Original Article

Comparison of Primal Reflex Release Technique and Positional Release Therapy on Pain, Functional Ability and Ankle Range in patients with Plantar Fasciitis: An Experimental Study

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Abstract

Background: Plantar fasciitis (PF) is characterized by inflammation, fibrosis and structural deterioration of foot and there is pain over heel and plantar fascia. Plantar fasciitis pain is gradualin on set, sharp and diffusely located initially which later localizes to medialcal caneal tuberosity. Typically, pain ıs most severe in the morning which lessens with movement but intensifies with long-standing weight bearing. Plantar fasciitis has been experienced by 10% of the non-athletic population and most typically observed in weight-bearing activities. So, the aim was to study the effects of primal reflex release technique and positional release therapy on pain, functional ability and ankle range in patients with plantar fasciitis.

Method: Total 36 patients were recruited for the study as per the selection criteria and were divided into two groups (18 in each group). Group A was treated with primal reflex release technique (PRRT) along with conventional therapy and Group B was treated with positional release therapy (PRT) along with conventional therapy for 7 consecutive days. Intergroup analysis by independent t-test showed statistically significant improvement in pain and functional ability (P value ≤ 0.001).

Conclusion: Primal reflex release technique along with conventional therapy was found to be more predominant in improving pain and functional ability than positional release therapy along with conventional therapy. Also, Primal reflex release tech-nique along with conventional therapy and positional release therapy along with conventional therapy were equally effective in improving ankle range of motion.

Keywords: Primal Reflex Release Technique, Positional Release Therapy, Foot Function Index, Weight Bearing Lunge Test

Introduction

The fascia in the foot is made up of fibrous connective tissue that separates, supports, and attach muscles. It can be separated into the deep fascia and the superficial fascia. The superficial fascia on the plantar side is thick and has many fat-filled septations that act as a cushion for the foot.[1]

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The deep fascia on the dorsal side is thin and continues laterally and posteriorly to join the deep fascia onthe plantar side, which is known as the plantar fascia. The plantar aponeurosis is made up of the central portion of the plantar fascia; it begins proximally at the calcaneum and extends distally into five distinct bands that become the digital sheaths.[2]

The "windlass mechanism" is a well-known mechanical model to depict the plantar fascia's critical role in providing dynamic support to the foot during weight-bearing activi-ties.[3,4]This mechanism creates tension in plantar fascia as well as tension in several intrinsic and extrinsic toe muscles as the toes extend during terminal stance and preswing.[5]

Plantar fasciitis (PF) is characterized by inflammation, fibrosis and structural deterioration of foot and there is pain over heel and plantar fascia.[6]It is the result of degenerative irritation of the plantar fascia origin at the medial calcane-al tuberosity of heel as well as the surrounding perifascial structures.[7-9] The most common causes are overuse activi-ties or poor biomechanics, resulting in abnormal function-al pronation. A stiff subtalar joint or functional leg length inequality, obesity, training errors, improper foot wear and occupation requiring prolonged standing are risk factors of plantar fasciitis.[10]

PF pain is gradual in onset, sharp and diffusely locat-ed initially which later localizes to medial calcaneal tuberosity. Typically, pain is most severe inthe morning which lessens with movement but intensifies with long-standing weight bearing.[11,12]Primary symptoms include: description of throbbing, piercing or stabbing pain; inferior heel pain when bearing weight; pain that improves after brief activ-ity but worsens with prolonged activity.[13,14] The primary physical finding is tenderness on palpation at the medial calcaneal tuberosity, while some researchers suggest lim-itations in dorsiflexion and decrease in strength of intrinsic and extrinsic muscles present in individuals with PF.[15,16]

