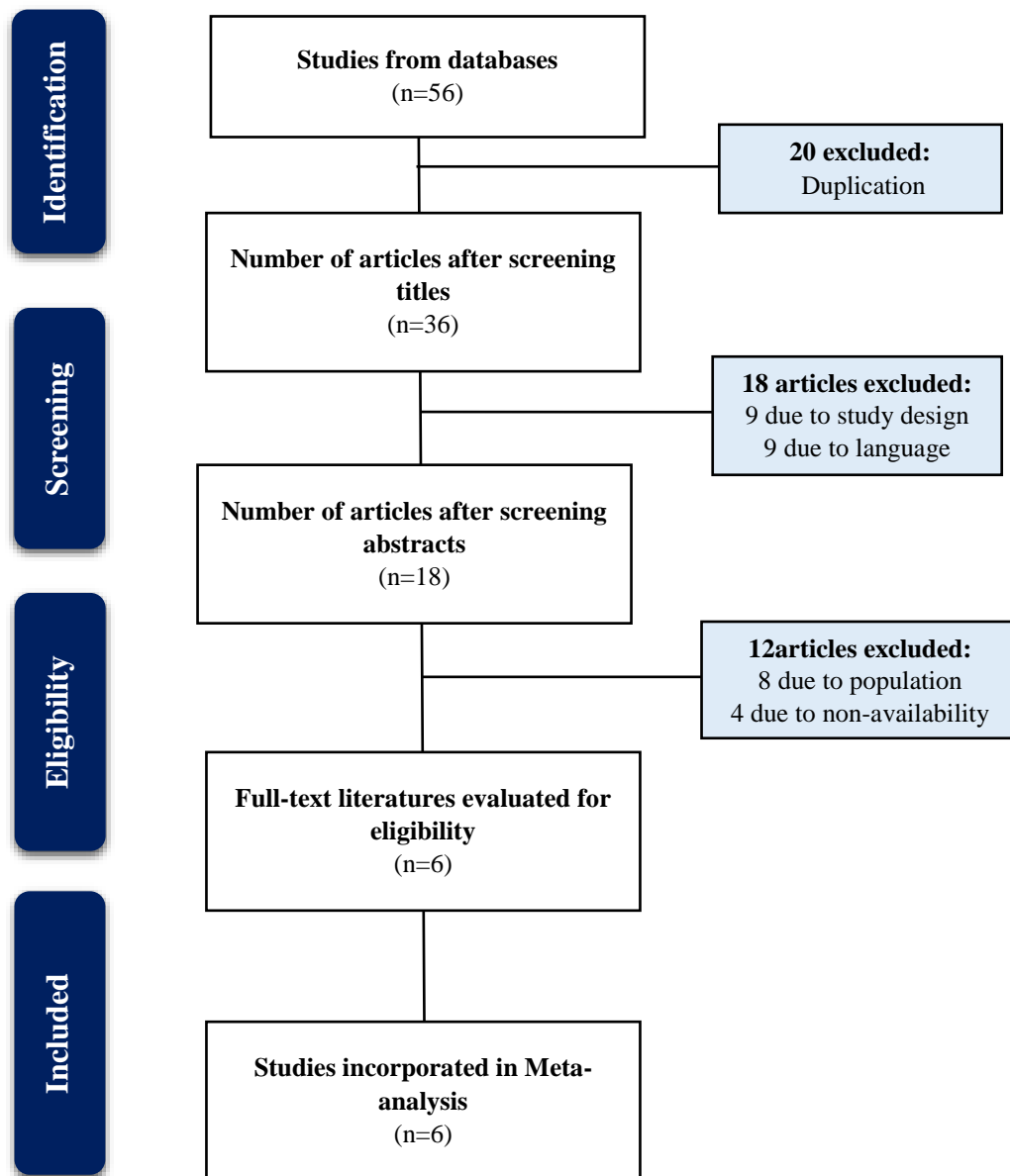


Figure-1 Flow chart on PRISMA guidelines

Table-1 Description of studies incorporated for the purpose of meta-analysis

Author & Year of Publication	Sample Size	Target Population	Age Range in Years	Intervention		Outcome
				MFRT Alone or in Combination with Other Conservative Treatment	MFRT Alone or Conservative Treatment or No Treatment	
Lipa et al. 2022 ¹⁴	30	Planter Fasciitis	25-50 years	MFRT + Stretching Exercises	MFRT	Pain and Foot Functional index
Bac et al. 2022 ¹⁵	30	Planter Fasciitis	20-49 years	MFR+ Exercises	MFRT	Pain
Tamboli et al. 2021 ¹⁶	30	Planter Fasciitis	25-45 years	MFRT+ Strengthening Exercises	MFRT	Pain and Foot Functional index
Ranbhor et al. 2021 ¹⁷	50	Heel pain	18-60 years	MFRT (Foam roller)	Stretching	Pain
Hemlata et al. 2019 ¹⁸	30	Heel pain, pain during first step upon walking	20-50 years	MFRT	Static stretching and exercises	Pain and Foot Functional index

Subbiah et al. 2019 ¹⁹	30	Plantar Fasciitis	40-60 years	MFRT + Ultrasound	Conventional Treatment + Ultrasound=d	FFI
Lipa et al. 2022 ¹⁴	30	Planter Fasciitis	25-50 years	MFRT + Stretching Exercises	MFRT	Pain and Foot Functional index

EG denotes Experimental group performed interval training exercises

CG denotes Control Group performed continuous exercises or no exercises

Assessment of Risk of Bias

The characteristics of the Cochrane tool were used to assess the ROB in the included studies on MFR methods in the context of plantar Fasciitis therapy. The authors assessed allocation techniques based on randomization and concealment, blinding protocols (for participant and outcome evaluation), data completeness, selective reporting, and other biases¹³.

Quantitative Analysis

Quantitative analysis was performed using MedCalc Statistical Software version 20.112 to evaluate the effect of MFR techniques in managing plantar fasciitis. The pooled effect was determined using Continuous Measure Analysis with a 95% Confidence Interval (CI) based on Standardized Mean Difference (SMD). Cohen's rule of thumb was used to determine the effect size, which was classified as minor (SMD: 0.2 to 0.5), moderate (SMD: 0.5 to 0.8), or high (SMD :>0.8).

