Original Article

COMPARING EFFECTS OF DRY CUPPING AND STATIC STRETCHING ON UPPER CROSS SYNDROME

Aleesha Arshad ,[1] Usama Attique ,[2] Ujala Farooq,[3] Faiz Ul Hasnain [4] , Bilal Ishaq , [5] Fiza Riaz , [6] Laiba Kayani [7]

Abstract

Objective: This study aimed to compare the effects of dry cupping therapy vs static stretching on pain intensity, ROM of the cervical region, and postural alignment (Craniovertebral angle) in university students with Upper Crossed Syndrome.

Study Design: A Randomized Controlled Trial was conducted.

Place and duration of study: This study was extended over the time of 8 months following the consent from the research panel from May 2025 to January 2026 . All Public and Private Universities of Rawalpindi & Islamabad were included in the study.

Material and Methods: The 46 students who completed the inclusion criteria with UCS and were willing to have treatment were engaged and were randomly distributed into two groups: Group A (Dry Cupping) and Group B (Static Stretching). Both groups received the treatment protocol for 6 sessions of respective treatment for the muscles, upper trapezius and levator scapulae, and pectoralis major for 2 weeks on alternate days. The results were measured by tools including the numeric pain rating scale (NPRS), goniometry, and the Neck Disability Index (NDI).

Results: The results revealed that both groups i.e. dry cupping and static stretching have shown improvement in pain and ROM compared to the initial values ($p < 0.05$). However, the results revealed that the Dry Cupping was more effective in improving Craniovertebral angle, which showed improvement in the head position and Neck Disability Index in students with UCS, then static stretching. whereas both groups were equally efficient in improving the pain and cervical ROM.

Conclusion: The conclusion of this study was that dry cupping and static stretching both are beneficial modalities in students who had UCS. The results strongly suggest the potential use of dry cupping within the clinical management of postural complaints.

Keywords: Upper cross syndrome, neck pain, NDI, neck disability, Dry cupping, Static stretching, postural malalignment, Craniovertebral angle (CVA), cervical range of motion

1. Introduction

The prolonged placement of head in a forward position lead to a postural issue known as “upper crossed syndrome”, it is characterized by an increase in lordosis of cervical spine along with increased kyphosis in upper thoracic spine. This condition has become more prevalent due to advancements in technology, particularly due to the increased use of laptops/computers and smartphones. It mostly affects the school-aged children, university students, and workers who maintain poor posture or are involved in repetitive wrong movements during their workday. If the condition is not addressed at the correct time, then headaches are quite common in this syndrome, which can disturb one’s lifestyle or life quality. (1)

Upper cross syndrome is most common in the young population. The research found that a 2.8% prevalence of UCS with its specific patterns of muscle tightness and weakness. There are several studies have investigated the prevalence of UCS among student populations. One of those study reported the prevalence of UCS as 37.8%. the students who had forward head posture were 48.9% and students with forward shoulder posture were 80% of the total participants ad0ded in the study. The studies also showed that factors such as BMI, school performance, use of technology, and physical activity were also associated with UCS in students. (2) The muscles involved Upper cross syndrome are divided in two groups of muscles one

Doctor of Physical Therapy, Yusra Institute of Rehabilitation Sciences [1,2,3,4,6,7] Lecturer, Yusra Institute of Rehabilitation Sciences [5]
Correspondence: Doctor of Physical Therapy, Yusra Institute of Rehabilitation Sciences **Email:** attiqueusama5@gmail.com

which are tightened like levator scapulae, the pectoralis major, and the upper trapezius and second which are weakened in pectoralis major, and the upper trapezius and this condition includes the neck flexors, rhomboids, serratus anterior, middle, and lower. This muscular imbalance occurs in a unique 'X' pattern in the upper body, leading to the term cross in upper cross syndrome. [2] The tightness of muscles exerts extra pressure on the atlantooccipital joint, cervicothoracic and glenohumeral joints and spine T4-T5 which induce the symptoms. [3]

The treatment protocol for upper cross syndrome conventionally involves exercise programs such as stretching of the tight muscles, exercises for cervical muscles strengthening, isometric exercises for weak neck muscles. [4] This also includes resistance band exercises, interferential current therapy, aquatic exercises. The corrective exercises for postural education have been proved to be beneficial for UCS. [4]

Static stretching is the most widely used type of stretching in Physical Therapy. As it is the simplest technique to perform and can either be performed passively by the physical therapist or independently by the patient. In static stretching, the stretch is given till the therapist feels the maximum resistance or the patient complains any discomfort, then the position is maintained the for up to 15 to 60 seconds. The lengthening of the muscle and joint connective tissues along with the stretching of the muscle sarcomeres leads to a decrease in muscle tension. [5]

Dynamic dry cupping is another type of dry cupping in which the therapist moves the cup over the skin in the direct of the muscle fibers, to release the muscles tightness unlike static cupping which works by increasing the blood flow towards targeted muscle. This technique is often used in physical therapy to treat musculoskeletal issues, especially tightness of muscles and pain. [6] In this study dynamic dry cupping was used.

The Effective treatment of dynamic cuping depends on the length of session which varies from 5-20 min depending on area to be treated and tolerance of patient [7] and treatment frequency: noticeable effects often require at 5 sessions on alternative days [7]

2. Materials & Methods

The study was a Randomized controlled trial (RCT) with the sample size of 46 which was divided into two groups of 23. This study was extended over the time of 8 months following the consent from the research panel from May 2025 to January 2026 . Non-Probability convenient sampling technique was used in this study with sealed envelope method for randomization. All Public and Private Universities of Rawalpindi & Islamabad were included in the study.

Sample was selected on the basis of inclusion and exclusion criteria.

All students both male and female aged between 18–25 years were included in the study. [8] The complain of the student must be of more than 3 months and should not have any major medical condition. The participant were willing to participate and able to attend all 6 sessions.

Any student with Chronic musculoskeletal or neurological conditions, history of recent injuries or surgeries in the neck or shoulder area, skin conditions or allergies that prevent cupping or currently undergoing other treatments for UCS were not added in the stud

Following tools were used for the evaluation of participants pre and post intervention:

Adult pain intensity is measured unidimensional by using the Numeric Pain Rating Scale (NPRS), an outcome measure. '0' represents one extreme of pain (no discomfort) and '10' represents the opposite extreme (or "worst pain) on the 11-point numerical scale. ICC = 0.67 indicates intrarater reliability. [18]

The angle between the horizontal line and the line from the ear tragus to the spinous process of the seventh cervical vertebra was defined as CVA. A typical CVA is between 50 and 60 degrees. According to the CV angle, the lower cervical spine flexes more when the angle is smaller. [9]

Range of Motion (ROM) measurement were executed with the assistance of goniometer, which issued a very accurate angular measure of the movement in the articulations. Intrarater reliability for a goniometer is ranged from .43 to .99. [10]

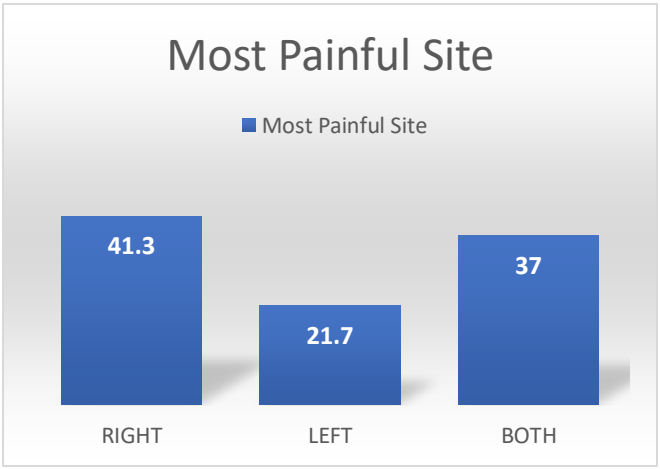
NDI questionnaire was used to evaluate the severity of pain and limitations in related function of the participants. It contains 10 sections covering various aspects of daily life which can be affected by neck. The Test- Retest reliability or intraclass correlation coefficient (ICC) is 0.89. [11]

An RCT was performed among the students of public/private universities in Islamabad and Rawalpindi. Participants were divided into DRY CUPPING (Group A) and STATIC STRETCHING (Group B). Interventional protocol of 6 sessions was provided to each group. The sessions were given 3 times a week on alternate days. The individuals were randomly allocated through sealed enveloped method. The members were enrolled according to the given inclusion and exclusion criteria.

Craniovertebral angle of the participants was taken to confirm the forward head. And neck disability index (NDI) questionnaire was used to assess the level of deformity.

3. Results

Over 46 participants were involved in this research and were equally distributed into two groups (n = 23 each): Group A (dry cupping group) and Group B (static stretching group). Among the participants, 20 (43%) were male, and 26 (57%) were female(Figure 1). In Group A, 15 participants were male, and 8 were female, whereas in Group B, 5 participants were male and 18 were female. The mean age of the participants was 23.07 ± 2.03 years , and the mean duration of pain was 5.33 ± 1.24 months. Regarding the most painful site, 19 participants (41.3%) reported right-sided neck pain, 10 participants (21.7%) reported left-sided pain, and 17 participants (37%) reported bilateral neck pain. (Figure 1)



Normality of data distribution was evaluated using the Shapiro–Wilk test at a 95% confidence interval with an alpha level of 0.05 (Table 1).

VARIABLES		Pre p-values
Cervical flexion	Dry Cupping	0.164
	Static Stretching	0.894
Cervical extension	Dry Cupping	0.794
	Static Stretching	0.763
Left rotation	Dry Cupping	0.121
	Static Stretching	0.058
Right Rotation	Dry Cupping	0.514
	Static Stretching	0.062
Left Lateral flexion	Dry Cupping	0.518
	Static Stretching	0.236
Right Lateral Flexion	Dry Cupping	0.337
	Static Stretching	0.231
NPRS	Dry Cupping	0.239
	Static Stretching	0.132
CVA	Dry Cupping	0.508
	Static Stretching	0.269
NDI	Dry Cupping	0.878
	Static Stretching	0.138

Table 1 :Shapiro wilk test for Normality

All pre-treatment variables demonstrated p-values greater than 0.05, indicating normal distribution of data; therefore, parametric statistical tests were applied. Within-group analysis using paired t-test showed statistically significant improvement from baseline to post-intervention (6th session) in cervical range of motion, Numeric Pain Rating Scale (NPRS), Craniovertebral angle (CVA), and Neck Disability Index (NDI) scores in both Group A and Group B ($p < 0.05$).

At baseline, the mean CVA was 38.70 ± 5.20° in Group A and 39.13 ± 3.85° in Group B. Following the 6th session, the mean CVA improved to 47.30 ± 4.07° in Group A and 45.30 ± 3.29° in Group B. Both groups demonstrated a significant reduction in forward head posture; however, between-group comparison revealed a statistically significant difference favoring Group A ($p < 0.05$), indicating greater improvement in the Craniovertebral angle with dry cupping.

The Pain intensity was assessed by using NPRS which showed a reduction in both groups. The mean NPRS score at baseline was 4.78 ± 1.66 in Group A and 5.87 ± 1.10 in Group B, which decreased to 0.91 ± 1.94 and 1.35 ± 0.88, respectively, after the 6th session. Both interventions were found effective in reducing pain intensity ($p < 0.05$); however, no statistically significant difference was observed between the two groups, suggesting that both treatments were effective for pain reduction.

For the measure of Neck disability, the Neck Disability Index was used, this was also found to improved significantly in both groups. The baseline mean NDI score was 31.70 ± 12.61 in Group A and 24.96 ± 10.13 in Group B, which reduced to 11.57 ± 7.69 and 7.48 ± 4.18, respectively, after the intervention. Between-group analysis demonstrated a statistically significant difference favoring Group A ($p < 0.05$), indicating that dry cupping was more effective in reducing

neck pain-related disability in Upper Cross Syndrome.