Primal reflex release technique is a therapeutic maneuver that falls under the regional interdependent approach to patient care and involves down regulating an overstimulated autonomic nervous system to minimize pain patterns.[17] By resetting over-aroused primal responses within the body, the paradigm is intended to treat the neurological system.[18] To block painful locations, the treatment requires repeatedly inducing deep tendon reflexes (DTR) that stim-ulate the skin. There is a five-step procedure for diagnosing and treating plantar fasciitis. The procedure includes neuro-muscular "resetting"of five locations, including the sacro-iliac joint (through the hip adductors), hamstring muscles, triceps surae complex, peroneal tendons and toe flexors.[19]

Positional release therapy is an osteopathic manual approach that aims to increase muscle flexibility by keeping the muscle in a shortened position to encourage relaxation rather than stretching or lengthening it. According to Wynn et al., PRT is an indirect myofascial approach with regard to tissue resistance that makes use of body alignment, the use of tender points to locate the issue, and monitoring of the therapeutic intervention. This mechanism is thought to result from spindle resetting and reducing in nociceptive impulses.[20]

Materials and Method

Study design:An Experimental study
Study population: Patients with plantar fasciitis
Study setting :Physiotherapy OPD sin Vadodaracity
Study period: 1 week (7 consecutive sessions)
Study duration:7 months (November 2023 –May 2024)
Sampling method: Convenient sampling method Sample size: 36 patients

The sample size was calculated by using Gpower software version 3.1.9.7. The main outcome variable taken into consideration for sample size calculation was foot function index. From the previous study conducted by Jadhav Adi-tietalin 2023"Comparative effectiveness of Gua Sha, Cryo stretch and positional release technique on tenderness and function with plantar fasciitis," the value for outcome vari-ables were (59.67 ± 5.94, 60.42 ± 6.08,7.36±1.03).Keep-ing the values of α error as 0.05(95% confidence interval) and β error as 0.2 (power of the study 80%), the calculated sample size was 36 (18 in each group) Inclusion criteria:

- Age: 40 to 60 Years[21]
- Gender:Both male and female
- Pain or tenderness in the medialarch of plantar fascia at the medial tubercle of calcaneum for more than 6 months
- Windlass test positive
- Patients willing to participate in the study Exclusion criteria:
- Pain or tenderness along lateral border of foot
- History of recent fractures around leg, ankle and foot
- Any lower extremity surgery
- Congenital foot deformities
- Infective skin conditions
- Impaired sensations around leg,ankle and foot
- Open wounds around leg, ankle and foot
- Patients who had taken cortico steroid injection in the heel preceding 3 months
- Any neurological and cardio vascular conditions which affected the out come measures and treatment protocol of the study

Materials used:

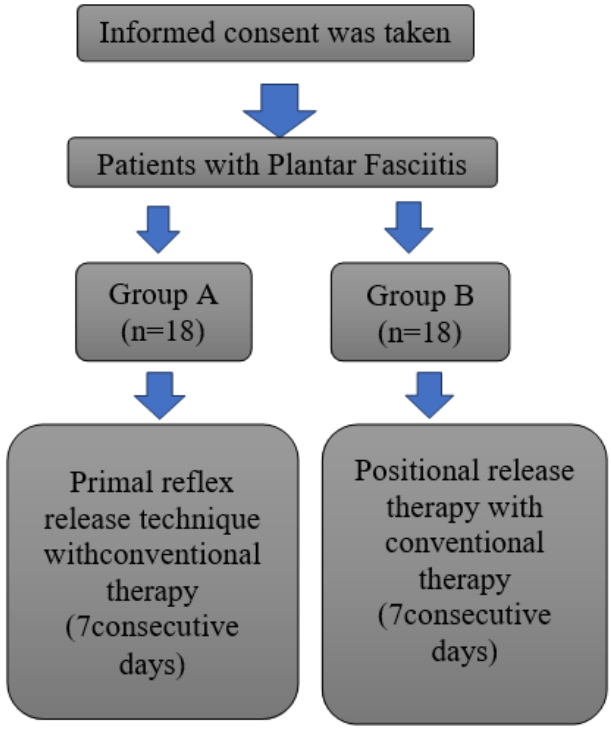
- Consent form
- Measure-tape
- Examination table
- Pen,pencil
- Cotton tipped applicators
- Table or stool
- Stop watch
- Foot function index (FFI)scale

