Evaluation and Comparison of Patient Feedback on Chlorhexidine Vs Anti-Calculus Mouthrinse after 6 Months of Compliance

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Abstract. Chronic inflammation of the gum tissue surrounding the teeth is associated with the bacterial biofilm (plaque) that covers the teeth and gums. Gingivitis was once seen as the first stage in a chronic degenerative process which resulted in the loss of both gum and bone tissue surrounding the teeth. It is now recognised that gingivitis can be reversed by effective personal oral hygiene practices through both mechanical and chemical plaque control. The principle routes to chemical plaque control are to prevent colonization of the tooth surface, to inhibit the growth of microorganisms, the prevent plaque maturation, to modify plaque biochemistry and to modify plaque ecology to a less pathogenic flora. The present study was done to compare the feedback for the chlorhexidine (CHX) and anti-calculus mouthrinse after 6 months of compliance. The results confirmed that CHX had noticeable clinical side effects as compared to anti-calculus mouthrinse.

Keywords: chlorhexidine, anti-calculus, periogen, inflammation

1 Introduction

Research over the past decade has led to the recognition of dental plaque as a biofilm - a highly organized accumulation of microbial communities attached to an environmental surface. Biofilms are organized to maximize energy, spatial arrangements, communication, and continuity of the community of microorganisms. The growth and development of biofilm are characterized by 4 stages: initial adherence, lag phase, rapid growth, and steady state. Biofilm formation begins with the adherence of bacteria to a tooth surface, followed by a lag phase in which changes in genetic expression (phenotypic shifts) occur. A period of rapid growth then occurs, and an exopolysaccharide matrix is produced. During the steady state, the biofilm reaches growth equilibrium. Surface detachment and sloughing occur, and new bacteria are acquired [1]. Biofilms form particularly fast in flow systems where a regular nutrient supply is provided to the bacteria. The reason for the existence of the biofilm is that it allows the micro-organisms to stick and to multiply on surfaces. Micro-organisms undergo a wide range of physiological and morphological adaptations in response to environmental changes [2]. Adequate control of biofilm accumulation on teeth has been the cornerstone of prevention of periodontitis and dental caries. Mechanical plaque control is the

mainstay for prevention of oral diseases, but it requires patient cooperation and motivation; therefore, chemical plaque control agents act as useful adjuvants for achieving the desired results [3]. However, there are varied variety of oral rinses with their related clinical effects and side effects. The aim of this study was to evaluate and compare the feedback after six months usage of anti-calculus and 0.12% chlorhexidine mouthrinse regarding their acceptability for longer compliance.

2 Materials and Methods

This randomized controlled clinical trial was carried out in Faculty of Odonto-Stomatology, University of Medicine and Pharmacy, Ho Chi Minh City, Vietnam. The study population consisted of 30 individuals, who were systemically healthy, between 20 and 50 years of age and with moderate to severe plaque-induced gingivitis were enrolled in the study. They were equally distributed (n = 15) in the test (Conventional Oral Hygiene & Anti-Calculus mouthrinse: Periogen, USA) and the control group (Conventional Oral Hygiene & 0.12% Chlorhexidine mouthrinse: Kin, Spain). The Participants were excluded from the study if they suffered from non-plaque induced gingivitis or periodontitis, history of antibiotic use and use of any form of anti-calculus products in the last 90 days, need for antibiotic premedication, patients using mouth rinse within the last 3 months, pregnant women, habit of smoking or any form of smokeless tobacco and with systemic diseases. The examiner and participants were blinded to product allocation. Patients were recalled at weekly interval to check for the oral hygiene and the oral hygiene was reinforced in non-compliant patients. All the subjects were also provided with a fixed set of feedback questionnaire during their clinical visit at 2, 4 and 6 Month to understand their challenges regarding compliance for the both the products. The response from the subjects recorded under both the groups in a coded manner and their feedback was revealed to the clinician only after the study was completed.

