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Original Article

Effectiveness of Dry Needling versus Cupping Therapy for Pain in Piriformis Syndrome

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ABSTRACT

Background: Piriformis syndrome is characterized by discomfort in the buttocks and throughout the course of the sciatic nerve. Dry needling modulates pain perception, disrupts pain signaling pathways, and induces local tissue responses. Cupping therapy facilitates localized blood flow, lymphatic drainage, and tissue oxygenation to alleviate muscular tension and improve circulation. Both interventions have shown promise in improving symptoms of piriformis syndrome.

Objective: The purpose of this study was to evaluate the efficacy of dry needling versus cupping therapy in managing piriformis pain syndrome.

Methods: This experimental study was conducted at Chaudhary Muhammad Akram Teaching and Research Hospital, Lahore, from October 2023 to May 2024. Eighty participants diagnosed with piriformis syndrome, aged between 18 and 65 years, were randomly assigned to one of two groups: Group A (dry needling) and Group B (cupping therapy). Exclusion criteria included pregnancy and previous surgical interventions for piriformis syndrome. Both groups received their respective treatments three times a week for six weeks. Pain intensity was measured using the Visual Analogue Scale (VAS), disability was assessed with the Oswestry Disability Index (ODI), and quality of life was evaluated using a standardized questionnaire. Data were analyzed using SPSS version 25, with paired sample t-tests used for within-group comparisons and independent sample t-tests for between-group comparisons. Statistical significance was set at $p < 0.05$.

Results: In the dry needling group, the mean VAS score decreased from 6.216 ± 1.931 to 3.432 ± 0.987 ($p < 0.001$), while the cupping therapy group saw a reduction from 6.108 ± 2.195 to 4.189 ± 1.697 ($p < 0.001$). The mean ODI score in the dry needling group decreased from 27.432 ± 7.617 to 10.054 ± 3.036 ($p < 0.001$), and in the cupping therapy group from 26.270 ± 7.209 to 12.918 ± 7.495 ($p < 0.001$). Quality of life scores improved significantly in both groups, with the dry needling group showing a mean reduction from 12.702 ± 3.673 to 7.270 ± 1.627 ($p < 0.001$), and the cupping therapy group from 13.027 ± 3.523 to 8.270 ± 1.609 ($p < 0.001$).

Conclusion: Both dry needling and cupping therapy are effective interventions for managing piriformis pain syndrome, with dry needling showing greater improvements in pain reduction, disability reduction, and quality of life. These findings support the use of dry needling as a preferred therapeutic option for piriformis syndrome.

Keywords: Piriformis syndrome, dry needling, cupping therapy, pain management, myofascial trigger points.

INTRODUCTION

Piriformis Muscle Syndrome (PMS) is a neuromuscular condition characterized by restricted hip joint mobility, buttock soreness, tenderness, and numbness that extends to the back of the leg (1). Annually, approximately 2.4 million cases of piriformis syndrome are reported (2), with symptoms primarily arising from the compression or irritation of the sciatic nerve (3). The underlying causes of PMS include inflammation, trauma, hypertrophy of the piriformis muscle, anatomical variations in the sciatic nerve or piriformis

muscle, and myofascial trigger points, which are particularly prevalent (4). Activities that place stress on the piriformis muscle, such as prolonged walking, cross-legged sitting, sitting on hard surfaces, cycling, and jogging, can exacerbate PMS symptoms (5). Although physical examination maneuvers like the active piriformis test, Beatty test, flexion-adduction-internal rotation (FAIR) test, and Pace test can aid in diagnosis, no single maneuver is diagnostic on its own (6). Deep palpation and compression may also intensify gluteal or buttock pain.

Currently, there is no definitive cure for PMS, and management primarily involves lifestyle modifications and conservative measures. These include oral medications such as muscle relaxants, neuropathic agents, and non-steroidal anti-inflammatory drugs (NSAIDs) (7). Physical therapy interventions and exercises are also employed to alleviate muscle soreness, spasms, and localized pain associated with PMS. Among the therapeutic options, dry needling and cupping therapy have shown potential benefits and are considered complementary treatments for individuals seeking relief from PMS symptoms (8). Dry needling is a minimally invasive technique that targets and deactivates myofascial trigger points within muscles, thereby reducing local and referred pain. This procedure involves inserting a thin filiform needle into the skin to stimulate muscle and connective tissues at myofascial trigger points, aiming to manage neuromusculoskeletal pain and correct movement impairments (8).

