REVIEW

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J-Stroke Myofascial Release Offers Greater Pain Relief than Foam Rolling in Patients with Plantar Fasciopathy: A Randomized Clinical Trial

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SUMMARY

Background. In plantar fascia and nearby muscles, trigger points can reduce the pain threshold, causing increased sensitivity and discomfort in individuals with plantar fasciitis that lies superficial to plantar muscles of foot usually causes pain in inferior medial region of calcaneus during first few steps in the morning.

Objective. The purpose of this study was to compare the effects of foam roller and J-stroke myofascial release on pain intensity, pain threshold, range of motion and functional disability in patients with plantar fasciitis.

Methods. A total of 44 patients with plantar fasciitis were randomly allocated into two of the intervention groups, a Foam roller (n = 22) and J-Stroke myofascial release (n = 22) through computer-generated random number table. Outcomes were assessed through visual analogue scale (VAS) for pain intensity, pressure algometry for pressure pain threshold (PPT), weight bearing lunge test (WBLT) for dorsiflexion ROM at ankle joint and Urdu version of Foot and Ankle Disability index (FADI-U) for functional disability at the beginning of the session (baseline first session) and 4 weeks after completing the treatment sessions. The parametric test was used as data was found normally distributed by Shapiro-Wilk test. The independent t-test is used for intragroup analysis and paired t-test was used for intergroup analysis.

Results. The independent t-test for between the group analysis was not significant ($p > 0.05$) for post VAS and post PPT (Plantar fasciitis) whereas post WBLT, PPT (Gastrocnemius and soleus) and post FADI were significant ($p < 0.05$). The paired t-test value within the group analysis for both groups were found statistically significant ($p < 0.05$) for all outcome measures except for group FR (Foam roller) in WBLT was not significant ($p > 0.05$).

Conclusions. This study concluded that J-stroke myofascial release intervention provided clinically relevant results and was found statistically significant as the effect size was large and high mean difference was reported in comparison to foam roller intervention for all the outcome measures in reducing pain intensity, pain pressure threshold, disability and range of motion.

Study registration. The clinical trial was prospectively registered in the WHO-Iranian registry of clinical trials (Trial registration number: IRCT20190717044238N9, trial registration date: 09/11/2023).

KEY WORDS

Myofascial release; plantar fasciitis; pain threshold; trigger points; visual analogue scale.

INTRODUCTION

Plantar fascia is a wide band of connective tissue made of dense and fibrous connective tissue that supports the foot arch originating proximally from the medial calcaneal tubercle and extends distally to split into five digital bands that attach to the metatarsal heads and the proximal phalanx of each toe (1). Due to the deterioration of the plantar fascia, plantar fasciitis (PF) is considered the most common cause of sub-calcaneal pain associated with discomfort in the calcaneus (2). Approximately 15% of the heel pain are reported to health care professionals annually are due to plantar fasciitis and moreover in athletes it accounts for 8% cases of injuries related to running (3).

Obesity, pes planus, pes cavus, limited ankle dorsiflexion range, and tense calf muscles are intrinsic factors related to the patient. Examples of extrinsic factors *i.e.*, training and environmental factors include jogging on hard surfaces, suddenly increasing running volume or intensity, walking barefoot, and prolonged standing (4). Flatfoot has been linked to various ailments, including musculoskeletal disorders that affect the foot and ankle, like plantar fasciitis (5).

While most plantar fasciitis cases improve with conservative treatment and time, about 1% of patients will need surgery. Age and sex are non-modifiable risk factors (6). Ultrasonography is accurate, reliable and inexpensive imaging technique in comparison to MRI for evaluating plantar fasciitis. To rule out bony lesions in heel plain radiography is suggested (7, 8). Physical examination reveals tenderness to palpation at proximal region of plantar fascia on the calcaneal tubercle. Windlass test will also be helpful in ruling out other potential causes of pain in heel region. Plantar fasciitis is often associated with gastrocnemius tightness that can also be felt during the physical examination (9).

