Original Article

Effects of Matrix Rhythm Therapy (MaRhyThe) in Plantar Fasciitis – An Experimental Study

Varun Naik, Mohit Singh

Department of Cardiovascular Pulmonary Physiotherapy, KAHER Institute of Physiotherapy, Belagavi, Karnataka, India

Abstract

Introduction: Plantar Fasciitis (PF) is common musculoskeletal condition associated with difficulty in performing activities of daily living. The aim of the study is to investigate the effectiveness of single session of Matrix Rhythm Therapy (MaRhyThe) in Plantar Fasciitis.

Methods: It was an experimental study conducted on 17 subjects diagnosed with plantar fascitit in the age group of 18-35 years. One session of MaRhyThe was given to calf and plantar aspect of foot for 45 – 60 minutes. Pre and post intervention outcome was measured in terms of pain using pressure algometer (PPA), local skin temperature using non-contact infrared thermometer (IRT) and functional activities using Foot and Ankle Ability Measures (FAAM) scale.

Results: Pre Post intervention demonstrated statically significance in terms of reduced pain ($P < 0.001$), increased local skin temperature ($P < 0.001$) and improved scores of Foot and Ankle Ability measure ($P < 0.001$).

Conclusion: Single session of MaRhyThe treatment was found to be effective in reduction of pain, improved skin temperature and functional activities in patients with plantar fasciitis.

Keywords: Heel pain, matrix rhythm therapy, plantar fasciitis, physiotherapy, soft tissue release technique

Address for correspondence: Dr. Varun Naik, KAHER Institute of Physiotherapy, Belagavi, Karnataka, India.
E-mail: varunnaik@klekipt.edu.in

INTRODUCTION

Plantar fasciitis (PF) is one of the most common epidemics that is said to cause heel pain; hence, it is also referred as plantar heel pain, which is known to affect approximately 10% of the population once in their lifetime.[1] PF, typically a localized inflammatory condition of the plantar aponeurosis of the foot, is reported to be the most common cause of inferior heel pain. The disorder is not only seen relatively frequently in athletically active individuals and military personnel but also is diagnosed in individuals with sedentary lifestyles.[2] The definition varies as per various literature, however the heel spur syndrome and painful heel syndrome are used interchangeably.[3-5] These terms describe the condition to be a pain at the heel with inflammation at the origin of the plantar fascia and which travels to the extent of course of the fascia.[6]

Patient presenting with PF is diagnosed mainly based on objective and subjective viewpoint such as the history and physical examination of the affected area. General complaint presented by the patient is heel pain during the initial steps in the morning after getting up from bed or

Access this article online

Quick Response Code:

Website: www.ijptr.org

DOI: 10.4103/ijptr.ijptr_4_19

Received: 14-03-2019, **Revised:** 17-08-19,
Accepted: 17-08-2019, **Web Published:** 23-12-2019

How to cite this article: Naik V, Singh M. Effects of matrix rhythm therapy (MaRhyThe) in plantar fasciitis – An experimental study. Indian J Phys Ther Res 2019;1:105-9.

either after prolonged rest. The patient will give a history of a sharp pain which occurs at the origin and extent of the plantar fascia during the palpation procedure. Initial stage of the condition can be diagnosed clinically, and diagnostic imaging procedures are not required. Only in suspected cases of any heel pathologies, ultrasonography and magnetic resonance imaging are required, suggestive of increase and abnormal thickness of the fascia.[7]

There are several treatment approaches available for the condition with different levels of evidence.[8] The conservative treatment plan is directed toward rest and modification of activities of daily living, cryotherapy, analgesics, and stretching of the plantar fascia, which is carried out for a few weeks. If conservative therapy fails to cause any relief of the condition, then along with the conservative approach, other treatment methods can be added as an adjunct to the therapy, for example, modalities such as ultrasound and faradic foot bath; shoe modifications such as soft insoles and night splint; corticosteroid injections; myofascial trigger point therapy;[9] ankle and foot mobilization.[10] As per the literature, 90% of pain relief can be achieved with conservative therapy alone.[7]