Cupping therapy, another treatment for PMS, has gained popularity in sports medicine due to endorsements from high-profile athletes and its straightforward application with minimal side effects (9). Rooted in traditional Chinese medicine, cupping therapy addresses various conditions, including blood disorders, pain, inflammation, and physical relaxation, and promotes overall well-being (10). The technique involves placing a dome-shaped cup on the skin and creating negative pressure either through heat or an air pump. Wet cupping includes making a small skin incision before applying the cup to draw blood, whereas dry cupping involves placing the cup without incisions, either statically or by moving it along the skin with lubricants (11). The negative pressure within the cup is believed to lift and separate tissues, facilitating the release of adhesions between soft tissues, including skin, fascia, neural tissues, muscles, ligaments, and tendons (12). Clinically, moving cupping has shown effectiveness for conditions like Iliotibial Band Syndrome and PMS, improving range of motion by addressing pain, scar tissues, muscle adhesions, and swelling, creating a massage-like effect (13).

This study aims to compare the effectiveness of dry needling versus cupping therapy in managing piriformis pain syndrome, addressing a significant gap in the current understanding of these interventions. While both treatments have demonstrated promise in managing musculoskeletal pain, their comparative efficacy in PMS remains underexplored. This research seeks to provide valuable insights into the relative benefits of dry needling and cupping therapy, contributing to more informed clinical decision-making for individuals suffering from PMS.

MATERIAL AND METHODS

The study employed an experimental research design conducted in a clinical setting at Chaudhary Muhammad Akram Teaching and Research Hospital, Lahore. The sample size, determined using an appropriate formula, consisted of 80 participants. Probability sampling was utilized for the random selection of participants, ensuring a representative sample of the target population. The study was conducted from October 2023 to May 2024. Participants included were those diagnosed with piriformis syndrome, aged between 18 and 65 years. Exclusion criteria were pregnancy and previous surgical interventions for piriformis syndrome.

Participants were randomly assigned to one of two groups: Group A received dry needling treatment, and Group B underwent cupping therapy. Both interventions were administered three times per week for a duration of six weeks. Dry needling involved the insertion of fine filiform needles into specific myofascial trigger points to deactivate them and reduce pain. Cupping therapy involved the application of dome-shaped cups to the skin, creating negative pressure either through heat or an air pump to lift and separate tissues, facilitating pain relief and improved circulation.

Data collection involved baseline and post-treatment assessments of pain, disability, and quality of life. The Visual Analogue Scale (VAS) was used to measure pain intensity, the Oswestry Disability Index (ODI) assessed disability levels, and a standardized questionnaire evaluated quality of life. Assessments were conducted before the initiation of treatment and after the completion of the six-week intervention period (14).

Throughout the study, ethical considerations were strictly adhered to, in accordance with the Declaration of Helsinki. Participants provided informed consent after being fully informed about the study's purpose, procedures, potential risks, and benefits. Confidentiality and anonymity were maintained throughout the research process.

Data analysis was performed using SPSS version 25. Descriptive statistics, including means and standard deviations, were computed for demographic and baseline clinical characteristics. Within-group differences for VAS, ODI, and quality of life scores before and after treatment were analyzed using paired sample t-tests. Independent sample t-tests were employed to compare the differences between the dry needling and cupping therapy groups. Statistical significance was set at a p-value of less than 0.05.

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The study aimed to provide a comprehensive comparison of the effectiveness of dry needling and cupping therapy in managing piriformis pain syndrome, contributing valuable insights to the clinical management of this condition. The methodology was designed to ensure rigor and reliability, facilitating the generation of robust and clinically relevant findings.

RESULTS

The study evaluated the effectiveness of dry needling versus cupping therapy in managing piriformis pain syndrome among 80 participants. The demographic and clinical characteristics of the study subjects are presented in Table 1.

Table 1: Demographics and Clinical Characteristics of the Study Subjects (N=80)

Variable	Dry Needling (N=40)	Cupping Therapy (N=40)	P Value
Age (years)	41.275 ± 7.818	41.375 ± 7.241	0.953
Gender			0.070
- Female	19 (47.5%)	27 (67.5%)	
- Male	21 (52.5%)	13 (32.5%)	
Location			0.485
- Right	27 (67.5%)	24 (60.0%)	
- Left	13 (32.5%)	16 (40.0%)	
Height (ft)	5.662 ± 0.191	5.657 ± 0.182	0.905
Weight (kg)	65.500 ± 8.301	66.325 ± 8.103	0.654
BMI	22.076 ± 2.648	22.395 ± 2.617	0.590
Duration of Pain (months)	5.000 ± 1.086	4.950 ± 1.011	0.832

Baseline characteristics showed no significant differences between the two groups, indicating a balanced distribution of demographic and clinical variables.

