ISSN: 0976-3031

Available Online at http://www.recentscientific.com

CODEN: IJRSFP (USA)

International Journal of Recent Scientific Research
Vol. 10, Issue, 06(A), pp. 32683-32688, Jun, 2019

International Journal of Recent Scientific Research

DOI: 10.24327/IJRSR

Research Article

EFFECT OF MATRIX RHYTHM THERAPY VERSUS INTERFERENTIAL CURRENT THERAPY WITH LESSER THERAPY ON PLANTAR HEEL PAIN: A RANDOMIZED CLINICAL TRIAL

Dr. Ketan Bhatikar*

Department of Orthopedic Health Science

DOI: http://dx.doi.org/10.24327/ijrsr.2019.1006.3523

ARTICLE INFO

Article History:
Received 12th March, 2019
Received in revised form 23rd April, 2019
Accepted 7th May, 2019
Published online 28th Jun, 2019

Key Words:

matrix rhythm therapy, Interferential current therapy, LASER therapy, heel pain.

ABSTRACT

Background and Objectives: Heel pain is a highly prevalent problem in most developing and under-developing countries. There are many studies done that show beneficial effects by different manual and physical modalities and therapies yet there is more research to be done on new modalities and therapies that are drug-free andrapid in its effect. The purpose of this study was to evaluate and compare the effect of matrix rhythm therapy with strengthening exercises v/s interferential current therapy with LASER therapy and strengthening exercise.

Methods: 30 Participants between age group 30 to 50 years, experiencing heel pain at least for one-month duration were randomly assigned to receive matrix rhythm therapy v/s IFT and LASER therapy. Strengthening exercises for plantar fascia were the same for both the groups. Intervention for both the groups was given alternatively for 15 sessions at the center by a certified therapist.

Measurement: VAS for the early morning first step pain and stiffness and Planter fasciitis pain/disability scale and revised Foot Function Index.

Results: The pain subscale scores of the Foot Function Index showed significantly better results for the patients managed with the matrix rhythm therapy. Analysis of the response rates to the outcome measures also revealed significant differences with respect to pain, activity limitations, and patient satisfaction, with greater improvement seen in the group managed with the matrix rhythm therapy strengthening exercise.

Conclusion: In the present study both the therapies showed the beneficial effects. However, matrix rhythm therapy was more significant than IFT and LASER therapy.

INTRODUCTION

Plantar heel pain is the most commonly experienced pain under the heel of the foot and sometimes extending up to the medial arch. Pain causes soreness or tenderness of the sole which often radiates from the central part of the heel pad or the medial tubercle of the calcaneus bone that may cause substantial disability and poor health-related quality of life[1,2,3]. There is no exact cause found up to date. Most commonly reported risk factors suggested by most clinical and research expertise include being overweight, prolonged standing, pronated foot posture, having a reduced range of motion in the ankle and first metatarsophalangeal joint and older age. According to a recent study, the most common diagnosis is plantar fasciitis, which leads to medial plantar heel pain with the first weight-bearing steps after rest. Other causes of plantar heel pain include calcaneal stress fractures which progressively worsens pain after an increase in activity or change to a harder walking surface, nerve entrapment or neuroma (pain accompanied by tingling, burning, or numbness), heel pad syndrome (deep, bruise-like pain in the middle of the heel), and plantar warts. Achilles tendinopathy causes posterior heel pain or pain localized to the insertion site of the affected tendon. Tarsal tunnel syndrome, Haglund deformity are other common causes for heel pain[4]. A recent study was done to see the changes in women using high heels whichsuggested that changing from flat footwear to high heels induces chronic muscle shortening associated with discomfort, reduced shock absorption, fatigue, and increased risk of imbalance and fall leading to ankle and other serious injuries. The study also suggested that in chronic adaptation to any functional movement by muscles gradually adjust to its new functional length by a chronic loss of sarcomeres in series that may lead to further complications of that joint like reducingjoint freedom of movement[5]. This also holds true in other conditions like sudden overweight, prolonged standing, paralysis, muscular atrophy, and muscular dystrophy etc. About 118 out of 200 patients have heel pain of which 60% are infemales. The most common age group seems to be between40 to 50 years[6,7,8,9].