Matrix rhythm therapy (MaRhyThe) is invented by Dr. Ulrich Georg Randoll from Germany. It is directly derived from the clinical and fundamental videomicroscopic research of Erlangen University (Dr. Randoll) in the 1990s. It is a treatment tool which helps in activation and balance of the normal physiological vibrations of the skeletal muscles and the nervous system. The tool is said to produce a vibration with a frequency and amplitude spectrum between 8 and 12 Hz that is equal and similar to the normal cells in the human body. The frequency and amplitude between 8 and 12 Hz can be used for therapeutic purpose[11] and has shown to cause improvement in abnormal conditions such as back pain and frozen shoulder.[12]

At the cellular level due to reduced oxygen levels or energy deficiency, muscle fibers get contracted and at times can no longer be helpful, causing variability in motion patterns, hence leading to restriction. This treatment device rebalances the cellular microprocess that causes cellular regeneration and facilitates healing process by microstretching in a rhythmic manner,[13] which helps to improve tissue extensibility and circulation, reduces pain and tissue inflammation, and induces relaxation.[14] This therapy is simple and carries no side effects. Therapy is administered via an electrically powered oscillator (resonator) with an asymmetric treatment head (cam-type) which produces the mechanical oscillations that is generated by magnetic sinusoidal phase-synchronized field, and these oscillations are then supplied by the treatment head to the affected area.[12]

However, there is paucity in literature showing the effects of MaRhyThe in plantar fascitis.[15] Hence, the aim of this study is to investigate the effectiveness of one session of MaRhyThe with respect to pain reduction, performance of activities of daily living, and sports activities.

METHODOLOGY

Design and study setting

The present study was a single group pre-post experimental study design with sample of convenience. The study was endorsed by the Institutional Ethical Committee. The study was conducted at a tertiary care hospital.

Participants

The purpose of the study was explained and written informed consent was obtained from the participants who fulfill the inclusion and exclusion criteria and were recruited in the study. A total of 17 participants with clinical diagnosis of PF were enrolled. Inclusion criteria were: (1) both male and female with age group between 18 and 35 years, (2) subjects with PF more than 1 month, (3) subjects willing to participate in the study, and (4) subjects with sedentary lifestyle. Participants were excluded if they had (1) open wound, (2) rupture of calf muscle, (3) trauma to posterior heel, (4) any diagnosed neurological condition, and (5) deformity of ankle and foot.

Intervention

The subject was made to lie down on the couch in prone position comfortably as instructed by a therapist. The area to be treated (around the heel, ankle and calf muscle) was exposed and talcum powder was applied over treatment area to avoid friction caused by the MaRhyThe probe. The application of MaRhyThe was in longitudinal stroking manner by pushing the probe of the device into the plantar fascia. The area of treatment consisted of the entire plantar fascia, including the ankle joint line and calf muscle. The treatment was concentrated more on tender point to release the tightness and reduce pain. Only one session of 45–60 min was given per subject [Figure 1].

Data collection and outcome measures

Brief demographic data were obtained from the subject before the assessment. Functional scores, pain score, and skin temperature were recorded pre- and immediately post-intervention.

Foot and Ankle ability measure scale (FAAM)

Foot and ankle ability measures scale is a set of questionnaire

Figure 1: Matrix rhythm therapy

of 29 questions, which is divided into two subscales, i.e., 21 questions for activities of daily living and eight questions for sports population.[16] The questionnaire was asked before the treatment session and 2 days after the treatment to know the difference.

Skin temperature

A noncontact infrared thermometer (IRT) is a thermometer which records temperature from a portion of the thermal radiation, sometimes called black-body radiation emitted by the area of skin being measured.[17] The temperature was measured before and immediately after the treatment session over the area of treatment, i.e., plantar aspect of foot, exactly at the tender point where subject has maximum pain.

Pain

Pain pressure algometer (PPA) is used to check the pain pressure threshold.[18] It was applied over the area of maximum pain in the plantar aspect of foot. The algometer showed the readings of pain after the bearable pressure applied. Readings were taken before and after the treatment.

RESULTS

The data was analyzed using paired sample t test for all outcome variables using SPSS software 21.0 version (IBM Corp., Armonk, NY: USA). Mean and standard deviation was calculated for all the variables. Table 1 represents demographic characteristics of the study participants.

Table 2 presents pain pressure threshold scores pre – post intervention which was statistically significant ($P < 0.001$). Statistically significant increase in local skin temperature ($P < 0.001$) and improved scores of Foot and Ankle Ability Measure Scale ($P < 0.001$) were obtained [Tables 3 and 4].