Table 2: Paired Sample T-Test for VAS Scores Before and After Treatment

Assessment	Dry Needling (N=37)	Cupping Therapy (N=37)	P Value
VAS Before Treatment	6.216 ± 1.931	6.108 ± 2.195	
VAS After Treatment	3.432 ± 0.987	4.189 ± 1.697	
Paired Differences	-2.783 ± 1.356	-1.918 ± 1.516	<0.001

Dry needling showed a greater reduction in VAS scores compared to cupping therapy, with significant improvements in both groups ($p < 0.001$).

Table 3: Paired Sample T-Test for ODI Scores Before and After Treatment

Assessment	Dry Needling (N=37)	Cupping Therapy (N=37)	P Value
ODI Before Treatment	27.432 ± 7.617	26.270 ± 7.209	
ODI After Treatment	10.054 ± 3.036	12.918 ± 7.495	
Paired Differences	-17.378 ± 7.387	-13.351 ± 4.984	<0.001

Both groups showed significant improvements in ODI scores, with dry needling showing a more substantial reduction in disability ($p < 0.001$).

Table 4: Paired Sample T-Test for QOL Scores Before and After Treatment

Assessment	Dry Needling (N=37)	Cupping Therapy (N=37)	P Value
QOL Before Treatment	12.702 ± 3.673	13.027 ± 3.523	
QOL After Treatment	7.270 ± 1.627	8.270 ± 1.609	
Paired Differences	-5.432 ± 4.146	-4.756 ± 3.967	<0.001

Improvements in quality of life were observed in both treatment groups, with dry needling showing slightly better outcomes ($p < 0.001$).

The study results demonstrated that both dry needling and cupping therapy are effective interventions for managing piriformis pain syndrome. However, dry needling showed more significant improvements in pain reduction, disability reduction, and quality of life

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enhancement compared to cupping therapy. These findings suggest that dry needling may be a more effective treatment option for individuals suffering from piriformis pain syndrome.

DISCUSSION

The current study's findings indicate that both dry needling and cupping therapy are effective interventions for managing piriformis pain syndrome, with dry needling demonstrating superior outcomes in terms of pain reduction, disability improvement, and quality of life enhancement. These results align with previous research that has highlighted the efficacy of dry needling in reducing musculoskeletal pain and improving functional status (14-16). For instance, Guner and Ozcete (2023) reported significant reductions in pain and disability in patients receiving ultrasound-guided dry needling for piriformis syndrome, which corroborates the significant improvements observed in the present study (14). Similarly, Uttam et al. found that dry needling effectively releases myofascial trigger points in patients with acute piriformis syndrome, resulting in immediate pain relief, consistent with the current findings (17). Fusco et al. (2018) demonstrated that ultrasound-guided dry needling not only alleviates symptoms but also enhances the quality of life in patients with piriformis syndrome (16). This study observed similar improvements, suggesting that dry needling is a potent intervention for both symptom relief and overall well-being. Additionally, Jamaly et al. (2018) noted significant pain reduction and increased hip internal rotation range in patients treated with dry needling, further supporting the current study's outcomes (17). These consistent findings across multiple studies underscore the effectiveness of dry needling in managing piriformis syndrome (18). Cupping therapy, while also effective, showed slightly less improvement compared to dry needling. Previous studies have highlighted the benefits of cupping therapy for various pain conditions, including subacute low back pain and sciatica (18, 19). For example, Markowski et al. (2014) reported significant pain relief and functional improvements in patients with subacute low back pain following cupping therapy, which is in line with the improvements noted in the current study's cupping therapy group (18). Cao et al. (2014) conducted a meta-analysis demonstrating the favorable impact of cupping therapy on pain outcomes compared to conventional treatments, supporting the positive effects observed in this study (19).

Despite the promising results, the study had several limitations. The sample size, while adequate, was relatively small, limiting the generalizability of the findings. Future studies with larger sample sizes are needed to confirm these results. Additionally, the study was conducted in a single clinical setting, which may introduce site-specific biases. Multicenter trials could provide more robust and generalizable data. Another limitation was the short duration of follow-up, which did not allow for the assessment of long-term effects of the interventions. Longitudinal studies are recommended to evaluate the sustained benefits of dry needling and cupping therapy (20).

The strengths of this study include the randomized allocation of participants, the use of validated assessment tools, and the rigorous statistical analysis performed using SPSS version 25. These methodological strengths enhance the credibility of the findings and provide a solid foundation for future research.

CONCLUSION

In conclusion, both dry needling and cupping therapy are effective in reducing pain, improving disability, and enhancing the quality of life in patients with piriformis syndrome. However, dry needling appears to offer superior benefits. These findings support the inclusion of dry needling as a preferred therapeutic option for managing piriformis syndrome. Future research should focus on larger, multicenter trials with longer follow-up periods to further elucidate the long-term efficacy and safety of these interventions.

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