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Research Article

PREVENTION OF DENTAL CALCULUS BY AYURVEDIC DENTISTRY

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ABSTRACT

Dental calculus can be compared to Danta sharkara, which is considered as one of the major cause for dental problems. Calculus formation results in a number of clinical manifestations, including bad breath, receding gums, gingivitis, periodontitis, tooth mobility and loss of tooth. Hence its removal is very essential to prevent periodontal diseases. Ultrasonic scalers are used widely now a day by the dentists. It is more efficient and convenient method. Many mouthwashes like Chlorhexidine are used prophylactically to control plaque after scaling. But when used continuously they cause certain adverse effects. Considering these drawbacks in modern dentistry, the present study was taken up to evaluate the efficacy of local therapeutic procedure ie. Pratisarana and kavala, mentioned in our classics for control and prevention of calculus after scaling. A total of 40 patients having the features of supragingival calculus were selected for the study & were divided randomly into 2 groups as Group A and B consisting of 20 patients each. Group A was treated by Laksha choorna with Madhu pratisarana after removal of Danta sharkara by scaling followed by kavala with Tila taila for 3 months. Group B was treated by Ultrasonic Scaling followed by regular mouth wash with Chlorhexidine for 3 months. Thereafter follow up was done for 6 months. After treatment Group A showed better response compared to Group B. During follow up period the rate of recurrence of calculus was seen more in Group B than in Group A.

Keywords: Calculus, Ultrasonic Scaling, Danta sharkara, Pratisarana, Kavala

INTRODUCTION

Good oral hygiene is not just important—it's probably even more important than we think. Bad oral hygiene can kill us. Over the past decade, researchers have discovered that bad oral hygiene can trigger immune system reactions that can lead to heart attacks and strokes. The CDC estimates that more than 90% of adults over the age of 40 have tooth decay due to bad oral hygiene.¹

In Ayurveda, danta swasthya is held to be very individualistic, varying with each person's prakriti and kala-parinama. If oral hygiene is not maintained then it leads to various danta rogas. Among them, Danta sharkara is one such disease which occurs due to inadequate oral hygiene. It is a disease characterized by, hardened accumulation of mala on tooth surface which destroys the teeth and its surrounding structures and is accompanied by bad odour. The line of treatment as told in our classics is removal of the Sharkara by shastra followed by pratisarana and Danta harshokta kriya.²

The disease Danta sharkara can be compared to Dental calculus, which is considered as one of the major problems in Modern Dentistry. Calculus is a calcified mass that forms on and adheres to the surface of teeth and dentures. These hard deposits play a role in causing and aggravating periodontal diseases. Calculus formation results in a number of clinical manifestations, including bad breath, receding gums and chronically inflamed gingiva.³

Once tartar forms on teeth, it may be more difficult to brush and floss effectively. If this is the case, the acids released by the

bacteria in the mouth are more likely to break down tooth enamel. Tartar that develops above the gum line can be especially serious. That is because the bacteria it harbors may irritate and damage gums leading to gingivitis.

If tartar is not removed and gingivitis is left untreated, it can progress into periodontitis. With this gum disease, pockets form between the gums and teeth. Those pockets become infected by bacteria beneath the gums. The body's immune system releases chemicals to fight the bacteria. These chemicals along with the substances the bacteria release can damage the bone and other tissues that hold the teeth in place. This can lead ultimately to tooth loss and bone degradation. In addition, studies have shown that these bacteria may contribute to heart disease as well as other conditions. Even in Ayurvedic classics it is quoted that if Danta sharkara is neglected it will lead to Kapalika which destroys the qualities of tooth (dantanaam gunahari).⁴

Approach of treatment in modern medicine is Scaling and polishing (oral prophylaxis). It is a procedure performed to remove calculus, plaque and stains in order to prevent periodontal disease and Dental caries. Scaling consists of removal of soft and hard deposits on tooth surface by powerful short strokes of scaler. It is performed using hand instruments, ultrasonic instruments or rotating instruments. Ultrasonic scalers are used widely now a day by the dentists. Though it is more efficient and convenient method, it has certain drawbacks. Studies have shown that ultrasonic scaling leaves behind a rough tooth surface which makes further plaque accumulation and hence calculus formation easier. Chemical agents such as mouth washes and dentifrices used as an adjunct to mechanical removal, inhibit plaque and calculus formation. But these when

used for long term have shown adverse effects such as extrinsic staining of teeth, impaired taste sensation, dryness and soreness of mucosa.

Modern Dentistry has advanced a lot in terms of its numerous specialities & technical precision. Despite this advancement, the dental & related disorders are in a steady rate of increase. The approach of Western Dentistry is more mechanical than biological.

