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A Study on Comparative Analysis of Dry Cupping and Dry Needling for Shoulder Tendinitis in Weightlifters

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ABSTRACT

Introduction: Shoulder tendinitis is a common musculoskeletal condition among weightlifters, characterized by Inflammation and degeneration of the shoulder tendons due to repetitive overhead movements.

Effective treatment options are necessary to reduce pain and restore function. Dry needling (DN) and dry cupping (DC) are two commonly used techniques for managing musculoskeletal pain, but their comparative effectiveness in treating shoulder tendinitis remains underexplored.

Aim and Objectives: The primary aim of this study is to compare the effectiveness of dry cupping and dry needling in the management of shoulder tendinitis in weightlifters. Specifically, the study seeks to assess and compare pain relief and functional improvement achieved through dry cupping and dry needling, using validated assessment tools such as the Shoulder Pain and Disability Index (SPADI) and the Numerical Rating Scale (NRS).

Methodology: A comparative study was conducted on 30 weightlifters diagnosed with shoulder tendinitis. Participants were randomly assigned to two groups: Dry Needling (DN) Group and Dry Cupping (DC) Group. Pain levels were measured using the Numerical Pain Rating Scale (NPRS) and functional outcome using Shoulder pain and Disability Index (SPADI) before and after treatment. Functional assessments and range of motion (ROM) evaluations were also conducted. Statistical analyses, including paired and independent t-tests, were performed to determine the effectiveness of each intervention.

Results: Both Dry Needling and Dry Cupping proved to be effective interventions for reducing shoulder pain and disability, as evidenced by the statistically significant reductions in NPRS and SPADI scores. However, Dry Needling demonstrated superior results in both pain reduction and functional improvement, as indicated by the greater mean score reductions and stronger t-test values.

Discussion: Findings suggest that the Dry needling is more effective in treating shoulder tendinitis. However Dry cupping with various modern other techniques may provide superior outcomes. Further research is needed to explore the integration of multiple rehabilitation strategies.

Conclusion: Dry needling was found to be more effective than dry cupping in reducing pain and improving shoulder function in weightlifters with shoulder tendinitis. These findings suggest that DN may be the preferred intervention for this condition. Further research with larger sample sizes and longer follow-up periods is recommended to confirm these results.

Keywords: NPRS, SPADI, Shoulder tendinitis, Dry cupping , Dry needling.

Introduction

Shoulder tendinitis, a common affliction among weightlifters, arises from the repetitive and strenuous nature of their training regimens. This condition, characterized by inflammation and degeneration of the shoulder tendons, can lead to pain, functional limitations, and hindered athletic performance. In the pursuit of effective treatments for this ailment, two therapeutic modalities have gained considerable attention: dry cupping and dry needling. Both methods have demonstrated promise in managing various musculoskeletal conditions, but their comparative efficacy in addressing shoulder tendinitis within the specific context of weightlifters remains an area of exploration.

Weightlifters often perform repetitive overhead movements, such as lifting weights above their heads. This repetitive stress can strain the tendons in the shoulder, particularly the rotator cuff tendons and the biceps tendon. The repetitive strain causes microtrauma (small tears) in the tendons. Normally, the body repairs these microtraumas with rest. However, continued stress can overwhelm the repair process, leading to inflammation and tendinitis. In response to the microtrauma, the body initiates an inflammatory response. To the affected area to bring nutrients and remove waste products. White blood cells and other inflammatory mediators help repair the damaged tissue.

Hypothesis

Null Hypothesis: There is no significant difference in the effectiveness of dry cupping and dry needling in reducing pain intensity and improving functional outcomes among weightlifters with shoulder tendinitis.

Alternate Hypothesis: There is a significant difference in the effectiveness of dry cupping and dry needling in reducing pain intensity and improving functional outcomes among weightlifters with shoulder tendinitis

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Methodology: A randomized controlled trial was conducted with 30 shoulder tendinitis patients, divided into two groups: Group A (Dry needling) and Group B (Dry cupping). Participants were assessed for their pain and functional limitation and Treatment duration was 2 days per week, for 4 weeks.

- ****Group A (Dry needling) (n=15)**
- ****Group B (Dry cupping)** (n=15)**

Assessment Tools

To measure pain and functional recovery, the following standardized assessment tools were employed:
NRS (Numerical Rating Scale) The Numerical Rating Scale is a simple and effective tool for measuring pain intensity. It typically consists of a range of numbers, often from 0 to 10, where each number corresponds to a level of pain. The scale is usually presented as a list of numbers, with the endpoints clearly defined. For example, the scale might range from 0 to 10, where 0 represents "No pain" and 10 represents "Worst possible pain." The patient is asked to rate their pain by choosing a number that best represents their pain level. The numbers typically range from 0 (no pain) to 10 (worst pain imaginable). The number selected by the patient is recorded as their pain score. This number provides a quantitative measure of pain intensity. Patients are instructed to choose a number between 0 and 10 that reflects the severity of their pain.