Figure1: Materials used

Outcomes measures:

1. Foot function index (FFI): [ICC=0.96-0.73]
   It is a self-administered tool consisting of 23 items grouped into three sub-scales. The sub-scales were formed to provide information on three unique aspects of function-foot pain, dis-ability and activity limitation-as they are related to foot pathology.Any item which is marked as not applicable is excluded from the total possible. Higher scores indicating greater impairment.[22]
2. Weight bearing lunge test(WBLT): [ICC=0.93-0.99][23]
   Patient is in a standing position facing a wall with the test foot parallel with a tape measure secured to the floor with the second toe, center of the heel, and knee perpendicular to a wall, in order to make contact between the anterior knee andthe wall while keeping the heel firmly planted on the floor.They are instructed to conduct a lunge while holding this position.24 Every 1 cm away from the wall is equivalent to approximately 3.6 of ankle/subtalar dorsiflexion. Maximum lunge distance is definedas the distance of the great toe from thewall based on the farthest distance the foot is able to be placed without the heel lifting from the ground.

Figure2: Weight bearing lunge test



Group A:(Primal reflex release technique+ Conventional therapy)

The PRRT treatment involves five sequential steps target-ing specific areas for deep tendon reflex stimulation. The first step focuses on the above and below medial knee,second location was at the peroneal tendons with the patient holding the foot in eversion. The third and fourth steps in-volve releasing tension in the gastrocnemius and hamstring muscles through specific stimulation at patellar tendon and tibialis anterior and patellar tendon and hamstring muscle belly locations respectively. The final step includes a sus-tained maximal plantar flexion of the ankle with to e-gripping two cotton tipped applicators. Patients are instructed to maintain these positions even if cramping occurs, with the entire treatment lasting no more than five minutes.

Group B:(Positional release therapy+Conventional thera-py)

Patients were made to lie in supine with the affected limb off the plinth as the therapist applied firm pressure along the aponeurosis. Tender points were identified and gently pressed with fingertip pressure. The foot was then posi-tioned in complete plantar flexion, adjusted until a 70% reduction in tenderness was achieved, and held for 90 sec-onds with three repetitions.

Figure3:Positional Release Therapy

Conventional therapy:

- Ankle dorsiflexion exercise (10 repetitions,2sets)
- Ankle plantar flexion exercise(10 repetitions, 2sets)
- Standing calf stretch (30 seconds,3 repetitions)
- Curb/stair stretch (30seconds,3 repetitions)

Results and Discussion

Data was analysed by IBM SPSS 26 software and Microsoft Excel 2019. Prior to the statistical analysis test, data was screened for normal distribution by Shapiro-Wilk test. According to normality test, tests were applied for within group (ANOVA and Kruskal Wallis test) and between group (Independent t test and Mann Whitney U-test) analysis.

Table1:Base line data

GROUPS	**PRRT**	**PRT**
NO.OF PATIENTS	18	18
AGE	**MEAN±SD**	**MEAN±SD**
	48.16±4.6	49.05±5.5
GENDER	FEMALE:12	FEMALE:16
	MALE:06	MALE:02

Table2:Results of PRRTand PRT (Between group A and B)

