Effect of Myofascial Release (MFR) with Cupping in Plantar Fasciitis among Nursing Staff Due to Prolonged Standing

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Abstract

Background:
Plantar fasciitis is a prevalent musculoskeletal disorder characterized by pain and inflammation in the plantar fascia, often aggravated by prolonged standing. Among healthcare professionals, especially nurses, extended working hours and static standing positions contribute significantly to the development of plantar fasciitis. Conventional treatments—such as stretching, orthotics, and medication—offer only temporary relief.

Purpose:
This study aimed to evaluate the effectiveness of Myofascial Release (MFR) combined with Cupping Therapy in alleviating pain and improving functional mobility among nursing staff suffering from plantar fasciitis due to occupational standing.

Methods:
An experimental pre-post intervention design was employed among 40 nursing staff members (aged 25–50 years) diagnosed with plantar fasciitis. Participants received MFR and dry cupping therapy sessions three times weekly for four weeks. Pain intensity was measured using the Visual Analogue Scale (VAS), while foot function was assessed using the Foot Function Index

(FFI) and the Foot and Ankle Ability Measure (FAAM). Pre- and post-intervention comparisons were performed using paired t-tests.

Results:

Post-intervention analysis demonstrated a statistically significant reduction in pain ($p < 0.001$) and improvement in functional scores ($p < 0.01$). Participants reported increased flexibility and reduced morning stiffness. Qualitative feedback indicated enhanced comfort during work shifts.

Conclusion:

MFR combined with cupping therapy is effective in reducing pain, improving fascia mobility, and enhancing work efficiency among nursing staff with plantar fasciitis. Integration of such physiotherapeutic approaches in occupational health programs can improve quality of life and productivity among healthcare professionals.

Keywords:

Myofascial Release, Cupping Therapy, Plantar Fasciitis, Nursing Staff, Prolonged Standing, Occupational Health

1. Introduction

1.1 Background

Plantar fasciitis (PF) is a degenerative and inflammatory condition affecting the thick connective tissue that supports the arch of the foot. It is one of the most frequent causes of heel pain, accounting for approximately 10% of running-related injuries and up to 15% of chronic foot pain cases in the general population. The condition arises primarily due to repetitive microtrauma and overstretching of the plantar fascia, leading to collagen degeneration and chronic pain.

Nursing professionals are particularly prone to PF because their work demands prolonged standing, walking on hard floors, and minimal rest breaks. Extended shifts and inadequate footwear further exacerbate mechanical stress on the plantar fascia. Studies have shown that nurses report foot and heel pain as one of the top three occupational health complaints, leading to absenteeism, reduced productivity, and early fatigue.

1.2 Pathophysiology

Prolonged standing leads to continuous loading of the plantar fascia, causing micro-tears near its origin at the medial calcaneal tubercle. This results in an inflammatory cascade involving fibroblast proliferation, cytokine release, and collagen disorganization. Over time, this degenerative process causes fascial thickening and reduced elasticity, leading to stiffness, pain, and altered gait mechanics.

1.3 Conventional Management

Conservative management of PF includes rest, ice application, NSAIDs, stretching exercises, orthotics, and corticosteroid injections. While these modalities reduce pain temporarily, they often fail to address underlying fascial restrictions. Thus, recurrence rates remain high.

1.4 Role of Physiotherapeutic Interventions

Myofascial Release (MFR) and Cupping Therapy have emerged as promising manual techniques targeting fascia-related dysfunctions.

- **MFR** involves the application of low-load, sustained pressure to release fascial restrictions, restore tissue mobility, and enhance circulation.
- **Cupping Therapy**, an ancient method, creates negative pressure on the skin to promote blood flow, remove stagnation, and release myofascial adhesions.

1.5 Rationale for Combined Approach

Combining MFR with cupping may provide synergistic effects—while MFR mechanically releases fascial tightness, cupping enhances local perfusion and metabolic exchange. This combination could offer superior outcomes in pain reduction and functional restoration compared to single modalities. However, limited empirical evidence exists for this combination in occupationally induced plantar fasciitis, especially among nurses. Hence, this study seeks to fill this research gap.

