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IMPACT OF DIET THERAPY IN DENTAL CALCULUS

Health Science

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ABSTRACT

Dental calculus also known as tartar is mineralized dental plaque that occurs commonly with the extent varying widely among individuals and populations. Studies have shown that these bacteria may contribute to heart disease as well as other. Hence the present was taken up to evaluate the efficacy of Nutrition and Diet therapy for control and prevention of Calculus after its removal by scaling with the objectives - To know the efficacy of Diet Therapy in control and prevention of Dental Calculus. After establishing the diagnosis of Dental Calculus, 40 patients were selected randomly for the study divided into 2 groups with 20 patients each. Group "A" was treated by Nutrition and diet therapy after Scaling followed by Diet control for a period of 3 months. Group "B" was treated by Ultrasonic Scaling for a period of 3 months. Thereafter the Patients were reviewed once a month after treatment for next 6 months. Results revealed that Group A showed better results in Calculus index, Gingival index and Halitosis index ($p<0.001$) parameter compared to Group B which was highly significant. Gum recession shows that the treatment do not have significant result. Assessment of follow up period after 6 months showed 80% no recurrence among Group A and Group B 60% no recurrence. It was evident from the study that Nutrition and diet therapy has a positive effect on preventing dental calculus and showed no recurrence after treatment, than just scaling treatment. Hence it can be concluded that nutrition and diet plays a vital role on preventing and controlling dental calculus, thereby preventing the bacteria that may contribute to heart disease.

KEYWORDS

Dental Calculus, Gingivitis, Gingival index, Halitosis index, Gum recession

INTRODUCTION

Good oral hygiene is not just important—it's probably even more important than we think. Over the past decade, researchers have discovered that bad oral hygiene can trigger immune system reactions that can lead to heart attacks and strokes. Daily preventive care, including, diet, proper brushing and flossing will help stop problems Dental Calculus. (1,2,3)

Calculus is a calcified mass that forms on and adheres to the surface of teeth and dentures causing and aggravating periodontal diseases. Calculus formation results in a number of clinical manifestations, including bad breath, receding gums and chronically inflamed gingiva. Once tartar forms on teeth, the acids released by the bacteria in the mouth are more likely to break down tooth enamel 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. 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. (4, 5, 6)

Approach of treatment in modern medicine is Scaling and polishing (oral prophylaxis). 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.(7,8 9, 10). Considering these drawbacks present study was taken up to evaluate the efficacy of Nutrition and Diet therapy for control of Calculus after its removal by scaling.

Objectives of the study:

- To establish the efficacy of Diet Therapy in control and prevention of Dental Calculus.
- To compare the effect of treatment with diet therapy and Ultrasonic Scaling.

MATERIALS AND METHODS

The present clinical study is on the efficacy of Nutrition and diet therapy with modification in the routine diet and maintaining oral hygiene for the control of Dental calculus/plaque. This study was carried out in Dental OPD of Manjunath hospital Kundapur , udupi.

Selection of the patients:

The selection of the subjects was done on the basis of clinical examination. After establishing the diagnosis of Dental Calculus, 40 subjects aged between 15 to 65 years were selected randomly for the study from Dental OPD & IPD of Manjunath hospital kundapur, Udupi. They were randomly divided into 2 groups with 20 subjects each.

Group "A" was treated by Nutrition and diet therapy after Scaling for period of 3 months.

DIET TO BE FOLLOWED	FOODS TO BE AVOIDED
Balanced Diet advised • Whole grains • Fruits & Vegetables • Lean sources of protein such as lean beef, skinless poultry and fish, dry beans, peas and other legumes • Low fat and fat free dairy foods Limit the number of snacks you eat. Use of Honey on a regular basis Drink plenty of water	• Sugary sweets and Sour candies • Soft aerated drinks • Bread • Alcohol • Carbonated drinks • Ice • Citrus fruits and items • Potato chips • Pickles • Dried fruits

Group "B" was treated by Ultrasonic Scaling followed by Chlorhexidine mouth wash for a period of 3 months.