3 Results and Discussion

The feedback response along with questionnaire is listed in Table 1. By applying Z test of difference between two sample proportions there is a significant difference between proportions of burning sensation after use, strong taste effects, challenging of its compliance, adverse effects, some color changes of teeth and regular use after 6 months when experimental group compared with control group as illustrated in Table 2. 26.7% of the subjects reported with burning sensation and 20% reported with strong taste effects after 6 months of continuous use of 0.12% CHX mouthrinse. 13.3% of subjects reported adverse effects and color changes on their teeth with six months of continuous usage of 0.12% CHX mouthrinse. In contrast to those subjects under anti-calculus rinse reported with no noticeable side effects from the subjects under the study after six months of regular compliance. 13.3% of the subjects under experiment group (Anti-calculus) reported with challenge for its application as compared to control group.

Table 1. Feedback from subjects after 2, 4 and 6 months

Questionnaire	Experimental group (n=15)			Control group (n=15)		
	2 months	4 months	6 months	2 months	4 months	6 months
Do you feel any burning sensation after use	0	0	0	0	3	4
Do you feel any strong taste effects	0	0	0	3	3	3
Do you feel challenging of its application	2	2	2	0	0	0
Do you feel any adverse effects	0	0	0	1	1	2
Do you see some colour changes of your teeth	0	0	0	0	1	2
Do you want to use regularly	14	14	14	14	14	12

Table 2. Statistic comparative analysis after 6 months.

Questionnaire	Experimental group, n (%)		Control group, n (%)		Z test value p value
	Yes	No	Yes	No	
Do you feel any burning sensation after use	0 (0)	15 (100)	4 (26.7)	11 (73.3)	3.31 p=0.0023
Do you feel any strong taste effects	0 (0)	15 (100)	3 (20)	12 (80)	2.74 p=0.0461
Do you feel challenging of its application	2 (13.3)	13(86.7)	0 (0)	15 (100)	2.14 p=0.0311
Do you feel any adverse effects	0 (0)	15 (100)	2 (13.3)	13 (86.7)	2.14 p=0.0311
Do you see some colour changes of your teeth	0 (0)	15 (100)	2 (13.3)	13 (86.7)	2.14 p=0.0311
Do you want to use regularly	14 (93.3)	1 (6.7)	12 (80)	3 (20)	1.56 p=0.0311

The p-value was calculated using the Z test. A significance level of 5% was used.

The possible reason would be as the anti-calculus agent (Periogen) used in this study is powdered concentrate and the subjects had to mix in the water for making the solution for oral rinsing. In this study 20% of the subjects reported their disinclination for continuation usage of CHX oral rinse as compared to anti-calculus rinse the reluctance is only 6.7%. This reluctance in the experimental group is due

to daily efforts for creating liquid solution from powdered concentrate to use as mouthrinse. However, 93.3% of subjects still showed their strong affinity towards using the anti-calculus product considering its long-term benefits as compared to adverse effects associated with CHX.

Results of our study that Chlorhexidine leads to clinical side effects with long term usage; reported many times previously in the clinical studies and literature. Flotra et al [4] in his study found that rinsing with 0.2% and 0.1 % chlorhexidine gluconate and acetate, some desquamations and soreness in the oral mucosa were observed; 12% of the tooth surfaces and 62 % of the silicate fillings were discoloured; while 36 % of the test persons developed discoloured tongues in the experimental period. Shruti Balagopal et al [5] stated that the side effects of chlorhexidine include brown discolouration of the teeth, restorative materials and dorsum of tongue. There is taste perturbation. Zanatta et al [6] in intergroup comparisons showed statistically higher ($p<0.05$) stain intensity and extent index as well as calculus formation over the study in test (chlorhexidine) surfaces as compared to control surfaces. Thus, 26.19% of test surfaces presented calculus, whereas calculus was observed in 4.52% in control surfaces. Abdallah [7] concluded that despite its superior antimicrobial properties, chlorhexidine is a potentially allergenic substance. Pemberton et al8concluded that CHX has the potential to cause serious adverse reactions. There are, however clinical evidence in various research studies that conformed that there's no noticeable side effects when subjects used anti-calculus oral rinse (Periogen) both for long and short-term usage [9-13].

4 Conclusion

Long term usage of chlorhexidine mouthrinse lead to noticeable side effects and hence alternative anti-calculus (Periogen) mouthrinse will be a true substitute for promoting the complete oral hygiene with no side effects.

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