Considering these drawbacks in modern dentistry present study was taken up to evaluate the efficacy of local therapeutic procedure i.e. Laksha choorna pratisarana with madhu and Tila taila kavala mentioned in our classics for control of Calculus after its removal by scaling.

MATERIALS AND METHODS

A total of 40 patients having the features of supragingival calculus were selected for the study irrespective of sex, occupation, religion and social status from Shalakya tantra OPD & IPD of Sri Jayachamarajendra Institute of Indian Medicine, Bangalore.

The selection of the patients was done on the basis of clinical examination. After establishing the diagnosis of Danta sharkara 40 patients were selected for the study. The selected patients were divided randomly into 2 groups as Group A and Group B consisting of 20 patients each. Ethical clearance number – 03_A005_23301

Inclusion Criteria

1. Patient aged between 15 to 65 years
2. Patients with Supra gingival calculus.

Exclusion Criteria

1. Patients below 15 years of age and above 65 years.
2. Patients contraindicated for Scaling

STUDY DESIGN

40 patients selected were randomly divided into 2 groups with 20 patients each.

a) Treatment adopted in Group A - Group "A" was treated by Laksha choorna pratisarana with madhu after Scaling followed by Tila taila kavala for a period of 3 months.

Procedure - The patient was asked to sit on dental chair. Since there was difficulty in using hand scalers supragingival calculus was removed gently with the help of Ultrasonic scaler. Then Laksha choorna with madhu was rubbed over the teeth and gums and left in situ for 5 minutes. This was followed by Tila taila kavala, i.e., vigorous rinsing of the mouth.

This procedure was advised to be done twice daily, morning & night before going to bed, for a period of 3 months. Later, follow up was done for 6 months. During this period patients were advised to maintain oral hygiene.

b) Treatment adopted in Group B - Group "B" was treated by Ultrasonic Scaling followed by Chlorhexidine mouth wash for a period of 3 months.

Procedure -The patient was asked to sit on dental chair. With the help of Ultrasonic scaler, supragingival calculus was removed

gently. Then the patient was given Chlorhexidine mouth wash in 1:1 dilution (1 part solution and 1 part water) for rinsing the mouth.

Patients in this group were advised to maintain oral hygiene and to continue mouth wash with Chlorhexidine twice daily, morning and night before going to bed, for a period of 3 months. Later, follow up was done for 6 months.

The patients were advised to maintain oral hygiene. They were asked to brush twice daily and were advised to gargle the mouth after each meal

RESULT

Effect of Treatment in Group A (Figure 1)

1. Analysis of the Calculus index shows that there was 100% of improvement in the symptom.
2. Analysis of the Gingival index shows there was 45.71% of improvement in the symptom.
3. Analysis of the Gum recession shows that there was 3.03% of improvement in the symptom
4. Analysis of the Halitosis index shows that there was 95% of improvement in the symptom

Effect of Treatment in Group B (Figure 2)

1. Analysis of the Calculus index shows that there was 92.5% of improvement
2. Analysis of the Gingival index shows that there was 38.2% of improvement.
3. Analysis of the Gum recession shows that there was 5.55% of improvement
4. Analysis of the Halitosis index shows that there was 95.45% of improvement

Comparison of effect of treatment on Parameters in "Group A" and "Group B" after treatment

Comparatively Group A therapy is effective than Group B therapy in all the parameters. (Figure 3)

Observations after the follow up period in trial groups

In Group A, 4 (20%) showed recurrence of calculus and 16(80%) showed no recurrence of calculus after follow up period. In Group B, 8 (40%) showed recurrence of calculus and 12(60%) no recurrence of calculus after follow up period. (Figure 4)

DISCUSSION

Probable mode of action of Laksha choorna

Laksha has Kashaya, Tikta and Madhura Rasa, hence it pacifies Pitta. It has Vednashamana, Daha Prashaman and Shothahara properties. It also helps in healing of wound caused due to scaling by its Vranaropaka properties. It has Krimihara guna which may help in reducing plaque accumulation. Based on its Dravya-guna it has acted on Danta sharkara and has helped in control of plaque and hence, tartar.⁵

Laksha (Lac) is a natural, non toxic, physiologically harmless and edible resin. It is acidic in character.⁶ It is having a mild abrasive action, which aids in eliminating plaque through cleaning and polishing tooth surfaces. It restores natural luster and also enhances enamel whiteness. Its coloring agent imparts its color to soft deposits which can be rinsed easily from tooth surfaces and hence help in plaque control.

