



**International Journal of Biology, Pharmacy
and Allied Sciences (IJBPAS)**

'A Bridge Between Laboratory and Reader'

www.ijbpas.com

**A COMPARATIVE STUDY OF THE EFFECTIVENESS OF *YASTIMADHU
KSHEERAPAKA* AND *YAAVAKSHARA PRATISARANA* WITH ULTRASONIC
SCALING FOR THE TREATMENT OF *DANTA SARKARA* W.S.R TO DENTAL
CALCULUS**

SYAM CHANDRAN C^{1*} AND KESKAR M²

1: Ph.D. scholar, Department of Shalakyatantra, Parul Institute of Ayurveda and Research, Parul University, Vadodara; Associate professor and HOD, Kunwar Shekhar Vijendra Ayurved Medical College and Research centre, Gangoh, UP, India

Professor and HOD, Department of Shalakyatantra, Parul Institute of Ayurveda and Research, Parul University, Vadodara, Gujarat, India

***Corresponding Author: Dr. Syam Chandran C: E Mail: drsyamchandran3@gmail.com**

Received 26th April 2024; Revised 29th Aug. 2024; Accepted 18th Oct. 2024; Available online 1st Oct. 2025

<https://doi.org/10.31032/IJBPAS/2025/14.10.9514>

ABSTRACT

In *Dinacharya*, maintaining good oral hygiene is crucial, as neglecting it might result in numerous health problems. Of the eight *danta rogas* listed in *Shalakyatantra*, *Danta sharkara* is thought to be caused by poor dental hygiene. The condition is typified by a solid buildup of mala on the surface of the teeth, which damages them and the tissues that support them. According to Ayurveda, removal of the *sharkara* by *danta Shanku's* is the first step in treatment, followed by *pratisarana* and *gandusha*. *Danta sharkara* can be compared to dental calculus, according to modern dentistry. Dental plaque that's undergone mineralization is called calculus. There are several clinical signs of calculus formation, such as poor taste and breath in the mouth, mild to moderate gingivitis, and receding gums. Therefore, getting rid of it's crucial to preventing periodontal infections. The treatment done is scaling and polishing. By removing the etiologic factors, like dental plaque and calculus, that lead to gum inflammation, scaling contributes to a disease-free periodontium. Despite being an effective and convenient approach, there may be some side effects. Research has indicated that ultrasonic scaling leaves a rough tooth surface behind, which facilitates

subsequent plaque formation and recurrence. *Ashtanga Hrudyam* describes *Gandusha* in the form of *ksheerapaka* for the treatment of *danta harsha*, a major symptom of *danta sarkara*. So *Yastimadhu Ksheerapaka* has been chosen for having *sleshmapittahara* and *shothahara* activity, along with *Yavakshara* having *lekhana* and *shodana* properties, with a scraping effect that regulates *danta sarkara* development.

Keywords: Dental calculus; *Ashtanga Hrudyam*; *Shalakyatantra*; *Danta shanku*; *Yastimadhu*; *Yavakshara*

1. INTRODUCTION:

Ayurveda consists of eight major branches, of which the *shalakya tantra* deals with various diseases of the *danta*, *netra*, and *karna* (dental, ophthalmology, and ENT). In Ayurveda, dentistry is referred to as *danta sastra*. "*Sastra*" denotes science, while "*Danta*" denotes teeth. While many more *acharyas* worked on and wrote books on *shalakyatantra*, none are currently available. The only significant sources for *Shalakyatantra* that are currently available are *Sushruta Samhita* and *Vagbhata's* writings. The oldest source on *danta* can be found in *Sushruta Uttara stahana*, and some descriptions in *Nidana* and *Chikitsa stahana* are found in the *Samhita* (2350 B.C.). He made reference to it in *Mukharoga Prakarana* under *Dantagata Rogas*. Even more *Bhrihatrayees* and *Laghutrayees* have provided specific explanations of *danta rogas* and *danta sarkara*. *Vata*-induced vitiation of *kapha* will cause mala to accumulate on the surface of the teeth, causing a bad odor, discoloration, and sensitivity to the teeth [1]. Dental calculus and *danta sarkara* are comparable. In daily

practice, it is the oral disease that is faced most frequently. Plaque typically serves as the cause of it. Dental calculus is caused by the progression of plaque [2]. Bacterial plaque buildup at or close to the gingival margin is the root cause of plaque-induced gingival disease. If no precautions are taken to manage plaque, Deeper structures may be affected by gingivitis, which can result in the resorption of alveolar bone and the deterioration of periodontal fibers, ultimately resulting in the loss of the entire tooth [3]. An inflammatory response of the gingiva without the breakdown of supporting tissues is known as "*danta sarkara*," which is inevitably caused by poor oral hygiene. Retracted gums, irritated gingiva, halitosis, tooth hypersensitivity, discoloration, movement, and toothache are some of the symptoms of dental calculus [4]. Polishing and scaling are the methods used to treat the calculus. Scaling helps to maintain a periodontium free of disease by eliminating the causative elements that cause gum inflammation, such as dental plaque and calculus. There might be some

negative effects, even though the method is practical and successful. Studies have revealed that the tooth surface left rough after ultrasonic scaling promotes plaque development and recurrence. Even after several scaling procedures, gingival irritation can often be continuously present [5].