2. Review of Literature

Several studies have examined manual therapies for plantar fasciitis, demonstrating positive results in pain and function improvement.

2.1 Epidemiological Studies

Riddle & Schappert (2004) reported that plantar fasciitis affects approximately 2 million people annually in the United States, with the highest prevalence among individuals with occupations requiring prolonged standing.

In India, the prevalence among nurses has been reported between 18–25% due to inadequate ergonomic support and excessive load-bearing during shifts.

2.2 Myofascial Release

Barnes (1997) described MFR as a hands-on technique applying gentle sustained pressure into fascial restrictions to eliminate pain and restore motion. A randomized controlled trial by Ajimsha et al. (2014) demonstrated that MFR significantly reduced pain and improved ankle

dorsiflexion in plantar fasciitis patients. The authors attributed this to the viscoelastic property of fascia, allowing elongation and stress reduction with sustained stretching.

2.3 Cupping Therapy

Cupping, part of Traditional Chinese Medicine, functions by creating a vacuum that lifts the skin and superficial fascia. Lauche et al. (2012) found that dry cupping reduces musculoskeletal pain by improving local circulation, stimulating the immune system, and altering pain perception through the gate control mechanism.

Studies by Tham et al. (2018) and Akbarzadeh et al. (2020) revealed significant reductions in pain and stiffness after multiple cupping sessions in plantar fasciitis and myofascial pain syndromes.

2.4 Combined Modalities

Recent literature suggests that combining manual therapies such as MFR and cupping enhances fascial glide and neuromuscular re-education. The integrated approach reduces chronic fascial densification, which single methods may not fully resolve. However, few studies have applied this combination specifically in occupational groups such as nurses.

2.5 Research Gap

While substantial evidence supports MFR or cupping individually, there is insufficient data regarding their combined impact on occupationally induced plantar fasciitis. This study addresses this gap by investigating both pain and functional outcomes among nursing professionals—a population underrepresented in musculoskeletal research.

3. Methodology

3.1 Study Design

An **experimental pre-post intervention study** was conducted to evaluate the effectiveness of combined MFR and cupping therapy in plantar fasciitis among nursing staff.

3.2 Setting and Participants

The study was carried out in the physiotherapy department of a tertiary care hospital. Forty nursing staff members aged 25–50 years, diagnosed with plantar fasciitis, were selected through purposive sampling.

3.3 Inclusion Criteria

- Nursing staff with ≥1 year of experience.

- Heel pain for at least 1 month.
- Positive Windlass test and localized tenderness over the medial calcaneal tubercle.

3.4 Exclusion Criteria

- Previous foot or ankle surgery.
- Neurological disorders affecting gait.
- Skin conditions or varicose veins contraindicating cupping.

3.5 Intervention Protocol

Each participant underwent a four-week treatment protocol consisting of:

- **Myofascial Release:** Direct technique applied over plantar fascia and gastrocnemius-soleus complex using slow, sustained strokes (5–7 min per foot).
- **Cupping Therapy:** Dry cupping applied along the plantar fascia and calf region (5 min duration, negative pressure adjusted for comfort).
- Frequency: 3 sessions/week × 4 weeks = 12 sessions.

All participants continued routine stretching exercises for the lower limb but were advised to avoid NSAIDs and additional therapies.

3.6 Outcome Measures

1. **Pain:** Visual Analogue Scale (VAS)
2. **Function:** Foot Function Index (FFI), Foot and Ankle Ability Measure (FAAM)
3. **Flexibility:** Ankle dorsiflexion range and Windlass test
4. **Work Performance:** Subjective nurse comfort scale

3.7 Data Analysis

Statistical analysis was performed using SPSS v25. Mean ± SD values were calculated. Paired t-tests compared pre- and post-intervention outcomes. A p-value < 0.05 was considered statistically significant.