The I^2 value was used to determine the amount of heterogeneity, directing the interpretation based on the random and fixed effect models. A fixed effect model is indicated by an I^2 value less than 50, whereas a random effect model is indicated by an I^2 value greater than 50.

Results

A thorough search using different databases had been conducted. Fifty-six articles on the protocol using MFR as an intervention were found to treat Plantar fasciitis. Out of 56 papers, six were selected after critical appraisal. All six studies fulfilled the inclusion criteria and included 200 participants. There was a focus on specific factors, pain decrement, and functional improvement. The meta-analysis used the models based on random and fixed effects to aggregate the pooling of the cumulative data of the selected studies, providing an extensive overview of the efficacy of Myofascial Release procedures in treating Plantar Fasciitis symptoms and improving overall patient outcomes.

Estimation of Effects of MFR on Pain

Five trials with 170 individuals examined the efficacy of Myofascial Release Techniques (MFRT) in line with other therapies versus MRFP only or control interventions on pain. Overall, SMD had been found by a fixed-effects model of -0.822 (95% CI: -1.136 to -0.508, $p = 0.001$) in favor of the combo treatment. The random-effects model concurred with an SMD of -0.924 (95% CI: -1.470 to -0.378, $p = 0.001$). The heterogeneity test revealed substantial inconsistency among the trials ($I^2 = 65.69\%$, $p = 0.0201$), indicating treatment effect variability. Despite this heterogeneity, the pooled results strongly support the notion that MFRT, when combined with other treatments, results in a significant improvement in outcomes when compared to MRFP alone or control interventions, emphasizing the potential synergistic effects of combining Myofascial Release Techniques with complementary treatments for enhanced therapeutic efficacy in the management of the studied conditions (Table-2, Figure-2).