Pratisarana, *Pralepa*, *Gandusha*, and *Nasya* are the ayurvedic treatments for *danta sarkara* that are meant to break the disease's etiology and enhance gingiva health. The *Ashtanga Hridaya* reference explains that *danta sarkara nirharana* by *danta shanku*, along with *Pratisarana*, *Kavala*, and *Nasya*, is the order of treatment for *danta sarkara* [6]. These are easy, inexpensive, and side-effect-free processes. In managing *danta sarkara*, *pratisarana* with *Yavakshara*, as indicated in *Ashtanga Hridaya*, has attributes like *kaphahara*, *Vrana shodhaka*, and *ropaka*, as well as scrapping effects [7]. Our classics describe *Gandusha* in the form of *ksheerapaka* in the treatment of *danta harsha*, a major symptom of *danta sarkara* [8]. *Yastimadhu Ksheerapaka* has therefore been chosen for *Gandusha* in *Danta Sarkara*.

Taking into account the aforementioned considerations, the purpose of this study is comparing the effectiveness of *Yastimadhu Ksheerapaka gandusha* and

Yavakshara Pratisarana with ultrasonic scaling in the treatment of *Danta Sarkara*.

2. MATERIAL AND METHODOLOGY:

2.1 Material 1: Authentic source of *Yavakshara* and *Yastimadhu Choorna* were purchased from SDM Pharmacy, Hassan.

2.2 Material 2: 30 patients

2.3 Diagnostic criteria: Clinical characteristics of *Danta sharkara* (dental calculus) are *Danta shoola* (tooth pain); *Dantamoola Shotha* (gum inflammation); *Dourgandhya* (bad mouth odor); *Krishnata* (discoloration); *Chalatva* (tooth mobility); and *Danta harsha* (dentin hypersensitivity).

2.4 Inclusion criteria for patients: The clinical trial will enroll all patients exhibiting signs and symptoms of *danta sharkara*, regardless of their age, sex, caste, religion, socioeconomic background, or chronicity; Age range: 15–70; individuals prepared to sign a written declaration of consent.

2.5 Exclusion criteria for patients: patient with uncontrolled DM; having deeper pus pockets; Artificial crowns, fillings, and dentures; Subgingival calculus linked to any kind of infective or inflammatory gum disease was excluded from the study.

2.6 Methodology: The study was conducted on the 30 patients chosen from the OPD and IPD of the *Shalakya tantra* department of

SDM College of Ayurveda and Hospital, as well as cases that were recommended by doctors in different departments of the hospital. Patients satisfying the criteria for diagnosis and inclusion were selected regardless of gender or the duration of illness. Two groups of fifteen patients each will be formed at random from the thirty patients who were chosen. *Danta Shanku* and *Yavakshara* will treat Group "I" for *Danta sharkara nirharana*, which will be followed by *Yastimadhu ksheerapaka gandusha* and *Pratisarana*. *Danta sharkara nirharana* is intended to use hand scalars. The patient is instructed to perform one hand-scaling dental session and two months of *yavakshara pratisarana* and *yastimadhu ksheerapaka gandusha*.

Group "II" will receive treatment consisting of four quadrants scaled by the modern ultrasonic method, followed by routine mouthwashing. For the next two months, the patient is encouraged to visit for a consultation and dental examination once a month. The observations will be noted on the designated proforma. A two-tone dye swab is used to analyze the production of dental plaque on the surfaces of the teeth. Following the scaling, the patients were checked up on the seventh day, first day, and second month.

2.7 Study duration: two months

2.8 Ethical clearance (IEC No: SDMCAH/IEC/177/13-14: The institutional ethics committee gave its approval for the project. Before the study started, the written consent of every patient who wished to participate was obtained. Patients might remove their names from the study at any moment and for any reason.

2.9 The *pratisarana* [9] and *gandusha* [10] procedures: *Yavakshara* is firstly ground into a powder and then turned into a paste by adding a small amount of water. Next, the mouth, tongue, and teeth were given a gentle massage every morning for around two minutes using the powder. To ensure that any material is effectively eliminated, the massage should be performed in both vertical and circular directions. Following the correct *pratisarana* with *yavakshara*, *gandusha karma* ought to be performed. *Yastimadhu Ksheerapaka* was made, and perform *gandusha* by holding it in the mouth as tightly as possible without moving until the ailment or its symptoms subside and you have a sensation of freshness in all of your *Indriyas* and a lightness in your mouth.

2.10 Evaluation Criteria: Using a self-developed grading system, the condition will be evaluated based on the degree of improvement in symptoms and signs. Analyzed using both subjective and objective

criteria for dental calculus (*danta sharkara*) both before and after treatment using the proper statistical analysis.

2.10.1 Subjective parameter evaluation:

subjective parameters were evaluated by

using different grades between 0 and 3 according to the intensity of symptoms. Gradations were as follows (**Table 1**).