After the treatment the cervical range of motion showed considerable improvement in both groups following the intervention. In Group A, cervical flexion improved from 35.22 ± 9.23° to 44.30 ± 6.12°, cervical extension from 45.70 ± 10.88° to 55.78 ± 11.52°, left rotation from 53.65 ± 11.52° to 68.74 ± 13.28°, right rotation from 52.84 ± 11.79° to 70.83 ± 10.64°, left lateral flexion from 30.22 ± 9.04° to 41.30 ± 11.43°, and right lateral flexion from 31.22 ± 9.43° to 40.87 ± 12.08°. In Group B, cervical flexion improved from 32.00 ± 9.84° to 39.39 ± 8.16°, cervical extension from 40.91 ± 8.66° to 48.48 ± 6.74°, left rotation from 42.78 ± 12.54° to 50.52 ± 13.34°, right rotation from 38.87 ± 12.04° to 50.91 ± 11.35°, left lateral flexion from 27.00 ± 10.15° to 34.39 ± 8.38°, and right lateral flexion from 28.39 ± 9.17° to 35.96 ± 7.05°. Between-group comparison showed statistically significant improvement in cervical range of motion in both groups ($p < 0.05$), with no clear superiority of one intervention over the other, except for cervical extension, which showed a statistically important difference between groups ($p = 0.001$).

Overall, both dry cupping and static stretching showed efficacy in improving pain intensity, forward head posture, neck disability, and cervical range of motion in individuals with upper crossed syndrome. However, dry cupping demonstrated greater effectiveness in improving Craniovertebral angle and reducing neck disability, while both interventions were equally capable of reducing pain and improving cervical range of motion.

4. Discussion

This study was aimed to compare the effectiveness of the dry cupping and static stretching on upper cross syndrome. Both techniques were provided to the participants for 2 weeks with 6 sessions on alternative days to estimate the results of both the techniques. The outcome tools used for evaluation at baseline and at the end of the 6 sessions were numeric pain rating scale (NPRS), neck disability index (NDI), goniometer for Craniovertebral angle (CVA) and ROMs of neck. Demographic history containing age, gender, height, weight, screen time, most painful side of neck and history of any musculoskeletal system.

The results of this study has showed that pain and range of motion in individual with upper cross syndrome was improved in both group (. i.e. dry cupping and static stretching) some previous studies give evidence related to these results like a study to assess the effectiveness of cupping for pain, an evidence mapping study was carried out in 2023. A meta-analysis and systematic review of the association between cupping therapy and pain-related conditions were conducted by searching various databases, demonstrated that cupping was useful in reducing pain from low back pain, osteoarthritis in the knee, chronic back pain, neck pain, and even herpes zoster. Although this evidence was of low to moderate quality, it indicates that cupping may be a useful clinical intervention. [12]

A female scholar Sarah Wood and her colleague Gary Fryer, conducted a systematic review and meta-analysis in order to assess the efficacy of dry cupping in case of musculoskeletal pain and reduced range of motion. After studying these articles Sarah concluded that dry cupping was an effective intervention to treat chronic neck pain and nonspecific back pain. [13] They concluded the same as we suggested from our study.

A study was conducted to check the effectiveness of stretching in the nurses having neck pain with neck dysfunction. This study was a quasi-experimental study that was conducted into two hospitals in the county of Palestine and among that 90 nurses with moderate to severe neck pain were taken in the research. The results showed that neck pain and disability were significantly reduced in the experimental group. [14] These results

support stretching effectiveness on neck disability as we concluded from our research as well.

In results dry cupping was found to be effective in reducing the neck deformity related to upper cross syndrome. The evidence supporting these results include the quasi-experimental study conducted by Janagiraman R in Chennai, India, in 2025. For the assessment of the results the Neck Disability Index (NDI) was used for assessing functional performance, and the Numeric Pain Rating Scale (NPRS) was used for measuring pain intensity in muscles and these tools were used to check the results after the interventions. The results were compared and a conclusion was made that says stretches of trapezius was more effective in this case. [15]

Conclusion

This study concludes that both dry cupping and static stretching can help patients with UCS relieve pain, improve Craniovertebral angle (CVA) and improve their range of cervical movement.

