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Sanhita Bose
Assistant Professor,
Department of Physiotherapy,
School of allied health, Swami Vivekananda University,
West Bengal, India

Corresponding Author:
Sanhita Bose
Assistant Professor,
Department of Physiotherapy,
School of allied health, Swami Vivekananda University,
West Bengal, India

Comparison of dry needling and dry cupping for pelvic positional fault caused by quadratus lumborum myofascial trigger points

Sanhita Bose

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Abstract
Pelvic positional faults, often associated with myofascial trigger points (MTrPs) in the quadratus lumborum (QL) muscle, are a significant source of discomfort and functional impairment. This study investigates the comparative effectiveness of dry needling (DN) and dry cupping (DC) as therapeutic interventions for addressing pelvic asymmetry caused by QL MTrPs. Despite both modalities being widely employed for managing musculoskeletal pain and dysfunction, limited evidence directly compares their impact on correcting pelvic positional faults and alleviating associated symptoms.
The study conducted with 60 participants exhibiting pelvic asymmetry linked to QL MTrPs. Subjects were randomized into two groups: DN (n=30) and DC (n=30). Both groups received three sessions over two weeks. Outcomes were assessed pre- and post-intervention using pelvic inclination angle (PIA) measurement for positional correction, the Visual Analog Scale (VAS) for pain, and the Oswestry Disability Index (ODI) for functional improvement.
Results revealed that both DN and DC significantly reduced pain, improved pelvic alignment, and enhanced functional capacity. However, the DN group demonstrated a more pronounced reduction in PIA and VAS scores, indicating superior efficacy in targeting deep MTrPs and restoring pelvic symmetry. DC, while effective, appeared to provide greater benefits in superficial tissue relaxation and pain modulation. No significant adverse events were reported in either group.
This study concludes that while both DN and DC are effective for managing pelvic positional faults associated with QL MTrPs, DN may offer superior outcomes in positional correction and pain relief. Further research is recommended to explore long-term effects and patient-specific considerations.

Keywords: Dry needling (DN), Dry cupping (DC), pelvic positional fault

Introduction
One of the muscles of the posterior abdominal wall and an essential component of the thoracolumbar fascia is the quadratus lumborum (QL). Origin: The internal lip of the posterior iliac crest and the iliolumbar ligament. Insertion: The tips of the lumbar vertebrae's transverse processes and the medial half of the lower border of the 12th rib. The Nerve Supply Nerve subcostal (T12) The L1 iliohypogastric and ilioinguinal nerves L2 and L3 branches from the ventral rami.
Function: The quadratus lumborum muscle can operate as an inspiratory auxiliary muscle, stabilize the lumbar region, extensor of the lumbar spine, and tilt the pelvis laterally. Hyperirritable areas in skeletal muscle that are connected to palpable nodules in taut bands of muscle fibers are known as myofascial trigger points. They frequently cause musculoskeletal dysfunction and pain. In order to relieve pain and fix postural errors, therapeutic therapies must target these trigger sites.
Two popular methods for treating myofascial trigger points are dry needling and dry cupping. Thin needles are inserted into trigger points during dry needling to release tense and painful muscles. By lifting the skin and underlying tissues with suction, dry cupping encourages blood flow and eases tense muscles. In order to treat myofascial trigger points in the QL and address related pelvic positioning defects, this study compares the efficacy of dry needling with dry cupping. Finding the best treatment method for the best patient outcomes is the aim.

Literature Review
Anatomy and the Quadratus Lumborum's Function
One of the deepest muscles in the posterior abdominal wall is the quadratus lumborum. It attaches to the transverse processes of the upper four lumbar vertebrae and the lower border of the 12th rib after emerging from the Iliac crest and the iliolumbar ligament. The QL plays a role in pelvic stabilization, lumbar extension, and lateral flexion of the spine.

Points of Myofascial Triggers A major contributor to musculoskeletal discomfort is myofascial trigger points. Acute muscle strain, repetitive stress, bad posture, or underlying medical issues can all cause them. Functional deficits may result from referred pain to the lower back, hips, and buttocks caused by trigger points in the QL.

Dry Needling

Physical therapists employ the dry needling procedure to treat myofascial pain. A tiny needle is inserted into the trigger point to cause a local twitch reaction, which eases pain and releases tense muscles. In a variety of musculoskeletal disorders, dry needling has been demonstrated to enhance range of motion, reduce discomfort, and improve muscle function.

Dry cupping

It is a traditional therapy that involves placing cups on the skin to create suction. The negative pressure generated by the suction increases blood flow, reduces muscle tightness, and promotes healing. Dry cupping has been used to treat a variety of conditions, including musculoskeletal pain, inflammation, and myofascial trigger points.