Myofascial release is a technique used for mobilizing adhesions and breaking down restrictions in soft tissues (10). It has the best results if given for a chronic condition; the symptoms will worsen if the illness is acute. Two or three fingers are used to apply a stroke myofascial release, which creates some torque at the end of the stroke. The release is administered in the direction of the limitation. The heel of the hand applies counter pressure (11). Several studies report that myofascial release improves flexibility of hamstrings, shoulder ROM and jaw mobility proving the significance of technique in increasing ROM (12). Foam rolling is a type of self-myofascial release (SMR) technique where a person exerts pressure by using their own body weight. This subjects the soft tissues to direct and sweeping pressure, thus rupturing adhesions by improving the fascial layer's lubricity and promoting tissue extensibility (13). It is supposed to improve fascial remodeling, increase elasticity, hydration and proprioception (14, 15).

Data gathered from the preliminary literature review showed that myofascial release techniques were found to be more effective than the conventional physical therapy intervention for plantar fasciitis (16). A few RCTs also reported the effectiveness of foam roller intervention in treatment of plantar fasciitis and declared that foam roller more effective in reducing pain, in terms of increasing range by weight bearing lunge test (17), pressure pain threshold at gastrocnemius and soleus (18), muscular power, agility of muscles and also boosts dynamic flexibility (19).

While physiotherapy treatments for plantar fasciitis are well-established, the effectiveness of specific techniques, such as foam rolling and J-stroke myofascial release, remains unclear, particularly in comparative studies. Both approaches aim to alleviate soft tissue restrictions and reduce pain, but they operate via different mechanisms. Foam rolling utilizes a self-administered approach to apply pressure to the fascia, potentially improving tissue extensibility and function, while J-stroke myofascial release is a manual technique that targets specific adhesions within the fascia to enhance mobility and reduce tension.

Despite evidence supporting the efficacy of both techniques in improving flexibility and reducing pain, direct comparisons between foam rolling and J-stroke release for plantar fasciitis have not been fully explored. Understanding how these techniques affect pain intensity, pain threshold, range of motion, and functional disability could provide valuable insights for clinicians and guide treatment decisions. This gap in the literature presents an opportunity to evaluate and compare these interventions in a systematic way, ultimately contributing to more effective management strategies for individuals suffering from plantar fasciitis. Hence, the objective of this study was to compare the effects of foam roller and J-stroke myofascial release on pain intensity, pain threshold, range of motion and functional disability in patients with plantar fasciitis.

METHODS

Ethical approval and consent to participate

This study was approved by the Institutional Review Board of the Riphah International University, Lahore, Pakistan (REC/RCR & AHS/23/0140 - approval date: August 03, 2023). All the participants provided written informed consent before taking part in the study. All methods were carried out in accordance with guidelines outlined in the declaration of Helsinki and CONSORT guidelines.

Study design

This study was single blinded, randomized clinical trial conducted over 6 months from 1st July to 30th December 2023. In this study, 44 patients (14 males and 30 females) aged between 25 and 55 years with plantar fasciitis. The disease was pre-diagnosed or referred by orthopedic surgeon with heel pain in the morning on first step and heel pain focused over plantar aspect. Patients diagnosed with unilateral plantar fasciitis since last 6 weeks. These patients were recruited from outpatient physical therapy department of Public Sector Hospital, Pakistan. The sample did not include the patients who were reported with inflammatory and degenerative joint disorder, impaired blood circulation, ankle and foot bone fracture, patients with skin diseases *i.e.*, dermatitis or any infective disorder, metal implants and post-surgical, altered sensation in lower extremity, patients with history of corticosteroid injection in heel in last 3 months, diagnosed malignancy, diabetic foot. Informed consent in written form was taken from each participant prior to the inclusion in study. Patients fulfilling the selection criteria and willing to participate were recruited in the study, duly approved by Institutional Review Board (IRB). The demographic details such as height, weight, body mass index (BMI) and affected side were also recorded.

Assessment

The assessments were done at baseline and after 12 treatment sessions for 4 weeks consecutively. Both assessments were performed by an assessor (qualified and trained physical therapist with 5 years' experience) dealing with musculoskeletal disorders patients. The patients were assessed for pain intensity, pain threshold, ankle dorsiflexion ROM and functional disability.

Outcome measures

The primary outcomes of this study were pain intensity, pain threshold, ankle dorsiflexion ROM and functional disability.

