

COMPARATIVE EFFECTIVENESS OF CROSS-FRICTIONAL MASSAGE VERSUS MYOFASCIAL CUPPING THERAPY IN PATIENTS WITH NON-SPECIFIC NECK PAIN

Original Research

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ABSTRACT

Background: Non-specific neck pain is commonly associated with reduced cervical spine range of motion, often implicating the trapezius muscle. Comparative studies on the effectiveness of cross frictional massage and myofascial cupping therapy are limited, particularly in terms of pain relief and mobility improvement.

Objective: This study aims to evaluate and compare the efficacy of cross frictional massage and myofascial cupping therapy in treating non-specific neck pain and enhancing cervical range of motion.

Methods: Thirty participants aged 20 to 40 with non-specific neck pain were randomized into two groups. Group 1 received cross frictional massage, and Group 2 underwent myofascial cupping therapy targeting the trapezius fibers. Assessments of range of motion, pain intensity, and functional impairment were conducted before treatment and 72 hours post-treatment.

Results: Both treatment groups demonstrated statistically significant improvements in range of motion, pain reduction, and function ($p < 0.0001$), with 95% confidence intervals affirming the efficacy of both modalities. Comparisons of mean differences between groups revealed no significant disparities. However, participants reported greater perceived effectiveness from myofascial cupping therapy.

Conclusion: Cross frictional massage and myofascial cupping therapy both significantly enhance range of motion, alleviate pain, and improve function in individuals with non-specific neck pain, although no significant differences in their effectiveness were statistically evident. Participant feedback favored myofascial cupping therapy for perceived efficiency.

Keywords: Cervical spine; Cross frictional massage; Myofascial cupping therapy; Non-specific neck pain; Pain relief; Range of motion; Trapezius.

INTRODUCTION

Neck pain is a common musculoskeletal complaint in Western societies, affecting a considerable portion of the adult population. An epidemiologic study in The Netherlands indicated a lifetime prevalence of neck pain at 30% among males and 43% among females. At the time of interview, approximately 10% of males and 18% of females reported experiencing neck-related issues (1). Neck pain with no identifiable cause is categorized as “non-specific” and typically resolves on its own within days or weeks. However, for some individuals, the discomfort persists or recurs, potentially developing into chronic neck pain, defined as pain lasting more than three months (2).

One primary anatomical contributor to neck discomfort is the trapezius muscle, a large, flat muscle that extends from the cervical to the thoracic region along the back of the neck and trunk. Unique in its widespread origin, the trapezius attaches to the clavicle and scapula, playing a crucial role in maintaining scapulohumeral rhythm and head balance by regulating the cervical spine (2,4). The trapezius muscle is particularly vulnerable to strain in individuals experiencing chronic stress or anxiety, as these conditions often manifest in habitual tension within the neck and shoulder region. The constant contraction of the trapezius can lead to tension headaches, a type of headache commonly associated with stress and muscular tension (3). Although severe trauma to the trapezius is uncommon, it can occur in incidents such as motor vehicle accidents, resulting in muscle tearing or compression (4).

Massage therapy, one of the oldest therapeutic practices, is frequently employed for relaxation, muscle pain relief, and enhancement of soft tissue function. With over 75 different types of massage techniques, each serving specific therapeutic purposes, deep cross-friction massage is particularly notable. This technique involves the application of perpendicular forces to align newly formed collagen during healing, thus reducing adherent scar tissue and fostering local hyperemia and analgesia (5). Cross-friction massage, a form of soft tissue mobilization, applies steady pressure to soft tissues in a controlled manner, effectively aiding in the management of tissue adhesions and improving mobility (6).

Another approach for addressing fascial constraints and related symptoms, such as pain and restricted range of motion, is myofascial release. Various techniques, including myofascial cupping, target the fascia to induce length alterations at a histological level, thereby alleviating fascial restrictions (7). Cupping therapy, an ancient alternative medicine practice, uses suction created by specialized cups applied to the skin to improve circulation, ease muscle stiffness, and enhance overall tissue flexibility (8).

While existing studies have examined the effectiveness of manual soft tissue mobilization (STM) and instrument-assisted soft tissue mobilization (IASTM), few studies provide a direct comparison of these two modalities. This study aims to address this gap by investigating the comparative effects of cross-friction massage (manual STM) and myofascial cupping therapy (IASTM) on pain, range of motion, and functional outcomes in patients with chronic neck pain.



METHODS

The methodology for this study was designed as a two-group experimental trial, incorporating both pre- and post-treatment assessments to evaluate the effectiveness of cross-frictional massage and myofascial cupping therapy on chronic neck pain. Participants, selected from the outpatient department of Allied Hospital's physiotherapy unit, were eligible if they were between the ages of 20 and 40 and exhibited tenderness or pain over the trapezius muscle. Exclusion criteria included individuals with acute or traumatic neck pain, cervical spondylosis, other neck diseases such as degenerative disorders, or those who had undergone invasive neck treatments or surgery within the last four weeks.