Table 1: Subjective parameter evaluation

Sr. No	Subjective parameter	Gradation
1.	<i>Danta shoola</i> (Tooth pain)	0-no complaints 1-mild toothache 2-moderate level of toothache 3-severe toothache
2.	<i>dourgandhya</i> (bad mouth odor)	0-no halitosis present 1-mild level and person himself can't feel 2-moderate and can get smell from more than 30 cm 3- severe and from below 30 cm
3.	<i>Krishnata</i> (discoloration)	0-Absent 1-mild discoloration of tooth 2-moderate discoloration of tooth 3-severe discoloration of tooth
4.	<i>Chalatva</i> (tooth mobility)	0-no mobility 1- 1 ^o mobility of teeth 2- 2 ^o mobility of teeth 3- 3 ^o mobility of teeth
5.	<i>Danta harsha</i> (dentin hypersensitivity)	0-Absent 1-mild and occasional 2-moderate and always 3- severe and always

2.10.2. Objective parameter evaluation:

Plaque index and gingival index were evaluated by using following formula

Plaque index = Total PI score per tooth / Total no. of tooth

Gingival index = Total GI score per tooth / Total no: of tooth examine

2.10.3 Criteria for analyzing the overall effect of treatment:

The entire efficacy of the treatment was evaluated in terms of total disappearance, significant improvement, moderate

improvement, mild improvement, and unchanged, as determined by applying the subsequent standards.

Complete remission was defined as having 100% of the chief complaints resolved and showing no recurrences throughout the follow-up investigation.

Significant improvement: the primary complaints have improved by 76 to 99%.

A moderate improvement in chief complaints, with a 51–75% improvement.

A mild improvement: a 26–50% reduction in primary complaints.

2.11 Statistical test: The unpaired "t" test was used to statistically analyze the data gathered from the observations in terms of mean, standard deviation, and error. The findings were considered insignificant at the level of a P value of 0.01.

3. OBSERVATION AND RESULTS:

It was demonstrated that the majority of patients, i.e., 59.38%, belonged to the 15–30 age range, 78.13% were men, 30% belonged to the student category, and 17% were housewives. The patient demographics included 59.36% married patients, 87.50% Hindu patients, 93.75% patients with mixed diets, 62.50% patients without addictions, 100% of patients reported using a toothbrush as their oral hygiene tool, 93.8% utilizing tooth paste as a cleaning agent, 84.4% cleaning their teeth once a day, and 71.9% being part of the *madhura rasa* consuming group out of 30 patients.

Overall outcome of therapy: In Group I, every patient experienced alleviation from *dantashoola* (Table 2), which was followed by *dantamoola sotha* (Table 3). Statistical analysis revealed that all the results for *Durgandhya* (Table 4), *Krishnata* (Table 5), *Chalatva* (Table 6), and *Danta Harasha* (Table 7) were highly significant at the $P < 0.0001$ level obtained by the Freidman test. Patients in Group II reported 100.00% alleviation from *dantamoola sotha* (Table 8), *dourgandhya* (Table 9), *Krishnatva* (Table 10), and *chalatva* (Table 11), in that order highly significant at the $P < 0.0001$ level. With the exception of *Dantashoola* (Table 12) and *Danta harsha* (Table 13), where the results were significant at the levels of $P < 0.001$ and 0.007 , respectively. With a p-value of 0.001 compared to group II with 0.005 , group I is more significant when employing the Wilcoxon signed rank test with the boniferonic correction. The subject suggests that group I is more significant than group II, with a p-value less than 0.0125 .

Table 2: Dantashoola group I
Friedman’s test:

Parameter	N	X ² (2)	P value	Remark	Significant change in
Group I	15	38.547	.0001	S	During treatment

Wilcoxon test:

Bonferroni error: 0.0125

Parameter	Negative ranks			Positive ranks			Ties	Total	Z value	P value	Remark
	N	MR	SR	N	MR	SR					
BT-AT	15	8	120.0	0	.00	.00	0	15	-3.531	.0001	S
Ob1BT	15	8	120.0	0	.00	.00	0	15	-3.771	.0001	S
Ob2-Ob1	13	7.54	98	1	7.0	7.00	1	15	-3.153	.002	S
At- Ob 2	5	4.50	22.50	3	4.50	13.50	7	15	-.707	.480	NS

**Table 3: Dantamoola Sotha I:
Friedman's test:**

Parameter	N	X ² (2)	P value	Remark	Significant change in
Group I	15	39.065	.0001	S	During treatment

Wilcoxon test: Bonferroni error: 0.0125

Parameter	Negative ranks			Positive ranks			Ties	Total	Z value	P value	Remark
	N	MR	SR	N	MR	SR					
BT-AT	15	8.00	120.0	0	.00	.00	0	15	-3.482	.0001	S
Ob1BT	14	7.50	105.0	0	.00	.00	1	15	-3.556	.0001	S
Ob2-Ob1	13	7.00	91	0	7.0	.00	2	15	-3.419	.001	S
At- Ob 2	7	5.50	38.50	3	4.50	5.50	5	15	-1.265	.206	NS

**Table 4: Dourgandhya group I:
Friedman's test:**

Parameter	N	X ² (2)	P value	Remark	Significant change in
Group I	15	35.449	.0001	S	During treatment

Wilcoxon test: Bonferroni error: 0.0125

Parameter	Negative ranks			Positive ranks			Ties	Total	Z value	P value	Remark
	N	MR	SR	N	MR	SR					
BT-AT	15	8.00	120.0	0	.00	.00	0	15	-3.477	.001	S
Ob1BT	13	7.0	91.0	0	.00	.00	2	15	-3.314	.001	S
Ob2-Ob1	13	7.54	98.0	1	7.0	7.0	1	15	-3.153	.002	S
At- Ob 2	5	5.00	25.00	4	5.0	20.00	6	15	-.333	.739	NS

**Table 5: Krishnata group I:
Friedman's test:**

Parameter	N	X ² (2)	P value	Remark	Significant change in
Group I	15	28.854	.0001	S	During treatment

Wilcoxon test: Bonferroni error: 0.0125

Parameter	Negative ranks			Positive ranks			Ties	Total	Z value	P value	Remark
	N	MR	SR	N	MR	SR					
BT-AT	12	6.50	78.0	0	.00	.00	3	15	-3.126	.002	S
Ob1BT	15	6.50	78.0	0	.00	.00	3	15	-3.126	.002	S
Ob2-Ob1	3	2.63	45.00	2	5.0	10.00	5	15	-1.941	.052	NS
At- Ob 2	3	.00	.00	7	4.0	28.0	8	15	-2.646	.008	S

**Table 6: Chalatra group I:
Friedman's test:**

Parameter	N	X ² (2)	P value	Remark	Significant change in
Group I	15	36.250	.0001	S	During treatment

Wilcoxon test: Bonferroni error: 0.0125

Parameter	Negative ranks			Positive ranks			Ties	Total	Z value	P value	Remark
	N	MR	SR	N	MR	SR					
BT-AT	15	8.00	120.0	0	.00	.00	0	15	-3.626	.001	S
Ob1BT	12	6.50	78.0	0	.00	.00	3	15	-3.357	.001	S
Ob2-Ob1	6	3.50	21.0	0	.00	.00	9	15	-2.449	.014	NS
At- Ob 2	0	.00	.00	1	1.0	1.0	14	15	-1.00	.317	NS

**Table 7: Dantaharsha group I:
Friedman's test:**

Parameter	N	X ² (2)	P value	Remark	Significant change in
Group I	15	28.500	.0001	S	During treatment

Wilcoxon test: Bonferroni error: 0.0125

Parameter	Negative ranks			Positive ranks			Ties	Total	Z value	P value	Remark
	N	MR	SR	N	MR	SR					

BT-AT	12	6.50	78.0	0	.00	.00	3	15	-3.169	.002	S
Ob1BT	10	5.50	55.0	0	.00	.00	5	15	-3.051	.002	S
Ob2-Ob1	7	4.0	28.0	0	.00	.00	8	15	-2.530	.011	S
At- Ob 2	1	2.50	2.50	3	2.50	7.50	11	15	-1.00	.317	NS

Table 8: Dantamoola Sotha II:
Friedman’s test:

Parameter	N	X ² (2)	P value	Remark	Significant change in
Group II	15	23.899	.0001	S	During treatment

Wilcoxon test:

Bonferroni error: 0.0125

Parameter	Negative ranks			Positive ranks			Ties	Total	Z value	P value	Remark
	N	MR	SR	N	MR	SR					
BT-AT	10	5.50	55.0	0	.00	.00	5	15	-2.842	.004	S
Ob1BT	13	7.0	91.0	0	.00	.00	2	15	-3.606	.0001	S
Ob2-Ob1	7	4.64	32.50	1	3.50	3.50	7	15	-2.126	.033	NS
At- Ob 2	3	5.00	15.00	6	5.0	30.00	6	15	-1.000	.317	NS

Table 9: Dourgandhya group II:
Friedman’s test:

Parameter	N	X ² (2)	P value	Remark	Significant change in
Group II	15	28.157	.0001	S	During treatment

Wilcoxon test:

Bonferroni error: 0.0125

Parameter	Negative ranks			Positive ranks			Ties	Total	Z value	P value	Remark
	N	MR	SR	N	MR	SR					
BT-AT	12	6.50	78.0	0	.00	.00	3	15	-3.165	.002	S
Ob1BT	15	8.0	120.0	0	.00	.00	0	15	-3.531	.001	S
Ob2-Ob1	3	3.50	10.50	3	3.50	10.50	9	15	-.000	1.0	NS
At- Ob 2	3	4.50	13.50	5	4.50	22.50	7	15	-.707	.480	NS

Table 10: Krishnata group II:
Friedman’s test:

Parameter	N	X ² (2)	P value	Remark	Significant change in
Group II	15	20.237	.0001	S	During treatment

Wilcoxon test:

Bonferroni error: 0.0125

Parameter	Negative ranks			Positive ranks			Ties	Total	Z value	P value	Remark
	N	MR	SR	N	MR	SR					
BT-AT	9	5.61	50.50	1	4.50	4.50	5	15	-2.486	.013	NS
Ob1BT	14	7.50	105.0	0	.00	.00	1	15	-3.494	.0001	S
Ob2-Ob1	3	5.00	16.50	8	6.19	49.50	4	15	-1.604	.109	NS
At- Ob 2	4	4.00	16.00	4	5.0	20.0	7	15	-.302	.763	NS

Table 11: Chalatra group II:
Friedman’s test:

Parameter	N	X ² (2)	P value	Remark	Significant change in
Group II	15	24.495	.0001	S	During treatment

Wilcoxon test:

Bonferroni error: 0.0125

Parameter	Negative ranks			Positive ranks			Ties	Total	Z value	P value	Remark
	N	MR	SR	N	MR	SR					
BT-AT	14	7.50	105.0	0	.00	.00	0	15	-3.557	.0001	S
Ob1BT	7	4.0	28.0	0	.00	.00	8	15	-2.646	.008	S
Ob2-Ob1	7	4.0	28.0	0	.00	.00	8	15	-2.646	.008	S
At- Ob 2	3	.00	7.50	1	2.50	2.50	11	15	-1.00	.317	NS

Table 12: Dantashoola group II:
Friedman’s test:

Parameter	N	X ² (2)	P value	Remark	Significant change in
Group II	15	17.143	.001	S	During treatment

Wilcoxon test:

Bonferroni error: 0.0125

Parameter	Negative ranks			Positive ranks			Ties	Total	Z value	P value	Remark
	N	MR	SR	N	MR	SR					
BT-AT	9	5	45.0	0	.00	.00	6	15	-2.810	.005	S
Ob1BT	9	5.00	45.0	0	.00	.00	6	15	-3.00	.003	S
Ob2-Ob1	6	4.50	27	2	4.50	9.00	7	15	-1.414	.157	NS
At- Ob 2	2	3.50	7.00	4	3.50	14.00	9	15	-.816	.414	NS

Table 13: Dantaharsha group II:
Friedman’s test:

Parameter	N	X ² (2)	P value	Remark	Significant change in
Group II	15	11.969	.007	S	During treatment

Wilcoxon test:

Bonferroni error: 0.0125

parameter	Negative ranks			Positive ranks			Ties	Total	Z value	P value	Remark
	N	MR	SR	N	MR	SR					
BT-AT	8	5.0	40.0	1	5.00	5.00	6	15	-2.333	.020	NS
Ob1BT	9	5.0	45.0	0	.00	.00	6	15	-2.887	.004	S
Ob2-Ob1	3	4.0	12.0	4	4.00	16.00	8	15	-0.378	.705	NS
At- Ob 2	4	5.50	22.0	6	5.50	33.00	5	15	-.632	.527	NS

To assess if there was a significant difference in mean value of the Plaque index, the Unpaired T-test was used. There is decrease in plaque index of both Group I and II after treatment and at follow-up. (table 14 and table 15) Also it was found that there is a significant

difference between the mean values of the Plaque Index before and after treatment, with group I having a lower t-value than group B (Group I = 4.175, Group II = 3.801) at the significant threshold of P-Value.

Table 14: plaque index of group-I

		Mean	T-value	P-value	Significant/ nonsignificant
Baseline	BT	.59	4.175	0.001	S
	AT	.24			
1 st obs.	BT	.59	4.224	0.001	S
	10 B	.22			
2 nd obs.	10B	.22	-1.67	0.116	NS
	20B	.30			
3 rd obs.	20B	.30	1.64	0.123	NS
	AT	.24			

Table 15: Plaque index of group II

		Mean	T-value	P-value	Significant/ nonsignificant
Baseline	BT	.66093	3.801	0.002	S
	AT	.40			
1 st obs.	BT	.66093	5.655	0.000	S
	10 B	.24473			
2 nd obs.	10 B	.24473	-4.164	0.001	S
	20B	.43			
3 rd obs.	20 B	.43	.444	0.664	NS
	AT	.40			

To assess whether there was a significant difference in the Gingival Index mean value, an unpaired t-test was used again. The results showed that there was a significant difference between the mean values of the gingival index before and after treatment, with group I

having a lower t-value (Group I = 8.666, Group II = 2.421) at a significant level of P-Value <0.001 than group II. Consequently, it suggests that group I is of greater significance than group II (Table 16 and 17).

Table 16: gingival index of group I

		Mean	T-value	P-value	Significant/nonsignificant
Baseline	BT	.62	8.666	0.000	S
	AT	.19			
1 st obs.	BT	.62	7.945	0.000	S
	10 B	.30			
2 nd obs.	10 B	.30	1.752	0.102	NS
	20 B	.20			
3 rd obs.	20 B	.20	.173	0.865	NS
	AT	.19			

Table 17: gingival index of group II

		Mean	T-value	P-value	Significant/nonsignificant
Baseline	BT	.38	2.421	0.030	S
	AT	.26			
1 st obs.	BT	.38	6.169	0.000	S
	10 B	.22			
2 nd obs.	10 B	.22	-.875	0.412	NS
	20 B	.24			
3 rd obs.	20 B	.24	-.757	0.462	NS
	AT	.26			

4. DISCUSSION:

According to contemporary medicine, poor oral hygiene can cause the problems listed above, such as the buildup of dental calculus or dirt on the surface of teeth. Since the beginning of time, Ayurveda has used a wide variety of remedies to treat *mukha rogas*. *Mukha rogas* are treated using techniques such as *raktamokshana*, *Nasya*, *Gandusha*, *Pralepa*, and *Pratisarana* [11]. In the present study, an analysis of the effectiveness of *Yastimadhu Ksheerapaka* and *Yaava Kshara Pratisarana* with ultrasonic scaling for the

treatment of *Danta Sarkara* with regard to dental calculus was done. Thirty patients were chosen at random and split into two groups, I and II, each with fifteen patients. Group I will receive treatment using *Danta sharkara nirharana* by *danta shanku* coupled with *Yavakshara pratisarana* and *Yastimadhu ksheerapaka gandusha* for two months. Whereas group II will receive treatment using contemporary ultrasonic dental scaling of all four quadrants, followed by routine mouthwashing, For the next two months, the patient is asked to come in for a consultation

and dental examination once a month. All 30 patients had one or more of the *Lakshanas* of *Danta Sharkara*, with varying degrees of severity. Patients in Group I showed a statistically significant decrease in signs and symptoms such as *Dantamoola Shotha*, *Danti Shoola*, *Krishnata*, and *Danti Harshata* compared to those in Group II.

Among the many *Kshara*, *Yavakshara* (*barley alkali*) is regarded as the greatest and most superior (alkali). *Yavakshara* is the combination of *Vata*, *Kaphaghna*, *Ushna Veerya*, and *Katu rasa* in terms of taste and activity. *Strotovivaran* and *Strotoshodhana* are caused by *Yavakshara's Ushna Tikshna Guna*. The elements of *Yavakshara* possess the attribute of *Kapha Pitta Shamaka*, whereas on the *shareera* plane, they possess the attributes of *Lekhana*, *Shodhahara*, *Vrana Ropana*, *Medohara*, *Varnya*, *Balya*, and *Abhisyandi* [12]. Given that it seldom encourages the reappearance of plaque on tooth surfaces, the *lekhana* activity of *yavakshara* may therefore play a significant role in the management of *danta sharkara*. Because *yava* possesses the *shothahara* feature, it might also help prevent gingival inflammation brought on by dental calculus from recurring. According to studies, *yavakshara* has a high percentage of potassium and trace amounts of

salt [13]. The potassium in *yavakshara* may help lessen the hypersensitivity brought on by dental calculus. It also strengthens enamel, which lowers the likelihood that plaque will form [14]. Traces of salt have been shown to completely prevent all harmful periodontal illnesses and to clean the surface of the teeth to reduce the likelihood of plaque formation. Sodium bicarbonate and potassium nitrate are increasingly the main constituents in many popular tooth paste formulations. Because it has the aforementioned qualities and is less expensive than other products on the market, *yavakshara* can be used as a tooth paste substitute. *Yavkshara* is applied in the form of *pratisarana*. Gingival massage, which is performed in *Pratisarana*, increases the generation of gingival crevicular fluid. Because it contains phagocytic leukocytes, particular antibodies, and enzymes with several specificities, this crevicular fluid facilitates the penetration of germs into the tissues. In the epithelium and connective tissue, gingival massage results in epithelial thickening, enhanced keratinization, and increased mitotic activity. Additionally, *pratisarana* encourages salivation, which hastens the healing process. Additionally, it controls plaque and returns the gingiva and teeth to their natural color. *Pratisarana* constantly irritates the gingival

tissues; it causes a pseudo-inflammatory reaction in the tissues, which may change the permeability of the blood vessels. The medications' active ingredients will have an easier time penetrating the local vasculature because of the changed permeability of the arteries. Thus, the intended result of reducing gingival inflammation caused by calculus severity is achieved [15].

Yastimadhu is utilized in *Gandusha* because it has anti-inflammatory and anti-ulcerative properties, [16] protecting the gingiva from chemical and physical damage. *Gandusha* strengthens the mouth's natural defenses, improves the food's first chemical and mechanical digestion, and eliminates metabolic wastes such as uric acid and urea, resulting in a soothing impact and improved oral cavity muscular strength. The act of *gandusha*, which involves holding a mouthful of beverage, causes the oral cavity's mechanical pressure to rise. Therefore, the press receptor (stretch reflex) in the mouth is stimulated by this increased pressure. They communicate with the brain stem's salivary nuclei (pons and medulla) by stimulating the press receptor. Consequently, there is an increase in parasympathetic nervous system activity, and facial motor fiber (VII) and glossopharyngeal (IX) nerves cause a significant rise in saliva production. The

action of *gandusha* may activate the mouth's chemoreceptor, which in turn causes saliva to secrete more. Saliva contains an enzyme known as lisozone, which has bacteriostatic properties. It will prevent harmful microorganisms from proliferating within the oral cavity. Saliva contains IgA antibodies that offer further defense against microorganisms. *Gandusha* may therefore strengthen the local defense system [17]. The breakdown of CHO and fat is started by the enzymes salivary amylase in saliva and lingual lipase released by the lingual gland, respectively. These enzymes may secrete more when *gandusha* is used. Overproduction of saliva, which is mostly made up of water, flushes out metabolic waste from the oral cavity. Certain *dravyas*, such as the *Gandusha* action increases the motor functions of the muscles of the cheeks, tongue, lips, and soft palate by providing them with appropriate exercise. Systematically, *gandusha* helps the mucosal layer sublingual, or behind the tongue, to be sufficiently thin and highly vascular to allow for the quick absorption of lipid-soluble medications into the bloodstream [18]. Due to their chemical makeup, several medications irritate the oral mucosa and increase vascular permeability. Thus, a drug's active ingredient is absorbed into the bloodstream [19]. Since the majority

of *Dravyas* prescribed for *Gandusha* are lukewarm (*Sukoshna*), a higher body temperature may enhance the absorption of medications through enhanced vascular permeability. In addition, *Gandusha* benefits in the following ways: It has gained popularity as a common, routine procedure (*Dinacharya*).

Yastimadhu possesses *sheeta Virya*, *madhura Vipaka*, *guru* and *snigdha guna*, *anurasa* of *Kashaya*, and *madhura rasa*. The *kapha-pitta Shamana*, *sophanashaka*, *shotha nashaka*, *Vrana Ropana*, *bala-varnakritha*, *Raktapittagna*, and *balya* effects are caused by the virtue of the aforementioned attributes [20]. Teeth preservation is aided by the *Kashaya gunatva* of *Yastimadhu*. Glycyrrhizin, one of the primary ingredients in *yastimadhu*, has anti-inflammatory properties [21]. *Gandusha*, which involves holding a mouthful of liquid, increases the mechanical pressure inside the oral cavity, allowing medicine to directly contact the surface primarily inflamed gingiva caused by dental calculus. Glycyrrhizin's activity may reduce gingival inflammation and preserve tooth integrity. *Yastimadhu* is credited with being the first plant-based thrombin content inhibitor. It increases the duration of plasma recalcification and lengthens the clotting times of thrombin and fibrinogen. As a result,

subgingival calculus hemorrhage that is mild to severe can be mostly controlled [22]. *Yastimadhu* root displayed strong antibacterial and anti-oxidant properties due to the presence of numerous beneficial secondary metabolites, including saponins, alkaloids, and flavonoids [3]. These properties helped the root combat bacterial infections that arise from dental calculus. *Yastimadhu* in the form of *ksheerapaka* may alleviate gum inflammation and pain and sensitivity caused by dental calculus, among other *pittahara* activities. By mixing it with milk, *Yastimadhu guru* *guna* and *rukshatva* are negated, and the milk's ability to raise blood cholesterol levels is also neutralized. It has been observed that patients enjoy the flavor of *ksheerapaka*.

Due to *Yavakshara's* ability to scrape off plaque buildups, *patisarana* in conjunction with it appears to be a good way to both manage pathology and instantly lessen the severity of the condition. After the removal of *Danta Sharkara*, *Gandusha* had a wonderful effect on managing sensitivity. *Yastimadhu* is a drug with strong antimicrobial, anti-inflammatory, hemostatic, and antioxidant properties. It also inhibits plaque. *Yastimadhu's Kashaya rasa* aids in achieving *sthiratha* of the gums, which in turn aids in lowering tooth movement.

5. CONCLUSION:

It is concluded that the *Danta sharkara* treated with *yavakshara pratisaran* and *yastimadhu gandusha* is treated more efficiently than modern ultrasonic technique. Given that the current study only included 30 patients and had a constrained research period, more samples from a larger number of studies over a longer time period are required, since this could pave the way for the modern world to adopt the Ayurvedic medical system.

