



## Clinical Research

## Clinical evaluation of *Krimidanta Pratishedha* (anti-caries) activity of *Triphaladi Gandusha* in high risk dental caries patients

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### Abstract

**Background:** Dental caries is the most common complaint encountered in clinical practice. Virtually every adult in the world has experience of dental caries. It affects almost 80% of the population. It is now being viewed in dual perspective- “caries as a disease” and “caries as a lesion”.

**Aims:** To evaluate the efficacy of *Triphaladi Gandusha* for its anti-caries activity and improvement in Oral Hygiene Index in high risk patients of dental caries and to compare the efficacy of prevalent method of mouth rinsing and classical method of *Gandusha*. **Materials and Methods:** The study was conducted in 40 patients, 20 in each Group-1 and 2. Group -1 was given prepared *Triphaladi* mouthwash (mouth rinse) while Group-2 was given *Triphaladi Kwath* for *Gandusha* (retention).

**Results:** The effect of treatment was assessed by subjective and objective parameters (like salivary pH, buffering capacity and microbial count). *Triphaladi Gandusha* (retention) in Group - 2 provided better results in the improvement of *Ruja* (toothache), *Dantaharsha* (tooth sensitivity), *Sarambha* (inflammation), pH of saliva, microbial count in salivary sample. And *Triphaladi* Mouthwash in Group - 1 provided better results in *Srava* (discharge), bad breath, pH of saliva and buffering capacity of salivary sample. There was no improvement in *Chidrata* (cavity formation), *Krishnata* (discoloration) and *Chaladanta* (mobility) with *Triphaladi Gandusha* and mouthwash.

**Conclusion:** Study concluded that although both groups were effective, but *Gandusha* group patients’ got better relief in subjective symptoms compared to mouthwash group.

**Key words:** Dental caries, *Krimidanta*, Saliva, *Triphaladi Gandusha*

### Introduction

Dental caries is the most common complaint encountered in the clinical practice.<sup>[1]</sup> It is a microbial disease of calcified tissue of tooth, resulting in demineralization of the inorganic portion and destruction of organic structure.<sup>[2]</sup> If we analyze the clinical features of dental caries, it simulates with *Krimidanta* described in Ayurveda, thousands of years back!<sup>[3]</sup>

In *Krimidanta* by various *Nidana Sevana* (causative factors) either *Sukshma Krimi* or *Dhatu Kshaya* ultimately leads to *Vata Dosha Prakopa*. As *Prakrita Vata* helps to do *Dharana of Asthi* (bones), if vitiated causes its destruction. In short *Asthi Vrana* (wound) is formed which causes destruction of tooth and once if carious lesion, i.e. *Vrana Vastu* formed becomes

irreversible (*Arudha*).<sup>[4]</sup> Therefore in this study, an attempt has been made to treat the disease by identifying the risk group for the disease by use of Decayed, Missing, Filled Teeth (DMFT) index, treating carious tooth without surgical intervention and preventing the recurrence of the disease in the individual by explaining *Pathya Apathya* (does and don't).

*Terminalia chebula* Retz. is a proven best anti-caries agent by using salivary parameters.<sup>[5]</sup> Saliva properties reside principally in flow rate, pH and buffering capacity and the organic and inorganic components.<sup>[6]</sup> Higher numbers of *Streptococci mutans* and *Lactobacilli* in dental plaque and saliva have also been reported to be associated with a higher prevalence of caries.<sup>[7]</sup> On this basis the study was carried out with the objective to evaluate the role of salivary testing in dental caries assessment.

The present study was undertaken to evaluate the efficacy of *Triphaladi Gandusha* for its anti-caries activity and improvement in Oral Hygiene Index in high risk patients of dental caries and also to compare the efficacy of prevalent method of mouth rinsing and classical method of *Gandusha*.

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## Materials and Methods

This study was conducted in the Dental Clinic of Department of Shalakya Tantra, IPGT and RA, Jamnagar. The study was conducted in forty patients. Patients' written informed consent was taken before starting the treatment. Patients were selected using "Simple random sampling method". The study was approved by Institutional Ethics Committee (No. PGT/7-A/Ethics/2010-11/1858; dated on 01/09/2010).

### Criteria for inclusion

- High risk patients of dental caries (hereditary susceptible along with patients having more than 3 DMFT index, lowered pH and buffering capacity along with microbial load in salivary samples)
- Patients in the age group 5-40 years were included in this study.

### Criteria for exclusion

Patients of chronic debilitating diseases, diabetes mellitus, endocrine dysfunction, pregnant women, age below 5 and above 40 etc., were excluded from the study.

### Grouping and posology

Total 40 patients were registered and divided into two groups (20 in each group)

- Group-1: Prepared *Triphaladi* Mouthwash was given 4.5 ml; diluted with 5 times water to make 0.5% solution for two times a day
- Group-2: *Triphaladi Gandusha (Yavakutta)* 6 g given to the patients and then used after making *Kwatha* (decoction) for two times a day.

Duration of treatment: 1-month followed by 2 months of follow-up.

### Preparation of Triphaladi mouth wash

An aqueous solution was prepared on the basis of method described in the previous study<sup>[5]</sup> i.e. dried fine powder of *Triphala* (equal amount) was taken along with 1/4 part of dried fine powder of *Putiha* (leaves of *Mentha spicata*). Then was mixed with 10 times its quantity of sterile distilled water in a round bottomed flask and then suspension was kept in refrigerator at 4°C for 72 hrs. The aqueous extract was decanted, filtered through muslin cloth. Then taken into evaporating dish and evaporated on hot water bath. Finally dried obtained extract was again mixed with solution of polyethylene glycol (20% w/v). This mixture was subjected to sonication for 15 min. to decrease the particle size and get a homogenous mixture. This was again mixed with solution of alum (5% w/v) to get a 15% w/v solution.

### Preparation of Triphaladi Kwath for Gandusha

*Yavakuta* (coarse powder) of *Triphala* (1 part each) was homogeneously mixed with fine powder of *Putiha* (1/4<sup>th</sup> part) and Alum (1/10<sup>th</sup> part). Patients were asked to make decoction from it. By taking coarse powder of drugs would be mixed with 16 times water and water was evaporated till 1/4 part remains. Then it was filtered and used luke warm for *Gandusha*.

### Retention time

Retention time for the patients receiving mouthwash was 40 s and for the patients receiving *Gandusha* was until features of

*Samyaka Gandusha* appear (i.e. until the cheeks show signs of *Kapha* accumulation and exudation appear in the nostrils and eyes)<sup>[8]</sup> before expectorating it. Average time for *Gandusha Dharana* was 8 min.

Patients were not allowed to rinse with water or to consume anything orally for 90 min.

### Advice to the patients

Patients were advised to avoid sticky, oily, sweet, bakery items, excess cold or hot foods and drinks followed by strict oral hygienic maintenance.

### Investigations

Routine hematological and urine analysis were carried out before treatment to rule out any systemic diseases.

Caries activity tests - salivary pH, buffering capacity and microbial analysis were carried out. Changes in Salivary analysis were recorded before and after treatment. In after treatment sample pH and buffer tests were repeated at 10, 30, 60 and 90 min intervals. The microbial analysis was performed at 90 min interval.

### Assessment criteria

#### Subjective parameters

Subjective symptoms, i.e. *Krishnata* (discolouration), *Ruja* (odontologia), *Dantaharsha* (odontitis), *Chalatva* (mobility), *Srava* (discharge), *Sarambha* (inflammation), *Dauragandhya* (halitosis) were assessed with the help of scoring method, grading from 0 to 3.<sup>[9]</sup>

#### Objective parameters

Salivary test - for microbial analysis, pH, buffer test and DMFT index.

#### DMFT index

Procedure: It was applied only to permanent teeth. It comprises of three components. i.e. D - Used to describe no. of decayed teeth, M - Used to describe no. of missing teeth due to caries, F - Used to describe no. of teeth that have been previously filled due to caries.

Calculation of the index: The maximum number for an individual DMFT score is 28 or 32, if the third molars are included. Total each component, i.e. D, M and F separately, then, total D + M + F = DMF.<sup>[8]</sup>

### Overall assessment

The improvement was assessed on the basis of subjective symptoms and salivary tests (objective parameters).

#### Subjective parameters

The assessment was carried out by adopting the following scoring pattern

1. Cured: 76-100% relief in signs and symptoms was considered as cured
2. Marked improvement: 51-75% improvement in signs and symptoms was recorded as marked improvement
3. Moderate improvement: 26-50% improvement in signs and symptoms was considered as moderate improvement
4. Unchanged: 0-25% improvement in signs and symptoms was considered as Unchanged.

**Salivary tests**

1. Cured-pH and buffering level comes to normal (6.8-7.6) and no microbial growth
2. Markedly improved-pH and buffering level comes to 5.5-6.8 and decrease in microbial growth
3. Moderately improved-pH and buffering level reaches 5.5-4.5 and decrease in microbial growth
4. Unchanged-pH and buffering level reaches 4.5 and no decrease in microbial growth.

**Statistical analysis**

The obtained data were analyzed statistically. The values were expressed as percentage of relief and standard error of mean. The data were analyzed by paired *t*-test. Unpaired *t*-test was applied for comparative study. Significance interpreted as  $P > 0.05$  = Insignificant,  $P < 0.05$  and  $0.01$  = Significant,  $P < 0.001$  = Highly significant.

**Observations**

In this clinical trial of *Krimi Danta*, maximum number of the patients reported in the age group of 16-40 years, were female, doing household work.

Observation reveals that, all the patients (100%) were having complaint of *Krishnata*. *Ruja* was present in 72.5% patients, *Dantaharsha* was present in 70% patients and 2.5% patients had *Chalata*, *Srava* and *Sarambha*. Past history of dental caries and taken pain killers was reported in 42.5% of the patients. Nearly 32.5% of the patients had undergone for extraction and 25% had Root Canal Treatment (RCT) done. History of depression found in 27.5% of the patients. Positive family history was found in 57.5% of the patients. Maximum, 90% of the patients were having pit and fissure caries. Smooth surface caries was noticed in 65% of the patients. Only 12.5% patients were having the habit of cleaning the teeth twice a day. 52.5% were changing their tooth brushes at the interval of 4-8 months while 47.5% of the patients were changing at the interval of 2-3 months. Almost 45% patients were of *Kapha-Vata Prakriti*, followed by 37.5% patients having *Vata-Pitta Prakriti*.

42.5% were having pH of their saliva between 5.6 and 6.8. pH below 4.5 was observed only in 2.5% of the patients. Regarding buffering capacity of saliva maximum number of the patients i.e. 52.5% were having below 4.5 followed by 27.5% between 4.5 and 5.5. Microbial count was positive only in 38.46% of the patients.

**Results****Subjective parameters**

No relief was observed in *Krishnata*. As one lesion forms it becomes irreversible, can't be removed by preventive measure alone. *Chalata* was observed in Group-1 and no relief was noticed. 63.18% relief was observed in *Ruja* in Group-1 while 80% in Group-2. In *Dantaharsha* 73.91% relief was observed in Group-1 while 78.95% in Group-2. Group-1 provided 100% relief in *Srava*, while 100% relief was observed in *Sarambha* in Group-2. 100% relief was observed in bad breath in Group-1 while 83.33% in Group-2 [Table 1].

**Objective parameters**

Both the groups showed 50% relief in pH. Group-1 showed 63.64% relief in buffering capacity while 31.71% in Group-2.

The 50% relief was observed in microbial count in Group-1 while 100% in Group-2 [Table 2].

**Total effect of Triphaladi Gandusha**

None of the patients were noted cured in subjective symptoms, while 27.03% cured in objective parameters. Marked improvement was observed in 43.24% in subjective symptoms while 13.51% in objective parameters. Moderate improvement observed in 35.14% in subjective and objective parameters. No change was observed in 21.62% of the patients in subjective parameters while 24.32% in objective parameters [Figure 1].

**Follow up observation**

Pain and sensitivity was observed in follow-up period in both groups. Observation reveals that both the therapies give relief for time being, pulpitis recurs unless cavity is not treated. Once cavity or lesion formed is irreversible.

**Discussion****Probable mode of action of Triphaladi Gandusha (formulation)**

*Triphaladi Gandusha* acts at hard tissue (*Asthi*) and/or at soft-tissue of the tooth (*Majja/pulp*) by relieving pulpitis.<sup>[10]</sup> After going through the properties of the drug, it is seen to have predominantly *Kashaya* (astringent), *Madhura* (sweet) along with *Katu Rasa* (pungent taste), *Laghu*, *Ruksha Guna* and *Tridoshashamaka* property. *Kashaya* as dominant *Rasa* along with *Katu Rasa* and *Laghu*, *Ruksha Guna* having *Shothahara* (anti-inflammatory) and *Ropana* (healing) property, helps to absorb the *Kleda* (Exudate) collected due to inflammatory process, i.e. pulpitis (inflammation of pulp as a result of caries), thus better result was obtained in symptoms such as toothache and sensitivity. Not only this, it also helps to absorb pus collected in later stage of caries.<sup>[11]</sup> *Vranahara* (wound healing) property may also have some role in regaining tissue health from damage.

**Table 1: Comparative effect on subjective parameters in Group-1 with Group-2**

Chief complains	Relief % (Group)		Mean difference	S.D.	S.E.	t	P
	1	2					
<i>Ruja</i>	63.18	80	1.08	0.63	0.12	0.57	>0.05
<i>Dantaharsha</i>	73.91	78.95	1.23	0.71	0.14	0.13	>0.05
Bad breath	100	83.33	1.12	0.64	0.23	0.68	>0.05

SD: Standard deviation, SE: Standard error

**Table 2: Comparative effect on objective parameters in Group-1 with Group-2**

Parameters	Relief % (Group)		Mean difference	S.D.	S.E.	T	P
	1	2					
pH	50	50	0.5	0.57	0.13	0.37	>0.05
Buffering capacity	63.64	31.71	0.54	0.85	0.14	2.86	<0.001
Microbial count	50	100	1.25	0.5	0.25	0.45	>0.05

SD: Standard deviation, SE: Standard error

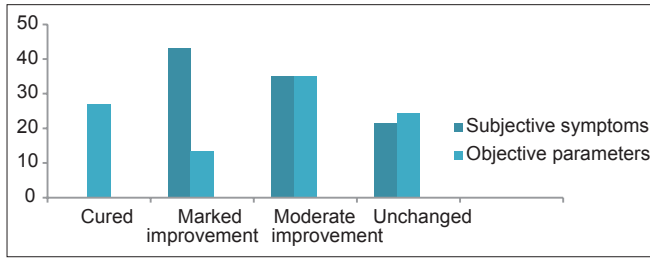


Figure 1: Total effect of Triphaladi Gandusha

### Mode of action of Gandusha

Mouthrinse-Gargle helps in loosening food debris from the teeth has been suggested to be of value as a caries control measure.<sup>[12]</sup>

Swedana (fomentation) and *Mardana* (massage) done over *Kapola* (cheeks), *Lalata* (forehead), *Skandha* (shoulder) and *Kandhara* (neck) will help to improve circulation to local region. So that when *Gandusha Dharana* is done one gets maximum absorption of the drug through oral mucosa which helps in relieving inflammation. Luke warm property of the drug in *Gandusha* has analgesic effect up to some extent which wasn't possible in mouthwash group. In *Gandusha* group retention time was more, i.e. approximately 8-10 min, which is much more than mouthwash group, i.e. 40 s. This may be the reason why *Gandusha* group patients' got better relief in subjective symptoms in comparison to mouthwash group.

### Conclusion

From the results and observation of present study, *Triphaladi Gandusha* (retention) provided better results in *Ruja*, *Dantaharsha*, *Sarambha*, pH, microbial count. And *Triphaladi* mouthwash provided better results in *Srava*, bad breath, pH and buffering capacity. There was no improvement in *Chidrata*-cavity formation, *Krishnata*-discoloration and *Chaladanta*-mobility with *Triphaladi Gandusha*. Study concluded that although both groups were effective, but *Gandusha* group patients' got better relief in subjective symptoms compare to mouthwash group.

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## हिन्दी सारांश

### त्रिफलादि गण्डूष का कृमिदन्तहर प्रभाव पर चिकित्सकीय मूल्यांकन

अच्युता जी. अटारा, मंजुषा आर., विनय जे. शुक्ला, धर्मेन्द्र बी. वाघेला, ब्रिजेश रूपारेलिया

वर्तमान में दन्तकृमि की समस्या प्रायः सभी लोगों में देखने को मिलती है। इस अध्ययन में उन रूग्णों को लिया गया जिन में कृमिदन्त की सम्भावना अधिक थी। प्रस्तुत अध्ययन त्रिफलादि गण्डूष का कृमिदन्तहर प्रभाव देखने हेतु किया गया। इस में कुल ४० रूग्णों को पंजीकृत किया गया और उन्हें दो समूहों में विभाजित किया गया। समूह '१' में त्रिफलादि क्वाथ से निर्मित माउथवॉश से कवल करवाया गया। जब की समूह '२' में त्रिफलादि क्वाथ से गण्डूष दिया गया। परिणामों में समूह '२', समूह '१' की अपेक्षा अधिक लाभदायक पाया गया।