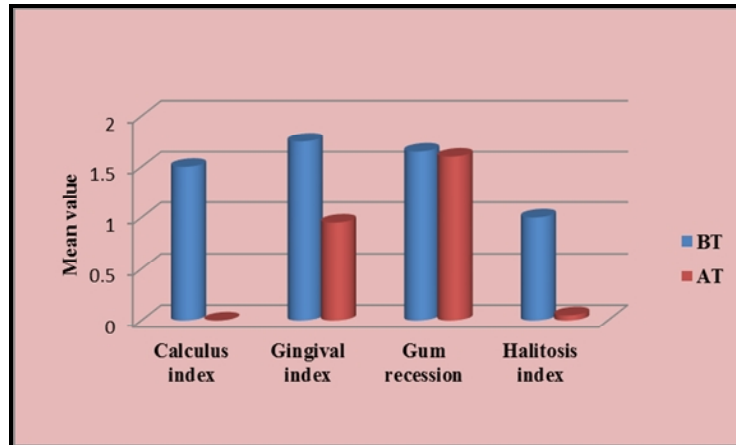


Figure 1: Effect of treatment in Group A

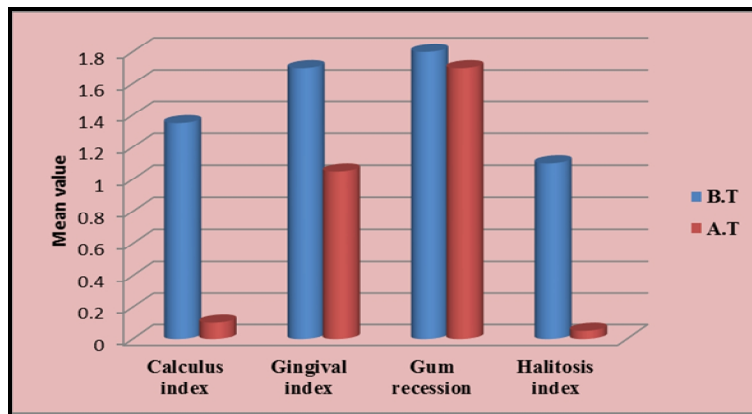


Figure 2: Effect of treatment in Group B

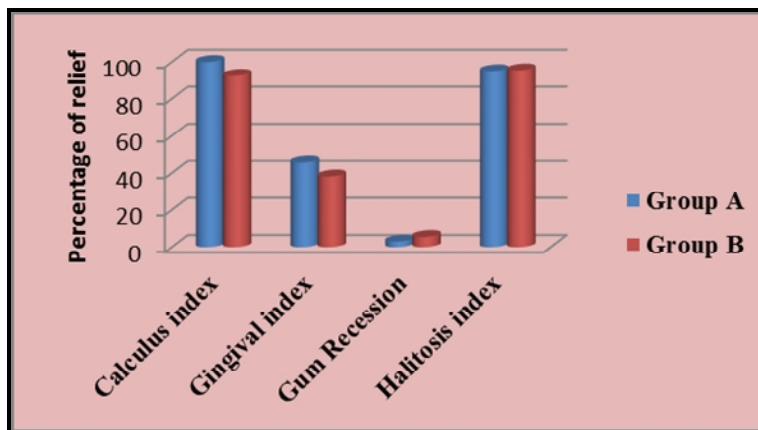


Figure 3: Comparison of effect of treatment in Group A and B

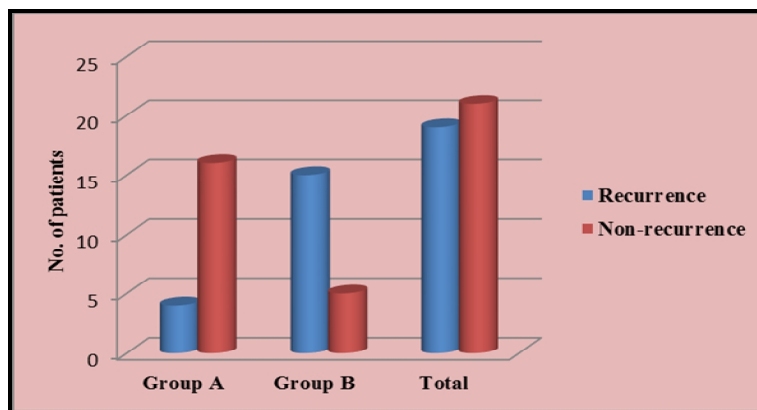


Figure 4: Observations after follow up period in trial groups

Studies have suggested a relationship between oral disorders and a reduced level of antioxidant capacity that may be explained by an age-related reduction in the level of antioxidants in saliva and/or by the age-related increase of Reactive Oxygen Species and oxidative stress in the oral cavity.⁷

Aleuritic acid, a major constituent of lac resin, is a potential substitute for alpha-hydroxy acids and is valued for its antioxidant action.⁸ Antioxidants have been proven to be beneficial in controlling plaque, gum disease prevention, and healing gum disease. They cause the degradation of mineral deposits, making them water-soluble. The calcified dental plaque is composed of calcium carbonate, which is converted to calcium bicarbonate, becoming water-soluble. They can prevent the formation of dental stains that occur from oxidation of both organic and inorganic compounds. Antioxidant treatment can block the production of Reactive Oxygen Species or obstruct its effects and may be therapeutically valuable in reducing the risk for many dental maladies.