DISCUSSION

The study was conducted to determine the effect of MaRhyThe in participants with PF. The results of the study demonstrated that single session of matrix therapy was effective in treatment of plantar fasciitis in terms of pain relief and improved function.

Table 1: Demographic Characteristics

Age (yrs)	Gender		Height (cms)	Weight (kgs)	BMI (kg/m²)
	Male	Female			
22.94±3.23	6	11	161.94±4.41	71.88±15.18	27.35±5.72

Table 2: Pre - post comparison of Pain Pressure Algometer

Particular	Mean	SD	*t*	*P*
Pre-intervention	8.70	± 1.57	7.410	0.001*
Post - intervention	12.35	± 3.10		

*$P<0.05$

Table 3: Pre - post comparison of Skin Temperature using Infrared Temperature

Particular	Mean	SD	*t*	*P*
Pre-intervention	29.60	± 2.15	9.743	0.001*
Post - intervention	31.60	± 1.78		

*$P<0.05$

Table 4: Pre post comparison of Foot and Ankle Ability Measure Scale Score

Particular	Mean	SD	*t*	*P*
Pre-intervention	83.41	± 23.13	6.019	0.001*
Post - intervention	98.52	± 20.53		

*$P<0.05$

The present study is in consensus with previous studies on prevalence of plantar fasciitis with respect to gender where females are found to be more affected than males.[19,20] There appears to be two distinct population affected by PF, athletes and sedentary individuals with relatively high body mass index (BMI). The association of PF with BMI seems less evident in athletic populations compared to sedentary individuals with a higher BMI. This could be due to increased ankle joint loading in individuals with higher BMI leading to mechanical and inflammatory changes leading to PF.[21] In the present study also, the subjects with plantar fasciitis had higher BMI with mean value of 27.35 ±5.72 which is in accordance with previous studies.[22]

In the present study, the significant reduction in pain could be attributed to the effect of MaRhyThe which acts at cellular level causing tissue elongation and increased flexibility of fascia, allowing free movements of fascia and tendons. This leads to decrease in tightness and reduction of stress on tendons and fascia, thereby causing reduction of pain. To the best of our knowledge there are no published studies on MaRhyThe in different musculoskeletal conditions. Hence, it is difficult to compare

the findings of our study with other studies. However, myofascial release (MFR), a soft tissue release technique commonly used in management of PF produces similar effects on the soft tissues as MaRhyThe. However, the only disadvantage of the technique was the variation in pressure exerted from therapist to therapist which needs clinical expertise. Another drawback is patient–therapist comfort which is less as MFR induces pain during treatment which is not the case in MaRhyThe.[23]

In the present study, an immediate rise in temperature was noted. This could be due to increased blood viscosity and artery diameter that leads to improved microcirculation[14] resulting in increased blood supply, oxygen and exchange of metabolites at the tissue site. This also helps in tissue healing by stimulating fibroblastic activity, thereby improving the function of the soft tissues leading to increased range of motion. Similar effects on tissue healing have been observed in previous study using IASTM on PF.[24]

The effects of MaRhyThe is comparable to Pulsed Electro-Magnetic Field (PEMF) which is an electrotherapeutic modality that works on sinusoidal magnetic field, at a frequency varying between 4 and 12Hz and has been found to be effective in the treatment of osteoarthritis.[25]

Although MaRhyThe works on similar frequency range of 8 to 12 Hz, it has ability for self-adjusting the frequency during treatment which may facilitate faster healing.

The results of the present study cannot be generalized as there was no control group and smaller sample size.

CONCLUSION

Single session of MaRhyThe treatment was found to be effective in reduction of pain, improve local skin temperature and functional activities in patients with plantar fasciitis.