Visual analogue scale (VAS)

VAS was represented by a 10-cm-long line which showed no pain at one extreme end and worst pain possible at the other extreme of the line. The VAS has very good internal consistency (ICC = 0.96-0.98) and the test–retest reliability was excellent (20).

Pressure pain thresholds (PPT)

PPT were assessed through pressure algometry. It measures minimum pressure required to produce pain. The algometry has high reliability reported (ICC = 0.91; 95% CI 0.82-0.96) (21).

Ankle dorsiflexion with weight bearing lunge test (WBLT)

A tape measure was positioned on the floor perpendicular to the wall in order to measure the straight distance between the tip of the big toe and the wall. The participants were instructed to place their big toe and heel on the tape while standing on it. For improved balance, the patient was permitted to lean against the wall. To make contact with the wall without elevating the heel, participants were told to lunge towards it with their knees. Without raising the heel, the foot gradually glides in either direction towards or away from the wall until the ankle's maximal range of motion is reached. An additional physiotherapist measured patients both prior to and right after the intervention. This test has high inter-rater and intra-rater reliabilities for ROM assessment. [Intra-rater ICC = 0.97-0.98; Inter-rater ICC = 0.97(angle) and 0.99 (distance) (22, 23).

Urdu version of Foot and Ankle disability index (FADI-U)

This tool, which is self-contained, measures functional limitations linked to foot and ankle diseases. There are two subscales comprising of total of 26 items: 22 items of the activity subscale and 4 items of the pain subscale. The Cronbach alpha coefficient (0.96-0.97) value showed excellent internal consistency (24).

Randomization

44 patients fulfilling the inclusion and exclusion criteria were found eligible for the study. These participants were randomized by computer-generated random number table through simple random sampling. Those numbers were sealed in envelopes opened by main investigator to assign the allocated treatment. The participants were allocated to foam roller group and j-stroke group. Informed consent in written form was taken from each participant prior to the inclusion in study and the participants were fully aware about the treatment intervention techniques, risks and potential benefits as well as their right to withdraw at any time from the study.

Blinding

This study was a single-blinded, randomized clinical trial. The outcome assessor (specialized in musculoskeletal physical therapy and had more than 5 years of experience) was blinded to the allocation of patients to the groups.

Interventions

Patients agreeing to participate in study were recruited by convenient sampling technique and randomly assigned to one of the two groups. In group FR participants received treat-

Figure 1. Pressure pain threshold assessment using pressure algometer.

ment by a foam roller along with conventional physical therapy. The participants in group JS received J-stroke myofascial release with conventional physical therapy. The total duration of treatment was per week three sessions on alternate days for four weeks' time period. Assessment of the patients VAS, PPT, ankle dorsiflexion ROM with WBLT and FADI were done at baseline and 4th week (**figure 1**).

Group FR

These patients were treated with foam roller for pain beneath heel for 45 seconds with 15 seconds rest with 5 repetitions, 3 times in a week for 4 weeks (18).

Guidelines for using foam roller

Use foam roller with smooth surface and medium density, before the performance of exercise warm up your foot and calf muscles then sit comfortably and place the foam roller under your foot. The body weight should be gradually increased on the foam roller to target all affected areas roll foot back and forth and adjust foot accordingly after foam rolling stretch your calf muscles and plantar fascia (**figure 2**).

Group JS

These patients were treated with J-stroke myofascial release beneath the heel for 15 seconds for 5 to 12 repetitions, 3 times in a week for 4 weeks.

Technique of J-stroke myofascial release

The patient should be comfortable with bare foot, apply a lubricant to plantar aspect of foot being treated. Place the thumb on medial aspect of plantar fascia, near heel than glide the thumb with gentle and sustained pressure on medial side of the plantar fascia while moving towards the ball of the foot. The stroke is applied in a J-shaped or inverted L-shaped pattern focusing on tenderness and tension in the area being treated and repeat strokes multiple times.

Conventional treatment for plantar fasciitis

Towel curl up

Participants sit with their foot flat on one end of the towel and the other end of the towel on a smooth surface, holding a little weight. For ten minutes, keep the heel on the ground while you curl and draw the towel towards your body.

Active ankle exercises

In supine lying**,** normal active ankle movements were performed 10 repetitions each.