Corresponding author:* **Dr. Ketan Bhatikar
Department of Orthopedic Health Science

Heel pain is a very common problem in most of the working group and affects the daily living of the person. Psychologically long-term heel pain can cause depression, anxiety and stress and have been shown to affect pain and disability[10]. Many studies have shown significant results in treatment with heel pain. Injections, insoles, heel pads, strapping, taping and surgery have been common forms of treatment offered. Other physical treatments may consider as therapies that include the use of electromedical devices delivering heat, electricity, magnetic fields, shockwave therapy; dry needling therapies, acupuncture[11,12,13,14].

According to Dr. Randoll Matrix-Rhythm-Therapy is a method to maintain the body's good health (prevention) and to support the healing of muscular-skeletal problems, post-operatively as well as rehabilitative. Normal cells are rhythmically vibrating between 8-12 Hz. When any cell is injured or suffering any injury its oscillations decreases leading to obstruction in the healing process. Matrix-Rhythm-Therapy is known to delivers physiological rhythmic oscillations between 8-12 Hz that Synchronizes with internal body rhythm and helps in the healing process at microcellular level[15,16].

Laser therapy uses light to penetrate the skinandinto tissues. It has been shown to aid in pain relief, stimulates wound healing, reduces inflammation, increases blood flow, reduces scarring, and stimulate tissue regeneration. Many types of research have proved that laser therapy can be a powerful anti-inflammatory that is equally effective in anti-inflammatory medications[17,18,19].

Interferential current therapy is an effective therapy option used in combination with other therapies in physiotherapy treatment. The Interferential Current device transmits electrical impulses in minute quantities through the skin to underlying tissue and nerves that stimulatesthe healing properties. Frequencies produced by the IFC have been proven to stimulate endorphins, the body's natural painkillers that help to create a self-healing process without the need for medications. This form of therapy is useful in reducing pain, inflammation, curing edema, and spasms[20,21].

Therefore, the hypothesis to be tested in the present study was to evaluate the effect of Matrix-Rhythm-Therapy in the treatment of heel pain and to promote healing. Two groups of the same group matched subjects were tested – Group A with Matrix-Rhythm-Therapy followed by exercise therapy and Group B with interferential therapy along with LASSER and exercise therapy.

METHODS

Study design: the present study was a randomized clinical trial that studied the effect of Matrix-Rhythm-Therapy followed by exercise therapy and interferential therapy along with LASSER and exercise therapy. Approval for the project was obtained from the head of Dr. K.B. SPARC Research management. Written consent was obtained prior to the study participants. Participants after their enrollment were randomly allocated to either (1) Group A receiving Matrix-Rhythm-Therapy followed by exercise therapy or (2) Group B receiving interferential therapy along with LASER and exercise therapy.

Participant: participants of either gender with non-specific heel pain were recruited from Dr. K.B SPARC centers in Ponda and Margao Goa. Participants were assigned into groupsif they were suitable according to the inclusion criteria: 1) participants of both sex with the age group of 30 to 50 years. 2) Plantar fasciitis as a cause of heel pain having tenderness at the origin of the plantar fascia. 3) Heel pain greater than or equal to 3 on a 1–10 VAS scale. Participants were excluded from the study statistics on the following exclusion criteria. Exclusion criteria: 1) having any history of fracture or surgery in ankle and foot. 2) Any muscle stress or strain injury. 3) Any metabolic or connective disorders or associated disorders that interfere with the treatment protocol.

32 participates were evaluated by the clinic where 28 participants were included in the inclusion and exclusion criteria and randomly allocated to both the groups (Flowchart1).