Limitations

This study concludes that both dry cupping and static stretching can help patients with UCS relieve pain, improve Craniovertebral angle (CVA) and improve their range of cervical movement. It was challenging to attain maximum effects of both techniques in intervention protocol of 6 sessions for 2 weeks. The majority of those who took part in the study were female, indicating that gender distribution is not equal in both groups. It was difficult to maintain a correct posture of every participant in daily activities, due to lack of postural education.

Future Recommendations

Further research should be done to determine the deviations in pain and range of motions between males and females. The protocol should be made for at 10-12 sessions on alternative days for better results. Postural education or postural training should also be added in the protocol as an convectional therapy to assess the prolonged effects of both interventions

Disclosure /Conflict of interest:

Authors declare no conflict of interest.

References:

1. Ranđelović, I., et al., Effects of exercise programs on upper crossed syndrome: a systematic review. Fizičko vaspitanje i sport kroz vekove, 2020. 7(2): p. 152-68.
2. Nikita, D. and M. Rima, Prevalence of Upper Cross Syndrome in IT professionals. International Journal of Allied Medical Sciences and Clinical Research, 2022. 10(2): p. 141-147.
3. Lin, G., et al., The relationship between forward head posture, postural control and gait: A systematic review. Gait & posture, 2022. 98: p. 316-329.
4. Ranđelović, I., et al., Effects of Exercise Programs on Upper Crossed Syndrome: A Systematic Review. Physical Education and Sport Through the Centuries, 2020. 7: p. 152-168.
5. Nelson, A.G. and J. Kokkonen, Stretching anatomy. 2021: Human Kinetics Publishers.
6. Mohamed, A.A., X. Zhang, and Y.K. Jan, Evidence-based and adverse-effects analyses of cupping therapy in musculoskeletal and sports rehabilitation: A systematic and evidence-based review. J Back Musculoskelet Rehabil, 2023. 36(1): p. 3-19.
7. Murasing, H., P. Dutta, and D. Nikhilesh, A REVIEW OF LITERATURE ON THE EFFECTIVENESS OF DRY CUPPING THERAPY ON MUSCULOSKELETAL PAIN. 2024.
8. Chandarana, P., S. Rathod, and D. Sorani, Prevalence of upper crossed syndrome in college going students–an observational study. International Journal of Health Sciences and Research, 2022. 12(3): p. 179-186.
9. Mostafaee, N., et al., Evaluating differences between participants with various forward head posture with and without postural neck pain using craniovertebral angle and forward shoulder angle. Journal of Manipulative and Physiological Therapeutics, 2022. 45(3): p. 179-187.

10. Lewis, E., L. Fors, and W.J. Tharion, Interrater and Intrarater Reliability of Finger Goniometric Measurements. The American Journal of Occupational Therapy, 2010. 64(4): p. 555-561.
11. Widbom-Kolhanen, S., K.I. Pernaa, and M. Saltychev, Reliability and validity of the Neck Disability Index among patients undergoing cervical surgery. International Journal of Rehabilitation Research, 2022. 45(3): p. 273-278.
12. Wang, L., et al., Efficacy of cupping therapy on pain outcomes: an evidence-mapping study. Frontiers in Neurology, 2023. 14: p. 1266712.
13. Wood, S., et al., Dry cupping for musculoskeletal pain and range of motion: a systematic review and meta-analysis. Journal of bodywork and movement therapies, 2020. 24(4): p. 503-518.
14. Amoudi, M. and A. Ayed, Effectiveness of stretching exercise program among nurses with neck pain: Palestinian perspective. Science Progress, 2021. 104(3): p. 00368504211038163.
15. Janagiraman, R., et al., Comparison of sternocleidomastoid and trapezius muscle stretches in the management of symptomatic non specific cervical pain. Retos, 2025. 68: p. 1971-1978.Ali Raza, S. S. (2021). Incidence of plantar fasciitis in overweight patients of goverment hospital of faisalabad . The Professional Medical Journal, 718-724.