4. Results

4.1 Participant Characteristics

Parameter	Mean ± SD
Age (years)	36.2 ± 6.8
Duration of heel pain (months)	4.1 ± 1.9
Standing hours/day	9.3 ± 1.5

4.2 Pain and Functional Outcomes

Variable	Pre-test Mean ± SD	Post-test Mean ± SD	p-value
VAS (Pain)	7.2 ± 0.8	2.9 ± 0.7	<0.001
FFI Score	65.4 ± 9.2	42.1 ± 7.8	<0.001
FAAM	58.6 ± 8.5	76.9 ± 7.2	<0.01

A significant improvement was observed across all parameters. Participants reported reduced morning stiffness and improved endurance during prolonged shifts.

4.3 Qualitative Feedback

Interviews revealed that most participants experienced noticeable pain relief after 3–4 sessions. Several reported better sleep, reduced limping, and enhanced work comfort.

5. Discussion

The findings of this study support the hypothesis that the combination of MFR and cupping significantly reduces pain and improves functional ability in plantar fasciitis. The results align with prior studies emphasizing the importance of fascial manipulation in musculoskeletal pain syndromes.

Mechanism of Action:

- **MFR** acts by restoring fascial extensibility, reducing tension within the plantar fascia, and facilitating neuromuscular re-education.
- **Cupping** enhances local microcirculation and lymphatic drainage, reducing metabolic waste and inflammatory mediators.

The combined effect produces both mechanical and neurophysiological benefits, leading to faster pain relief and tissue recovery.

Occupational Relevance:

Given that nurses often experience repetitive loading due to long shifts, incorporating manual therapy sessions as part of workplace physiotherapy programs can prevent chronicity and enhance occupational health.

Comparison with Literature:

Results are consistent with Ajimsha et al. (2014) and Tham et al. (2018), who reported that manual techniques are superior to conventional stretching alone. This study extends those findings by focusing on a specific occupational group.

Clinical Implications:

- MFR with cupping can be adopted as a first-line physiotherapeutic approach for occupational heel pain.
- It is cost-effective, non-invasive, and easily administered within hospital settings.

Conclusion

The findings of this research underscore the remarkable potential of combining **Myofascial Release (MFR)** and **Cupping Therapy** as a therapeutic strategy in the management of **plantar fasciitis among nursing staff** who are chronically exposed to the biomechanical stresses of prolonged standing. Plantar fasciitis is not merely an isolated musculoskeletal disorder but a multifactorial occupational health concern that significantly impacts the physical efficiency, productivity, and quality of life of healthcare professionals. This study, by exploring the physiological, functional, and occupational dimensions of plantar fasciitis, offers a comprehensive understanding of both its etiology and the rehabilitative possibilities offered through integrative physiotherapy modalities.

Synthesis of Findings

The present investigation revealed that the combination of MFR and cupping therapy significantly reduced pain intensity and improved functional mobility among participants. Quantitatively, the reduction in **Visual Analogue Scale (VAS)** scores and improvement in **Foot Function Index (FFI)** and **Foot and Ankle Ability Measure (FAAM)** demonstrate measurable improvements in both subjective and objective parameters. Participants reported substantial relief in morning stiffness, tenderness at the calcaneal attachment, and discomfort during prolonged standing or ambulation. These improvements were not transient but persisted through the intervention period, indicating sustainable fascial and vascular adaptations.

The synergistic mechanism underlying these results can be attributed to the complementary effects of MFR and cupping. **Myofascial Release** targets the fascial restrictions and adhesions within the plantar fascia, gastrocnemius, and soleus muscles, improving elasticity and restoring normal fascial glide. In contrast, **Cupping Therapy** enhances localized microcirculation, facilitates metabolic waste removal, and modulates the autonomic nervous system through neurovascular stimulation. Together, they provide both mechanical and physiological relief—enhancing tissue oxygenation, reducing inflammation, and improving proprioceptive feedback. These findings align with earlier studies (Ajimsha et al., 2014; Lauche et al., 2012), which emphasized the benefits of manual therapy in restoring fascial mobility and pain modulation. However, the present research is unique in its focus on occupationally induced plantar fasciitis, thus extending the clinical relevance of these modalities to workplace ergonomics and preventive healthcare.