Upon providing informed consent, participants were randomly assigned into one of two groups-Group A or Group B-using a lottery method to ensure unbiased distribution. Both groups received a baseline treatment of a hot pack application. Group A underwent manual soft tissue mobilization through cross-frictional massage, where the trapezius muscle was first lubricated with olive oil followed by manual pressure applied to the neck muscles. In contrast, Group B received instrument-assisted soft tissue mobilization with myofascial cupping therapy. After lubricating the neck, a plastic suction cup attached to a suction gun was placed on the neck, set to one degree of pressure, and moved along the trapezius muscle fibers.

Each treatment session lasted for 10 minutes, and adjustments were made based on patient feedback. If participants reported any exacerbation of symptoms other than localized pressure or stretch sensations, the intensity of the technique was reduced accordingly. The primary outcome measures included active cervical flexion, extension, and contralateral side-flexion range of motion (ROM) (9). Secondary outcomes focused on the severity of pain during rest and activity, measured using an 11-point Numerical Pain Rating Scale (NRS), and functional disability assessed through the Neck Disability Index (NDI), which scores components related to daily activities, pain, and concentration, with higher scores indicating greater disability (10).

Statistical analysis was performed using data collected from 30 participants, divided evenly between the two groups. With a 95% confidence interval and a significance level set at 0.05, this sample size was deemed sufficient to detect meaningful differences between the interventions. Measurements taken before the initiation of treatment and 72 hours post-treatment were analyzed to determine the significance of changes within each group and between the two treatment modalities. This rigorous approach ensured that the study's findings would provide reliable insights into the comparative effectiveness of these therapies on chronic neck pain.

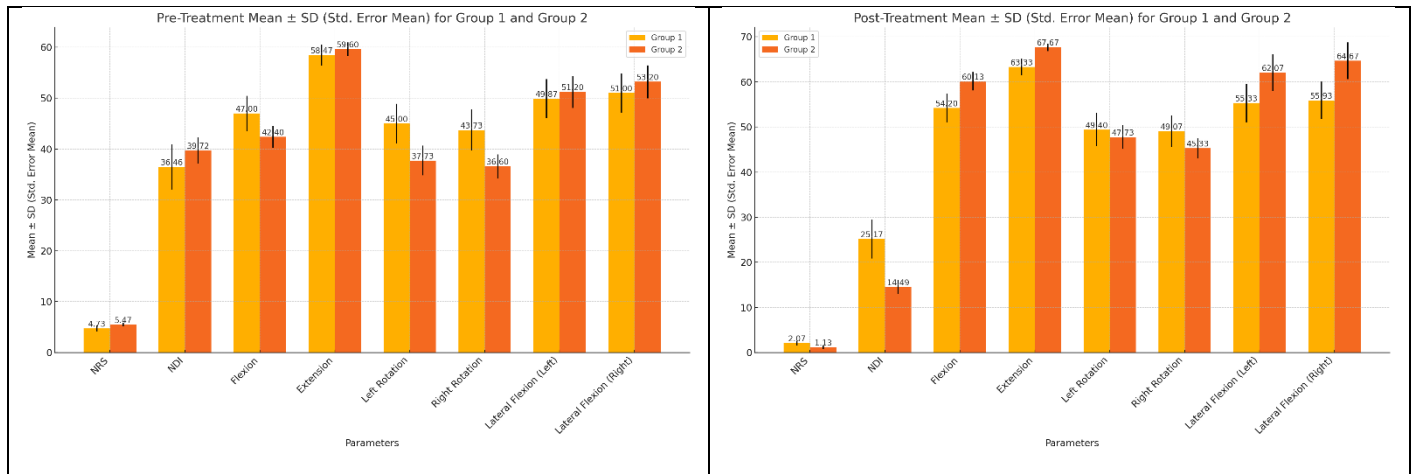
RESULTS

The study results demonstrated significant improvements in both cross frictional massage and myofascial cupping therapy groups with respect to pain reduction, increased range of motion, and functional ability in individuals with chronic neck pain. Initial assessments showed no significant differences between the two groups in terms of baseline measurements, ensuring a fair comparison of the treatment effects.

Table 1 Pre and post treatment values of Group 1 and Group 2.