TA stretching

In standing the subject leans against wall to actively stretch Achilles tendon and holds stretch for 1 minute and 5 repetitions in every session (10).

Sample size

Sample size calculated was 40 (alpha = 0.05, power = 0.8) through G*power (3.1.9.4) software. Visual analogue scale was used for sample size calculation (18). The final sample size after considering 10% attrition was 44 patients.

Figure 2. A patient using a foam roller.

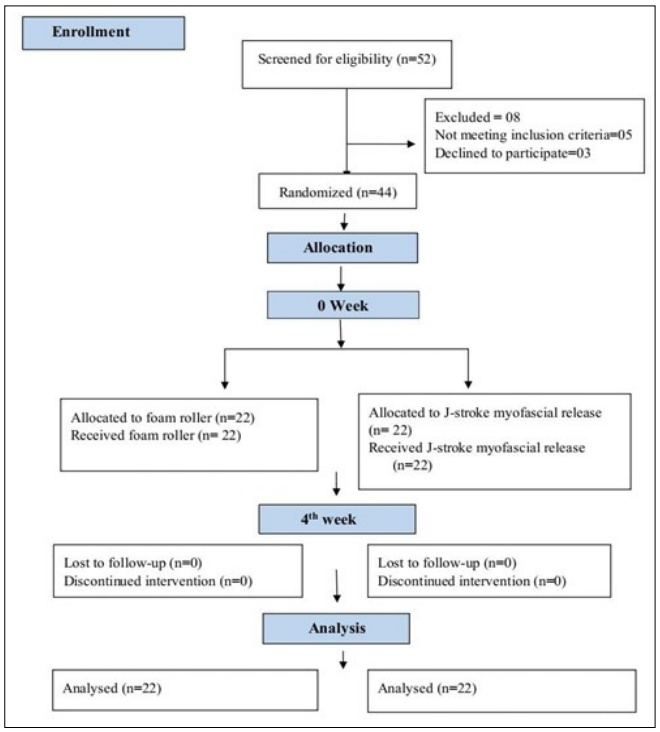

Figure 3. CONSORT flow diagram showing recruitment and assessment of patients.

Data analysis

The window software, SPSS 26 version is used for analyzing data. The level of significance was set at $p \leq 0.05$. After assessing the normality by Shapiro-wilk to find normality of the data, P value was found to be more than 0.05, so for data analysis parametric test was used as the data was found normally distributed. Across group differences were evaluated through parametric test independent sample t-test. Within group differences were evaluated through parametric test paired sample t-test. Cohen's d was used to evaluate the effect size between the two groups. The effect size of 0.2, 0.5, and 0.8 were considered small, medium and large, respectively (26).

RESULTS

The total sample size calculated was 44 with an attrition rate of 10%. These participants were randomized into two groups, so, for analysis data, 22 participants from Group FR and 22 participants from Group JS was used in the study. After the data collection, SPSS version 26 was used for the data analysis. All participants received a 4-week treatment protocol with 3 sessions per week on alternate days. Numeric variables were defined as mean ± S.D. The significance level was set at $p < 0.05$. The normality of data collected was checked by Shapiro-Wilk test, result value was more than 0.05 then the data was found under normal distribution curve and parametric tests were used. The details of patients are shown in CONSORT 2010 flow diagram for reporting randomized clinical trial (**figure 3**).

Clinical and demographic characteristics of the patient

There were 7 males and 15 female patients in Foam roller group and 7 males and 15 female patients in J-stroke group. However, in group FR (Foam roller) participants have mean age 39.82 ± 4.80 years, mean height 1.67 ± 0.11 meters, mean weight 73.63 ± 7.41 kgs, mean BMI 26.64 ± 4.12 and 59.09% comes with complain of right side plantar fasciitis and 40.91% came with complain of left side. In group JS (J-stroke myofascial release) participants have mean age 39.73 ± 5.34 years, mean height 1.65 ± 0.94 meters, mean weight 77.09 ± 9.92 kgs, mean BMI 28.68 ± 4.81 and 68.18% reports right side affected, and 31.82% reports left affected side (**table I**).

Intragroup analysis

Intragroup analysis shows the comparison between the Group FR and JS for the pre- and post-VAS, WBLT, PPT (Gastrocnemius, soleus and plantar fascia) and FADI treatment values by the independent sample t-test. The indepen-

Table I. Baseline characteristics of the study participants.