Primary outcome: In the present study we evaluated the first step pain in the morning experienced by the patients. First step pain was recorded by using Visual Analog Scale[22]. We also considered Planter fasciitis pain/disability scale as our primary evaluating outcome measure. Plantar fasciitis pain/disability scale evaluates two components; one for the pain severity and impact on functional abilities, due to Plantar Fasciitis. Studies also demonstrated that PFPS is effective in differentiating between PF patient's v/s patients with other pathologies causing heel pain. PFPS shows higher the score the worse is the condition[23,24].

Secondary outcome: In the present study we used revised foot functional index (RFFI) which is a self-administered questionnaire and can be used to evaluate the extent of foot pain and stiffness, the effect on daily food-related activities, and the quality of life. Test-retest reliability of the FFI total and subscale scores range from 0.87 to 0.69, while internal consistency ranged from 0.96 to 0.73. Original FFI contains 23 items were revised extensive version (FFI-R) contains 68 items.[25,26]In 2006, the FFI was on the basis of criticisms from researchers and clinicians. It contains 4 subscales and 68 items. Both the FFI short and long from demonstrated good psychometric properties.

Procedure

After inform consent was signed by all the subjects, patients were randomly allocated in two groups, namely group A and Group B. Before starting of the study,subjects were explained the procedure and benefits of the study. Also were advised not to be on any medication that interferes with the result and effect of the undergoing study. Subject's pre-session records were maintained. In Group A subjects were treated with Interferential current therapy followed by LASER and strengthening exercises. In Group B patient was treated with 45 minutes of matrix rhythm therapy followed by conventional strengthening exercises. At the end of the 15 sessions, post-session measures were recorded and detailed statistical evaluation was done. Strengthening exercise for both the groups were started 3rd session onwards. 1) plantar-specific stretching and calf stretching 2) resisted plantar and calf musculature exercises with therabend and Foot gym 3) on toes treadmill walking for 15 minutes.

Fig 1 Treatment modalities used in Group A and Group B for treating Heel Pain

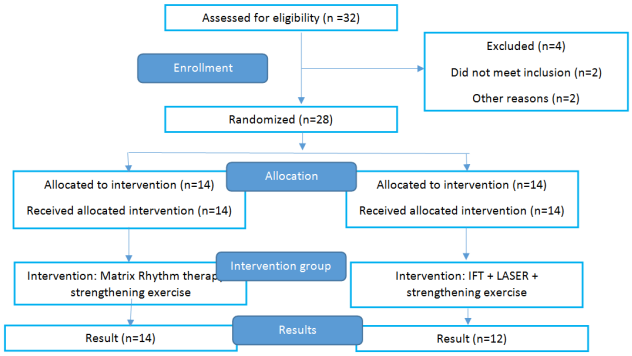

Fig 2 Patient distribution flow chart

RESULTS

Baseline demographic data of both the groups were randomly done and were in an equal margin. Participants were primarily middle-aged (mean 40 years; SD ± 10) and female 60%.

Intergroup pre value of both groups (fig 3) was recorded for Planter fasciitis pain/disability scale. Intragroup pre and post values of group A and Group B were also statistically calculated and presented in the line graph (fig 3).

Revised Foot Function index was measured Intra group pre and post values of group A (Table 1) and Group B (Table 2) were also statistically calculated and presented. Intergroup comparison was also calculated in table 3 & 4.