All 40 subjects were advised to maintain oral hygiene. They were asked to brush twice daily and were advised to gargle the mouth after each meal. Total duration of treatment was 3 months. Subjects were advised to come for consultation and dental checkup once in two weeks and the observations were recorded.

Thereafter the subjects were reviewed once a month after treatment for next 6 months. The observations were made before, during and after treatment and assessed as per the subjective and objective parameters.

Assessment of the results:

Evaluation of responses of study groups in this clinical trial was based on the subjective and objective parameters assessed before and after the treatment. The subjective & objective parameters were graded

using Calculus index (Green & Vermillion), Gingival index (Loe, 1967), Gum recession (PD Miller's) and Halitosis index

RESULTS AND DISCUSSION:

The observations were made on 40 patients in this study. They were divided as Group A and Group B consisting of 20 subjects each. Out of 40 subjects, 47.5% were male and 52.5% were females. In Group A, 50% subjects were male and 50% subjects were female. In Group B, 45% subjects were male and 55% subjects were female.

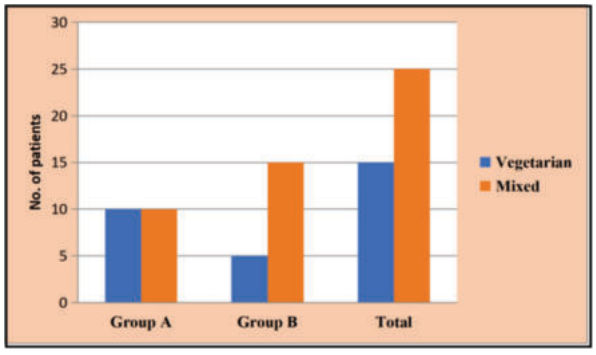

Figure 1- Dietary habits among study groups

Figure- 1 shows Dietary habit of the study groups. In Group A, 50% **subjects** were of vegetarian diet and 50% were of mixed diet. In Group B, 25% patients were of vegetarian diet and 75% were of mixed diet.

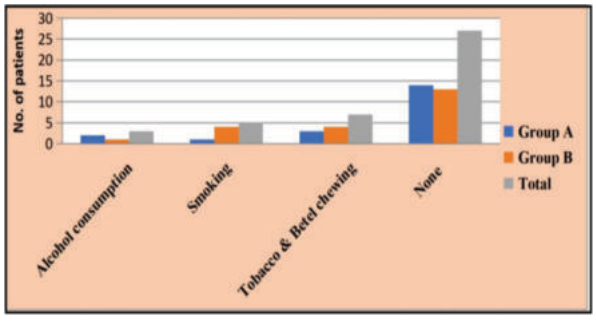

Figure 2- Habits among study groups

From Figure -2 it is evident that in Group A, 10% subjects were having habit of consuming alcohol, 5% subjects was having the habit of smoking, 15% had habit of tobacco and betel chewing and 70% did not have any such habits. In Group B, 5% subjects was having habit of consuming alcohol, 20% subjects were having the habit of smoking, 20% had habit of tobacco and betel chewing and 65% did not have any such habits.