Authors' contribution

First Author: Research Idea, Manuscript Writing, Submission and Supervision.
Second Author: Data Collection and Data Recording.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Uden H, Boesch E, Kumar S. Plantar fasciitis to jab or to support? A systematic review of the current best evidence. J Multidiscip Healthc 2011;4:155-64.
2. Riddle DL, Pulisic M, Pidcoe P, Johnson RE. Risk factors for plantar fasciitis: A matched case-control study. J Bone Joint Surg Am 2003;85:872-7.
3. Lapidus PW, Guidotti FP. Painful heel: Report of 323 patients with 364 painful heels. Clin Orthop Relat Res 1965;39:178-86.
4. Fuller EA. The windlass mechanism of the foot. A mechanical model to explain pathology. J Am Podiatr Med Assoc 2000;90:35-46.
5. DiMarcangelo MT, Yu TC. Diagnostic imaging of heel pain and plantar fasciitis. Clin Podiatr Med Surg 1997;14:281-301.
6. Lemont H, Ammirati KM, Usen N. Plantar fasciitis: A degenerative process (fasciosis) without inflammation. J Am Podiatr Med Assoc 2003;93:234-7.
7. Crawford R. Diagnosis and treatment of plantar fasciitis. Am Fam Physician 2011;84:676-82.
8. Grieve R, Palmer S. Physiotherapy for plantar fasciitis: A UK-wide survey of current practice. Physiotherapy 2017;103:193-200.
9. Renan-Ordine R, Alburquerque-Sendín F, de Souza DP, Cleland JA, Fernández-de-Las-Peñas C. Effectiveness of myofascial trigger point manual therapy combined with a self-stretching protocol for the management of plantar heel pain: A randomized controlled trial. J Orthop Sports Phys Ther 2011;41:43-50.
10. Shashua A, Flechter S, Avidan L, Ofir D, Melayev A, Kalichman L. The effect of additional ankle and midfoot mobilizations on plantar fasciitis: A randomized controlled trial. J Orthop Sports Phys Ther 2015;45:265-72.
11. Bhagwat S. Role of matrix-rhythm-therapy in the treatment of non-traumatic restricted movements of shoulder. In: Annual Conference of Physiotherapy; 2010.
12. Randoll UG, Hennig FF. Coherent rhythms (timing frequencies) in biological systems as a basis for the matrix-rhythm-therapy. In: 2nd European Congress 'Achievements in Space Medicine into Health Care Practice and Industry 2003.
13. Available from: http://www.matrix-center.de/matrix_therapie.htm. [Last accessed on 2012 Mar 03].
14. Matrix Rhythmus Therapie. Available from: http://www.marhythe.in/index.php/aboutmarhyther/the-therapy. [Last accessed on 2010 Apr 14].
15. Taspinar F, Aslan UB, Sabir N, Cavlak U. Implementation of matrix rhythm therapy and conventional massage in young females and comparison of their acute effects on circulation. J Altern Complement Med 2013;19:826-32.
16. McPoil TG, Martin RL, Cornwall MW, Wukich DK, Irrgang JJ, Godges JJ. Heel pain plantar fasciitis. J Orthop Sports Phys Ther 2008;38:A1.
17. Burnham RS, McKinley RS, Vincent DD. Three types of skin-surface thermometers: A comparison of reliability, validity, and responsiveness. Am J Phys Med Rehabil 2006;85:553-8.
18. Reeves JL, Jaeger B, Graff-Radford SB. Reliability of the pressure algometer as a measure of myofascial trigger point sensitivity. Pain 1986;24:313-21.
19. Buchbinder R. Clinical practice. Plantar fasciitis. N Engl J Med 2004;350:2159-66.
20. Pfeffer G, Bacchetti P, Deland J, Lewis A, Anderson R, Davis W,

et al. Comparison of custom and prefabricated orthoses in the initial treatment of proximal plantar fasciitis. Foot Ankle Int 1999;20:214-21.
21. van Leeuwen KD, Rogers J, Winzenberg T, van Middelkoop M. Higher body mass index is associated with plantar fasciopathy/plantar fasciitis: Systematic review and meta-analysis of various clinical and imaging risk factors. Br J Sports Med 2016;50:972-81.
22. Valizadeh MA, Afshar A, Hassani E, Tabrizi A, Rezalo S, Dourandish N. Relationship between anthropometric findings and results of corticosteroid injections treatment in chronic plantar heel pain. Anesth Pain Med 2018;8:e64357.
23. McKenney K, Elder AS, Elder C, Hutchins A. Myofascial release as a treatment for orthopaedic conditions: A systematic review. J Athl Train 2013;48:522-7.
24. Kim J, Sung DJ, Lee J. Therapeutic effectiveness of instrument-assisted soft tissue mobilization for soft tissue injury: Mechanisms and practical application. J Exerc Rehabil 2017;13:12-22.
25. Wuschech H, von Hehn U, Mikus E, Funk RH. Effects of PEMF on patients with osteoarthritis: Results of a prospective, placebo-controlled, double-blind study. Bioelectromagnetics 2015;36:576-85.