Occupational Relevance

Nursing professionals often stand or walk for 8–12 hours per shift, frequently on hard surfaces, and often without adequate footwear support. Repetitive loading of the plantar fascia leads to microtears and chronic inflammation, ultimately resulting in heel pain, reduced gait efficiency, and absenteeism. In this context, the intervention proposed in this study provides a **non-invasive, cost-effective, and easily applicable physiotherapeutic solution** for occupational injury prevention and management.

The improvement in functional indices (FFI and FAAM) observed in this study suggests that beyond mere pain relief, participants regained confidence in their daily mobility, posture, and physical endurance. This has profound implications for the healthcare system: reducing fatigue-related errors, minimizing sick leaves, and promoting overall occupational wellness. By addressing the root cause rather than the symptomatology, the combined MFR and cupping protocol could serve as a standard adjunct in ergonomic health programs within hospitals and healthcare settings.

Physiological Interpretation

The therapeutic effect of the combined intervention can be explained by the **biomechanical and neurophysiological models** of pain and fascia. MFR exerts sustained pressure on myofascial restrictions, leading to viscoelastic deformation and release of fascial crosslinks, thereby reducing tensile stress on the plantar fascia. This mechanism improves the alignment of collagen fibers and enhances the range of motion of the ankle and subtalar joints. Cupping, by creating negative pressure, induces a form of controlled hyperemia, which improves microcirculatory dynamics and lymphatic drainage.

Furthermore, both modalities activate **mechanoreceptors and nociceptors**, thereby influencing pain gating mechanisms and central sensitization. The resultant increase in tissue temperature and perfusion not only accelerates healing but also promotes metabolic recovery. The mechanical stretch induced by MFR, combined with the vacuum effect of cupping, leads to a more profound release of fascial layers compared to either modality used alone.

Comparison with Previous Studies

Several prior investigations have examined the role of MFR in musculoskeletal disorders, but few have focused on plantar fasciitis in occupational contexts. The results of this study reinforce the evidence base supporting manual therapies as effective alternatives or adjuncts to conventional treatments such as ultrasound, orthotics, or corticosteroid injections. While corticosteroid therapy offers short-term relief, it carries risks such as tissue degeneration and recurrence. In contrast, MFR with cupping offers sustainable improvements without adverse effects, supporting the growing global shift toward **non-pharmacological pain management**. Comparatively, studies by Tham et al. (2018) and Rozenfeld et al. (2020) have shown cupping therapy to improve blood flow and reduce pain in myofascial pain syndromes. When combined

with targeted fascial release, as demonstrated in the present study, the outcome becomes multidimensional—addressing both the local fascial stiffness and the systemic pain perception.

Implications for Clinical Practice

The implications of this research extend beyond individual symptom relief to institutional healthcare management. Integrating MFR with cupping therapy within regular physiotherapy sessions for nurses could dramatically reduce the burden of musculoskeletal disorders. Hospitals and occupational health departments can implement this intervention as part of **preventive physiotherapy protocols**, coupled with ergonomic education, proper footwear advisories, and scheduled rest periods.

Moreover, physiotherapists can incorporate this combination therapy as part of **multimodal rehabilitation plans** for workers in other standing-intensive occupations such as retail, teaching, and manufacturing. Its simplicity, safety, and affordability make it accessible even in low-resource settings, expanding its potential reach and impact.

Limitations and Challenges

While the study produced promising results, certain limitations must be acknowledged. The sample size was moderate, which may limit the generalizability of the findings. The study duration was relatively short (four weeks), preventing the observation of long-term recurrence or maintenance effects. Additionally, factors such as footwear type, BMI, and individual gait patterns could influence outcomes but were not controlled.

Moreover, cupping therapy's outcomes can vary based on suction intensity, cup material, and application duration. Similarly, MFR efficacy depends on therapist skill, pressure accuracy, and fascial response variability. Future studies should adopt standardized intervention protocols, larger sample sizes, and extended follow-up durations to confirm these findings.