OUTCOMEMEASURES		**PRRT (MEAN±SD)**	**PRT (MEAN±SD)**	**U/t VALUE**	**P - VALUE**	**REMARKS**
FFI%	1ST week	49.80±10.5	38.42±8.06	3.63	<0.001	Significant
	2ND week	48.98± 10.35	36.57±7.83	4.05	<0.001	Significant
	4TH week	46.36± 10.20	34.92±7.57	3.81	<0.001	Significant
WBLT	RT 1ST week	5.60±2.82	4.80±2.46	-0.974	0.331	Notsignificant
	LT 1ST week	5.0±3.05	4.0±2.7	-1.197	0.231	Notsignificant
	RT2ND week	5.6±2.82	4.8±2.46	-0.974	0.332	Notsignificant
	LT2ND week	5.0±3.05	4.0±2.73	-1.197	0.231	Notsignificant
	RT4TH week	5.4±2.82	4.4±2.63	-1.080	0.281	Notsignificant
	LT4TH week	4.4±3.60	3.6±2.76	-0.875	0.381	Notsignificant

Here, the absolute difference was measured by Unpaired t-test for FFI and Mann Whitney U- test for WBLT (right and left).As shown in the figures 4 and 5, it showed statis-tically significant difference in FFI. But, for WBLT (right and left), it showed no statistically significant difference.

Hence, PRRT along with conventional therapy was found to be more predominant in improving pain and func-tional ability (FFI) than PRT along with conventional ther-apy. Also, PRRT along with conventional therapy and PRT along with conventional therapy were equally effective in improving ankle range of motion.

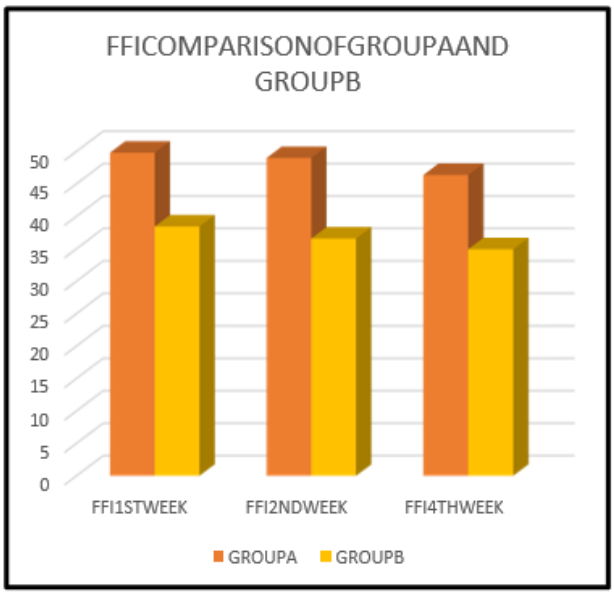


Figure 4:FFI-Mean difference between Group A and Group B

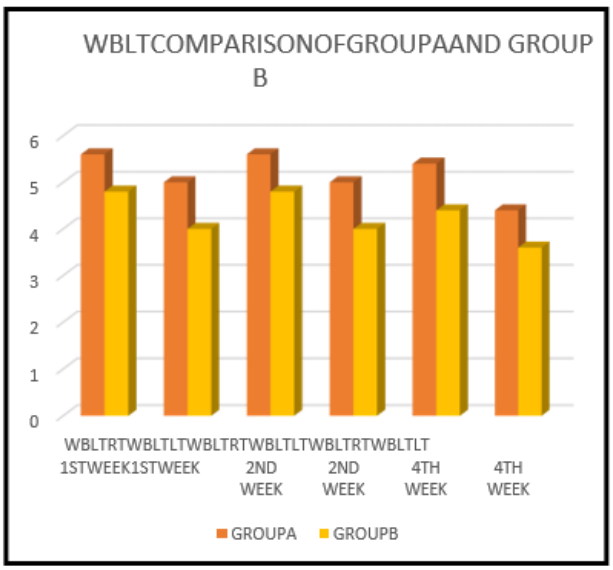


Figure5:WBLT-Mean difference between Group A and Group B

In this study, effects of primal reflex release technique and positional release therapy on pain, functional ability and ankle range of motion in patients with plantar fasciitis were examined. Pain and functional ability were assessed by foot function index (FFI) and ankle range was measured by weight bearing lunge test (WBLT).