Variables	Group FR (n = 22) Mean ± SD	Group JS (n = 22) Mean ± SD
Age (Years)	39.82 ± 4.80	39.73 ± 5.34
Height (m)	1.67 ± 0.11	1.65 ± 0.94
Weight (kg)	73.63 ± 7.41	77.09 ± 9.92
BMI (kg/m^2)	26.64 ± 4.12	28.67 ± 4.81
	Frequency (%)	**Frequency (%)**
Gender	Males = 7 (31.8%) Females = 15 (68.2%)	Males = 7 (31.8%) Females = 15 (68.2%)
Affected side	Left = 9 (40.91%)	Left = 7 (31.8%)
Affected side	Right = 13 (59.1%)	Right = 15 (68.2%)

BMI: Body mass index: SD: Standard Deviation; FR: Foam Roller; JS: J-Stroke; n: number of participants.

dent T-test for between the group analysis was not significant ($p > 0.05$) for post VAS and post PPT (Plantar fasciitis) whereas post WBLT, PPT (Gastrocnemius and soleus) and post FADI were significant ($p < 0.05$) (**table II**).

Intergroup analysis

The results of paired t test for group *i.e.*, Foam roller group. The P-value was less than 0.05 for all the variables of within the group FR analysis, which shows that there was significant difference before and after the treatment application except the WBLT for which P-value is greater than 0.05 which shows that there was no significant difference before and after the treatment application (**table III**). The result of the paired t test for group *i.e.*, J-stroke myofascial release Group JS and shows that there was significant difference before and after the treatment protocol for within the Group JS analysis as P-value is less than 0.05. The mean difference showed that group (J-stroke myofascial release) was found more effective than group (Foam roller) intervention (**table IV**).

DISCUSSION

The current study was done to check the comparative effects of Foam roller and J-stroke myofascial release in patients with plantar fasciitis on pain intensity, ROM, pain pressure threshold and disability. The parameters like VAS, WBLT (weight bearing lunge test), PPT (Pain pressure threshold) and FADI (foot and ankle disability index) were included to measure the effects of both treatment techniques in plantar fasciitis. To know the effects of both treatment techniques on the patients, a randomized clinical trial was carried out for 3 sessions per week on every alternate day for 4 weeks and around 44 patients were part of this study. The mean age in Group FR (Foam roller) was 39.82 ± 4.80 years and in Group JS (J-stroke myofascial release) was 39.73 ± 5.34 years. Data of both groups was analyzed for all the outcome measures after the data collection. All the participants in both groups were given a conventional treatment protocol exercises towel curl up, tennis ball stretch of plantar fascia, active ankle exercises, tendon Achilles stretching before applying the foam roller and J-stroke myofascial release

Table II. Intragroup comparisons (Independent t-test) in both groups.

Variables	Follow up	Group FR Mean ± SD	Group JS Mean ± SD	Mean difference (95% CI)	Effect size	P-value
VAS*	Pre	6.95±1.17	2.87±0.65	0.033 (0.836-0.902)		
	Post	3.29±0.70		0.41 (0.07-0.845)	0.60	0.540
WBLT**	Pre	9.45±0.81	9.22±1.47	0.23 (0.51-0.98)	0.20	0.531
	Post	9.78±1.46	11.92±1.24	2.1 (2.98-1.28)	1.40	0.000
PPT*** (Gastrocnemius)	Pre	7.60±1.40	7.01±0.81	0.59 (0.13-1.31)	0.70	0.106
	Post	10.98±1.11	10.00±1.17	0.98 (0.26-1.69)	0.80	0.008
PPT (Soleus)	Pre	7.04±0.66	6.99±1.00	0.05 (0.47-0.58)	0.08	0.829
	Post	8.60±1.27	10.68±1.41	2.06 (2.89-1.22)	1.60	0.000
PPT (Plantar fascia)	Pre	7.09±1.16	6.73±1.29	0.359 (0.408-1.12)	0.30	0.350
	Post	9.47±1.81	9.54±1.75	0.067 (1.18-1.04)	0.03	0.900
FADI**** score	Pre	29.71±1.89	29.25±2.64	0.45 (0.97-1.89)	0.20	0.520
	Post	76.64±15.06	92.03±9.55	15.38 (23.25-7.51)	1.02	0.000

SD: Standard Deviation; FR: Foam Roller; JS: J-Stroke; CI: Confidence Interval; P-value less than 0.05 was considered significant; *VAS: Visual Analog Scale; **WBLT: Weight Bearing Lunge Test; ***PPT: Pressure Pain Threshold; ****FADI: Foot and Ankle Disability Index.