Table-2 Pooled effect model evaluating the effectiveness of MFRT on plantar fasciitis pain										
Study	N1	N2	Total	SMD	SE	95% CI	t	P	Weight (%)	
									Fixed	Random
Lapa et al. 2022	15	15	30	-1.360	0.396	-2.172 to -0.549			16.11	18.85
Bac et al. 2022	15	15	30	-1.014	0.379	-1.789 to -0.238			17.65	19.51
Tambala et al. 2021	15	15	30	-0.586	0.363	-1.331 to 0.158			19.17	20.09
Rancher et al. 2021	25	25	50	-0.205	0.279	-0.766 to 0.357			32.47	23.42
Helmet et al. 2019	15	15	30	-1.680	0.416	-2.532 to -0.827			14.60	18.13
Total (fixed effects)	85	85	170	-0.822	0.159	-1.136 to -0.508	-5.169	<0.001	100.00	100.00
Total (random effects)	85	85	170	-0.924	0.277	-1.470 to -0.378	-3.343	0.001	100.00	100.00
Test for Heterogeneity										
Q	11.6596									
DF	4									
p-value	P = 0.0201									
I ² (inconsistency)	65.69%									
95% CI for I ²	10.36 to 86.87									

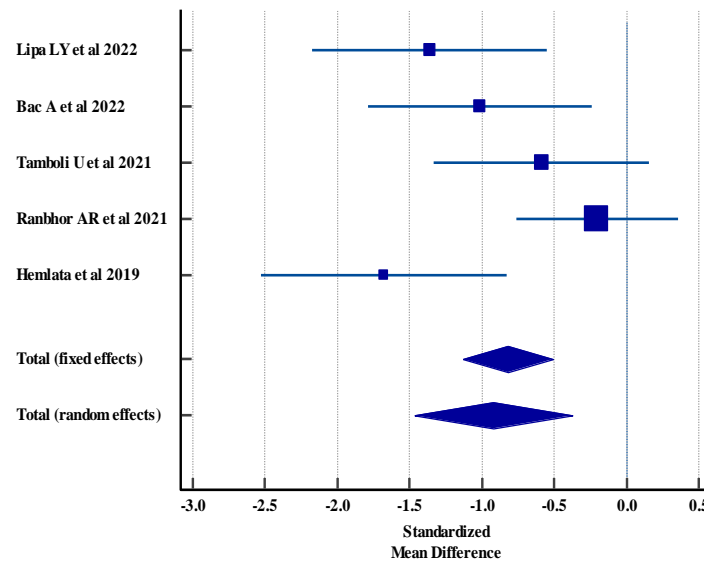


Figure-2 Forest plot on pain

Estimating the Effects of MFRT on Foot Function Index

Four trials were included in the meta-analysis, examining the effect of Myofascial Release (MFR) alone or in conjunction with other therapies on MFR alone, control, or conventional treatments. The analysis comprised a total of 120 individuals. The fixed-effects model revealed a significant overall standardized mean difference (SMD) of -0.896 (95% CI: -1.270 to -0.522, p 0.001) in favor of MFR treatments. The random-effects model validated these findings with an SMD of -0.915 (95% CI: -1.409 to -0.420, p 0.001). The heterogeneity test found substantial inconsistency among the trials ($I^2 = 42.50\%$, $p = 0.1566$), indicating some variation in treatment effects. Despite this, the aggregated data consistently showed that MFR, alone or in combination with other therapies, outperformed MPR or control interventions. These data support Myofascial Release's potential usefulness in improving outcomes for the illnesses evaluated, arguing for its consideration as a viable therapeutic intervention (Table-3, Figure-3).

Table-3 Effects of MFRT on foot functional index

Study	N1	N2	Total	SMD	SE	95% CI	t	P	Weight (%)	
									Fixed	Random
Lipa et al. 2022	15	15	30	-1.666	0.415	-2.516 to -0.815			20.68	22.39
Tamboli et al. 2021	15	15	30	-0.617	0.364	-1.363 to 0.128			26.91	26.13
Hemlata et al. 2019	15	15	30	-0.980	0.377	-1.752 to -0.207			25.08	25.12
Subbiah et al. 2019	15	15	30	-0.509	0.361	-1.249 to 0.231			27.33	26.36
Total (fixed effects)	60	60	120	-0.896	0.189	-1.270 to -0.522	-4.742	<0.001	100.00	100.00
Total (random effects)	60	60	120	-0.915	0.250	-1.409 to -0.420	-3.664	<0.001	100.00	100.00
Test for Heterogeneity										
Q	5.2171									
DF	3									
p-value	P= 0.1566									
I ² (inconsistency)	42.50%									
95% CI for I ²	0.00 to 80.68									

