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Research

Comparative Assessment of Octenidine and Chlorhexidine Mouthwash in Gingivitis and Periodontitis Patient: A Clinical Trial

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Abstract

Background: A common and tried-and-true ingredient in mouthwashes that works well against the development of plaque, gingivitis, and oral microbial growth is chlorhexidine gluconate (CHX). However, when it must be taken for an extended period of time, its benefits are limited by the accompanying side effects, which include taste modification, cytotoxicity, supragingival calculus formation, mucosal irritation, and tooth discoloration. In the 1980s, octenidine dihydrochloride (OCT), a new antibacterial cationic surfactant molecule, was produced at the Sterling-Winthrop Research Institute in Rensselaer, NY. OCT binds to negatively charged microbial surfaces and has a strong adherence to lipid components, which causes disruption of the cell membrane of bacteria, yeast, and fungus.

Aim: The purpose of the study was to evaluate the efficacy of mouthwashes with 0.1% octenidine and 0.2% chlorhexidine in patients with gingivitis and periodontitis.

Material and Method: Participants in this clinical experiment were split into two groups, each consisting of forty patients with periodontitis and gingivitis. Next, as an addition to scaling and root planning (SRP), 20 patients from each group were provided chlorhexidine mouthwash and 20 patients were recommended to use octenidine mouthwash. At baseline and three months later, clinical measures such as the O'Leary plaque index (PI), bleeding index, probing pocket depth (POD), and clinical attachment loss (CAL) were assessed.

Result: All clinical measurements showed that the Octenidine group performed much better than the chlorhexidine group in both the gingivitis and periodontitis groups.

Conclusion: When compared to chlorhexidine, Octenidine performed better across all of the previously listed clinical parameters. As a result, it can be regarded as a promising mouthwash for upcoming medical and scientific investigations.

***Keywords:** Mouthwash, