

COMPARISON OF DRY NEEDLING AND DRY CUPPING THERAPY IN INDIVIDUALS WITH PATELLOFEMORAL PAIN SYNDROME: A RANDOMIZED CLINICAL TRIAL

Sameen Asif^{*1}, M Arif Ali Rana², Hamza Babar³, Shrazar Joseph⁴, Wayna Sajid⁵, Hadia Asif⁶,
Dr Hafiza Aimen Hameed PT⁷

^{*1}Student DPT, MS-OMPT Superior University Lahore

²Assistant Professor Physical Therapy Superior University Lahore

^{3,4,5}DPT Gulab Devi Educational Complex Affiliated with University of Sargodha

⁶Optometrist (Bachelor of Vision Sciences) The University of Lahore

⁷Clinical Physiotherapist and visiting lecturer University of Sargodha DPT

^{*1}sameen123asif@gmail.com, ²arifalirana@gmail.com, ³iamhamzababar10@gmail.com,

⁴jshrazar48@gmail.com, ⁵waynasajid47@gmail.com, ⁶asifhadia02@gmail.com,

⁷aimenhameed2000@gmail.com

DOI: <https://doi.org/10.5281/zenodo.23051570>

Keywords

Dry needling, pain measurement, Patellofemoral Pain Syndrome, physical therapy

Article History

Received: 01 June 2026

Accepted: 23 August 2026

Published: 30 September 2026

Copyright @Author

Corresponding Author: *

Sameen Asif

Abstract

Purpose: To compare the effect of dry needling and dry cupping on severity of pain and functional ability in patients with Patellofemoral pain syndrome (PFPS).

Method: This randomized clinical trial included 42 individuals aged 18–35 years with PFPS. They were randomly divided into two equal groups. One group received dry needling (n = 21), while other received dry cupping (n = 21), with both groups also receiving the same conventional physiotherapy treatment for eight sessions over four weeks. The Numeric Pain Rating Scale (NPRS) and the Kujala Anterior Knee Pain Scale were used to measure pain severity and functional ability at baseline, Week 4, and three month follow up. Groups were compared using independent t-tests and Mann-Whitney U test. Changes within each group were assessed using repeated measures ANOVA and Friedman tests, while mixed design ANOVA examined differences between groups over time. A p-value of 0.05 was considered significant.

Result: All 42 participants completed both follow-up assessments, and both groups had similar characteristics at baseline. The both groups improved significantly across all outcomes ($p < 0.001$), but dry needling group showed greater improvement. After three months, the activity related NPRS with dry needling was lower at 2.62 ± 0.71 compared with 3.69 ± 0.90 , with mean difference of 1.07 ($p < 0.001$) and Kujala score was higher at 82.63 ± 6.21 compared with 72.82 ± 7.06 , with mean difference of 9.81 ($p < 0.001$). Resting pain was also significantly reduced in dry needling group at Week 4 and after three months ($p < 0.001$). There was a significant interaction between

group and time for all three outcomes ($p < 0.001$).

Conclusion: Dry needling offers greater benefits than dry cupping for a longer period when combined with conventional physiotherapy for PFPS. However, dry cupping remains practical, non-invasive option for patients who prefer not to have needling treatment.

INTRODUCTION

Patellofemoral pain syndrome (PFPS) is a prevalent musculoskeletal disorder characterized by pain localized around or behind the patella, particularly during activities that increase loading of the patellofemoral joint. Common aggravating activities include squatting, stair climbing, running and prolonged sitting. It mainly affects young, physically active people and is one of the conditions most commonly seen in sports medicine and orthopedic clinics around the world. Although PFPS is common, it can be difficult to fully resolve and may come back overtime. Many patients continue to have symptoms for years despite receiving diagnosis and treatment (1). Along with physical limitations, the condition can also affect a person psychologically. Fear of movement because of pain is often linked to greater disability and difficulty with everyday activities, even when joint loading is taken in account (2).

PFPS is a complex condition that can develop due to a combination of factors, such as changes in movement patterns, muscle function and neuromuscular control. Together, these factors may place extra stress on patellofemoral joint (1). One important but often overlooked factor is the presence of tight or sensitive areas in the quadriceps and surrounding hip muscles. These trigger points can contribute to pain in people experiencing pain at the front of the knee. Myofascial trigger points in the hip and thigh muscles are found much more frequently in people with anterior knee pain compared with those without symptoms, indicating that muscle related dysfunction may play a role in the persistence of pain (3). Likewise, people with PFPS may have sensitive trigger points in the muscles around the lower back, pelvis and hip.

This suggests that the muscle problems linked to PFPS may extend beyond the knee itself (4).

Based on these findings, treatments such as cupping therapy and needling of myofascial trigger points are gaining more attention in clinical practice and research. They are often used alongside standard rehabilitation to help manage knee pain. A single blind randomized trial showed that combining dry needling with a structured program helped reduce trigger point sensitivity and pain more effectively than exercise alone (5). Similarly using electrical dry needling along with corticosteroid injections may provide greater improvements in pain and physical function than injections alone in people with knee osteoarthritis (6). Dry needling of active and latent trigger points has also been reported to provide pain relief similar to that achieved with oral diclofenac (7).

Dry needling may help reduce pain in several ways. It can produce a local twitch response, improve blood flow to the affected area, and influence how pain signals are processed by both the peripheral and central nervous systems. The strength of this twitch response, when measured using ultrasound, has also been linked to improvements in joint range of motion after treatment (8). Recent research suggests that the twitch response may help reduce pain immediately after needling in people with musculoskeletal pain (9).

Studies have found that dry needling may be helpful for people with PFPS, with encouraging results reported so far. A randomized controlled trial found that dry needling of vastus medialis obliquus, vastus lateralis and rectus femoris helped improve muscle function and reduce pain compared with sham needling in people with people with exercise induced PFPS (10). Similarly,

a randomized clinical trial showed that dry needling and ischemic compression of vastus medialis obliquus trigger points helped reduce pain and improve function in patients with unilateral PFPS (11). Dry needling of trigger points around the knee and hip has also been found to improve function in patients with anterior knee pain, suggesting that it may be useful for managing myofascial pain in these regions (12).

On the other hand, cupping therapy is a traditional technique that uses suction to gently pull the soft tissue into a cup and is now being used again as a non-invasive method for managing musculoskeletal pain. A pilot randomized trial revealed that using dry cupping together with ischemic compression reduced trigger point sensitivity more effectively than using either treatment alone (13). A systemic review and meta-analysis found that dry cupping may help decrease pain and improve range of motion in various musculoskeletal conditions, although the available evidence was not equally strong across all studies (14). In people with low back pain, dry cupping has been shown to low pain and improves daily function compared with control treatments (15). However, a well-designed sham controlled trial showed that dry cupping was not more effective than placebo cupping, so its actual physiological effects remain unclear (16). Although both techniques have shown positive effects, only a few studies have directly compared dry needling with dry cupping in patients with PFPS. Most studies have looked at each treatment separately by comparing it with sham treatment or exercise. Moreover, both techniques aim to reduce trigger point related pain, but they differ in how invasive they are and how comfortable they may be for patients. Comparing them directly can therefore help determine which approach may be more suitable in clinical practice. Therefore, this randomized clinical trial aimed to compare dry needling and dry cupping therapy for reducing pain and improving function in individuals with patellofemoral pain syndrome.

METHOD

Study Design and Setting:

This randomized clinical trial was carried out over a period of six months from March 2026 to August 2026 in the physiotherapy department of Wasif Medical Center and Dental Care, Lahore, Pakistan. 42 participants were included by non-probability convenient sampling technique and were divided equally into two groups.

Participants and Allocation

Participants aged 18-35 years and with anterior or retro patellar knee pain for more than three months, with an activity related NPRS score of at least 4, were included in the study. The pain had to increase with at least one patellofemoral loading activity, along with tenderness around the patella and a positive patellar grind or compression test. Participants were excluded if they had a previous knee dislocation, fracture or surgery, a ligament or meniscal injury, an infection or inflammatory condition affecting the lower limb, a neurological problem affecting lower limb function, pregnancy, any skin problem or infection at the treatment site, ongoing physiotherapy for the same knee, or a bleeding disorder or were taking anticoagulant medication. The last two criteria were strictly followed because dry needling involves inserting needles through the skin, while dry cupping applies suction to the superficial tissues. After the baseline assessment, participants were randomly assigned to either Group A (dry needling) or Group B (dry cupping) using a computer generated sequence prepared by an investigator who was not involved in recruitment or treatment. An independent investigator prepared the sealed envelopes, which were opened after the baseline assessment to assign participants to their groups. Blinding of participants and therapist was not possible because the two treatments involved different procedures. A single assessor who was not involved in treatment collected all outcome data and did not know which group the participants belong to. Participants were also asked not to

mention their treatment during follow-up assessments.

Interventions:

Both groups had two treatment sessions per week for four weeks, with each session lasting about 40-45 minutes. The both of the groups received the same conventional physiotherapy treatment at the beginning of each session. This included a moist heat pack on the front of the thigh and knee for 10 minutes, isometric quadriceps exercise held for 5-10 seconds for 3 sets of 10 repetitions, straight leg raises to about 45° held for 5 seconds for 3 sets of 10 repetitions, and quadriceps stretching held for 20-30 seconds, repeated three times. This part of the treatment took about 20-25 minutes, with the same instructions and treatment time for both groups to ensure equal therapist contact and physiotherapy care. **Group A: Dry Needling:** After the traditional physiotherapy, active trigger points were identified in the vastus medialis obliquus, vastus lateralis and rectus femoris using flat or pincer palpation. Before treatment the skin was cleaned with 70% alcohol. A trigger point was treated when a tender nodule was felt within a tight band of muscle, pressure reproduced the participant's usual knee pain, and a local twitch or familiar referred pain was produced. Sterile, single use stainless steel needles (0.30 × 40mm or 0.30 × 50mm, depending on muscle depth) were inserted into the identifier trigger points using a quick in and out technique. Needling continued until the local twitch responses stopped or the therapist decided that no further stimulation was needed. The needles were retained for 10-15 minutes, depending on the participant's tolerance. Gloves and standard infection control measures were used during the procedure. Used needles were immediately placed in a sharps container, and the area was checked for bleeding or bruising after the needles were removed. **Group B: Dry Cupping:** After the conventional physiotherapy treatment, dry cupping was applied over the vastus medialis, vastus lateralis and rectus femoris muscles, as well as around the patella when needed. Plastic cups

of 3, 5 or 7 cm were selected according to the size and shape of the treatment area, and a small amount of lubricant was used to reduce skin friction. A manual suction pump was used to create moderate negative pressure, with the skin raised about 3-5mm inside the cup and pressure maintained at around 100-200 mmHg. The cups were left in place for 12-15 minutes without any movement. The skin was checked before and after each treatment, and excessive suction that could cause pain or tissue strain was avoided.

Outcome Measures:

Pain intensity was measured using the NPRS, with scores ranging from 0 (no pain) to 10 (worst possible pain). Since PFPS pain usually increases with activity, activity related NPRS was used as the main pain measure, while resting NPRS was used as a secondary measure. Knee function was measured as a secondary outcome using the 13 item Kujala Anterior Knee Pain Scale. Score ranged from 0 to 100, with higher scores showing better knee function. Both measures are reliable, valid and responsive for assessing patients with patellofemoral conditions. Outcomes were measured before randomization (T0), after four weeks of treatment (T1), and again at three months (T2), using the same instructions and testing conditions each time. Attendance was recorded for each treatment session, and any adverse events noted along with their type, severity and management.

Statistical Analysis:

Data were analyzed using IBM SPSS Statistics (Version 26). A two tailed p-value below 0.05 was considered statistically significant. Before analysis, the data were checked for errors, duplicate IDs and missing values. No follow-up data were missing, so the intentions to treat and complete case groups were the same. Continuous variables were reported as mean ± standard deviation, while categorical variables were reported as frequencies and percentages. Normality was checked using the Shapiro-Wilk test and visual inspection of the data. The two groups were

compared at each assessment point using independent samples t-tests for activity related NPRS and Kujala scores. Mean differences, 95% confidence intervals and Cohen's d were also reported.

Changes within each group over the three assessment points were assessed using one way repeated measure ANOVA, with partial η^2 used as the effect size. A mixed design (split plot) ANOVA was used to assess how the two groups changed over time, with group as the between subject factor and time as the within subject factor. Resting NPRS did not follow a normal distribution, so non-parametric tests were used. The Mann-Whitney U test was used to compare the two groups, while the Friedman test with Kendall's W was used to assess changes within each group. Results were reported as medians and inter-quartile ranges (IQR). Responder analysis used predefined criteria, including a reduction of at least 2 points in NPRS, a reduction of at least 30% from baseline NPRS, or an increase of at least 10 points in the Kujala score. The groups were compared using Fisher's exact test.

ETHICAL CONSIDERATION

The study was reported according to the CONSORT guidelines for non-pharmacological trials. The study was approved by the Institutional Review Board of the Faculty of Allied Health Sciences, The Superior University, Lahore (approval number: IRB/FAHS/REHAB/04/26/MS/RS-4069). All participants provided written informed consent before the baseline assessment.

RESULTS

A total of 42 participants were assessed and evenly assigned to the two groups. None of the subjects withdrew or were lost during follow-up, and all outcome data were available. All 42 individuals completed the Week 4 and three month assessments and were included in the final analysis. Before treatment, the two groups were similar in age, sex, affected side, symptom duration, and all three outcomes measures, with no significant differences between them. Detailed demographic and clinical results are shown in the tables and figures below.

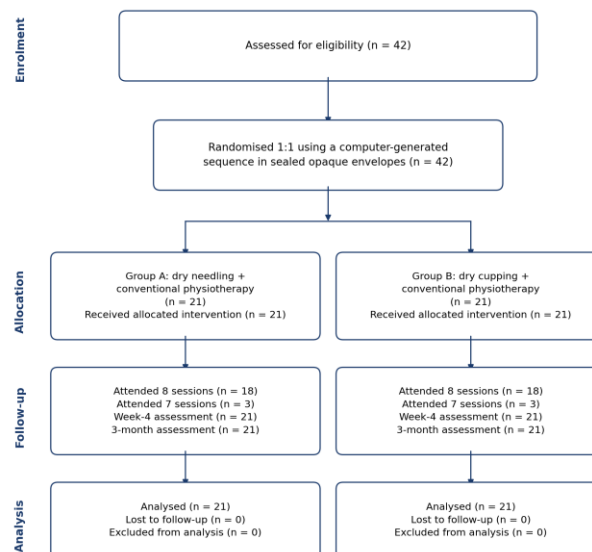


Figure 1: CONSORT flow diagram of participant recruitment, allocation, follow-up and analysis.

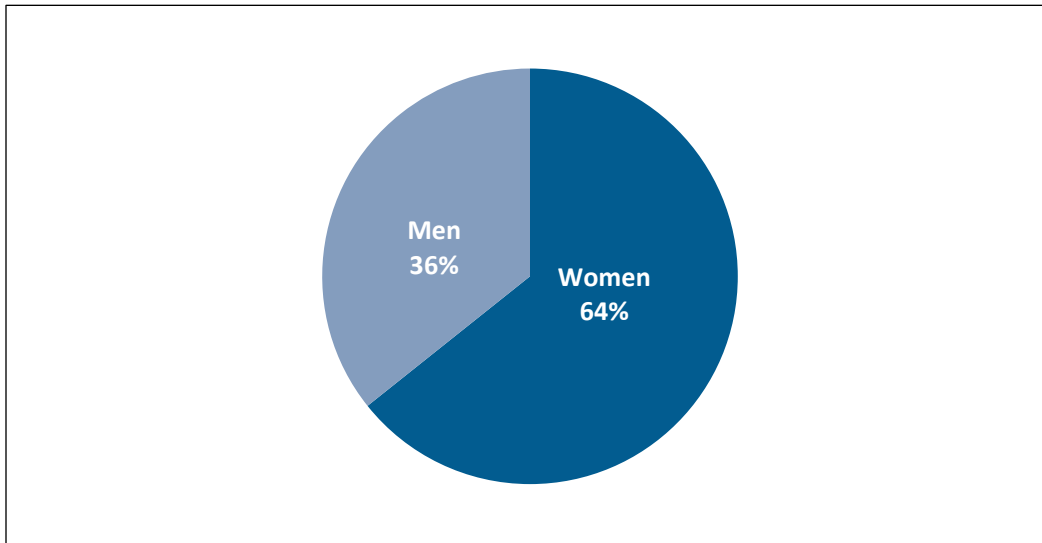


Figure 2: Gender Distribution of Participants

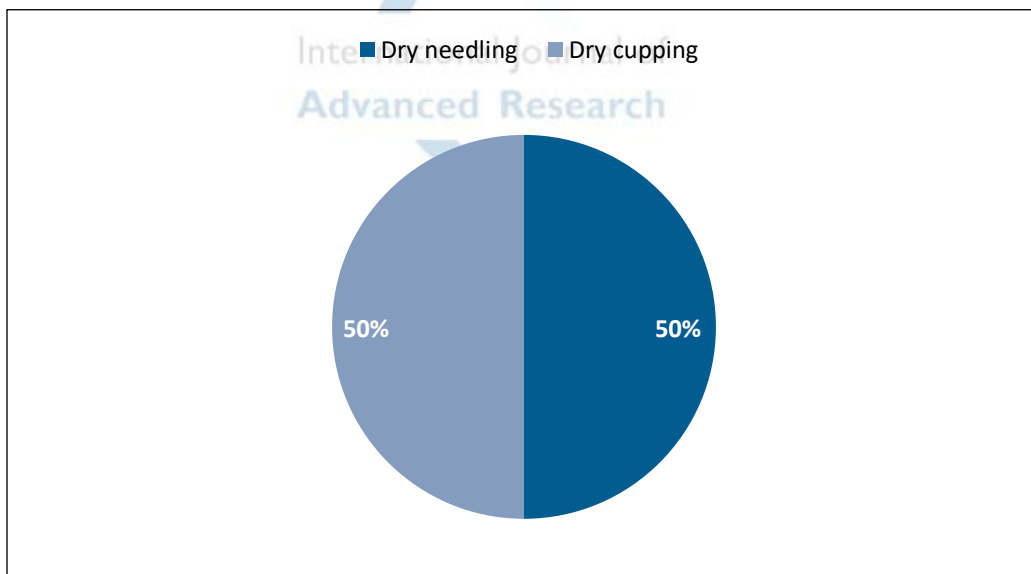


Figure 3: Participants Distribution in each Group

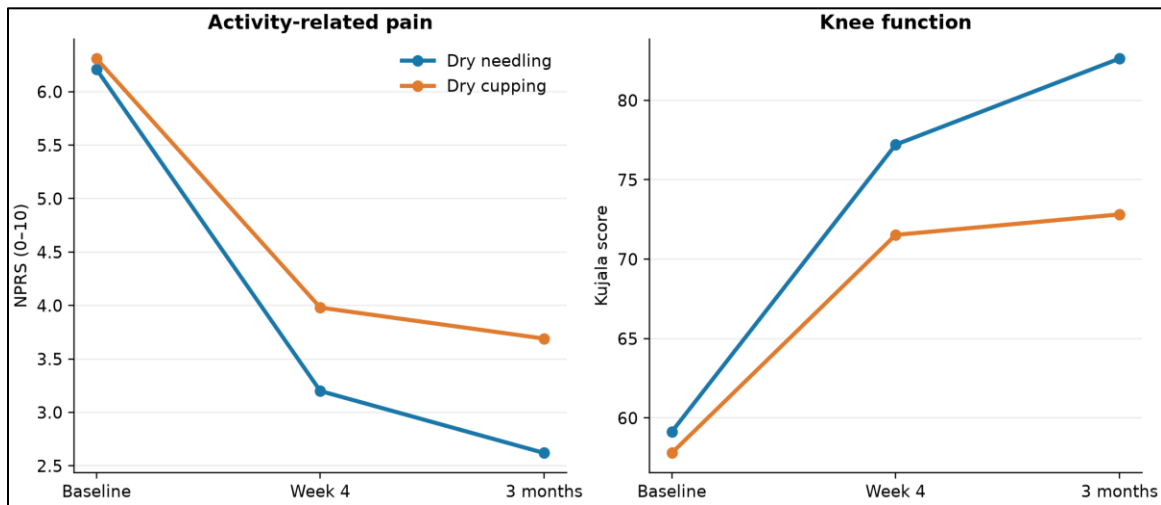


Figure 4: Separate Outcome Trends: Activity-related pain (Left) and Kujala Function (Right)

Table 1: Participants Allocation in Each Treatment Groups

Treatment Group	Participants (n)	Percentage (%)
Dry Needling	21	50
Dry Cupping	21	50
Total	42	100

Table 1 shows how participants were divided in each treatment group. 21 subjects received dry needling while other 21 received dry cupping therapy.

Table 2: Gender Distribution in Each Treatment Groups

Gender	Dry Needling, n (%)	Dry Cupping, n (%)	Total, n (%)
Women	14 (66.7)	13 (61.9)	27 (64.3)
Men	7 (33.3)	8 (38.1)	15 (35.7)
Total	21 (100)	21 (100)	42 (100)

Table 2 reveals that women made up most of the sample, and the gender distribution was similar between groups ($p = 0.001$).

Table 3: Affected Knee Distribution in Both Groups

Affected Knee	Dry Needling, n (%)	Dry Cupping, n (%)	Total, n (%)
Right Knee	13 (61.9)	9 (42.9)	22 (52.4)
Left Knee	7 (33.3)	8 (38.1)	15 (35.7)
Both Knees	1 (4.8)	4 (19.0)	5 (11.9)

Table 3 shows that right knee involvement was most common overall. The distribution of affected knee did not differ significantly between groups ($p = 0.273$).

Table 4: Age and Symptom Duration of Participants before Treatment

Baseline measure	Dry Needling	Dry Cupping	p-value
Age, Mean $\pm$ SD (years)	27.48 $\pm$ 3.64	28.33 $\pm$ 3.73	0.456

Symptom Duration, Mean $\pm$ SD (months)	11.44 $\pm$ 4.23	10.74 $\pm$ 4.04	0.586
--	------------------	------------------	-------

Table 4 shows that the groups were similar in age and how long participants had experience symptoms before treatment.

Table 5: Baseline Pain and Kujala Function Score in Treatment Group

Baseline Outcome	Dry Needling	Dry Cupping	p-value
Resting Pain (NPRS), Mean $\pm$ SD	3.28 $\pm$ 0.43	3.46 $\pm$ 0.43	0.178
Activity Pain (NPRS), Mean $\pm$ SD	6.21 $\pm$ 0.68	6.31 $\pm$ 0.70	0.640
Kujala Function Score, Mean $\pm$ SD	59.14 $\pm$ 4.57	57.80 $\pm$ 4.04	0.321

Table 5 demonstrated that before treatment, resting pain, activity pain and knee functions were similar between groups. NPRS is a 0-10 pain scores, and higher Kujala scores indicate better function.

Table 6: Between Group Comparison of Activity Related NPRS Scores

Assessment	Dry Needling	Dry Cupping	Mean Difference	p-value	d
Baseline	6.21 $\pm$ 0.68	6.31 $\pm$ 0.70	-0.10	0.640	-0.15
Week 4	3.20 $\pm$ 0.83	3.98 $\pm$ 0.92	-0.79	0.006	-0.90
3 Months	2.62 $\pm$ 0.71	3.69 $\pm$ 0.90	-1.07	<0.001	-1.32

Table 6 reveals that pain decreased in both groups. The dry needling group had lower pain at Week 4 and three months.

Table 7: Between Group Comparison of Kujala Anterior Knee Pain Scale Scores

Assessment	Dry Needling	Dry Cupping	Mean Difference	p-value	d
Baseline	59.14 $\pm$ 4.57	57.80 $\pm$ 4.04	1.34	0.321	0.31
Week 4	77.21 $\pm$ 6.45	71.53 $\pm$ 4.94	5.68	0.003	0.99
3 Months	82.63 $\pm$ 6.21	72.82 $\pm$ 7.06	9.81	<0.001	1.48

Table 7 indicates that the Kujala scores increased in both groups, showing better knee function. Dry needling produced the larger functional gain, especially at three months.

Table 8: Between Group Comparison of Resting NPRS

Assessment	Dry Needling, Median (IQR)	Dry Cupping, Median (IQR)	U	p-value
Baseline	3.3 (3.0-3.4)	3.3 (3.2-3.7)	173.5	0.239
Week 4	1.4 (1.0-1.6)	2.1 (2.0-2.6)	57.0	<0.001
3 Months	1.2 (0.9-1.3)	1.9 (1.7-2.6)	58.0	<0.001

Table 8 reveals that resting pain was similar at baseline but significantly lowered after both treatments at both follow-ups.

Table 9: Group by Time Recovery Pattern for Pain and Function Outcomes

Outcome	Group by Time Test	Effect Size (partial η^2)	p-value
Activity NPRS	F(2,80)=16.50	0.292	<0.001
Kujala Function	F(2,80)=14.60	0.267	<0.001
Resting NPRS	F(2,80)=17.00	0.298	<0.001

Table 9 demonstrates the significant interactions that the groups did not simply differ by a fixed amount, and their recovery patterns over time were different.

Table 10: Clinically Meaningful Improvement Rates at Three Months

Threshold	NPRS reduction ≥ 2 , n (%)	NPRS reduction $\geq 30\%$, n (%)	Kujala increase ≥ 10 , n (%)
Dry Needling	21 (100.0)	21 (100.0)	21 (100.0)
Dry Cupping	20 (95.2)	20 (95.2)	16 (76.2)

Table 10 shows that nearly all participants improved in pain, while the functional responder rate was higher with dry needling.

Table 11: Adverse Events Recorded During Intervention Period in Groups

Adverse Event	Dry Needling, n (%)	Dry Cupping, n (%)
Post-Treatment Soreness	3 (14.3)	0 (0.0)
Minor Bleeding	1 (4.8)	0 (0.0)
Bruising	1 (4.8)	1 (4.8)
Transient Dizziness	1 (4.8)	0 (0.0)
Circular Cupping Marks	0 (0.0)	3 (14.3)
Erythema	0 (0.0)	1 (4.8)
No Adverse Event Recorded	15 (71.4)	16 (76.2)

Table 11 reveals that all events were minor and self-limiting. No serious adverse event occurred and no participant withdrew because of an adverse effect.

Discussion

This trial compared dry needling and dry cupping therapy in 42 adults with PFPS, with both groups receiving the same conventional physiotherapy treatment. Both treatments led to significant improvements in pain and function. However, dry needling showed greater improvement at the end of treatment and at the three-month follow-up. The differences between the two groups were statistically significant and also clinically meaningful. At three months, the 1.07 point difference in NPRS was close to the commonly used 2 point threshold for meaningful improvement in musculoskeletal pain. The 9.81 point differences in the Kujala score was within 8-10 point range generally considered meaningful in patients with patellofemoral conditions.

The significant group by time interaction for all three outcomes showed that the two treatments resulted in different patterns of improvement over time, rather than just having differences at the beginning that stayed the same. The difference was most noticeable in knee function. The dry needling group improved by 18.07 points on the Kujala scale during treatment and

improved by another 5.42 points between Week 4 and three months. The dry cupping group improved by 13.72 points during treatment, with only a further 1.29 point improvement during follow-up. After the treatment ended, dry cupping group showed little further improvement, while dry needling group continued to improve during follow-up. The responder analysis showed a similar pattern. At three months, all participants in the dry needling group maintained a meaningful improvement in function, compared with about three quarters of those in dry cupping group.

These findings are similar to previous studies on trigger point dry needling in PFPS. Ma and colleagues found that dry needling of the Vasti and rectus femoris reduced pain and improved neuromuscular performance compared with sham needling (10). Behrangrad and colleagues found that dry needling that dry needling of trigger points in the vastus medialis obliquus helped reduce pain and improve function in patients with unilateral PFPS (11). Needling of trigger points around the knee and hip has also been found to improve function in patients with

anterior knee pain (12). The improvement with dry needling appeared during treatment and continued after treatment ended, suggesting that the number of treatment sessions may be important.

Studies using only one session have generally not found dry needling to be better than sham treatment. In this study, the eight session treatment allowed the same trigger points to be treated repeatedly. One possible reason for this difference is where the mechanical stimulus is applied. Dry needling directly targets the tight muscle band and can produce a local twitch response, which may help reduce pain and improve joint movement after treatment (8, 9). Dry cupping mainly affects the skin and tissues near the surface, so its effect on deeper quadriceps trigger points is indirect. Since trigger points in the quadriceps and hip muscles are more common in people with anterior knee pain than in those without knee symptoms (3, 4). Directly treating these trigger points may therefore result in greater and more lasting improvement.

This does not mean that dry cupping does not work. At three months, the dry cupping group had a mean reduction of 2.62 points in NPRS and had a mean improvement of 15.01 points in the Kujala score. Overall, 95.2% of participants achieved at least a 2 point reduction in pain. This finding is also supported by reviews showing that dry cupping may reduce pain and improve range of motion in different musculoskeletal conditions, although evidence is not equally strong across all conditions (14). Similar results have also been reported in trials involving people with persistent low back pain (15). These findings are also in line with studies that have reported more limited effects of dry cupping. One well controlled sham trial found that dry cupping was not better than placebo cupping for chronic low back pain (16). Therefore, some of the improvements seen in Group B may have come from the conventional physiotherapy given to groups, natural recovery, or other treatment related effects. Since, the study did not have a sham or only physiotherapy group,

we cannot say how much of the improvement was due to the two treatments themselves. The study therefore compares the effects of the two active treatments than showing the separate effect of each treatment.

The safety results were similar for both treatments. The side effects were mild, short lasting and occurred at similar rates in both groups (28.6% versus 23.8%). The reported effects were also expected with each treatment. Dry cupping is non-invasive and does not involve needles, so it may be more suitable for patients who are afraid of needles or cannot have skin penetration, such as those taking anticoagulants. Therefore, dry cupping is still a useful treatment option, while dry needling may offer greater benefits when both treatments are suitable and acceptable to the patient.

Furthermore, there are some limitations to consider when interpreting the findings. The trial was not registered before recruitment. However, the outcomes, assessment time points, and analysis plan were clearly stated in an approved protocol before the study began. Participants and therapists could not be blinded because the two treatments were different, so expectations about the treatment may have affected the results, especially the self-reported outcomes. Blinding the outcome assessor helped reduce this risk but could not remove it completely.

In addition, subjects were recruited from a single clinic using convenience sampling, which may limit the generalizability of the findings. The sample size was calculated to compare the average outcomes between the two groups, not for responder analysis. Therefore, the Fischer's exact test result at three months ($p=0.048$) should be viewed as exploratory. Follow-up was only three months, so it is not known whether the benefit of dry needling lasts longer, especially since PFPS can recur. Muscle strength, pressure pain threshold, and kinesiophobia were also not measured, so the reason for the difference between the two treatments could not be directly explored. As kinesiophobia is linked to disability in patellofemoral pain (2), future studies should

include psychological measures, a sham or physiotherapy only group, and longer follow-up of 6 or 12 months.

Conclusion

In adults with PFPS, both dry needling and dry cupping improved pain and knee function when used along with the standard physiotherapy treatment over eight treatment sessions. Dry needling resulted in greater improvements in activity related and resting pain and knee function at the end of treatment and after three months. The large effect sizes and significant group by time interaction also suggest that patients receiving dry needling showed better improvement over time. Both treatments were well tolerated, and only mild, short-term side effects were reported. When appropriate and acceptable to the patient, dry needling can be used as a myofascial treatment option for PFPS. However, dry cupping is another option for patients who prefer a non-invasive treatment or cannot have dry needling.

Conflict Of Interest

The authors declared that there is no conflict of interest regarding the publication.