Parameter	Pre-Treatment		Post Treatment	
	Mean ± SD (Std. Error Mean)		Mean ± SD (Std. Error Mean)	
	Group 1	Group 2	Group 1	Group 2
NRS	4.73 ± 2.120 (0.547)	5.47 ± 1.356 (0.350)	2.07 ± 2.086 (0.539)	1.13 ± 1.685 (0.435)
NDI	36.46 ± 17.178 (4.435)	39.72 ± 10.068 (2.600)	25.17 ± 16.677 (4.306)	14.49 ± 6.043 (1.560)
Flexion	47.00 ± 13.320 (3.439)	42.40 ± 8.314 (2.147)	54.20 ± 12.178 (3.144)	60.13 ± 7.909 (2.042)
Extension	58.47 ± 8.132 (2.100)	59.60 ± 5.110 (1.319)	63.33 ± 7.178 (1.853)	67.67 ± 3.309 (0.854)
Left Rotation	45.00 ± 15.119 (3.904)	37.73 ± 11.310 (2.920)	49.40 ± 14.187 (3.663)	47.73 ± 10.194 (2.632)
Right Rotation	43.73 ± 15.682 (4.049)	36.60 ± 9.093 (2.348)	49.07 ± 13.693 (3.535)	45.33 ± 8.649 (2.233)
Lateral Flexion (Left)	49.87 ± 14.856 (3.836)	51.20 ± 12.190 (3.147)	55.33 ± 16.487 (4.257)	62.07 ± 15.522 (4.008)
Lateral Flexion (Right)	51.00 ± 14.957 (3.862)	53.20 ± 12.554 (3.241)	55.93 ± 15.980 (4.126)	64.67 ± 15.719 (4.059)

Pre-treatment pain levels, as measured by the Numeric Pain Rating Scale (NRS), showed that participants experienced moderate pain intensity, with slightly higher initial scores reported in the myofascial cupping therapy group. The Neck Disability Index (NDI), used to assess functional disability, reflected a similar burden of neck-related disability in both groups, with scores indicating a moderate level of disability.



Following the interventions, both groups experienced significant reductions in pain scores. The post-treatment NRS scores were markedly lower, indicating effective pain relief. Likewise, the NDI scores decreased substantially, suggesting improvements in neck function and a reduction in disability related to daily activities. The improvements in cervical flexion, extension, and lateral flexion further supported the therapeutic benefits, with both treatments facilitating better neck movement.

Table 2 Co-relation of IASTM and manual soft tissue mobilization with NRS, NDI, and ROM of the neck.

		N	Correlation	Sig.
Pair 1	NRS Pre value & NRS Post value	30	.694	.000
Pair 2	NDI Pre value & NDI Post value	30	.758	.000
Pair 3	Flexion Pre Value & Flexion Post Value	30	.753	.000
Pair 4	Extension Pre Value & Extension Post Value	30	.828	.000
Pair 5	Left Rotation Pre value & Left Rotation Post value	30	.904	.000
Pair 6	Right Rotation Pre Value & Right Rotation Post Value	30	.963	.000
Pair 7	Lateral Flexion (Left) Pre Value & Lateral Flexion (Left) Post Value	30	.963	.000
Pair 8	Lateral Flexion (Right) Pre Value & Lateral Flexion (Right) Post Value	30	.959	.000

Statistical analysis using independent T-tests confirmed that the differences between the groups in terms of pain and disability reduction were statistically significant. Paired T-tests, comparing pre- and post-treatment within each group, revealed significant improvements across all measured outcomes, including the range of motion metrics such as cervical flexion, extension, left and right rotation, and lateral flexion.

The correlation analysis underscored the robustness of the treatment effects, with high significance levels noted in the improvements from pre- to post-treatment values across all parameters. These correlations suggest a strong link between the therapeutic interventions provided and the observed improvements in neck pain and mobility.

The study found that both cross frictional massage and myofascial cupping therapy significantly alleviated pain and enhanced the functional capabilities and range of motion of the neck in patients with chronic symptoms. The results indicate that both modalities are effective in managing chronic neck pain, thus providing viable options for physical therapy interventions.

Table 3 Statistics of Pre and Post Treatment Values for Parameters

Parameter	Valid N	Missing	Mean	Median	Mode	Std. Dev.	Variance	Range
NRS Pre value	30	2	5.1	5	3 ^a	1.788	3.197	7
NRS Post value	30	2	1.6	1	-	1.923	3.697	7
NDI Pre value	30	2	38.09	36.78	35 ^a	13.934	194.14	46
NDI Post value	30	2	18.929	15.55	8.89 ^a	11.583	181.4	43.56
Flexion Pre Value	30	2	44.7	39.9	35	10.51	110.49	36
Flexion Post Value	30	2	57.17	60	66	10.531	110.9	32
Extension Pre Value	30	2	59.03	60	60 ^a	6.698	44.861	29
Extension Post Value	30	2	65.5	67.5	69	5.918	35.017	30
Left Rotation Pre Value	30	2	41.37	39	39	13.629	185.76	47
Left Rotation Post Value	30	2	48.57	45	45	12.167	148.05	43
Right Rotation Pre Value	30	2	40.17	38	30 ^a	13.107	171.8	50
Right Rotation Post Value	30	2	47.2	45	55	13.369	178.74	43
Lateral Flexion (Left) Pre Value	30	2	50.53	55.5	70	16.101	259.25	42
Lateral Flexion (Left) Post Value	30	2	58.7	65	70	13.614	185.33	47
Lateral Flexion (Right) Pre Value	30	2	52.1	57	52 ^a	16.195	262.29	43
Lateral Flexion (Right) Post Value	30	2	60.3	68.5	69 ^a	16.195	262.29	46

