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Research Paper

Comparative Evaluation of Salivary pH Using 3 different dentifrices among gingivitis patients: An In vivo Study

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ABSTRACT
AIM:*To evaluate and compare the effect of three different dentifrices with focus on salivary pH level before and after brushing among gingivitis patients*
INTRODUCTION:*Dentifrices serve as an ideal vehicle for any active therapeutic ingredient. Among dentifrices, toothpastes serve as the most common and accessible preventive oral health care material.The salivary pH is an important biomarker for oral health and disease.*
MATERIALS AND METHODS : *Thirty subjects in the age group of 18-30 years with severe gingivitis were randomly divided into 3 groups (10 in each group) and were randomly intervened with three different toothpastes (herbal ,fluoridated , conventional).saliva samples were collected at Day 1 and Day 28 and salivary pH levels were estimated.*
RESULTS: *All the three groups showed an increase in the salivary pH from Day 1 to Day 28. Only Group II ie fluoridated showed significant difference between Day 1 and Day 28*
CONCLUSION*:oral hygiene practice with Fluoridated dentifrices showed significant change in salivary pH level than herbal and conventional.*
KEY WORDS:*Dentifrices, Salivary pH , Fluoridated dentifrices, gingivitis*

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I. INTRODUCTION

Dentifrices is a substance used with a tooth brush for the purpose of cleaning all the accessible surfaces of the teeth.They are considered as agents with antimicrobial potential with beneficial effect on plaque control,caries incidence,tooth sensitivity and disease prevention(Therapeutic dentifrices)[1].Among dentifrices,various types of toothpastes serve as the most common andaccessible preventive oral health care tool available.

Saliva is a clear complex fluid found in oral cavity produced and secreted by salivary glands in mouth.It consists 99% of the water and remaining 1% of organic and inorganic molecules[2]The primary role of saliva is preservation and maintenance of oral health by washing away food debris and bacteria remaining in the tooth surfaces.Other functions includes mastication, deglutition, taste sensation, speech,antibacterial effect and pH buffering effect.

Saliva is considered as an important diagnostic tool because of the presence of biomarkers in it. Salivary components like pH, glucose which play an important role in maintaining oral health[3].The salivary pH is an important biomarker for oral health and disease.The long term use of dentifrices may influence the salivary pH level. The present study was undertaken to evaluate and compare the effect of three different dentifrices with focus on salivary pH level before and after brushing among gingivitis patients.

II. MATERIALS AND METHODS

Thirty subjects in the age group of 18-30 years with severe gingivitis reported in Department of Periodontics and Implantology ,Rajas Dental College and Hospital,Tirunelveli,were randomly divided into 3

groups (10 in each group) and were intervened with three different toothpastes (fluoridated, conventional, herbal).The study was conducted over a period of 4 weeks on each participant and saliva samples were obtained at Day 1 and Day 28.

The baseline (Day1) unstimulated salivary samples were collected in sterile container (figure 1) from the subjects by spitting method and pH was assessed using digital pH meter (figure 2) at Central research lab, Rajas Dental College and Hospital. After administration of different tooth paste same procedure was done at day 28.The participants were instructed to brush for 3 minutes twice daily using the toothpaste which was provided to them. They were also asked not to use any other form of oral hygieneaids apart from toothpastes provided to them.

2.a INCLUSION CRITERIA

Patients with OHI index ranging from 1.3-3.0
Systemically healthy
Gender – Both male and female

2.b EXCLUSION CRITERIA

Smokers and chronic alcoholics.
Patients on any medication within 48 hours.
Pregnant and lactating women.
Patients undergoing orthodontic treatment.

2.c SAMPLE SIZE

Group I Herbal toothpaste (Vicco Vajradanti care) ,n -10 (figure 3)
Group II Fluoridated tooth paste (Sensodyne) ,n - 10 (figure 4)
Group III Conventional toothpaste (CLOSE UP) ,n -10 (figure 5)

III. STATISTICAL ANALYSIS

Data were analyzed using SPSS software version 16. Mean and standard deviation of the obtained pre (before brushing) and post (after brushing) levels of Salivary pH at 1st and 28thday were compared within three groups bypaired 't' test.

IV. RESULTS

All the three groups showed an increase in the salivary pH from Day 1 to Day 28. (Figure 6)Effective of fluoridated tooth paste (Group II) gave us a significant difference ($p<0.05$) between before and after brushing with a P value of .003. No other groups showed significant P values between base line (Day 1) and 28th day.(figure 7)

V. DISCUSSION

Saliva has a pH normal range of 6.2-7.6 with 6.7 being the average pH. In the oral cavity, the pH is maintained near neutrality (6.7-7.3) by saliva. The saliva contributes to maintenance of the pH by two mechanisms. 1) the flow of saliva eliminates carbohydrates that could be metabolized by bacteria and removes acids produced by bacteria. 2) by the buffering capacity of saliva ie acidity from drinks and foods, as well as from bacterial activity, is neutralized by saliva.[4]Salivary pH is the important salivary parameter exciting the carious process. Demineralization and remineralization processes of the teeth, occurring in the oral cavity, are dependent on the pH of the saliva[5].The present study was undertaken to evaluate and compare the effect of three different dentifrices with focus on salivary pH level before and after brushing among gingivitis patients.For this we grouped in to 3 ie herbal ,fluoridated and conventional respectively**.** No adverse reactions was noticed after use of allotted toothpastes.