REFERENCES

1. Gragnani BC, Hart HF, Forsyth A, Barton CJ, De Oliveira Silva D. Patellofemoral pain is a multifactorial complex condition; are we missing a multidisciplinary approach to its management? Time for a Paradigm Shift. *Open Access Journal of Sports Medicine*. 2026;517971.
2. De Oliveira Silva D, Willy RW, Barton CJ, Christensen K, Pazzinatto MF, Azevedo FM. Pain and disability in women with patellofemoral pain relate to kinesiophobia, but not to patellofemoral joint loading variables. *Scandinavian journal of medicine & science in sports*. 2020;30(11):2215-21.
3. Rozenfeld E, Finestone AS, Moran U, Damri E, Kalichman L. The prevalence of myofascial trigger points in hip and thigh areas in anterior knee pain patients. *Journal of bodywork and movement therapies*. 2020;24(1):31-8.
4. Samani M, Ghaffarinejad F, Abolahrari-Shirazi S, Khodadadi T, Roshan F. Prevalence and sensitivity of trigger points in lumbo-pelvic-hip muscles in patients with patellofemoral pain syndrome. *Journal of Bodywork and Movement Therapies*. 2020;24(1):126-30.
5. Korkmaz MD, Ceylan CM. Effect of dry-needling and exercise treatment on myofascial trigger point: A single-blind randomized controlled trial. *Complementary Therapies in Clinical Practice*. 2022;47:101571.
6. Wang X, Sun Q, Wang M, Chen Y, Wang Q, Liu L, et al. Electrical dry needling plus corticosteroid injection for osteoarthritis of the knee: a randomized controlled trial. *Archives of Physical Medicine and Rehabilitation*. 2022;103(5):858-66.
7. Ma Y-T, Dong Y-L, Wang B, Xie W-P, Huang Q-M, Zheng Y-J. Dry needling on latent and active myofascial trigger points versus oral diclofenac in patients with knee osteoarthritis: a randomized controlled trial. *BMC Musculoskeletal Disorders*. 2023;24(1):36.
8. Cruz-Montecinos C, Cerda M, Becerra P, Tapia C, Núñez-Cortés R, Latorre-García R, et al. Qualitative ultrasonography scale of the intensity of local twitch response during dry needling and its association with modified joint range of motion: a cross-sectional study. *BMC Musculoskeletal Disorders*. 2021;22(1):790.

9. Fernández-de-Las-Peñas C, Plaza-Manzano G, Sanchez-Infante J, Gomez-Chiguano GF, Cleland JA, Arias-Buria JL, et al. The importance of the local twitch response during needling interventions in spinal pain associated with myofascial trigger points: a systematic review and meta-analysis. *Acupuncture in Medicine*. 2022;40(4):299-311.
10. Ma Y-T, Li L-H, Han Q, Wang X-L, Jia P-Y, Huang Q-M, et al. Effects of trigger point dry needling on neuromuscular performance and pain of individuals affected by patellofemoral pain: a randomized controlled trial. *Journal of Pain Research*. 2020:1677-86.
11. Behrangrad S, Abbaszadeh-Amirdehi M, Kordi Yoosefinejad A, Esmailnejadganji SM. Comparison of dry needling and ischaemic compression techniques on pain and function in patients with patellofemoral pain syndrome: a randomised clinical trial. *Acupuncture in Medicine*. 2020;38(6):371-9.
12. Farazdaghi M, Abdollahian N, Rahimi M, Motealleh A. Dry needling trigger points around knee and hip joints improves function in patients with mild to moderate knee osteoarthritis. *Journal of bodywork and movement therapies*. 2021;27:597-604.
13. Nasb M, Qun X, Ruckmal Withanage C, Lingfeng X, Hong C. Dry cupping, ischemic compression, or their combination for the treatment of trigger points: a pilot randomized trial. *The Journal of Alternative and Complementary Medicine: Paradigm, Practice, and Policy Advancing Integrative Health*. 2020;26(1):44-50.
14. Wood S, Fryer G, Tan LLF, Cleary C. Dry cupping for musculoskeletal pain and range of motion: a systematic review and meta-analysis. *Journal of bodywork and movement therapies*. 2020;24(4):503-18.
15. de Melo Salemi M, da Silva Alves Gomes VM, Bezerra LMR, de Souza Melo TM, de Alencar GG, de Melo Montenegro IHP, et al. Effect of dry cupping therapy on pain and functional disability in persistent non-specific low back pain: a randomized controlled clinical trial. *Innovations in Acupuncture and Medicine*. 2021;14(6):219-30.
16. Silva HJA, Barbosa GM, Silva RS, Saragiotto BT, Oliveira JMP, Pinheiro YT, et al. Dry cupping therapy is not superior to sham cupping to improve clinical outcomes in people with non-specific chronic low back pain: a randomised trial. *Journal of physiotherapy*. 2021;67(2):132-9.