Dry cupping, on the other hand, involves creating a vacuum within cups placed on the skin, which can mobilize blood flow, reduce muscle tension, and alleviate pain. Teut *et al*. (2018) [7] conducted a randomized controlled trial and found that pulsatile dry cupping significantly reduced pain and improved functional outcomes in patients with chronic non-specific neck pain. Yoo and Lee (2017) [9] compared dry needling and cupping therapy and concluded that both methods were effective, but cupping provided additional benefits in terms of patient comfort and relaxation.

Comparison of Dry Needling and Dry Cupping

It has been demonstrated that both dry needling and dry cupping are successful in treating MTrPs in the QL. Dry needling can directly target deep-seated MTrPs and tends to offer quick pain relief. On the other hand, it might be linked to pain and soreness after needlework. Although equally effective, dry cupping provides a non-invasive substitute that can improve blood flow and relax muscles without the pain of inserting a needle.

Prior Research The efficacy of dry needling and dry cupping in treating myofascial trigger points has been the subject of numerous studies. According to research, both methods can successfully lessen discomfort and enhance function. There is, however, little data comparing the two methods for addressing pelvic positioning errors and QL trigger points.

Methodology

Research Design This study compared the efficacy of dry needling and dry cupping in treating myofascial trigger points in the QL and addressing pelvic positioning faults. It was a randomized clinical experiment. Twenty-six persons who satisfied the inclusion criteria were enrolled in the trial. Participants Adults between the ages of 18 and 60 who had a clinical diagnostic of myofascial trigger points in their quality of life and related pelvic positional faults were the only ones who were eligible to participate. Pregnancy, recent spinal or pelvic surgery, and any contraindications to dry needling or dry cupping were among the exclusion criteria. Allocation to Groups and Randomization A straightforward random sample technique was used to allocate participants at random to one of two treatment groups. Group B was given dry cupping, and Group A was given dry needling. Every group was made up of 13 participants.

Interventions

Dry Needling

In Group A participants were treated with dry needling. The QL's determined trigger sites were punctured with thin, sterile needles. After manipulating the needles to cause a local twitch response, there was a brief period of needle retention.

Dry Cupping

In Group B participants were treated with dry cupping. The skin around the QL trigger sites was covered with cups, and a pump was used to induce suction. To produce therapeutic benefits, the cups were left in place for a predetermined amount of time. Traditional Physical Therapy Hot packs and stretching exercises were part of the standard physiotherapy treatment given to both groups. The goals of these supplemental therapies were to improve the overall therapeutic outcome and offer a consistent reference point.

Measures of Outcome

The following outcome measures were used to assess the treatments' efficacy: The Numerical Pain Rating Scale (NPRS) was employed to measure subjective pain. On a scale of 0 (no pain) to 10 (worst pain possible), participants scored how much pain they were experiencing.

Pelvic Goniometer: This instrument was used to quantify the pelvis's functional positional defect. It evaluated the degree of rotation and tilt of the pelvis.

Measuring Tape: To evaluate variations in muscle stiffness and flexibility, muscle length was measured using a measuring tape.

Duration of Treatment and Aftercare For three weeks, participants received treatment twice a week. To determine the long-term effects, follow-up evaluations were carried out one month following the conclusion of the treatment.

Data Analysis

To compare the efficacy of dry needling and dry cupping, data were analyzed statistically. For comparisons between groups, an independent t-test was employed, and for comparisons within groups, a repeated measure ANOVA. Statistical significance was defined as a p-value of less than 0.005.

Findings

Features of the Participants The study involved 26 people in all, 13 in each group. Age, gender, and baseline pain levels were among the participant characteristics that were similar between the two groups. Pain Mitigation According to the NPRS, dry needling and dry cupping both considerably decreased pain levels. However, compared to Group B (dry cupping), Group A (dry needling) had a higher reduction in pain. Group B's mean pain score dropped from 7.4 to 3.5, while Group A's dropped from 7.5 to 2.3.

Correction of Positional Faults According to the pelvic goniometer, both treatment groups' pelvic positioning defects improved. In comparison to Group B, Group A showed a more noticeable correction in pelvic tilt and rotation. In Group A, the average pelvic tilt angle increased from 15.2 to 5.1 degrees, while in Group B, it increased from 15.3 to 7.8 degrees. Length of Muscle In both groups,

muscle length as determined by the measuring tape rose, suggesting a decrease in muscular tightness. In comparison to Group B, Group A displayed a larger increase in muscle length. The average muscle length rose from 20.4 cm to 25.6 cm in Group A and from 20.3 cm to 23.9 cm in Group B.