DISCUSSION

The primary objective of this research was to evaluate the comparative efficacy of manual soft tissue mobilization (STM) and instrument-assisted soft tissue mobilization (IASTM), specifically myofascial cupping therapy, in reducing pain, increasing range of motion (ROM), and decreasing disability in patients with non-specific neck pain. Conducted in a quasi-experimental setup, the study collected data from patients across several institutions, including Allied, DHQ, and National hospitals, following ethical guidelines and informed consent procedures detailed in simple language to ensure participant understanding and compliance.

This research drew on methodologies from similar studies in the field, such as the work by Farasyn et al., who observed significant reductions in pain following deep cross-friction massage facilitated by an apparatus (11). Consistent with literature suggesting that manual STM can enhance fibroblast proliferation and facilitate soft tissue repair and alignment through increased pressure application (12), this study found statistically significant improvements in active cervical contralateral side flexion ROM post-treatment with manual STM. This aligns with existing research indicating that manual therapies may decrease cortisol levels while increasing dopamine and serotonin, contributing to pain reduction (13).

Cupping therapy, which operates through the creation of negative pressure, has demonstrated broad efficacy across various pain-related conditions, further evidenced by improvements in musculoskeletal ailments among participants of this study (14-16). The technique, which involves lifting the skin to stimulate fascial movement and increase capillary dilation, thereby enhancing localized blood flow and reducing pain (17), was found to be equally effective as manual STM in improving ROM, alleviating pain, and enhancing function, despite the lack of a statistically significant difference between the two modalities in influencing the study's endpoints.

Both treatment approaches have unique advantages and limitations. Manual STM offers the benefit of not requiring specialized tools, although it may increase joint stress on the therapist's hands, a noted factor in occupational absences (21). Conversely, IASTM necessitates specific tools and training but reduces physical strain on the therapist through ergonomically designed instruments that can efficiently target and treat areas of tissue adhesion (22).

The results of this study corroborate findings from previous research that demonstrated the effectiveness of IASTM in reducing pain and disability post-treatment (20). The debate continues regarding the mechanisms by which IASTM may improve patient outcomes, with theories suggesting that micro-trauma induced by the technique could enhance blood circulation and expedite the removal of pain-inducing substrates from around injured tissues (24).

One of the study's strengths lies in its comprehensive approach to data collection and analysis, utilizing tools such as the Numeric Pain Rating Scale (NRS) and Neck Disability Index (NDI), alongside goniometry to assess changes in ROM. However, the research is not without limitations. The age restriction to participants between 20 to 40 years may limit the generalizability of the findings to older populations who commonly experience neck pain. Moreover, the manual nature of both STM and IASTM introduces variability in treatment application, which could influence the outcomes.

This study substantiates the therapeutic benefits of both manual STM and IASTM in treating non-specific neck pain, highlighting no significant difference in overall efficacy between the two techniques. Future studies could explore longer follow-up periods to assess the durability of these treatments and expand the participant age range to enhance the applicability of the findings across a broader demographic.

CONCLUSION

In conclusion, the findings of this study suggest that both myofascial cupping therapy and cross frictional massage offer significant therapeutic benefits in the management of non-specific neck pain by improving range of motion, reducing discomfort, and enhancing function. Myofascial cupping therapy demonstrated a marginally higher efficacy in these areas, which could influence the choice of treatment depending on the availability of specific tools and the therapist's proficiency with each technique. However, the decision to use manual soft tissue mobilization or instrument-assisted methods should be tailored to individual patient needs and contexts. Limitations of the study include the lack of long-term follow-up and its restricted applicability to other patient demographics, which could provide avenues for further research to explore the durability and broader efficacy of these therapies.

Author Name	Contribution
Janeeta Javaid	Conception and Design, Data Collection, Manuscript Drafting, Critical Analysis
Maria Mughees	Data Collection, Data Analysis and Interpretation
Ayesha Arooj	Data Collection, Critical Analysis, Proof Reading
Sofia Rehman	Data Analysis and Interpretation
Ayesha Kifayat	Critical Analysis and Proofreading
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