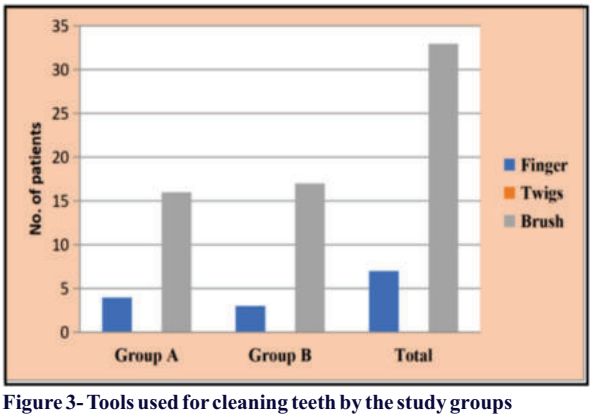

Figure 3- Tools used for cleaning teeth by the study groups

In Group A, 20% subjects used their finger to clean the teeth, 80% patients used brush for teeth cleaning and none of the subjects used twig for clean the teeth (fig.3). In group B15% subjects used their finger to clean the teeth, 85% patients used brush for teeth cleaning and none of the patients used twig for cleaning the teeth (fig.3). In Group A, 85% patients brush only in the morning and 15% patients brush in morning and night. In Group B, 70% patients brush only in the morning and 30% patients brush in morning and night.

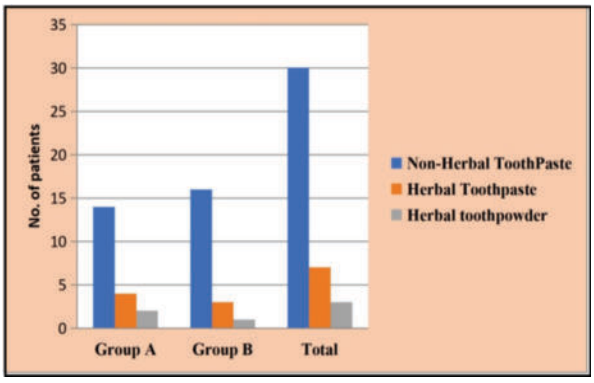

Figure 4- Incidence of Dentrifice used by the study groups

In Group A, 70% patients used Non Herbal Toothpaste, 20% patients used Herbal Toothpaste and 10% patients used Herbal toothpowder. In Group B, 80% patients used Non Herbal Toothpaste, 15% patients used Herbal Toothpaste and 5% patients used Herbal toothpowder.

In Group A, 45% patients did gargling only in the morning, 15% patients did gargling in morning and night and 40% patients did gargling after each meal. In Group B, 40% patients did gargling only in the morning, 5% patient did gargling in morning and night and 55% patients did gargling after each meal.

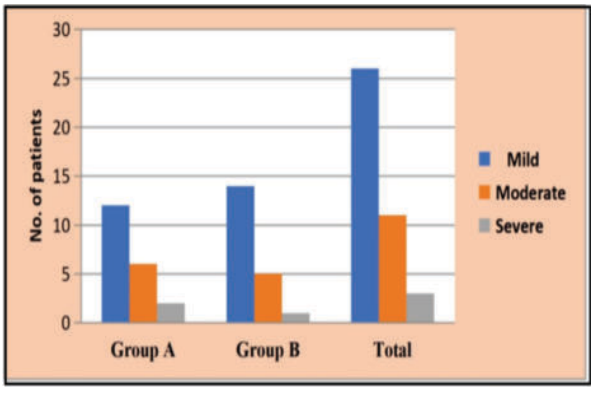

Figure 5- Incidence of Calculus in study groups

In Group A, 60% patients had mild Calculus development, 30% patients had moderate calculus development and 10% patients had severe calculus development. In Group B, 70% patients had mild Calculus development, 25% patients had moderate calculus development and 5% patient had severe calculus development.

In Group A, 90% patients had incidence of symptoms in lingual aspect and 10% had in lingual and palatal aspect. In Group B, 70% had in lingual aspect, 15% had in lingual and palatal aspect, 15% had in lingual and labial aspect.

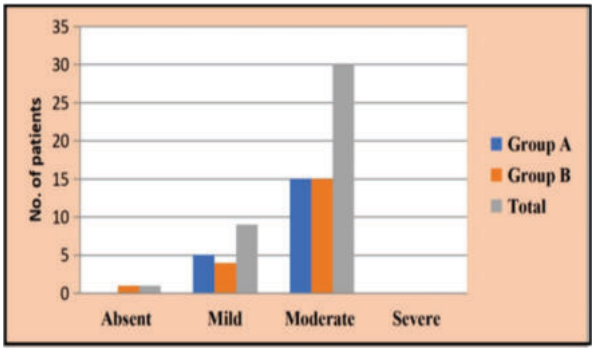

Figure 6 - Incidence of gingival bleeding in the study groups

In Group A, 25% patients had mild gingival bleeding and 75% patients had moderate gingival bleeding. In Group B, 5% patient had no gingival bleeding on probe, 20% patients had mild gingival bleeding, and 75% patients had moderate gingival bleeding.