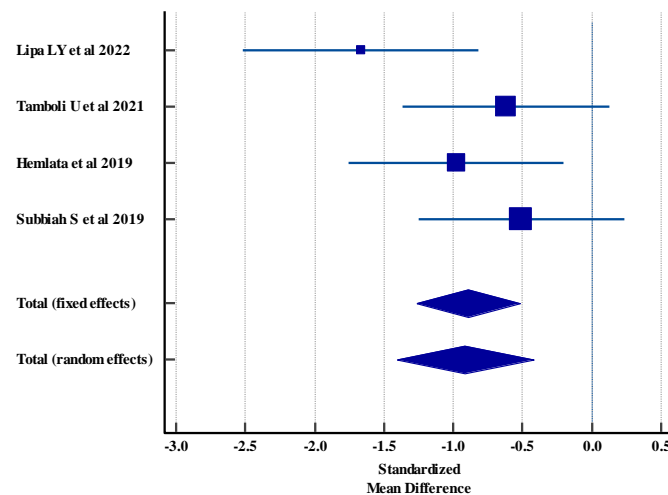


Figure-3 Forest Plot on FFI

Discussion

The findings showed a significant effect in favour of MFRT in conjunction with other therapies versus MRFP alone on pain using the random-effects model supported this with -0.924 SMD (95% of CI: -1.470 to -0.378 , $p = 0.001$). The findings were consistent for the foot function index in which the random effect model showed a significant overall standardized mean difference (SMD) in favour of MFR treatments, with values of -0.896 (95% CI: -1.270 to -0.522 , $p < 0.001$) and -0.915 (95% CI: -1.409 to -0.420 , $p < 0.001$), respectively. In one study conducted by Lipa et al. in 2022 comparing the effects of MFR vs MFR and stretching techniques on VAS and FFI showed that the experimental group exhibited significantly lower values of VAS ($t=4.25$) and FFI ($t=4.53$) compared to the control group, indicating a high level of significance ($p=0.00$). This effect suggests that the combination of stretching and the MFRT is significantly effective in managing plantar fasciitis compared to the MFRT. The study showed that the integrated approach of the MFRT with the stretching technique helps relieve pain and improve functional ability in individuals with plantar fasciitis compared to using only the MFRT¹⁴. Similar results were obtained in the study by Bac et al., who reported the therapeutic effects of myofascial release techniques (MF), exercise programs (E), and their combination (MFE) on individuals with flat feet with relative pain. Results revealed noticeable pain reduction in all intervention groups. Changes

were observed only for specific indicators in the distribution of static foot load tests. In contrast, dynamic tests showed statistically significant changes for indicators, particularly in groups assigned to the treatment protocol. The MF group exhibited the most changes in dynamic testing to assess the entire foot in the support phase, whereas the MFE group showed significant changes in selected subphases¹⁵⁻¹⁶.

The study by Ranbhor et al. aimed to differentiate the effects of rolling foam and stretching on decreasing pain and enhancing ankle ROM in individuals with plantar fasciitis. Both groups demonstrated a statistically significant effectiveness in all outcome measures ($p < 0.001$). In the between-groups analysis, no significant differences were found in VAS, plantar fascia PPT, and WBLT parameters (p -values of 0.171, 0.372, and 0.861, respectively). However, changes were observed in gastrocnemius PPT ($p = 0.029$) and soleus PPT ($p = 0.013$)¹⁷. Another study in 2019 comparing the effects of MFR and stretching exercises on plantar fasciitis indicated that both interventions were effective. However, MFR demonstrated better outcomes than Group B. MFR techniques were suggested to cause vasomotor responses, increase blood flow, enhance lymphatic drainage, realign fascial planes, influence proprioception, alleviate musculoskeletal pain, and restore functional range of motion¹⁸.

Conclusion

This meta-analysis found that MFRT were more beneficial than control therapies in lowering pain and increasing foot function index. The significant pooled effects, as measured by standardized mean differences in pain and foot function index of -0.924 and -0.915, demonstrate the possibility of MFRT as a viable treatment intervention for plantar fasciitis. These findings provide evidence-based insights that support the use of MFRT in treating this common and debilitating foot condition.

Authors Contribution

Mirza WN: Conception, design and data acquisition.

Syed FS: Data acquisition and analysis.

Liaquat FF: Drafting and critical revision.

Declaration of Interest

None.

Funding Sources

None.