Future Directions

The study opens several promising avenues for further exploration. Future research could investigate:

1. **Comparative efficacy** of MFR + cupping versus other physiotherapy modalities like shockwave therapy, stretching, or ultrasound.
2. **Longitudinal studies** assessing recurrence rates after cessation of therapy.
3. **Biomechanical gait analyses** to quantify improvements in plantar loading and arch mechanics.
4. **Neurophysiological assessments** using EMG or thermography to understand tissue-level responses.
5. **Integration of ergonomic training programs** with manual therapy interventions for holistic occupational health management.

Moreover, the use of **digital tools**—such as wearable gait trackers or AI-based pressure mapping—could further refine the monitoring of intervention progress. Combining traditional manual therapy with modern technology would represent a powerful blend of evidence-based rehabilitation and personalized care.

Practical Recommendations

From a clinical standpoint, implementing short 15–20-minute MFR and cupping sessions thrice weekly can be an effective therapeutic routine for nursing professionals. Supervising physiotherapists should ensure individualized pressure calibration and gradual progression to avoid overstimulation. Post-therapy stretching and patient education on posture, footwear, and self-mobilization techniques can enhance long-term benefits.

Hospital administrators should consider allocating dedicated physiotherapy slots during shift transitions, thereby preventing chronic musculoskeletal fatigue. Awareness workshops emphasizing the importance of early intervention can reduce chronicity and improve staff well-being.

Overall Conclusion

In summary, this research establishes that the **integrated application of Myofascial Release and Cupping Therapy is a highly effective, safe, and sustainable approach** for alleviating plantar fasciitis symptoms among nursing staff subjected to prolonged standing. The combination not only reduces pain but also restores functional mobility, enhances tissue health, and improves occupational efficiency.

Beyond clinical recovery, this therapeutic model offers a **holistic pathway to occupational wellness**, blending biomechanical correction with physiological healing. It reaffirms the need to shift from symptom-based management to preventive, person-centered physiotherapy strategies.

The broader implication of this work lies in recognizing plantar fasciitis not merely as a localized inflammation but as a **systemic fascial dysfunction** influenced by occupational, biomechanical, and postural dynamics. Addressing it through evidence-based manual therapy—rather than solely pharmacological means—signifies a paradigm shift toward sustainable rehabilitation.

Therefore, integrating **MFR with cupping therapy** within workplace physiotherapy and ergonomic health frameworks is not only clinically sound but also economically and socially beneficial. Such integrative rehabilitation approaches can transform workplace health standards, reduce the prevalence of repetitive strain injuries, and foster a culture of preventive care within the healthcare workforce.

Ultimately, this study contributes meaningfully to the growing body of physiotherapy literature supporting fascial and cupping-based interventions. It advocates for continued interdisciplinary research that merges ancient therapeutic wisdom with modern evidence-based practice, ensuring that frontline healthcare providers receive the same compassionate care they tirelessly deliver to others.

Limitations

While the present study demonstrated significant improvements following the combined application of Myofascial Release (MFR) and Cupping Therapy in managing plantar fasciitis among nursing staff, several limitations must be acknowledged to provide context for the findings.

Firstly, the **sample size** was relatively small, which may limit the generalizability of the results to the wider population of healthcare professionals. A larger, more diverse sample would enhance the statistical power and external validity of the conclusions. Secondly, the **duration of the intervention** was limited to four weeks, which may not reflect the long-term sustainability or recurrence rate of symptom relief. Longitudinal studies with extended follow-up are necessary to determine lasting benefits.

Additionally, **individual variations** such as body mass index, foot arch structure, footwear type, and daily workload were not strictly controlled, and these factors could influence treatment outcomes. The **lack of a control group** receiving either MFR or cupping alone also restricts the ability to isolate the specific contribution of each modality.

Moreover, the **subjective nature of outcome measures** like the Visual Analogue Scale (VAS) and Foot Function Index (FFI) may introduce reporting bias, despite their clinical relevance. Lastly, the study setting involved a single institution, which may not capture environmental or ergonomic variations across different hospitals.

Despite these limitations, the findings provide valuable preliminary evidence supporting the integration of MFR with cupping therapy for occupational plantar fasciitis and pave the way for larger, multicentric randomized controlled trials.

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