Table III. Intergroup comparison (paired T test) in Foam Roller group (n = 22).

Variables	Group Foam roller	Mean ± SD	Effect size	P-value
VAS*	Pre-treatment	6.95±1.17	2.73	0.000
	Post-treatment	3.29±0.70		
WBLT**	Pre-treatment	9.45±0.81	0.18	0.398
	Post-treatment	9.78±1.46		
PPT*** (Gastrocnemius)	Pre-treatment	7.60±1.40	2.02	0.000
	Post-treatment	10.98±1.11		
PPT (Soleus)	Pre-treatment	7.04±0.66	1.18	0.000
	Post-treatment	8.62±1.27		
PPT (Plantar Fascia)	Pre-treatment	70.09±1.16	1.22	0.000
	Post-treatment	9.47±1.81		
FADI****	Pre-treatment	29.71±1.89	3.09	0.000
	Post-treatment	76.64±15.06		

SD: Standard Deviation; FR: Foam Roller; JS: J-Stroke; CI: Confidence Interval; P-value less than 0.05 was considered significant; *VAS: Visual Analog Scale; **WBLT: Weight Bearing Lunge Test; ***PPT: Pressure Pain Threshold; ****FADI: Foot and Ankle Disability Index.

Table IV. Intergroup comparison (paired t test) in J- Stroke Myofascial release group (n = 22).

Variables	GroupJ-stroke MFR	Mean ± SD	Effect size	P-value
VAS*	Pre-treatment	6.92 ± 1.57	2.47	0.000
	Post-treatment	2.87 ± 0.65		
WBLT**	Pre-treatment	9.22 ± 1.47	1.32	0.000
	Post-treatment	11.92 ± 1.24		
PPT*** (Gastrocnemius)	Pre-treatment	7.01 ± 0.81	2.19	0.000
	Post-treatment	10.03 ± 1.17		
PPT (Soleus)	Pre-treatment	6.99 ± 1.00	1.94	0.000
	Post-treatment	10.68 ± 1.41		
PPT (Plantar Fascia)	Pre-treatment	6.73 ± 1.29	1.16	0.000
	Post-treatment	9.54 ± 1.75		
FADI****	Pre-treatment	29.25 ± 2.64	6.67	0.000
	Post-treatment	92.03 ± 9.55		

SD: Standard Deviation; FR: Foam Roller; JS: J-Stroke; CI: Confidence Interval; P-value less than 0.05 was considered significant; *VAS: Visual Analog Scale; **WBLT: Weight Bearing Lunge Test; ***PPT: Pressure Pain Threshold; ****FADI: Foot and Ankle Disability Index.

technique. After the application of the treatment protocol significant improvement was reported in both groups. Results show that within the groups, the foam roller Group FR and the J-stroke myofascial release Group JS have almost equal and significant effects ($p < 0.05$) in decreasing pain, pain pressure threshold, disability thus improving the ROM of the ankle dorsiflexion in patients of plantar fasciitis except in foam roller group where WBLT was

statistically insignificant but the mean difference between both groups suggested J-stroke myofascial release showed better results as compared to foam roller.

The outcomes of this study were consistent with Ranbhor *et al.*'s (2020) study, in which foam roller technique was found superior in relieving pain and increasing ROM in contrast to stretching in 50 participants that were randomly allocated into foam roller Group FR and the stretching group. Both groups were assessed at baseline and after the treatment immediately for VAS, PPT (Gastrocnemius, soleus, plantar fasciitis), WBLT. The between Group FR analysis of this study shows that there was no statistical significance in VAS, WBLT and plantar fascia PPT. The results of this study were in agreement to present study conducted because foam roller Group FR analysis showed similar result in case of WBLT which was found insignificant. The current study has conducted 3 sessions per week on alternate days for 4 weeks, so it showed long term effects of the treatment techniques rather than immediate effects (27).

