ISSN: 2322 - 0902 (P)
ISSN: 2322 - 0910 (O)

International Journal of Ayurveda and Pharma Research

Research Article

EFFECT OF WET CUPPING THERAPY *(RAKTAMOKSHA)* IN THE MANAGEMENT OF CARPAL TUNNEL SYNDROME: A PRE-POST TEST DESIGN

Shakkira N[1]*, Sunitha P V[2]

*[1]PG Scholar, [2]Professor, Department of Shalyatantra, VPSV Ayurveda College, Kottakkal, Malappuram, Kerala.

Article info

Article History:
Received: 26-05-2025
Accepted: 24-06-2025
Published: 07-07-2025

KEYWORDS:
Carpal Tunnel Syndrome, *Raktavrta Vata, Raktamoksha,* Wet cupping.

ABSTRACT

Background and objective: Carpal tunnel syndrome (CTS) affects approximately 4.25% of the global adult population, with women aged 30–60 years having a threefold higher risk compared to men. CTS primarily manifests as pain, tingling, numbness, and paraesthesia in the thumb, index, middle, and lateral half of the ring finger, with nocturnal exacerbation often relieved by shaking the hands. If untreated, CTS may cause permanent median nerve damage, leading to irreversible numbness, thumb deformity, and muscle atrophy. While surgical interventions provide symptom relief, they carry risks of recurrence, intraoperative complications, and wrist instability. This study aimed to evaluate *Raktamokṣa* by cupping therapy as a potential alternative or adjunctive treatment for CTS. **Methodology:** A single-group pre-post-test design was conducted at AVCH Kottakkal with 30 CTS-diagnosed participants. Wet cupping therapy was administered on day 1 and day 16. Assessments were done on days 1, 8, 16, 25, and 45 using the Boston Carpal Tunnel Questionnaire and clinical signs and symptoms. Data were analyzed using Friedman test, McNemar test, and Wilcoxon Signed Rank test. **Results and discussion:** Wet cupping therapy significantly reduced CTS signs and symptoms ($p < 0.05$). However, no significant changes were observed in nerve conduction velocity studies. **Conclusion:** Wet cupping therapy in two sittings showed statistically significant improvement in CTS symptoms, supporting the rejection of the null hypothesis and acceptance of the alternative hypothesis regarding its efficacy.

INTRODUCTION

Carpal tunnel syndrome (CTS) is the most prevalent upper limb entrapment neuropathy, affecting approximately 4.25% of the global adult population[1]. Characterized by motor, sensory, and vasomotor symptoms. CTS results from compression of the median nerve in the carpal tunnel[2]. Women between 30-60 years old are disproportionately affected, experiencing pain, paraesthesia, tingling, and numbness in the outer three and a half fingers and hand. If left untreated, CTS can significantly impact quality of life, leading to permanent nerve damage, muscle wasting, and deformity[3]. Wet cupping therapy, a variant of traditional cupping therapy, involves creating suction on the skin and drawing out blood to stimulate blood flow, promote healing, and reduce inflammation. Emerging evidence suggests wet cupping therapy's efficacy in managing various musculoskeletal conditions, including chronic pain and inflammation. However, its application in CTS management remains understudied.

Interestingly, the ancient Indian medical text, *Susruta Samhita*, describes a condition called *Raktavruta vata*[4], which shares similarities with CTS. *Raktamokṣa*, a para-surgical procedure involving cupping therapy, is recommended as a treatment for *Raktavruta vata*. Given the limitations of current surgical and non-surgical interventions for CTS, including high recurrence rates and potential complications, this study aims to investigate the effect of *Raktamokṣa* as a cupping therapy in managing CTS. By exploring the therapeutic potential of wet cupping, this research aims to help create alternative treatment options for CTS.

Access this article online

Quick Response Code

https://doi.org/10.47070/ijapr.v13i6.3752

Background study

Michalsen et al. (2009) found that traditional cupping therapy significantly improved pain, functional ability in study group. This study suggests cupping therapy done over shoulder may be a valuable adjunctive treatment for CTS, modulating pain processing and reducing inflammation. Building on this evidence, my dissertation will explore the effects of wet cupping therapy on CTS management, investigating its potential benefits and applications when the cupping done over affected wrist area in two sittings of wet cupping therapy.

The study by Gupta et al. (2020) discusses recent advances in *Raktamokṣa*, an Ayurvedic bloodletting therapy, with a focus on modifications in the instruments *(Shastra)* used for the procedure. The study highlights the importance of adapting traditional techniques to modern standards while maintaining their efficacy and safety, hence cupping can be used instead of *Sringa* for bloodletting.

OBJECTIVE

To find out the effect of cupping therapy in the management of CTS.

Research question: Whether the cupping therapy done over the wrist area in two sittings with a gap of 15 days has effect in reducing the signs and symptoms of carpal tunnel syndrome among 30 participants in the age group of 25-60 years attending OPD of V.P.S.V Ayurveda College Hospital, Kottakkal during 2023-2024?

Null hypothesis: Cupping therapy has no effect on reducing the signs and symptoms of carpal tunnel syndrome.

Alternative hypothesis: Cupping therapy has effect on reducing the signs and symptoms of carpal tunnel syndrome.

MATERIALS AND METHODS

The dissertation conducted as a single group pre-post test design to find out the effect of cupping therapy in the management of CTS.

Study design: Interventional study, single group pre and post design Study setting: OPD, V.P.S.V Ayurveda College Hospital, Kottakkal.

Study population: Participants selected as per inclusion and exclusion criteria.

Sampling method: Consecutive sampling

S**tudy period:** 18 months

Diagnostic criteria

Participants fulfilling ICD-10 CM diagnosis code for CTSG56.0

Clinically diagnosed cases of CTS confirmed with nerve conduction study.

Inclusion criteria

- Participants satisfying diagnostic criteria within the age group of 25-60 years.
- Participants with informed consent.

Exclusion criteria

- Subjects in whom *Raktamokṣa* is contraindicated.
- Uncontrolled diabetes mellitus.
- Patients taking anti-coagulants.
- Known cases of bleeding disorders.
- Fractures of bone in and around wrist joint.

Methodology of clinical study

1. Clinical study
2. Observation and Assessment

Intervention

Participants were selected from the study setting as per diagnostic, inclusion and exclusion criteria. An informed consent was obtained. Their primary data collected through clinical case proforma and the intervention of *Raktamokṣa* was done using sterilized hijama cup of size 6, over the area within 3cm diameter of flexor retinaculum of wrist joint in 2 sittings 1st day and 16th day.

Procedure

***Poorvakarma*:** Selected participants were subjected to local *abhyanga* over wrist using *Tilataila* and *Ushmasweda* for 5 minutes. Wrist area made aseptic using spirit.

***Pradhana karma*:** 4-5 bleeding points were made using size 24 needle and placed the hijama cup of size 6 properly over the bleeding points and negative pressure applied with a suction gun. The hijama cup was removed after spontaneous stoppage of bleeding.

***Paschat karma*:** cleaning and dressing of the area done with a sterile cotton pad.

Outcome measures

Objective criteria

Nerve Conduction Study report

Subjective criteria

1. Boston carpal tunnel questionnaire (BCTQ)
2. Range of movement of wrist joint
3. Pain
4. Tenderness
5. Paraesthesia
6. Phalen's test
7. Tinel's test

Assessment of the parameters was done on 1st, 8th, 16th and 25th days and follow-up on 45th day.

Grading of parameters

Pain in VAS scale
0 – Nil
1-3 – Mild
4-6 - Moderate

7 and above - Severe
Phalen's test – Positive, Negative
Tinel's test – Positive, Negative
Restricted wrist flexion and extension- Present, absent
Paraesthesia - Present, absent

Plan of analysis

The data obtained was compiled and coded using Microsoft excel. Data analysed using Friedman test, Wilcoxon signed rank test and MC Nemar test.

OBSERVATIONS

Distribution of presenting complaints

Pain

Among the total participants 83.3% were presented with pain as the main complaint.

Table 1: Distribution of pain

Pain	Frequency	Percentage
Absent	5	16.7
Present	25	83.3

Numbness/ paraesthesia

All the participants reported numbness as a primary presenting complaint.

Tenderness

Majority of participants were having tenderness on wrist and about 37% participants had grade 2 tenderness.

Table 2: Distribution of tenderness

Tenderness	Frequency	Percentage
Absent	10	33.3
Grade 1	9	30
Grade 2	11	36.7

Affected upper limb

50% were affected with CTS in the right upper limb, while 7 participants were affected on the left side and 8 participants were affected on both sides.

Diagnosis - CTS grade

40% participants affected with moderate grade CTS. 26% had grade 3 CTS. Whereas mild and very severe CTS were diagnosed in 17% participants each.

Results and Statistical Analysis

In this study, 30 participants diagnosed with CTS were treated with wet cupping therapy on first and fifteenth day of intervention in a single group, and the data was obtained by assessing with nerve conduction study and Boston carpal tunnel questionnaire. The effect of cupping therapy in clinical signs and symptoms were statistically analysed. On normality assessment it was found that the data was not following a normal distribution. As the data was ordinal type non-parametric test were used to do statistical analysis of the study. The following non-parametric tests were done.

1. Friedman test
2. Wilcoxon Signed Rank Test.
3. MC Nemar test.

The effect of therapy within group were tested with Friedman Test, followed by Wilcoxon Signed Rank Test for pairwise comparisons. MC Nemar test used to compare the outcomes of participants before and after the intervention. Level of significance fixed at 0.05 for statistical analysis.

Table3: CTS grading in NCS

CTS Grade	N	Mean	SD	Median (IQR)	Z Value	P Value
BT	30	2.37	0.967	2.00 (2.00, 3.00)	-1.414	0.157
AT	30	2.30	0.953	2.00 (2.00, 3.00)		

The Z value of -1.414 and p value of 0.157 suggest that the change in CTS grade before and after treatment is not statistically significant at the conventional 0.05 significance level.

Effect of Cupping Therapy in Pain

Table 4: Friedman test-Pain

Pain	Mean	SD	Median	Mean Rank	Friedman Value	P Value
1st Day	6.59	2.47	7.00	4.74	85.19	<0.001
8th Day	4.19	1.90	5.00	3.69		
16th Day	3.26	1.83	3.00	2.98		
25th Day	1.78	1.48	1.00	1.80		
45th Day	1.78	1.48	1.00	1.80		

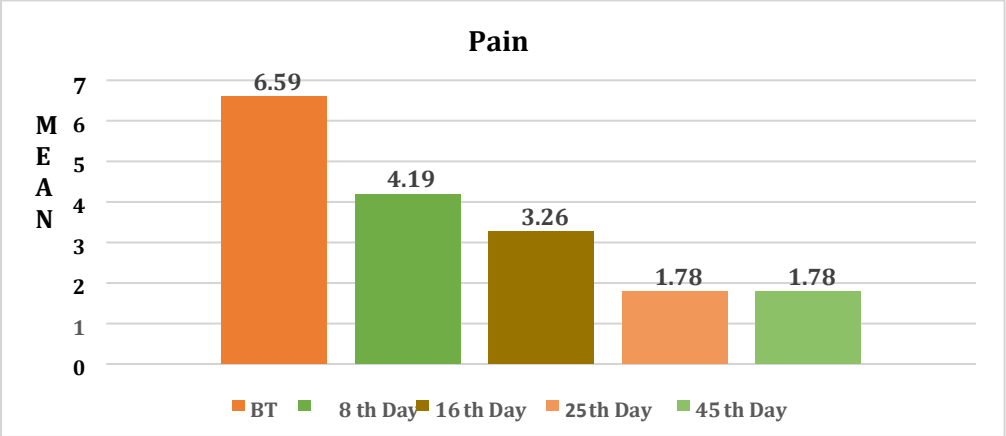


Figure3: Pain Chart

The p-value is a crucial component in understanding the statistical tests. In this context, the p-value assesses whether the differences in pain scores across the different days are statistically significant. A P value of less than 0.001 is very low, suggesting that there is less than a 0.1% probability that the observed changes in pain scores occurred by random chance. This suggests that the reduction in pain scores over the observed days is statistically significant.

Comparison-Pre and Post Cupping on Pain

Table 5: Wilcoxon Signed Rank Test

Pain Score	BT-8th Day	BT -16th Day	BT -25th Day	BT -45th day
Z Value	-4.4573	-4.4573	-4.5407	-4.5407
P Value	<0.001	<0.001	<0.001	<0.001

The analysis of pain scores over time reveals a statistically significant decrease in pain from the 1st day to each of the subsequent days observed: the 8th, 16th, 25th, and 45th days. The Z-values for the comparisons between the 1st day and each of these days are consistently negative and substantial (-4.4573, -4.4573,-4.5407,-4.5407), indicating a notable reduction in pain scores. Correspondingly, the P value for all these comparisons is less than 0.001, which is far below the significance level of 0.05. This shows that the reductions in pain scores are highly significant and not attributable to random chance. Overall, these results confirm a clear and significant trend of decreasing pain over the observed period.

Effect of Cupping Therapy in Paraesthesia

Table 6: Paranesthesia - Friedman test

Paraesthesia	Mean	SD	Median	Mean rank	Friedman value	P value
1st Day	2.00	0.00	2.00	4.70	85.440	<0.001
8th Day	1.19	0.396	1.00	2.67		
16th Day	1.19	0.396	1.00	2.67		
25th Day	1.11	0.320	1.00	2.48		
45th Day	1.11	0.320	1.00	2.48		

The consistent decrease in the mean rank from 4.70 on the 1st day to 2.48 by the 25th and 45th days reflects a significant improvement in paraesthesia symptoms over time.

Pairwise comparison

Table 7: Paraesthesia -Wilcoxon signed rank test

Paresthesia	BT -8th Day	BT-16th Day	BT-25th Day	BT-45th Day
Z Value	-4.690	-4.690	-4.899	-4.899
P Value	<0.001	<0.001	<0.001	<0.001

On the 1st day, the Z-value of -4.690 suggests a marked difference in paraesthesia scores compared to subsequent days. By the 8th day, the Z-value remains -4.690, indicating that the reduction in symptoms is both

significant and stable. This pattern continues through the 16th day with a Z-value of -4.899, and is maintained up to the 25th and 45th days with the same Z-value of -4.899. The P values are less than 0.001 for all time intervals, confirming that the observed reductions in paraesthesia are highly significant statistically.

Effect of cupping therapy on tenderness

Table 8: Friedman test- Tenderness

Tenderness	Mean	SD	Mean Rank	Friedman Value	P Value
1st Day	0.93	0.68	4.33	60.64	<0.001
8th Day	0.33	0.56	3.02		
16th Day	0.15	0.46	2.65		
25th Day	0.07	0.27	2.50		
45th Day	0.07	0.27	2.50		

The analysis of tenderness scores over time shows a significant reduction in tenderness from the 1st day to the 45th day. Initially, on the 1st day, the mean tenderness score is 0.93, which decreases progressively to 0.07 by the 25th and 45th days. The Chi-square test confirms this trend with a Chi-square value of 60.64 and a level of significance less than 0.001, indicating that the reduction in tenderness is statistically significant. These results demonstrate a meaningful decrease in tenderness over the observation period, reflecting an overall improvement.

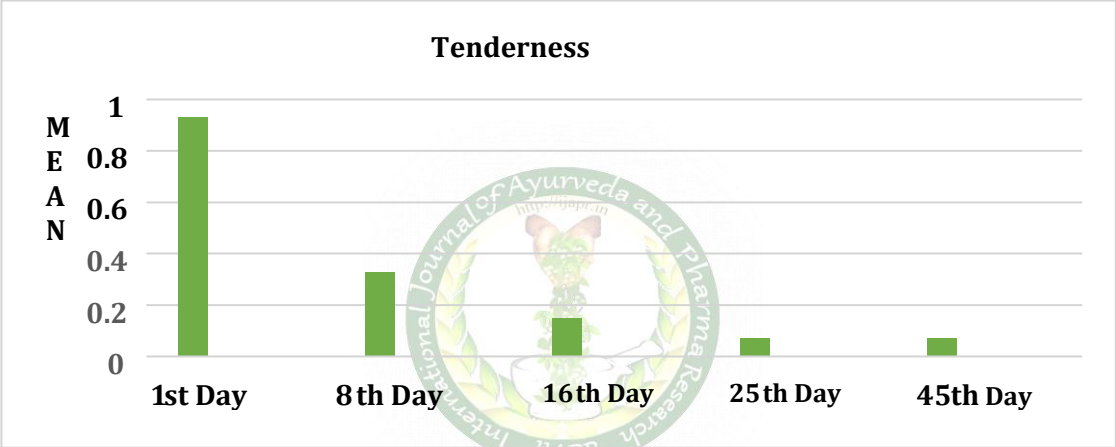


Figure 4: Tenderness chart

Comparison-Pre and Post Cupping -Tenderness

Table 9: Wilcoxon Signed Rank Test -Tenderness

Tenderness	Bt-8th day	Bt-16th day	Bt-25th day	Bt-45th day
Z Value	-4.00	-4.001	-4.065	-4.065
P Value	<0.001	<0.001	<0.001	<0.001

The analysis of tenderness scores reveals a statistically significant decrease from the 1st day to each subsequent observation day. The Z-values for comparisons between the 1st day and the 8th, 16th, 25th, and 45th days are consistently negative and substantial (-4.00, -4.001, -4.065, -4.065), indicating a notable reduction in tenderness. All associated P values are less than 0.001, concludes that these variations are highly significant.

Effect of Cupping Therapy on BCTQ

Table 10: Friedman Test-BCTQ-SSS

BCTQ (Symptom severity scale)	Mean	SD	Median	Mean Rank	Friedman Value	P Value
1st Day	27.33	6.96	28.00	5.00	103.32	<0.001
8th Day	20.00	4.77	20.00	3.74		
16th Day	18.67	5.28	20.00	3.11		
25th Day	14.30	4.29	13.00	1.57		
45th Day	14.30	4.29	13.00	1.57		

The table displays data from the BCTQ-Symptom Severity Scale at various intervals: 1st, 8th, 16th, 25th, and 45th days. On the 1st day, the mean SSS was 27.33 with a standard deviation (SD) of 6.96, and the median was 28.00. The mean rank was 5.00, and the chi-square value was 103.32, with a highly significant P-value of less than 0.001, indicating substantial differences compared to later days. By the 8th day, the mean score had dropped to 20.00 (SD = 4.77), with a median of 20.00 and a mean rank of 3.74. On the 16th day, the mean score further decreased to 18.67 (SD = 5.28), with a median of 20.00 and a mean rank of 3.11. Both the 25th and 45th days show the same results, with a mean score of 14.30 (SD = 4.29), a median of 13.00, and a mean rank of 1.57. These findings demonstrate a consistent reduction of symptom severity over time, with notable improvements observed from the initial assessment to the final evaluation on the 45th day.

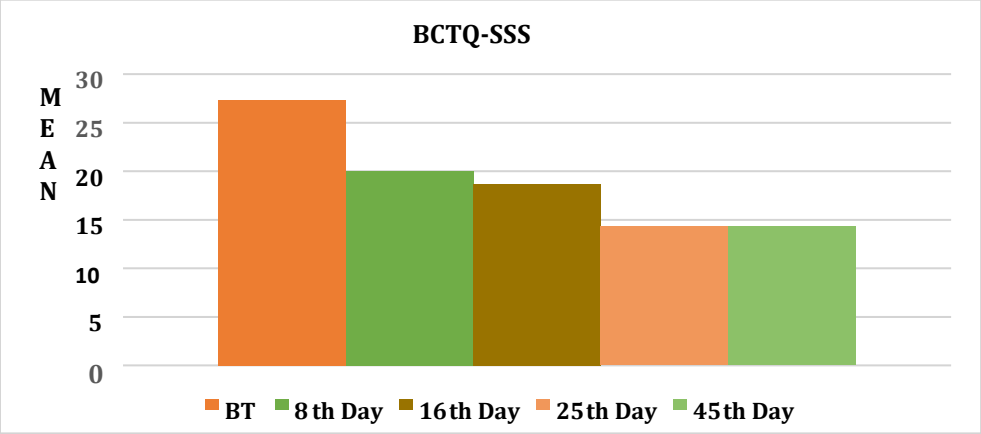


Figure 5: BCTQ-SSS

Pairwise Comparison

Table 11: Wilcoxon signed rank test

BCTQ (Symptom severity scale)	BT-8th Day	BT-16th Day	BT-25th Day	BT-45th Day
Z Value	-4.550	-4.547	-4.544	-4.544
P Value	<0.001	<0.001	<0.001	<0.001

The table shows the Z-values and P value for the changes in the Boston Carpal Tunnel Questionnaire (BCTQ) Symptom Severity Scale between the 1st day and subsequent days: 8th, 16th, 25th, and 45th days. The Z-value for the change from the to the 8th day is -4.550, and the Z-values for changes from the BT to the 16th, 25th, and 45th days are -4.547, -4.544, and -4.544 respectively. All these comparisons have P value less than 0.001, indicating that the reductions in symptom severity scores over these intervals are statistically significant.

Effect of Cupping therapy on BCTQ-FSS

Table 12: Friedman test-BCTQ-FSS

BCTQ (functional status scale)	Mean	SD	Median	Mean rank	Friedman value	P value
1st Day	16.33	3.57	16.00	4.93	100.05	<0.001
8th Day	12.30	2.35	12.00	3.67		
16th Day	11.70	2.13	11.0	3.19		
25th Day	9.89	2.03	9.00	1.61		
45th Day	9.89	2.03	9.00	1.61		

The table presents data from the BCTQ-Functional Status Scale at different time points: 1st, 8th, 16th, 25th, and 45th days. On the 1st day, the mean FSS was 16.33 with a standard deviation (SD) of 3.57 and a median of 16.00. The mean rank was 4.93, and the chi-square value was 100.05, with a highly significant p-value of less than 0.001, indicating significant differences compared to later days. By the 8th day, the mean score had decreased to 12.30 (SD = 2.35), with a median of 12.00 and a mean rank of 3.67. On the 16th day, the mean score further decreased to 11.70 (SD = 2.13), with a median of 11.00 and a mean rank of 3.19. The 25th and 45th days both show the same results, with a mean score of 9.89 (SD = 2.03), a median of 9.00, and a mean rank of 1.61. These results indicate a steady improvement in FSS over time, with significant improvements from the initial assessment on the 1st day to the final assessment on the 45th day.

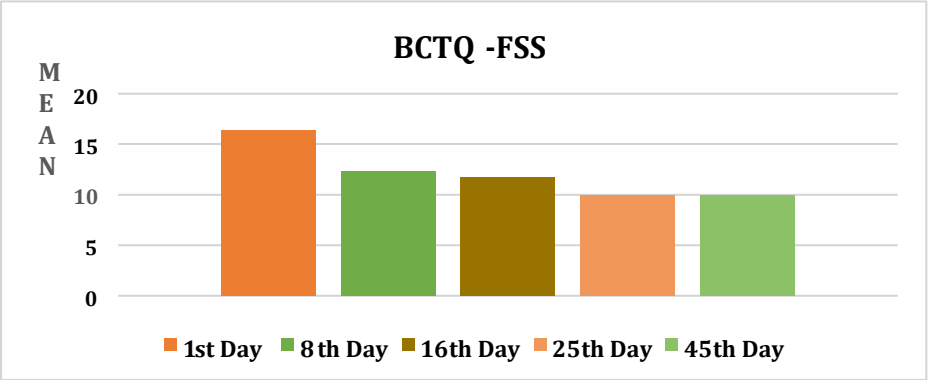


Figure 6: BCTQ-FSS

Table 13: Pairwise comparison between days-Wilcoxon signed rank test

BCTQ (Functional status scale)	BT-8th Day	BT-16th Day	BT-25th Day	BT-45th Day
Z Value	-4.294	-4.467	-4.549	-4.549
P Value	<0.001	<0.001	<0.001	<0.001

The table shows the Z-values and level of significance for the variations in the BCTQ FSS from the 1st day to the 8th, 16th, 25th, and 45th days. The Z-value for the change from the 1st to the 8th day is -4.294, while the Z-values for the changes from the 1st day to the 16th, 25th, and 45th days are -4.467, -4.549, and -4.549, respectively. All these comparisons have P value of less than 0.001, indicating statistically significant improvements in functional status over these time intervals. This data demonstrates a substantial and consistent improvement in the functional state of patients from the initial assessment on the 1st day through to the 45th day.

Restricted Wrist Flexion and Extension

Comparison Between Before Treatment and 8th Day of Assessment

Table 14: MC Nemar test

8th Day	Restricted Wrist Flexion and Extension (1st Day)				P Value
	Absent		Present		
	N	%	N	%	
Absent	28	100.0	0	0.0	1.00
Present	0	0.0	2	100.0	

The data indicates a perfect association between wrist flexion and extension on the 1st and 8th days. Specifically, 28 individuals without restricted wrist flexion and extension on the 1st day also showed no restriction on the 8th day, while 2 individuals with restricted wrist flexion on the 1st day continued to exhibit this restriction on the 8th day. The P value of 1.00 confirms that there is no significant difference between the groups, suggesting a complete correlation between the wrist flexion and extension restriction from the 1st to the 8th day.

The data indicates that the intervention had no effect on wrist flexion and extension. All 28 participants who did not have restricted wrist flexion and extension on the 1st day also did not have it on the 8th day while the 2 individuals with restricted wrist flexion and extension on the 1st day continued to have it on the 8th day. The P value of 1.00 suggests statistically insignificant change between groups, showing that the wrist flexion status remained unchanged over the 8-day period. Thus, the cupping did not influence wrist flexion and extension.

Comparison Between Before Treatment And 8th Day of Assessment

Table 15: MC Nemar test

16th Day	Restricted Wrist Extension (1st Day)		Flexion		P Value
	Absent		Present		
	n	%	N	%	
Absent	28	100.0	1	50.0	1.00
Present	0	0.0	1	50.0	

The data presents the wrist movement status on the 16th day in relation to the 1st day status. The data shows the association between wrist flexion and extension status on the 1st and 16th days, suggesting the

intervention's lack of impact. On the 16th day, all 28 participants who initially did not have restricted wrist flexion and extension continued to have no restriction. Among the individuals who had restricted wrist flexion and extension on the 1st day, one continued to have the restriction while one did not, indicating a 50% continuation rate.

The P value of 1.00 indicates statistically insignificant difference between the groups, reinforcing that the cupping did not effectively change wrist flexion and extension status over the 16-day period.

Comparison Between Before Treatment and 25th Day of Assessment

Table 16: MC Nemar test

25th day	Restricted Wrist Extension (1st Day)		Flexion		P Value
	Absent		Present		
	n	%	N	%	
Absent	28	100.0	1	50.0	1.00
Present	0	0.0	1	50.0	

The data on the 25th day also shows that the intervention did not affect wrist flexion and extension. All who did not have restricted wrist flexion on the 1st day still had no restriction on the 25th day. Of those who had restricted wrist movement on the 1st day, one continued to have the restriction while one did not, maintaining a 50% continuation rate. The P value of 1.00 indicates statistically insignificant difference between the groups, confirming that the cupping did not influence wrist flexion status over the 25 day period.

Comparison Between Before Treatment and 45th Day of Assessment

Table 17: MC Nemar test

45th Day	Restricted Wrist Extension (1st Day)		Flexion and		P Value
	Absent		Present		
	n	%	N	%	
Absent	28	100.0	1	50.0	1.00
Present	0	0.0	1	50.0	

The data collected on the 45th day reinforces the previous findings. The data in different time points, including the 45th day, consistently shows that the intervention had no significant effect on wrist flexion and extension status. Throughout the study, all 28 participants who did not showed restricted wrist movement on the 1st day continued to show no restriction on the 8th, 16th, 25th, and 45th days.

Among the individuals who had restricted wrist movements on the 1st day, one continued to have the restriction while one did not at each subsequent time point, maintaining a 50% continuation rate. The P value of 1.00 at each interval indicates statistically insignificant difference between the groups, confirming that the cupping did not impact wrist flexion and extension status over the 45-day period.

Tinel's Sign

Comparison Between Before Treatment and 8th Day of Assessment

Table 18: MC Nemar test

8th Day	Tinel's Sign (1st Day)				P Value
	Absent		Present		
	n	%	N	%	
Absent	1	100.0	11	38	<0.001
Present	0	0.0	18	62	

Table show the association between Tinel's sign on the 1st day and its presence on the 8th day. On the 8th day, among participants who did not exhibit Tinel's sign on the 1st day, 1 person (100.0%) remained without it, while 11 individuals (38%) who had Tinel's sign present on the 1st day no longer exhibited it. The participants who had Tinel's sign on the 1st day, 18 individuals (62%) still had it on the 8th day. The P value of 0.001 indicates a statistically significant change in the presence of Tinel's sign between the 1st and 8th days.

Comparison Between Before Treatment and 16th Day of Assessment

Table 19: MC Nemar test

16th Day	Tinel's Sign (1st Day)				P Value
	Absent		Present		
	n	%	N	%	
Absent	1	100.0	23	79	<0.001
Present	0	0.0	6	21	

The table examines the relationship between Tinel's sign on the 1st day and its status on the 16th day, along with the P-value. On the 16th day, one individual (100.0%) who have negative Tinel's sign on the 1st day remained without it. In contrast, 23 individuals (79%) who had Tinel's sign on the 1st day no longer exhibited it, while 6 individuals (21%) continued to show Tinel's sign positive. The P value of less than 0.001 indicates a statistically significant change in the presence of Tinel's sign from the before intervention to the 16th day. This suggests a notable improvement in the condition, with a significant reduction in the number of patients showing Tinel's sign over time.

Comparison Between Before Treatment And 25th Day of Assessment

Table 20: MC Nemar test

25th Day	Tinel's Sign (1st Day)				P Value
	Absent		Present		
	n	%	N	%	
Absent	1	100.0	26	89.7	<0.001
Present	0	0.0	3	10.3	

The data indicates a significant relationship between the presence of Tinel's sign on the 1st day and 25th day. All who had Tinel's sign absent on the 1st day continued to have it absent on the 25th day. Conversely, a substantial majority (89.7%) of those who initially had Tinel's sign present experienced an absence of the sign by the 25th day, while a smaller fraction (10.3%) retained the positive sign. The p value of less than 0.001 suggests this change is statistically significant, implying that the presence of Tinel's sign on the 1st day is a strong predictor of its status on the 25th day, with most cases resolving over time.

Comparison Between Before Treatment and 45th Day of Assessment

Table 21: MC Nemar test

45th Day	Tinel's Sign (1st Day)				P Value
	Absent		Present		
	n	%	N	%	
Absent	1	100.0	26	89.7	<0.001
Present	0	0.0	3	10.3	

The data indicates a significant correlation between the presence of Tinel's sign on the 1st day and on the 45th day. All participants who had Tinel's sign absent initially remained without it on the 45th day. Conversely, 89.7% of those with Tinel's sign present on the 1st day no longer exhibited the sign by the 45th day, while 10.3% continued to show it. The P value of less than 0.001 underscores the statistical significance of this relationship, suggesting that the initial presence of Tinel's sign is a strong predictor of its resolution over time, with the majority of cases improving by the 45th day.

Phalen's Test

Comparison Between Before Treatment and 8th Day of Assessment

Table 22: MC Nemar test

8th Day	Phalen's Test (1st Day)				P Value
	Absent		Present		
	n	%	N	%	
Absent	2	100.0	19	67.8	<0.001
Present	0	0.0	9	36.0	

The data demonstrates a significant association between the Phalen's test on the 1st day and on the 8th day. Specifically, two participants who had Phalen's test absent on the 1st day also had it absent on the 8th day. Among individuals who were first found to be positive, 67.8% had a negative result by the 8th day, while 32.1% remained positive. The P value of less than 0.001 highlights the statistical significance of this relationship, indicating that the initial presence of a positive Phalen's test strongly predicts its outcome over the subsequent week, with the majority of positive cases resolving by the 8th day.

Comparison Between Before Treatment and 16th Day of Assessment

Table 23: MC Nemar test

16th Day	Phalen's Test (1st Day)				P Value
	Absent		Present		
	n	%	N	%	
Absent	2	100.0	22	78.5	<0.001
Present	0	0.0	6	21.4	

The data shows a significant correlation between the results of Phalen's test on the 1st day and its outcome on the 16th day. All individuals who had a negative Phalen's test on the 1st day remained negative on the 16th day also. Among individuals who were found to be positive on first day, 78.5% had a negative result by the 16th day, while 21.4% remained same. The P value of less than 0.001 indicates a significant relationship statistically, suggesting that the initial presence of a positive Phalen's test is a predictor of its status over the following weeks, showing improvement by the 16th day.

Comparison Between Before Treatment And 25th Day of Assessment

Table: MC Nemar test

25th Day	Phalen's Test (1st Day)				P Value
	Absent		Present		
	n	%	N	%	
Absent	2	100.0	21	75.0	<0.001
Present	0	0.0	7	25.0	

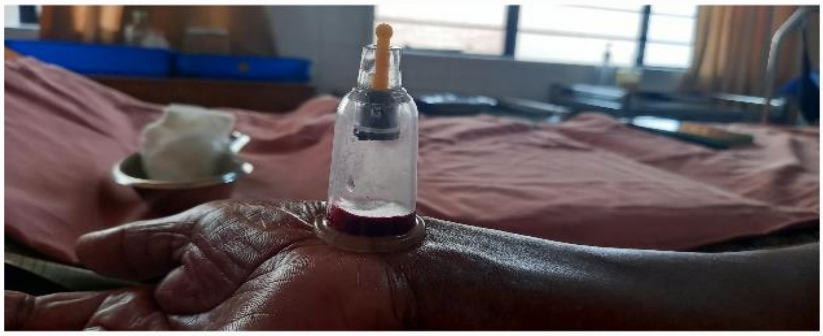
The data indicates a significant correlation between the results of Phalen's test on the 1st day and its outcome on the 25th day. All individuals who had a negative Phalen's test on the 1st day remained negative on the 25th day also. Among those who tested positive on first day, 75.0% had a negative result by the 25th day, while 25.0% continued to test positive. The P value of less than 0.001 signifies a highly significant relationship, suggesting that the initial presence of a positive Phalen's test is a strong predictor of its status over the following 25 days, with the majority of cases showing improvement by this time.

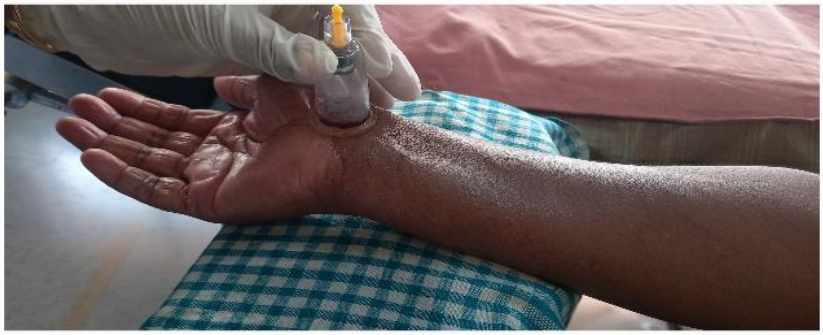
Comparison Between Before Treatment and 45th Day of Assessment

Table 24: MC Nemar test

45th Day	Phalen's Test (1st Day)				P Value
	Absent		Present		
	n	%	N	%	
Absent	2	100.0	21	75.0	<0.001
Present	0	0.0	7	25.0	

The data reveals a significant correlation between the results of Phalen's test on the 1st day and its outcome on the 45th day. All individuals who had a negative Phalen's test on the 1st day remained negative on the 45th day. Among those who tested positive on first day, 75.0% had a negative result by the 45th day, The P value of less than 0.001 shows a highly significant relationship, suggesting that the initial presence of a positive Phalen's test is a strong predictor of its status over the following 45 days, with the majority of cases showing improvement by this time.





DISCUSSION

Discussion on clinical data

Observation of the study was based on subjective and objective criteria. Objective criteria include assessment of Nerve conduction study. Subjective criteria included assessment of pain, tenderness, paraesthesia, Boston carpal tunnel questionnaire, Tinel's sign and Phalen's test.

NCS: When evaluating the objective criteria, NCS were initially conducted to confirm the clinical diagnosis of CTS. After the intervention, NCS was repeated to assess the effectiveness of the treatment.12 participants were with moderate grade CTS.8 had severe CTS. Whereas mild and very severe CTS were diagnosed in 5 participants each. The standard deviation values of 0.967 before treatment (BT) and 0.953 after treatment (AT) are similar, indicating that the variability in CTS

grades was consistent. There were no significant changes noted in NCS before and after cupping.

BCTQ -SSS Score: BCTQ evaluated symptom severity and functional status of each participant on 1st, 8th, 16th, 25th and 45th day. These findings indicate a consistent reduction in symptom severity and functional ability over time, with significant improvements from the initial assessment to the final assessment on the 45th day.

Pain: While assessing the pain score in VAS scale shows a clear and significant decrease in pain scores over time, supported by a P value much lower than the conventional threshold of 0.05. This implies that the observed changes in pain levels are meaningful and not due to random fluctuations.

Paraesthesia: All of the participants are reported the paraesthesia or numbness of hand as a main clinical feature before intervention having a mean of 2, which was changed to 1.19 on 8th and 16th days respectively. A gradual decrease of mean to 1.11 seen on 25th and 45th days. A P value less than 0.001, reflects a significant improvement in paraesthesia symptom over time.

Tenderness: The mean tenderness score was 0.93 while assessing the participants before intervention. It was decreased to 0.33 after 7 days of first sitting of cupping therapy and further decreased to 0.07 after 1 week of second cupping. The consistent and substantial decrease in tenderness at all assessed time points suggests a meaningful therapeutic effect or recovery trend over the observation period, highlighting the effectiveness of the intervention or natural improvement in the condition.

Restricted wrist flexion and extension: While analysing the data it is clear that only 2 participants among 30 were complained of slight restricted wrist flexion and extension. One participant got changes over time and one continued to have the restriction at each subsequent time point, maintaining a 50% continuation rate. This data is insufficient to explain the role of cupping therapy on wrist movement improvement, as participants did not exhibit restricted movements prior to the intervention. Consequently, it is unclear whether cupping therapy specifically contributed to any changes in wrist mobility. Further research with a focus on assessing movement limitations before and after treatment is needed to better understand the therapy's effects on wrist function.

Tinel's sign: 96.6% of participants showed a positive Tinel's sign before treatment and it decreased to 10% with positive Tinel's sign after intervention. On the other hand, 89.7% of individuals who showed Tinel's sign on the first day had a negative Tinel's sign by the 45th day, whereas 10.3% continued to have it. The P value of less than 0.001 indicates that this result is statistically significant.

Phalen's test: The data reveals a significant correlation between the results of Phalen's test on the 1st day and its outcome on the 45th day. All participants who had a negative Phalen's test on the 1st day remained negative on the 45th day. Among those who tested positive firstly, 75% had a negative result by the 45th day, while 25.0% continued positive test. The P value of less than 0.001 signifies a significant relationship, showing that the initial presence of a positive Phalen's test is a strong predictor of its status over the following 45 days, with the majority of cases showing improvement by this time.

Discussion on cupping therapy: Cupping therapy done using hijama cup can be considered as a modified form bloodletting method mentioned in ayurveda. *Sringa* (animal horn) was used for the procedure of bloodletting in which sucking with mouth was done for drawing blood.[5] In modern times we can use same principle of suction by creating vacuum with more user friendly and hygienic methods like hijama cups.[6]

Discussion on probable mode of action: Study findings showed that cupping therapy led to significant improvements in symptoms of CTS, that is reduction in pain and numbness, which in turn contributed to changes in BCTQ score and clinical signs of CTS.[7] Reviewing the literature on cupping and its mechanism of action has revealed insufficient information about the physiological, biological and mechanical changes of the body during cupping therapy. Certain theories are proposed to explain the mode of action of wet cupping procedure are.[7]

1. Pain gate theory 2. Nitric Oxide Theory

In the current study probable mode of action of cupping in reduction of pain may be explained by pain gate theory. The "Pain Gate Theory," proposed by Melzack and Wall, this theory suggests that the touch, pressure, and vibrations produced during cupping therapy selectively stimulate large nerve fibers.[7] This stimulation inhibits the transmission of pain signals to the brain via the dorsal horn of the spinal cord. The increased activation of peripheral nociceptors from cupping enhances receptor-fiber units, which in turn activates large-fiber nerves. These nerves respond to stimuli, and the suction created by cupping's pumping mechanism may help alleviate pain. The procedure of cupping could stimulate large fiber activity and thus modulate pain through the gate mechanism.[8]

The nitric oxide (NO) theory postulates that via NO-mediated endothelial vasodilation, cupping can improve circulation in a given anatomical area. Here mode of action may be explained by nitric oxide theory as Increased blood flow due to NO-mediated endothelial vasodilation shown to reduce the levels of pro-inflammatory cytokines such as TNF-α (Tumor

Necrosis Factor-alpha) and IL-6 (Interleukin-6) resulted in reduction of edema in the carpal tunnel and relieves pressure on the median nerve, and decrease pain, numbness, and tingling.[9] Proper blood flow relieves muscle tension and spasms in the forearm and wrist may decrease the strain on the carpal tunnel and alleviated related symptoms.[9]

Ayurvedic perspective: Acharya *Susruta* mentioned *Raktavruta vata* in 12th chapter *Vatavyadi nidana* of *Nidanasthana* having clinical features which resemble as that of CTS like *Toda, Sparsadvesa* and *Prasuptata* can be correlated with pain, tenderness and paraesthesia. *Raktamokṣa* is the treatment advised for *Rakthavrutha vata. Sringa* is used for *Raktamokṣa* when there is an association with *Vata.* Cupping can be considered as a modified form of *Sringa* where mechanical aspiration is used instead of mouth aspiration.[10]

Inflammation response to extensive use of wrist leads to synovial tissue hypertrophy of tendons which increases compartmental pressure, obstruction of overall venous outflow, localized edema buildup, and impairment of the median nerve's intraneural microcirculation,[11] results in hypoxia and cellular stress triggering an increase in HIF-1 alpha hypoxia inducible factor and VEGF-vascular endothelial growth factor. These changes collectively contribute to the symptoms and progression of carpal tunnel syndrome.

An impaired intraneural microvascular circulation of the median nerve that is *Srotorodha* of *Vata* by vitiated *Rakta* which obstructs the normal functions of *Vata*, that is normal conduction of median nerve producing sign and symptoms of CTS.

Through the procedure of *Raktamokṣa* vitiated blood is removed from localized circulatory pathways (micro-vascular structures) and causes an endothelial vasodilation which reduces the levels of pro-inflammatory cytokines such as TNF-α (Tumor Necrosis Factor-alpha) and IL-6 (Interleukin-6) and relieves *Sopha* in synovial tissue and *Avarana* of *Raktha* thereby removes *Sroto rodha* and resumes adequate blood flow resulted in reducing symptoms.

CONCLUSION

In the present study, cupping therapy done in two sittings has got statistically significant effect in reducing the symptoms like pain, paresthesia, tenderness and got significant changes in Tinel's sign and Phalen's test.

The study was able to yield statistical evidence to prove the alternative hypothesis. Hence the null hypothesis is rejected and the alternative hypothesis is accepted i.e., cupping therapy has significant effect on reducing the signs and symptoms of carpal tunnel syndrome.

Limitations

- Some individuals diagnosed with CTS were hesitant to participate due to concerns about bloodletting procedure.
- Most participants did not have restricted wrist movements, making it unclear whether cupping therapy had any effect on improving wrist mobility. The data from present study is insufficient to determine its specific impact.

Recommendations

- The number of cupping sessions could be increased and evaluated further.
- Future studies could extend the duration to assess long-term relief.
- A controlled clinical trial could be planned.

REFERENCES

1. Atroshi I, Gummesson C, Johnsson R, Ornstein E, Ranstam J, Rosén I. Prevalence of carpal tunnel syndrome in a general population. JAMA. 1999; 282(2): 153-8. doi:10.1001/jama.282.2.153
2. Padua L, Coraci D, Erra C, Pazzaglia C, Paolasso I, Loreti C, et al. Carpal tunnel syndrome: clinical features, diagnosis, and management. Lancet Neurol. 2016; 15(12): 1273-84. doi:10.1016/ S1474-4422(16)30231-9.
3. Aroori S, Spence RAJ. Carpal tunnel syndrome. Ulster Med J. 2008; 77(1): 6-17. PMID: 18318667.
4. Srikantha Murthy K.R. Sushruta Samhita, (English Translation) Vol I (nidana sthana, Chapter-12); Chaukhambha Orientalia, Varanasi; 2005 (Second Edition).
5. Sonal C, Pankaj k. Review of Shringa, alaby and cuppoing therapy. Innovare J Ay Sci [Internet]. 2014 Apr. 1 [cited 2024 Sep. 5]; 2(2): 1-2. Available from:https://journals.innovareacademics.in/index. php/ijas/article/view/922
6. Al-Bedah AMN, Elsubai IS, Qureshi NA, et al. The medical perspective of cupping therapy: Effects and mechanisms of action. J Tradit Complement Med. 2018; 9(2): 90-97. Published 2018 Apr 30. doi:10.1016/j.jtcme.2018.03.003
7. Furhad S, Sina RE, Bokhari AA. Cupping Therapy. [Updated 2023 Oct 30]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan. Available from: https://www.ncbi.nlm.nih.gov/ books/NBK538253
8. Mohammadi, S., Roostayi, M. M., Naimi, S. S., and Baghban, A.A. (2019). The effects of cupping therapy as a new approach in the physiotherapeutic management of carpal tunnel syndrome. Physiotherapy research International: The Journal for Researchers and Clinicians in physical therapy, 24(3), e1770. https://doi.org/10.1002/pri.1770

9. Srikantha Murthy K.R. Sushruta Samhita, (English Translation) Vol I (Nidana sthana, Chapter- 12); Chaukhambha Orientalia, Varanasi; 2005 (Second Edition).
10. Sawarkar G, Sawarkar P, Desai P. Raktamokshana-A Systemic Review. International Journal of Ayurvedic Medicine. 2020; 12(1): 23-30.
11. Joshi A, Patel K, Mohamed A, et al. Carpal Tunnel Syndrome: Pathophysiology and Comprehensive Guidelines for Clinical Evaluation and Treatment. Cureus. 2022;14(7): e27053. Published 2022 Jul 20. doi:10.7759/cureus.27053

Cite this article as:
Shakkira N, Sunitha P V. Effect of Wet Cupping Therapy (Raktamoksha) in the Management of Carpal Tunnel Syndrome: A Pre-Post Test Design. International Journal of Ayurveda and Pharma Research. 2025;13(6):48-61.
https://doi.org/10.47070/ijapr.v13i6.3752
Source of support: Nil, Conflict of interest: None Declared

***Address for correspondence**
Dr. Shakkira N
PG Scholar,
Department of Shalyatantra,
VPSV Ayurveda College, Kottakkal,
Malappuram, Kerala.
Email: shakiar144@gmail.com