REFERENCES

- [1] Srikantha Murthy KR. Astanga Hridayam. 3rd ed. Varanasi: Krishnadas Academy; 2000. p.586.
- [2] Van Der Weijden F, Slot DE. Oral hygiene in the prevention of periodontal diseases: the evidence. *Periodontol* 2000. 2010;55(1):104-23. doi: 10.1111/j.1600-0757.2009.00337.x.
- [3] Trombelli L, Farina R, Silva CO, Tatakis DN. Plaque-induced gingivitis: case definition and diagnostic considerations. *J Clin Periodontol*. 2018 Jun;45 Suppl 20.
- [4] Institute for Quality and Efficiency in Health Care (IQWiG). Overview: Gingivitis and periodontitis [Internet]. Cologne, Germany: Institute for Quality and Efficiency in Health Care (IQWiG); 2006 [updated 2023 Aug 23]. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK279593/>
- [5] Kumari N, Johnson L, Yadav H, Das A, Umrao B, Gera R. Effect of hand and ultrasonic scaling-root planing methods on tooth surface topography: an in-vitro atomic force microscopy study. *Cureus*. 2023 Oct 12;15(10). doi: 10.7759/cureus.46925. PMID: 38022287; PMCID: PMC10640483.
- [6] Paradakara Bhisagacharya HS. Astanga Hridayam with Sarvangasundara commentary of Arunadatta & Ayurveda rasayana of Hemadri. Varanasi: Choukambha Surbharati Prakashan; Reprint 2010. p. 956.
- [7] Bhavamisra, Bhavaprakasha, K R Srikantha Murthy, Varanasi: Chowkhamba Krihnadas Academy; 2011. p. 81.
- [8] Vishnu Mahadeva Gogate, Ayurvedic Pharmacology and Therapeutic Uses of Medicinal Plants. 1st ed., Mumbai, Bharatiya Vidya Bhavan, 2001, p. 409-411.
- [9] Susruta, Sushruta samhita with nibandh sangraha comentry, Vaidya Jadavji trikamji acharya editor, Varanasi: Chaukhambha Sanskrit

- sanstha; 2012. p. 397.
- [10] Vagbhata, Ashtanga hridaya, Sutrastana, Hindi translation by Banvarilal, Varanasi: Chaukhambha orientalia; 2007. p. 299.
- [11] Sushruta. Sushruta Samhita, Nibandhsangrah commentary of Shri Dalhana Acharyi: Chaukhambha Orientalia Publication; Reprint 2014. Chikitsasthana. 2014; 22/11:122.
- [12] Mishra BS, editor. *Bhavaprakasha Nighantu of Shree Bhava Mishra*. 11th ed. Varanasi: Chaukhambha Prakashana; 2007. Haritakyadi Varga, Ver. 252-255, p. 163.
- [13] Aggarwal P, Galib R, Prajapati PK. Standard manufacturing procedure of Yava kshara (alkali preparation from *Hordeum vulgare* L.) with cotton wick method. *J Drug Res Ayurvedic Sci*. 2021 Oct–Dec;6(4):200-5. doi: 10.4103/jdras.jdras_42_21.
- [14] Poulsen S, Errboe M, Lescay Mevil Y, Glenny AM. Potassium containing toothpastes for dentine hypersensitivity. *Cochrane Database Syst Rev*. 2006 Jul 19;2006(3). doi: 10.1002/14651858.CD001476.pub2. PMID: 16855970; PMCID: PMC7028007.
- [15] Bhat A, Sreedhar S. Management of Sheetada (Gingivitis) with Pricchanna karma followed by Mustadi choorna pratisarana and Mustadi kwatha kavala and Madhuyashti taila nasya. [*Journal Name*]. 2014;[*Volume(Issue)*]:*Page numbers*.
- [16] Das D, Agarwal SK, Chandola HM. Protective effect of Yashtimadhu (*Glycyrrhiza glabra*) against side effects of radiation/chemotherapy in head and neck malignancies. *Ayu*. 2011 Apr;32(2):196-9. doi: 10.4103/0974-8520.92579. PMID: 22408302; PMCID: PMC3296340.
- [17] Hosamani RB. A review on Gandusha: an Ayurvedic therapeutic procedure for oral disorders. *Int Ayurved Med J* [Internet]. 2017 [cited 2017 Sep]. Available from: http://www.iamj.in/posts/images/upload/746_754.pdf
- [18] Patil M, Nagur K. Comparative study on efficacy of Kavala Dharana with Godugdha and Goghrita in management of Mukhapaka. *J Ayu Int Med Sci*. 2023;8(10):28-33. Available from:

<https://jaims.in/jaims/article/view/2817>

- [19] Zhang H, Zhang J, Streisand JB. Oral mucosal drug delivery: clinical pharmacokinetics and therapeutic applications. *Clin Pharmacokinet.* 2002;41(9):661-80. doi: 10.2165/00003088-200241090-00003. PMID: 12126458.
- [20] Chunekar K. C., edited by Pandey G. S., Bhavprakash nighantu (Indian material medica) of shi bhavamisra, Haritakyadi varga; verse 146. Varanasi; Chaukhambha bharati academy, reprint 2022, 62.
- [21] Pastorino G, Cornara L, Soares S, Rodrigues F, Oliveira MBPP. Liquorice (*Glycyrrhiza glabra*): a phytochemical and pharmacological review. *Phytother Res.* 2018 Dec;32(12):2323-39. doi: 10.1002/ptr.6178. Epub 2018 Aug 17. PMID: 30117204; PMCID: PMC7167772.
- [22] Francischetti IM, Monteiro RQ, Guimarães JA. Identification of glycyrrhizin as a thrombin inhibitor. *Biochem Biophys Res Commun.* 1997 Jun 9;235(1):259-63. doi: 10.1006/bbrc.1997.6735. Erratum in: *Biochem Biophys Res Commun.* 1997 Aug 8;237(1):203. Francischetti B [corrected to Francischetti IM]. PMID: 9196073.