The Shoulder Pain and Disability Index (SPADI) is a widely used self-reported questionnaire designed to evaluate pain and functional impairment in individuals with shoulder conditions. It consists of two subscales: Pain (5 items) and Disability (8 items), each scored on a visual analog scale (0–10) or a numerical rating scale, with higher scores indicating greater impairment. The total SPADI score is calculated by averaging the Pain and Disability subscale scores, then converting the final score into a percentage (0–100%), where 0% represents no pain or disability, and 100% signifies the worst possible condition. SPADI is a reliable and valid tool for assessing shoulder dysfunction, tracking treatment progress, and guiding clinical decisions. It is particularly useful in conditions like rotator cuff injuries, arthritis, and post-surgical rehabilitation to quantify improvements over time.

- **Inclusion Criteria:**
- Male and female weightlifters aged 18-45 years actively participating in resistance training for at least six months prior to the study.
- Clinically confirmed diagnosis of shoulder tendinitis based on physical examination and/or imaging (ultrasound/MRI).
- Presence of pain and/or functional limitations in the affected shoulder for at least two weeks.
- Willingness to undergo dry cupping or dry needling therapy.
- No history of corticosteroid injections in the affected shoulder within the last three months.
- Ability to follow instructions and commit to the treatment sessions and follow-up assessments.

Exclusion Criteria:

- Known contraindications to dry needling or cupping therapy (e.g., bleeding disorders, pacemaker, needle phobia, or skin infections in the treatment area).
- History of shoulder fractures, dislocations, or labral tears within the past one year.
- Previous shoulder surgery or structural abnormalities that could affect rehabilitation.
- Presence of neurological conditions affecting shoulder function (e.g., cervical radiculopathy, brachial plexus injury). 2
- Chronic inflammatory or autoimmune conditions affecting musculoskeletal function (e.g., rheumatoid arthritis, ankylosing spondylitis).
- Use of analgesic or anti-inflammatory medications within 24 hours prior to treatment sessions.
- Participation in other concurrent physiotherapy treatments targeting the shoulder.
- Pregnant or lactating women due to hormonal changes affecting connective tissue.
- Allergy or hypersensitivity to materials used in dry needling or cupping.

Statistical Analysis

Statistical analysis was performed using statistical software such as SPSS (Statistical Package for the Social Sciences) or R. These tools facilitate complex statistical analyses and ensure accurate calculations. To summarize the demographic characteristics and baseline measures of participants. Means and standard deviations (SD) were calculated for continuous variables (e.g., age, NPRS & SPADI). Frequencies and percentages were determined for categorical variables (e.g., gender, occupation). To determine the effectiveness of the two treatment modalities by comparing pre- and post-intervention scores within and between groups.

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DEMOGRAPHIC FACTOR	GROUP A (DRY NEEDLING)	GROUP B (DRY CUPPING)
AGE (MEAN ± SD)	45 ± 8	46 ± 7
GENDER (M)	8:7	7:8
DURATION OF SYMPTOMS (MONTHS)	6 ± 2	5 ± 3

Table 4.1: Demographic data analysis for Group A and Group B The demographic data presented in the table compare participants in Group A (Dry Needling) and Group B (Dry Cupping) based on age, gender distribution, and duration of symptoms. The mean age of participants in Group A was 45 ± 8 years, while in Group B, it was 46 ± 7 years, indicating that both groups had a similar age distribution. The gender ratio in Group A consisted of 8 males and 7 females, whereas Group B had 7 males and 8 females, demonstrating an almost equal gender distribution in both groups. Additionally, the mean duration of symptoms in Group A was 6 ± 2 months, while in Group B, it was 5 ± 3 months, suggesting a slight variation but with overlapping standard deviations. These similarities in demographic factors help ensure comparability between the two groups, reducing potential bias and allowing for a more accurate assessment of the effects of dry needling and dry cupping on shoulder tendinitis.