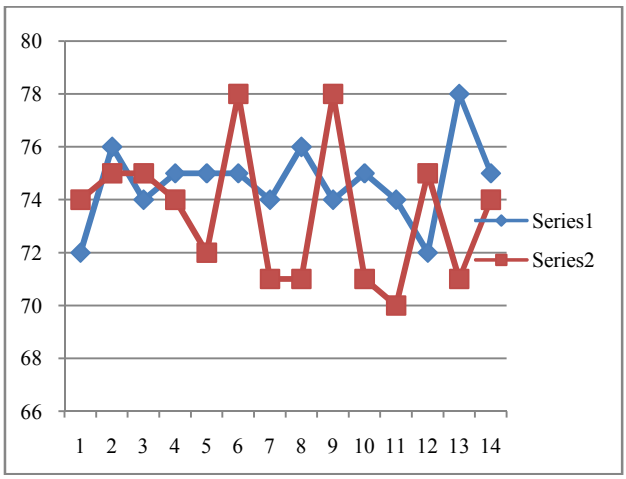

Figure 3 pre group A & B result of Plantar Fasciitis Pain disability index

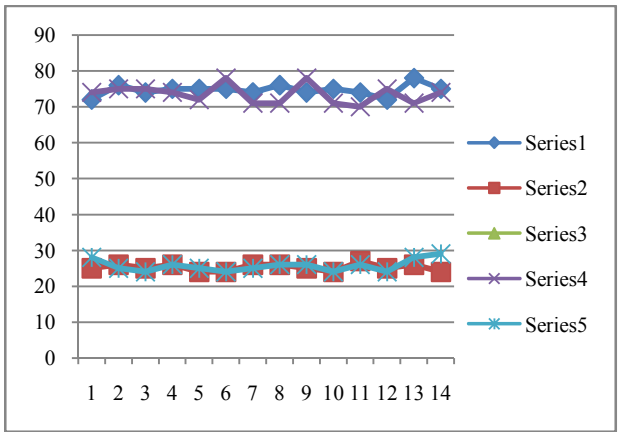

Figure 4 pre and post result of Plantar Fasciitis Pain disability index

DISCUSSION

Heel pain is the most common musculoskeletal pain any person experienced in his lifetime[27], yet its etiology is poorly understood. There are many different physiotherapies or physical therapy related treatment for heel pain or plantar fasciitis[28,29,30]. The purpose of this study was to examine effect of Matrix-Rhythm-Therapy for the treatment of heel pain and to promote healing. In the present study effect of Matrix-Rhythm-Therapy was compared with the most commonly used conventional therapy that is with Interferential current therapy followed by LASER and strengthening exercises.

The results demonstrate that Matrix-Rhythm-Therapy produces a statistically significant beneficial effect on 'first-step' pain compared with other conventional treatment. One reason for this trial found a statistically significant improvement in 'first-step' pain with Matrix-Rhythm-Therapy could be due to it being the symptom of plantar heel pain that is first notable to patients[31]. Matrix Rhythm Therapy is a new encroachment which uses the concept of vibromassage to restores the good tissue resonance. The lifting action produced by the oscillator as a horizontal micro extension movement is transferred to the inner organs, tissues, and bones that allow the cell metabolism of the tissue to be reactivated with depth-effective rhythmical micro-extensions. Further, the contracted areas of the musculature at inductively relaxed (circulation > oxygen > ATP > dissolution of the tension)[32]. Another reason patient responded to first step pain reduction could be due to increased ankle dorsiflexion, calf endurance and relived occupational lower limb stresses are the likely causes of the heel pain.

A study was done to evaluate the effect of massage and matrix rhythm therapy in young women on the peripheral blood circulation. In this study Matrix, rhythm therapy was applied to the left lower extremity for a single 30-minute session. The popliteal and the posterior tibial arteries were measured with color Doppler ultrasonography by the radiologist. Results concluded that matrix rhythm therapy caused a more prominent increase in the amount of blood flow in the popliteal and in the posterior tibial artery than did massage[33].