Probable mode of action of Madhu

Madhu has Sheeta Guna, having Madhura and Kashaya Rasa which are contradictory to the properties of Daha and Pitta. It is mentioned in Rakta Sthapana Mahakashaya and in Sandhaniya Mahakashaya. It has Vrana Shodhana, Sandhana, Ropana, Lekhana and Krimihara property.⁵ Madhu increases the flow of saliva which contains a large number of leucocytes that migrate through the epithelium of the gingival crevice has not only a bactericidal effect but rinsing function also. The antibacterial properties of honey can be attributed to its low pH (3.6), a thermolabile substance called inhibin and its hygroscopic properties (Efem, 1988, Bannur, et al., 1994). The hygroscopic property of honey enables it to dehydrate bacteria rendering them inactive.⁹

Honey contains an enzyme that produces hydrogen peroxide, which is believed to be the main reason for the antimicrobial activity of honey. The research has shown that honey not only stops the growth of dental plaque bacteria, it also reduces the amount of acid produced, which stops the bacteria from producing dextran. Dextran, a component of dental plaque, is the gummy polysaccharide that the bacteria produce in order to adhere to the surface of the teeth.¹⁰

Probable mode of action of Tila taila

Tila Taila is of Madhura Rasa and Vipaka, Balya, and Rasayana in Karma. It is considered as shreshta vatahara. Snigdha and GuruGuna decreases Rukshata of Vata and with the help of Ushna Guna and Veerya it alleviates Vata. Hence, it is helpful in

reducing the danta harsha caused after scaling. It has lekhanaguna which helps in removing plaque and prevent formation of calculus.¹¹

Sesame oil has three lignans - sesamin, sesamol, and sesaminol - that have antioxidant properties and potentiate Vitamin E action. It has the following advantages over chlorhexidine mouth wash: no staining, no lingering after-taste, and no allergy. It fulfills the criteria of ideal mouth wash. Sesame oil has increased polyunsaturated fatty acids and the lipid peroxidation is reduced thereby reducing free radical injury to the tissues. The viscosity of the oil probably inhibits bacterial adhesion and plaque co-aggregation. The other possible mechanism might be the saponification that occurs as a result of the alkali hydrolysis of fat. Sesame oil is a vegetable fat and when it is acted upon by the salivary alkali, like the bicarbonates, the soap making process is initiated. Soaps are good cleansing agents because they are effective emulsifying agents. Emulsification is the process by which insoluble fats like sesame oil can be broken down into minute droplets and dispersed in water. Emulsification greatly enhances the surface area of the oil thereby increasing its cleansing action. The unsaponifiable fraction, a class of substances not found in other fats (sesamin or sesamol) can probably protect the oral cavity from infection and inflammation by its antioxidant property. These mechanisms could have been the reason for the reduction of plaque scores.¹²

Probable mode of action of Pratisarana

Gentle rubbing with finger is Pratisarana. It is a mechanical approach for plaque control. Pratisarana mainly possesses Shodhana and ropana properties. By pratisarana mechanical pressure is exerted on gingivae in the direction of the gingival sulcus which remove food debris, food impaction, plaque, desquamated epithelial cells, calculus, and bacterial colonies. pratisarana increases rate of crevicular fluid production, which inhibits bacterial diffusion into the tissues as it has phagocytic leukocytes and enzymes.

Probable mode of action of Kavala

In Kavala Gaha, a comfortable amount of fluid is retained with the mouth closed and then gargled. It is a simple rejuvenating treatment, which, when done routinely, enhances the senses, maintains clarity, brings about a feeling of freshness, and invigorates the mind. This oral cleansing technique can also benefit bad breath, loss of taste, sore throat, and all kapha related imbalances.

The exact mechanism of the action of oil pulling therapy is not clear. It was claimed that the swishing activates the enzymes and draws the toxins out of the blood. Oil pulling can be used as an effective preventive adjunct in maintaining and improving oral health. The lukewarm liquid or oil used for kavala helps in dilation of the blood vessels in the oral mucosa and thus helps in absorption of the active ingredients present in medicine.

Gargling with oil helps in reduction in the specific bacteria in the oral cavity i.e. Streptococcus mutans. These bacteria are responsible for plaque accumulation which in turn results in Calculus formation. Due to scaling, the enamel gets thinned out and may cause hypersensitivity. As dentin loses its smear layer it becomes hyper conductive and hence hypersensitive. Kavala with oil forms a smear layer over the dentin thus probably helps in curing hypersensitivity caused after scaling.¹²

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