First objective of this study was to determine the effects of primal reflex release technique on pain, functional abil-ity (FFI) and ankle range (WBLT) in patients with plantar fasciitis.

Primal reflexes control unlearned movement patterns and are triggered as protective defense mechanisms for the body.[25] Over stimulation of the nervous system can result in pain and dysfunction.[17,26] PRRT technique is intended to “down-regulate” the areas that are identified as “up-regu-lated” by the presence of nociceptive startle reflexes. The treatment involves 12 seconds of light sensation in the form of deep tend on reflexes that stimulate the skin to in-hibit the painful areas.

Bethany L. Hansberger et al. in 2015 did a study enti-tled “A novel approach to treating plantar fasciitis-effects of primal reflex release technique”. Total eight physically active subjects ranging in age from 18-40 years were tak-en. Five steps of primal reflex release technique in which treatment lasted approximately one minute for the first four steps and two to four minutes for fifth step. NPRS was administered pre and post treatment and at discharge. The disablement in the physically active scale (DPA) and patient specific functional scale (PSFS) were administered at initial evaluation and discharge. The follow up was done at two weeks, one month, two months after discharge. It was concluded that use of primal reflex release technique produced both immediate and long- term positive changes on NPRS, PSFS and DPA scale.[27]

Second objective of this study was to determine the ef-fects of positional release therapy on pain, functional abil-ity (FFI) and ankle range (WBLT) in patients with plantar fasciitis.

Al-Shawabka SA et al. (2013), in their study used PRT and reported that there is decrease in tender points by in-creasing pressure pain thresholds of trigger points in the upper trapezius muscle with mechanical neck pain pa-tients.[28] Wynne MM et al.(2006), demonstrated reduction in pain and improvement in functional ability using PRT in subjects with plantar fasciitis.[29]

Pattanshetty Renu et al. in 2015 organized a study on, “Immediate effect of three soft tissue manipulation tech-niques on pain response and flexibility in chronic plantar fasciitis”. Therapeutic ultrasound was given for a single session to all the groups and then manual techniques were provided. VAS and ankle range of motion were assessed pre and post intervention. It was concluded that myofas-cial release, positional release and passive stretching group with therapeutic ultrasound were effective in pain relief instantly and improving ankle range of motion in subjects with chronic plantar fasciitis.[30]

In the current study, patients were assessed at base line and follow up was taken at the end of 1st week, 2nd week and 4th week. The results showed statistically significant improvement in pain, functional ability (FFI) and ankle range (right and left) with the use of primal reflex release technique along with conventional therapy and positional release therapy along with conventional therapy (within group analysis).But, in between group analysis, primal re-flex release technique along with conventional therapy was found to be more predominant in improving pain and func-tional ability (FFI) than positional release therapy along with conventional therapy. Also, primal reflex release tech-nique along with conventional therapy and positional re-lease therapy along with conventional therapy were equal-ly effective in improving ankle range of motion.

Conclusion

The results of this study accepted the alternative hypoth-esis and showed statistically significant improvement in pain, functional ability and ankle range in patients with plantar fasciitis with the use of PRRT along with conven-tional therapy and PRT along with conventional therapy (within group analysis) by ANOVA and Kruskal Wallis test. But, in between group analysis by Unpaired t-test and Mann Whitney U-test, PRRT along with conventional ther-apy was found to be more effective than PRT along with conventional therapy.

Limitations

- The duration of treatmentwas only 1 week,which was relatively shortfor determining the long-last-ing effects in chronic plantar fasciitis.
- Advanced equipment was not used to assess func-tional disability and ankle ROM.
- Small sample size.
- Gender distribution was unequal.

Ethical clearance–Ethical clearance was obtained from the Institutional Review Board (PPC/OW/698/2023) from Pioneer Physiotherapy College, Vadodara.

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Conflict of interest-Nil

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