Table 1 Intra group pre and post values of group A

Treatment	Anlysis	Mean	Standard deviation	Mean diff	Sd diff	% of change	Z test	P test
Pain	Before	37.07	1.92	21.6	5.05	31.21	0.96	5.19
	After	25.5	16.25					
Stiffness	Before	27.5	1.82	-2	4.52	-7.27	1	0.13
	After	29.5	16.25					
Difficulty	Before	76.07	1.35	48.64	4.11	63.94	5.5	1.42
	After	27.42	10.67					
Activity	Before	30.07	1.35	13.86	4.11	46.08	0.55	0.6
	After	16.21	9.3					
Social	Before	58.71	21.41	63.24	2.14	108.011	0	0.4
	After	23.78	4.86					

Table 2 Inter group pre and post values of group B

Treatment	Anlysis	Mean	Standard deviation	Mean diff	Sd diff	% of change	Z test	P test
Pain	Before	37.5	2.68	-8.93	7.63	-12.76	1	0.017
	After	39.5	16.25					
Stiffness	Before	30.11	4.84	-0.79	4.61	0	1	0.419
	After	43.5	16.25					
Difficulty	Before	76.21	1.6	-19.47	52.5	0	0.99	0.048
	After	33.1	6.39					
Activity	Before	29.71	2.92	29	52.11	97.59	0.14	0.018
	After	14.71	1.06					
Social	Before	63.21	2.31	122.38	219.51	193.6	0.03	0.46
	After	25.21	1.45					

Table 3 Pre Intra group correlation between group A and B

Treatment	Anlysis	Mean	Standard deviation	Mean diff	Sd diff	% of change	Z test	P test
Pain	Before	37.07	26.9	-0.8	1.99	-5.64	1	7.12
	Before	37.5	1.92					
Stiffness	Before	27.5	1.82	-0.64	1.74	-2.14	1	0.48
	Before	30.1	4.83					
Difficulty	Before	76.07	1.35	-0.14	1.96	-0.24	1	0
	Before	76.21	1.6					
Activity	Before	30.07	1.35	0.36	2.17	0.56	1	5.74
	Before	29.71	2.91					
Social	Before	58.71	21.41	0	1.75	0	1	0.09
	Before	63.21	2.31					

Table 4 Post Intra group correlation between group A and B

Treatment	Anlysis	Mean	Standard deviation	Mean diff	Sd diff	% of change	Z test	P test
Pain	After	25.5	16.25	78.43	133.58	98.01	0.04	0.03
	After	39.5	16.25					
Stiffness	After	29.5	16.25	-18.64	115.47	-22.58	0.85	0.18
	After	43.5	16.25					
Difficulty	After	27.43	10.67	-7.21	13.51	-11.22	1	0.03
	After	33.1	6.38					
Activity	After	16.21	9.31	2.71	6.31	10.19	1	0.03
	After	14.71	1.06					
Social	After	23.79	4.86	0.64	2.06	1.42	1	0.04
	After	25.21	1.45					

Strengthening exercise after the matrix rhythm therapy showed significant improvement in maintaining the intrinsic foot musculature strength and further increasing the foot and ankle function. A study was done to evaluate the literature investigating strength training interventions in the treatment of plantar fasciitis and improving intrinsic foot musculature strength supported the present study. In the literature review, the study stated that the foot exercises, toe flexion against resistance and minimalist running shoes may contribute to improved intrinsic foot musculature function. It also aids in a reduction of pain and improvements in function[34]. Another study aimed to investigate High-load strength training consisted of unilateral heel raises with a towel inserted under the toes was conducted with a primary outcome as the foot function index (FFI) at 3 months. Purpose of this case series was to describe physical therapist decision-making of

Limitations

The findings of this trial need to be viewed in light of some limitations. "Firstly the study subjects were taken from a limited source and secondly tracking of the therapeutic effect was not done for the longer duration, hence limited to mention about the period of lasting effect.

CONCLUSION

The patients improved with both treatment strategies; however, Matrix-Rhythm-Therapy with strengthening exercise was found to be superior then Interferential current therapy and LASER with strengthening exercises for first step pain, physical health, and satisfaction of the patients.