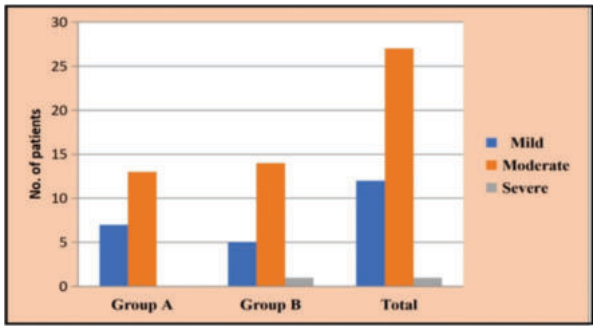

Figure 7- Incidence of Gum recession in the study groups

In Group A, 35% patients had mild gum recession and 65% had moderate gum recession. In Group B, 25% patients had mild gum recession, 70% had moderate gum recession and 5% patient had severe gum recession.

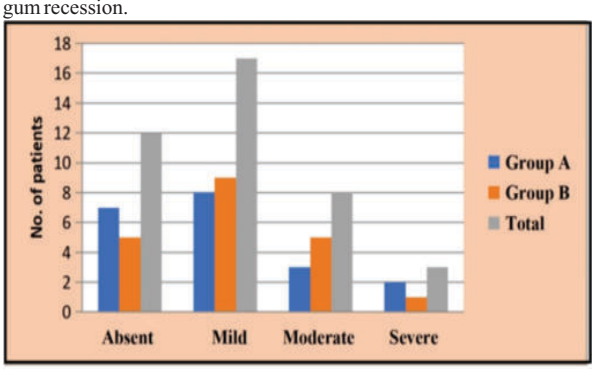

Figure 8- Incidence of Halitosis in the study groups

In Group A, 35% patients had no halitosis, 40% patients had mild halitosis, 15% patients had moderate halitosis and 10% patients had severe halitosis. In Group B, 25% patients had no halitosis, 45% patients had mild halitosis, 25% patients had moderate halitosis and 5% patient had severe halitosis.

Table 1- Effect of treatment on individual parameters in Group A

Parameter	Mean		Mean diff (d)	% diff (d)	SD	SE	df	t value	P value	Remarks
	B.T	A.T								
Calculus index	1.5	0.0	1.5	100	0.6882	0.1539	19	9.747	P<0.001	HS
Gingival index	1.75	0.95	0.8	45.71	0.4104	0.0917	19	8.718	P<0.001	HS
Gum recession	1.65	1.6	0.05	3.03	0.2236	0.0500	19	1.000	p>0.10	NS
Halitosis index	1.0	0.05	0.95	95	0.9445	0.2112	19	4.498	P<0.001	HS

Analysis in Group A for Calculus index, Gingival index and Halitosis index, shows that mean score before treatment was 1.5, 1.75 and 1.0 respectively which reduced to 0, 0.95 and 0.05 after treatment, there was 95 to 100% of improvement in the symptom indicating the result as statistically highly significant (p<0.001). However, Analysis of the Gum recession shows that mean score before treatment was 1.65 which reduced to 1.6, there was 3.03% of improvement in the symptom, with t value 1.0000 the result was statistically not significant (p>0.10).