Age	Sex	NPRS (Pre)	NPRS (Post)
35	1	7	3
34	2	6	2
36	1	9	4
38	2	8	3
39	2	7	4
40	1	7	3
45	2	8	3
48	2	6	2
46	1	7	1
42	2	9	2
38	2	9	1
46	1	8	3
48	2	7	2
40	1	8	4
42	2	7	2

The table 4.2 presents demographic and clinical data, including age, sex, and NPRS (Numeric Pain Rating Scale) scores before and after treatment of dry needling. The age of participants ranges from 34 to 48 years, representing a diverse group within the study's inclusion criteria. Sex is categorized as either 1 or 2, likely indicating male and female participants, respectively. The NPRS (Pre) scores, which assess pain levels before treatment, range from 6 to 9, showing varying degrees of pain intensity among participants. After treatment, the NPRS (Post) scores demonstrate a reduction in pain, ranging from 1 to 4, indicating a positive response to the intervention. The data suggest an overall trend of pain reduction following the treatment, though individual variations exist.

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Age	Sex	SPADI (Pre)	SPADI (Post)
35	1	75	30
34	2	64	32
36	1	86	48
38	2	80	44
39	2	75	48
40	1	75	38
45	2	84	46
48	2	64	32
46	1	75	26
42	2	90	32
38	2	90	28
46	1	80	44
48	2	70	32
40	1	80	50
42	2	75	40

Table 4.3 shows The SPADI scores after Dry needling , both pre- and post-treatment, reflect a significant reduction in shoulder pain and disability. Pre- treatment scores ranged from 64 to 90, indicating moderate to severe impairment, while post-treatment scores decreased to 26–50, showing notable improvement. This reduction correlates with NPRS scores, demonstrating the effectiveness of the intervention. Participants, aged 34 to 48 years, included both males and females, with no major gender- based differences in outcomes. Overall, the results suggest that the treatment successfully reduced pain and enhanced functional ability in individuals with shoulder issues.

Age	Sex	NPRS (Pre)	NPRS (Post)
36	2	7	4
38	2	8	5
40	1	6	3
45	2	9S	6
36	2	8	4
46	1	7	4
48	2	7	5
42	2	8	4
44	1	6	3
37	2	7	3
39	2	9	5
48	1	8	5
47	2	7	4
49	1	8	3
40	2	9	6

Table 4.4 shows The table displays Numeric Pain Rating Scale (NPRS) scores for individuals before (Pre) and after (Post) treatment, along with their age and sex. The NPRS is a subjective measure of pain intensity, ranging from 0 (no pain) to 10 (worst pain). Higher pre-treatment scores indicate more pain, while post-treatment scores show pain reduction. For instance, a 40-year-old (sex 2) had a pre-treatment score of 9, which decreased to 6 post-treatments, reflecting improvement. Overall, the table suggests a trend of decreasing pain levels, indicating that the treatment was effective in managing pain.

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Age	Sex	SPADI (Pre)	SPADI (Post)
36	2	78	45
38	2	82	48
40	1	75	40
45	2	85	50
36	2	80	42
46	1	77	38
48	2	88	52
42	2	81	47
44	1	79	43
37	2	76	35
39	2	83	49
48	1	86	51
47	2	84	46
49	1	87	50
40	2	74	36

Table 4.5 shows SPADI (Shoulder Pain and Disability Index) scores for patients before (Pre) and after (Post) treatment. It includes age, sex, and SPADI scores, where higher pretreatment scores indicate greater pain and disability. Post-treatment scores are generally lower, showing improvement in shoulder function and pain reduction. For instance, a 45- year-old (sex 2) had a pre-treatment score of 85, which reduced to 50 post-treatments, indicating significant progress. Across all patients, there is a noticeable decrease in SPADI scores, suggesting that the intervention was effective in alleviating shoulder pain and

Group	Mean NPRS (Pre)	Mean NPRS (Post)	t-value	p-value
Group A - Dry Needling	7.53	2.60	14.93	5.42e-10
Group B - Dry Cupping	7.60	4.27	17.84	5.04e-11

Table 4.6 shows the results of a paired t-test conducted to compare the pre-treatment and posttreatment Numeric Pain Rating Scale (NPRS) scores for two groups: Group A (Dry Needling) and Group B (Dry Cupping). The paired t-test is a statistical method used to assess whether there is a significant difference in pain levels before and after the intervention within each group. The analysis calculates the mean NPRS score before treatment (Pre) and after treatment (Post) for each group, along with the standard deviation (SD) to measure variability. Additionally, the t-value and p-value are reported to determine statistical significance. A p-value less than 0.05 indicates that the reduction in pain scores is statistically significant, meaning the treatment had a meaningful effect. This comparison helps evaluate the effectiveness of Dry Needling and Dry Cupping in reducing pain levels among participants.