References

1. Chen Z, Wu J, Wang X, Wu J, Ren Z. The effects of myofascial release technique for patients with low back pain: A systematic review and meta-analysis. *Complementary therapies in medicine*. 2021 Jun 1;59:102737.
2. Ożóg P, Weber-Rajek M, Radzimińska A, Goch A. Analysis of muscle activity following the application of myofascial release techniques for low-back pain—a randomized-controlled trial. *Journal of Clinical Medicine*. 2021 Sep 7;10(18):4039.
3. Sawali M, Aras D. Influence of myofascial release technique toward changes in pain level among non-specific low back pain patients. In *Journal of Physics: Conference Series* 2020 Apr 1 (Vol. 1529, No. 3, p. 032037). IOP Publishing.
4. Behm DG, Wilke J. Do self-myofascial release devices release myofascia? Rolling mechanisms: a narrative review. *Sports Medicine*. 2019 Aug;49(8):1173-81.
5. Ożóg P, Weber-Rajek M, Radzimińska A, Goch A. Analysis of Postural Stability Following the Application of Myofascial Release Techniques for Low Back Pain—A Randomized-Controlled Trial. *International journal of environmental research and public health*. 2023 Jan 26;20(3):2198.

6. Sulowska-Daszyk I, Skiba A. The influence of self-myofascial release on muscle flexibility in long-distance runners. *International Journal of environmental research and public health*. 2022 Jan 1;19(1):457.
7. Nagore AN, Patil DS, Wadhokar OC. Effect of Myofascial Release Technique Verses Conventional Therapy in Tension Neck Syndrome: A Research Protocol. *Journal of Pharmaceutical Research International*. 2021 Oct 15;33(46A):409-13.
8. Trojian T, Tucker AK. Plantar fasciitis. *American family physician*. 2019 Jun 15;99(12):744-50.
9. Latt LD, Jaffe DE, Tang Y, Taljanovic MS. Evaluation and treatment of chronic plantar fasciitis. *Foot & ankle orthopaedics*. 2020 Feb 5;5(1):2473011419896763.
10. 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 Nov 24;11(12):1287.
11. Rabadi D, Seo S, Wong B, Chung D, Rai V, Agrawal DK. Immunopathogenesis, early Detection, current therapies and prevention of plantar Fasciitis: A concise review. *International Immunopharmacology*. 2022 Sep 1;110:109023.
12. Giordani F, Bernini A, Müller-Ehrenberg H, Stecco C, Masiero S. A global approach for plantar fasciitis with extracorporeal shockwaves treatment. *European Journal of Translational Myology*. 2019 Aug 8;29(3).
13. Minozzi S, Cinquini M, Gianola S, Gonzalez-Lorenzo M, Banzi R. The revised Cochrane risk of bias tool for randomized trials (RoB 2) showed low interrater reliability and challenges in its application. *Journal of clinical epidemiology*. 2020 Oct 1;126:37-44.
14. Lipa LY, Kalita A, Dutta A. A Comparative Study To Find Out The Effectiveness Of Myofascial Release Technique Along With Stretching Versus Myofascial Release Technique In Patients With Plantar Fasciitis.(2022). *Int. J. Life Sci. Pharma Res.*;12(1):L183-193.
15. Bac A, Kaczor S, Pasiut S, Ścisłowska-Czarnecka A, Jankowicz-Szymańska A, Filar-Mierzwa K. The influence of myofascial release on pain and selected indicators of flat foot in adults: a controlled randomized trial. *Scientific reports*. 2022 Jan 26;12(1):1414.

16. Tamboli U, Patil C. Effect of myofascial release with lower limb strengthening on plantar fasciitis. *International Journal of Physical Education, Sports and Health*. 2021;8(1):27-31.
17. Ranbhor AR, Prabhakar AJ, Eapen C. Immediate effect of foam roller on pain and ankle range of motion in patients with plantar fasciitis: A randomized controlled trial. *Hong Kong Physiotherapy Journal*. 2021 Jun 8;41(01):25-33.
18. Hemlata NK, Praveen S, Kumar S, Badoni N. Comparison of The Effectiveness of Myofascial Release Technique and Stretching Exercise on Plantar Fascitis. *Physiotherapy and Occupational Therapy*. 2019 Apr;12(2).
19. Subbiah S. An Impact of Myofascial Release Technique on Management of Planter Fasciities. *Indian Journal of Applied research*.;9.