Table 2- Effect of treatment on individual parameters in Group B

Parameter	Mean		Mean diff (d)	% diff (d)	SD	SE	df	t value	p value	Remarks
	B.T	A.T								
Calculus index	1.35	0.1	1.25	92.5	0.5501	0.1230	19	10.16	P<0.001	HS
Gingival index	1.7	1.05	0.65	38.2	0.4894	0.1094	19	5.940	P<0.001	HS
Gum recession	1.8	1.7	0.1	5.55	0.3078	0.0688	19	1.453	p>0.10	NS
Halitosis index	1.1	0.05	1.05	95.45	0.8256	0.1846	19	5.688	P<0.001	HS

Group B Analysis revealed improvement in the symptom of Calculus index, Gingival index and Halitosis index with the treatment and the result was statistically highly significant (p<0.001).

Table 3- Comparison of effect of treatment on Parameters in "Group A" and "Group B" after treatment:

Parameter	Group	Mean diff (d)	% of diff(d)	SD	SE	t-value (df=38)	P-Value	Remarks
Calculus index	A	1.5	100	0.6229	0.1970	1.269	p>0.10	NS
	B	1.25	92.5					
Gingival index	A	0.8	45.71	0.4516	0.1428	1.050	P>0.10	NS
	B	0.65	38.2					
Gum recession	A	0.05	3.03	0.2690	0.0851	0.5878	p>0.10	NS
	B	0.1	5.55					
Halitosis index	A	0.95	95	0.8870	0.2805	0.3565	p>0.10	NS
	B	1.05	95.45					

It was evident from table- 3 that there was no statistically significant difference between group A & group B with all the parameters. However, follow up study after 6 months of treatment gave a positive result. In Group A, 20% showed recurrence of calculus and 80% showed no recurrence of calculus after follow up period. In Group B, 40% showed recurrence of calculus and 60% no recurrence of calculus after follow up period. This indicates that treatment with diet and nutrition played an important role.

Table 4: Comparison of effect of treatment on Parameters in Group A and B after 6 months Follow up period:

Parameter	Group	Mean diff (d)	% of diff(d)	SD	SE	T-Value (df=38)	P-Value	Remarks
Calculus index	A	1.3	86.67	0.4908	0.1552	2.256	P<0.05	S
	B	0.95	70.37					
Gingival index	A	0.55	31.42	0.6050	0.1913	0.5229	p>0.10	NS
	B	0.45	26.47					
Gum recession	A	0.05	3.03	0.1581	0.0500	1.000	p>0.10	NS
	B	0.0	0.0					
Halitosis index	A	1.0	100	0.8304	0.2626	1.143	p>0.10	NS
	B	0.7	63.63					

Comparison of efficacy of therapy (table -5) shows there was statistically significant result between Group A & Group B among all parameters. The percentage relief difference between the two groups shows that Group A therapy is more effective than Group B.

Overall response in the subjects indicated that, in Group A, 5% showed good response, 80% showed moderate response, 15% showed mild response and none showed poor response after treatment. In Group B, 5% showed good response, 60% showed moderate response, 35% showed mild response and none showed poor response after treatment. It was very much clear that nutrition and diet can have a positive impact on preventing and controlling dental calculus.

SUMMARY AND CONCLUSION

Calculus formation results in a number of clinical manifestations, including bad breath, receding gums and chronically inflamed gingiva. Approach of treatment in modern medicine is very important to prevent and control dental calculus as oral hygiene can trigger immune system reactions that can lead to heart attacks and strokes.

Group A showed better results in all parameter except Gum recession compared to Group B. It could be due to the plaque control effect of Diet Therapy, control of processed sugars and high acid or citrus foods. Assessment of result in follow up period After 6 months of observation

in the follow up period, following results were obtained in Group A 20% showed recurrence of calculus and 80% showed no recurrence. Group B showed 40% recurrence of calculus and 60% no recurrence.
It was evident from the study that Nutrition and diet therapy has a positive effect on preventing dental calculus and showed no recurrence after treatment, than just scaling treatment. Hence it can be concluded that nutrition and diet plays a vital role on preventing and controlling dental calculus, thereby preventing the bacteria that may contribute to heart disease.

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