Ethical Approval: not applicable. Written patient consent to publication of their case history was obtained with the permission of head of SPARC management.

Acknowledgement

The authors would like to thank Mr.Likhil Kavalekar for his assistance in detailed statistical recording and data filtering.

Footnotes

The author(s) declare that they have no competing interests.

Reference

1. Landorf KB. Plantar heel pain and plantar fasciitis. BMJ clinical evidence. 2015;2015.
2. www.mychiropodist.com.
3. M. DeMaio, R. Paine, R.E. Mangine, *et al.* Plantar fasciitis Orthopedics, 16 (1993), pp. 1153-1163
4. Tu P. Heel Pain: Diagnosis and Management. American family physician. 2018 Jan 15;97(2).
5. Zöllner AM, Pok JM, McWalter EJ, Gold GE, Kuhl E. On high heels and short muscles: A multiscale model for sarcomere loss in the gastrocnemius muscle. *Journal of theoretical biology*. 2015 Jan 21;365:301-10.
6. Lourdes RK, Ram GG. Incidence of calcaneal spur in Indian population with heel pain. *International Journal of Research in Orthopaedics*. 2016 Sep 3;2(3):174-6.
7. Thomas MJ, Roddy E, Zhang W, Menz HB, Hannan MT, Peat GM. The population prevalence of foot and ankle pain in middle and old age: a systematic review. Pain. 2011 Dec 1;152(12):2870-80.
8. Chatterton BD, Muller S, Roddy E. Epidemiology of Posterior Heel Pain in the General Population: Cross-Sectional Findings From the Clinical Assessment Study of the Foot. Arthritis care & research. 2015 Jul;67(7):996-1003.
9. Sullivan J, Burns J, Adams R, Pappas E, Crosbie J. Plantar heel pain and foot loading during normal walking. Gait & posture. 2015 Feb 1;41(2):688-93.
10. Jensen, M. P., Moore, M. R., Bockow, T. B., Ehde, D. M., Engel, J. M., & Otr, L. (2012). Psychosocial factors and adjustment to chronic pain in persons with physical disabilities. *A systematic review*, **92**(1), 146–160.
11. Rogers JA, Wilson A, Laslett LL, Winzenberg TM. Physical interventions (orthoses, splints, exercise and manual therapy) for treating plantar heel pain. The Cochrane Library. 2016 Aug 16.
12. Rompe JD, Furia J, Cacchio A, Schmitz C, Maffulli N. Radial shock wave treatment alone is less efficient than radial shock wave treatment combined with tissue-specific plantar fascia-stretching in patients with chronic plantar heel pain. *International Journal of Surgery*. 2015 Dec 1;24:135-42.
13. Fischell SR, Fischell RE, inventors; Zygood LLC, assignee. Three-coil magnetic pulsations system for the treatment of foot pain. United States patent US 9,849,302. 2017 Dec 26.
14. Cotchett MP, Munteanu SE, Landorf KB. Effectiveness of trigger point dry needling for plantar heel pain: a randomized controlled trial. Physical therapy. 2014 Aug 1;94(8):1083-94.
15. http://marhythe.in/
16. https://www.dr-randoll-institut.de/en/so-wirkt-die-matrix-rhythmus-therapie-marhythe/
17. https://www.treloarphysio.com/blog/articles/physiotherapyarticles/lasertherapy/
18. Tunnel C. About Low Level Laser Therapy.
19. Enwemeka CS, Parker JC, Dowdy DS, Harkness EE, Harkness LE, Woodruff LD. The efficacy of low-power lasers in tissue repair and pain control: a meta-analysis study. Photomedicine and Laser Therapy. 2004 Aug 1;22(4):323-9.
20. https://www.pthealth.ca/service/interferential-current-therapy/#
21. Johnson BG, Rhodes DA, inventors; Alan Neuromedical Tech LLC, Dynatronics Corp, assignee. Interferential current treatment apparatus. United States patent US 6,826,429. 2004 Nov 30.
22. Razzano C, Carbone S, Mangone M, Iannotta MR, Battaglia A, Santilli V. Treatment of Chronic Plantar Fasciitis with Noninvasive Interactive Neurostimulation: A Prospective Randomized Controlled Study. *The Journal of Foot and Ankle Surgery*. 2017 Jul 1;56(4):768-72.
23. PFPDScale… Willis B, Lopez A, Perez A, Sheridan L, Kalish S. Pain scale for plantar fasciitis. *Foot & Ankle Online Journal*. 2009.
24. Ratna ST, Dowle P, Prasad VB, Paruchuri RK. Effect of kinesio taping in adjunct to conventional therapy in reducing pain and improving functional ability in individuals with plantar fasciitis a randomized controlled trial. I*nternational Journal of Physiotherapy*. 2015 Jan 1;2(4):587-93.
25. Budiman-Mak, E., Conrad, K. J., & Roach, K. E. (1991). The Foot Function Index: A measure of foot pain and disability. *Journal of Clinical Epidemiology, 44*, 561–570.
26. Budiman-Mak, E., Conrad, K., Stuck, R., & Matters, M. (2006). Theoretical model and Rasch analysis to develop a revised Foot Function Index. *Foot & Ankle International, 27*, 519–527.
27. Radford JA, Landorf KB, Buchbinder R, Cook C. Effectiveness of low-Dye taping for the short-term treatment of plantar heel pain: a randomised trial. BMC musculoskeletal disorders. 2006 Dec;7(1):64.
28. Digiovanni BF, Nawoczenski DA, Lintal ME, Moore EA, Murray JC, Wilding GE, Baumhauer JF. Tissue-specific plantar fascia-stretching exercise enhances outcomes in patients with chronic heel pain: a prospective, randomized study. JBJS. 2003 Jul 1;85(7):1270-7.
29. Hoskins W, McHardy A, Pollard H, Windsham R, Onley R. Chiropractic treatment of lower extremity conditions: a literature review. Journal of manipulative and physiological therapeutics. 2006 Oct 1;29(8):658-71.
30. Johnson BG, Rhodes DA, inventors; Alan Neuromedical Tech LLC, Dynatronics Corp, assignee. Interferential current treatment apparatus. United States patent US 6,826,429. 2004 Nov 30.
31. Taspinar F, Aslan UB, Sabir N, Cavlak U. Implementation of Matrix Rhythmus Therapie and conventional massage in young females and comparison of their acute effects on circulation. *The Journal of*