Unlike the current study, a research conducted by Hameed and his coworkers in 2020, summarized that self-myofascial release with foam roller and tennis ball both were found to be beneficial choice of treatment in managing patients of plantar fasciitis. Outcomes at baseline were measured and after 2 weeks of treatment by VAS and FADI. Both groups showed improvement in VAS and FADI post treatment but between Group FR analysis was not found significant. The present study also showed significant results on VAS and FADI post treatment (13).

Another study conducted by Javed and colleagues (2021) in accordance with the current study found that myofascial release technique gave better results in alleviating pain and improving foot function when given along with conventional treatment rather than just conventional treatment. The intervention was given for 2-week time period on alternate days. Between Group FR analysis showed significant results on VAS and FFI (foot functional index) (28).

Studies report that physical touch improves the patient satisfaction, as in a study by Barroni *et al.*, of 2021 is concluded that it improves collaboration with patient, and provide significant information about underlying adhesions or abnormalities helps in shared decision making of the clinical disorder. It acts as a leading tool of communication, and this supports better outcomes gained by J-stroke myofascial release technique in the current study (29).

In the current study no electrotherapeutic modality *i.e.*, ultrasound or hot pack was used as a conventional treatment which contradicts the studies that reported use of ultrasound 1W/cm^2 using ratio of 1:4 pulsed mode, frequency of 10MHz for 5 minutes and use of contrast bath for 20 minutes as the conventional treatment another study Shah *et al.* (2018) is in accordance to report use of ultrasound as conventional treatment with exercises towel curl ups, active ankle exercise, tennis ball stretching and stretching of Achilles tendon (30).

A study conducted by Yoshimura *et al.* found effects of foam roller on ankle ROM that there was an immediate increase in ankle dorsiflexion ROM but no effect on muscle hardness and fascicle length were reported. Plantar flexion ROM at ankle was also not improved. In contrast, the current study reported no increase in dorsiflexion ROM at the ankle joint post-treatment with foam roller but pain pressure threshold at gastrocnemius muscle, soleus and plantar fascia produced significant results post-treatment (31).

This study's significant reduction in pain intensity is consistent with systematic review of Tandel and colleagues' effectiveness of myofascial release on pain intensity and function in individuals with plantar fasciitis, in which 7 RCT, 1 pre-post interventional, 1 prospective, 1 quasi-experimental study, were reviewed (10). Another study investigated that myofascial release is useful in treatment of plantar fasciitis results were measured by PPT, NPRS, FAAM and ROM outcome measures which reported significant difference after 10 day post treatment (32).

Clinicians may incorporate J-stroke myofascial release technique in their treatment protocol for patients with plantar fasciitis. Functional gait analysis may be done to evaluate improvements in gait and biomechanical alignment in patients with plantar fasciitis. Longitudinal outcome studies may be conducted to assess long term effectiveness and durability of J-stroke myofascial release. Future studies can be conducted to explore the synergistic effects of combining J-stroke with stretching exercises, orthotics and manual therapy.

CONCLUSIONS

This study concluded that J-stroke myofascial release technique produced clinically relevant results and found significant for all the outcome measures as the effect size was large and more mean difference was reported in comparison to foam roller in reducing pain intensity, pain pressure threshold, disability and range of motion. So, J-stroke myofascial release is superior to foam roller technique when treating plantar fasciitis patients.

Limitations of the study

In this study immediate effects of foam roller and J-stroke myofascial release were not assessed at 1st, 2nd and 3rd week in the study only two assessments were done at baseline and 4th week respectively. The results of the study cannot be generalized to both genders because more female patients were part of the study. Since there was no control group so it cannot be ruled out if pain subsided due to natural history of recovery. The absence of long-term follow-ups has not provided information on sustained effects over an extended period.

FUNDINGS

None.

DATA AVAILABILITY

Data analyzed for this study is included in this article.

CONTRIBUTIONS

MN: conceptualization, data curation, writing – original draft, writing – review & editing. FA: conceptualization. AM: data curation and formal analysis. AA, ZJ: formal analysis.

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CONFLICT OF INTERESTS

The authors declare that they have no conflict of interests.

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