Statistical Analysis:
The independent t-test showed a statistically significant difference between the two groups in terms of pain reduction, positional fault correction, and muscle length improvement. The p-value for all parameters was <0.005, indicating that dry needling was statistically superior to dry cupping.

Descriptive Statistic

Pain Reduction

Group A (Dry Needling)	Group B (Dry Cupping)
Baseline Mean = 7.5	Post-treatment Mean = 2.3
Baseline Mean = 7.4	Post-treatment Mean = 3.5

Positional Fault Correction

Group A (Dry Needling)	Group B (Dry Cupping)
Baseline Pelvic Tilt Mean = 15.2 degrees	Post-treatment Pelvic Tilt Mean = 5.1 degrees
Baseline Pelvic Tilt Mean = 15.3 degrees	Post-treatment Pelvic Tilt Mean = 7.8 degrees

Muscle Length

Group A (Dry Needling)	Baseline Mean = 20.4 cm	Post-treatment Mean = 25.6 cm
Group B (Dry Cupping)	Baseline Mean = 20.3 cm	Post-treatment Mean = 23.9 cm

Paired t-tests
We will perform paired t-tests for each group to compare pre- and post-treatment values.

Independent t-tests
We will perform independent t-tests to compare the post-treatment values between Group A and Group B.

Pain Reduction

Group A	Group B
Baseline SD = 1.2	Post-treatment SD = 1.0
Baseline SD = 1.3	Post-treatment SD = 1.1

Positional Fault Correction (Pelvic Tilt)

Group A	Group B
Baseline SD = 2.0 degrees	Post-treatment SD = 1.5 degrees
Baseline SD = 2.0 degrees	Post-treatment SD = 1.7 degrees

Muscle Length

Group A	Group B
Baseline SD = 1.0 cm	Post-treatment SD = 1.2 cm
Baseline SD = 1.1 cm	Post-treatment SD = 1.3 cm

Interpretation
Within-group Improvements
Both dry needling (Group A) and dry cupping (Group B) significantly reduced pain, improved pelvic positional faults, and increased muscle length. The p-values for all paired t-tests are less than 0.0001, indicating very strong evidence that these treatments are effective within each group.

Between-group Comparisons
Pain Reduction: Group A (dry needling) showed significantly greater pain reduction than Group B (dry cupping), with a p-value of 0.0021.
Positional Fault Correction: Group A also showed significantly greater correction in pelvic tilt compared to Group B, with a p-value of 0.0001.
Muscle Length: Group A had a significantly greater increase in muscle length compared to Group B, with a p-value of 0.0010.
These results indicate that dry needling (Group A) is more effective than dry cupping (Group B) in reducing pain, correcting positional faults, and increasing muscle length.

Discussion
Examining and contrasting dry needling and dry cupping According to the study's findings, those with myofascial trigger points in the QL can benefit from dry needling and dry cupping in terms of pain relief, postural error correction, and muscle lengthening. However, as compared to dry cupping, dry needling produced better outcomes. By focusing on the trigger points directly, dry needling causes a local twitch response that eases pain and releases tense muscles. This process could account for why dry needling is more successful in easing pain and fixing postural issues. Its effectiveness in treating myofascial trigger points is further supported by the longer muscles shown in the dry needling group.
Despite its effectiveness, dry cupping could not offer as much focused relief as dry needling. Although the cups' suction encourages blood flow and eases tense muscles, it might not be as effective at addressing trigger points as dry needling.

Clinical Implications
The findings of this study have important clinical implications for the treatment of myofascial trigger points in the QL. Dry needling should be considered the preferred treatment option for patients with QL trigger points and associated pelvic positional faults. Its superior effectiveness in reducing pain, correcting positional faults, and improving muscle length makes it a valuable therapeutic tool.
However, it is important to consider patient preferences and individual responses to treatment. Some patients may prefer or respond better to dry cupping, and clinicians should tailor treatment plans to meet the needs of each patient.

Limitations and Future Research
This study has several limitations. The sample size was relatively small, and the study was conducted at a single center. Future research with larger sample sizes and multi-center trials is needed to confirm these findings. Additionally, long-term follow-up studies are necessary to evaluate the sustained effects of dry needling and dry cupping.
Future research should also explore the underlying mechanisms of action for both treatments and investigate their effectiveness in other musculoskeletal conditions. Comparative studies involving other therapeutic modalities, such as manual therapy and electrotherapy.

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