Alternative and Complementary Medicine. 2013; 19(10):826-32.

32. Ulrich G Randoll, Friedrich F Henning. Cell biological basics, theory and practice; pt_zeitschrift fur physiotherapeuten 2009, 6(61).
33. 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. *The Journal of Alternative and Complementary Medicine*. 2013 Oct 1;19(10):826-32.
34. Huffer D, Hing W, Newton R, Clair M. Strength training for plantar fasciitis and the intrinsic foot musculature: A systematic review. Physical Therapy in Sport. 2017 Mar 1;24:44-52.
35. Rathleff MS, Mølgaard CM, Fredberg U, Kaalund S, Andersen KB, Jensen TT, Aaskov S, Olesen JL. High-load strength training improves outcome in patients with plantar fasciitis: A randomized controlled trial with 12-month follow-up. *Scandinavian journal of medicine & science in sports*. 2015 Jun;25(3):e292-300.

How to cite this article:

Dr. Ketan Bhatikar., 2019, Effect of Matrix Rhythm Therapy Versus Interferential Current Therapy with Lesser Therapy on Plantar Heel Pain: A Randomized Clinical Trial. *Int J Recent Sci Res.* 10(06), pp.32683-32688.
DOI: http://dx.doi.org/10.24327/ijrsr.2019.1006.3523

****