In our study we have found that an increase in the level of salivary pH from Day 1 to Day 28 in all groups.This may be due to presence of sudden change in the composition of the new dentifrices with the composition of previously one usedby the subjects and that will directly affect the salivary pH without any significant differences among Group I and Group III.

A saliva pH of 7.0 usually indicates a healthy dental and periodontal situation. At this pH, there is a low incidence of dental decay combined and little or no calculusA saliva pH below 7.0 usually indicates acidemia (abnormal acidity of the blood). Takahashi *et al*.concluded in their study that the periodontopathogens grow in a mildly acidic pH.[6.]So an increase in pH level can inhibit the growth of perioodntopathogenic bacterias and can control the progression of periodontitis from gingivitis.

Organoleptic properties of liquorice (Glycyrrhizaglabra) and cinnamon (Cinnamomum verum) which are present in herbal tooth paste (Vicco Vajradanti) stimulate the salivary flow and this in turn helps to raise the

pH of the saliva [7]. A saliva pH above 7.0 usually indicates alkalinity. Excessive alkalinity can bring about the same anaerobic conditions as acidemia, but it is much rarer condition[4]

Galgut et al conducted a study to investigate any possiblecorrelations between pH and gingivitis and periodontalpockets and proved the role of salivary pH and its significance on progression of periodontal diseases.[8]. Fujikawa *et al*studied the correlation between the pH level and the microflora in periodontal pockets in the various stages of periodontal disease.[11] A change in pH level was seen in deeppockets or severe gingival inflammation.In this present study only GroupII ie Fluoridated tooth paste only showed significant results between day 1 and day 28.By analysing different studies,brushing teeth using fluoridated tooth paste can reduce plaque attached on dental surfaces [9].A study done by Ekstrand J et al [10]proved that Fluoride concentration in the oral cavity influences the acidity or the saliva pH and is linearly comparative with the pH value of the oral cavity. The data obtained in our studies is also in line with other study's finding that the salivary pH increases significantly after brushing using fluoridated toothpaste. Study conducted by Alina C et al found that Salivary pH is not influenced by the fluoride content ofdentifrices.[12] Major drawbacks of our study is its smaller sample size.Larger sample size with more clinical parameters and longer duration is much more needed to assess the efficacy of different dentifrices

VI. CONCLUSION

Based on the findings of the present study, it can be concluded that salivary pH can consider as an important diagnostic tool for assessing gingival health and diseases and tends to believe that all dentifrices possess an increase in salivary pH with significant difference in fluoridated dentifrices than herbal and conventional ones.

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Figure 1 : sterile container Figure 2: digital pH meter

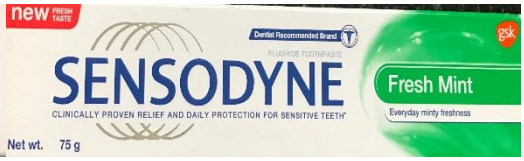

Figure 3 : Group IFigure 4 : Group II

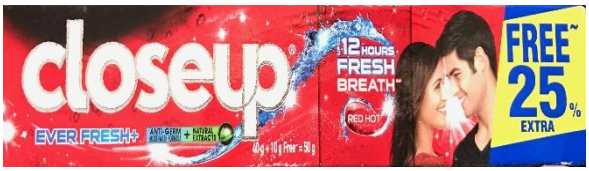

Figure 5: Group III

Paired sample t test:

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
GROUP I	BEFORE	6.9100	10	.45570	.14411
	AFTER	7.0200	10	.39384	.12454
GROUP II	BEFORE	7.0150	10	.36519	.11548
	AFTER	7.3500	10	.20683	.06540
GROUP III	BEFORE	6.9830	10	.23805	.07528
	AFTER	7.0600	10	.21705	.06864

Figure 6

PAIRED SAMPLES TEST

		Paired Differences					t	df	P-VALUE
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
GROUP I	BEFORE-AFTER	-.11000	.23781	.07520	-.28012	.06012	-1.463	9	.178
GROUP II	BEFORE-AFTER	-.33500	.26879	.08500	-.52728	-.14272	-3.941	9	**.003***
GROUP III	BEFORE-AFTER	-.07700	.18548	.05865	-.20968	.05568	-1.313	9	.222

t-value :paired t test value

*p≥0.05 significant

Figure 7