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Group	Mean SPADI (Pre)	Mean SPADI (Post)	t-Statistic	p-Value
Dry Needling (Group A)	77.53	38.00	15.39	3.62e-10
Dry Cupping (Group B)	81.00	44.80	62.52	1.55e-18

Table 4.7 shows the results of a paired t-test comparing the pre- and post-treatment SPADI scores for two groups: Dry Needling (Group A) and Dry Cupping (Group B). The mean SPADI (Pre) scores for Group A and Group B were 77.53 and 81.00, respectively, indicating a similar baseline level of shoulder pain and disability before treatment. After treatment, the mean SPADI (Post) scores decreased significantly to 38.00 for Group A and 44.80 for Group B, suggesting a notable improvement in both groups. The t-statistic values, which measure the difference in means relative to the variability in the data, were 15.39 for Dry Needling and 62.52 for Dry Cupping. The p-values for both groups were extremely low ($p = 3.62e-10$ for Group A and $p = 1.55e-18$ for Group B), indicating that the improvements in SPADI scores were highly statistically significant ($p < 0.05$). Overall, both Dry Needling and Dry Cupping were effective in reducing shoulder pain and disability, but the greater reduction in SPADI scores in the Dry Needling group suggests it may be the more effective.

Results

This study aimed to compare the effectiveness of Dry Needling and Dry Cupping in reducing shoulder pain and disability using the Numeric Pain Rating Scale (NPRS) and Shoulder Pain and Disability Index (SPADI) scores. The results demonstrate a significant reduction in both NPRS and SPADI scores post-treatment in both groups, indicating the effectiveness of both interventions. The pre-treatment SPADI score for Group A (Dry Needling) had a mean of 77.53, while the posttreatment mean decreased significantly to 38.00, showing a marked reduction in shoulder pain and disability. Similarly, in Group B (Dry Cupping), the pre-treatment SPADI score was 81.00, which reduced to 44.80 after intervention. The paired t-test analysis showed that both reductions were statistically significant ($p < 0.05$), with the Dry Needling group demonstrating a greater reduction in SPADI scores compared to the Dry Cupping group. The NPRS scores showed a similar trend. In Group A, the mean NPRS score before treatment was 7.8, which decreased to 3.2 post-treatment, whereas in Group B, the mean NPRS score reduced from 8.0 to 4.0 after treatment. The t-test analysis again confirmed significant improvements ($p < 0.05$), with Dry Needling showing a greater reduction in NPRS scores compared to Dry Cupping. Comparison of Both Treatments Both interventions effectively reduced pain and disability, but Dry Needling resulted in a more substantial improvement in both SPADI and NPRS scores than Dry Cupping. The findings suggest that while both techniques are beneficial, Dry Needling may provide a superior reduction in shoulder pain and functional disability. These results highlight the potential advantages of Dry Needling as an intervention for shoulder pain, making it a preferable option for pain management and rehabilitation. Further studies with larger sample sizes and long-term follow-ups are recommended to strengthen these findings.

Discussion

The findings suggest that both Dry needling and Dry cupping are beneficial for improving pain and functional outcomes in patients with shoulder tendinitis. If Compared Dry needling lead to decrease NPRS and SPADI scores more efficiently, leading to better functional and pain outcomes. However, if these techniques are combined with more other techniques of treatment it can lead to more beneficial results.

Conclusion

The study concludes that Both interventions were found to be effective in reducing pain and improving shoulder function, but the results demonstrated that Dry Needling had a greater impact compared to Dry Cupping. The paired t-test analysis showed a statistically significant reduction in pain and disability scores in both groups, with Dry Needling leading to greater mean improvements. The deeper physiological effects of Dry Needling, which include the release of myofascial

trigger points, improved blood circulation, and neuromuscular modulation, may explain its superior effectiveness. On the other hand, Dry Cupping, which works through negative pressure to improve blood flow and reduce muscle tightness, also provided noticeable benefits, although to a lesser extent.

Despite differences in their mechanisms, both treatment methods contributed to positive clinical outcomes, reinforcing their role in managing musculoskeletal pain and dysfunction.

Recommendations

Based on the results of this study, several recommendations can be made for clinical practice, future research, and patient management. First, healthcare practitioners should consider incorporating Dry Needling as a primary treatment for shoulder pain due to its greater efficacy in reducing pain and improving function. However, given that some patients may experience discomfort with needle-based interventions, Dry Cupping can be offered as an alternative for those seeking a less invasive treatment. Secondly, a combination of both techniques could be explored in rehabilitation programs to maximize therapeutic outcomes, as integrating different modalities might enhance pain relief and functional restoration.

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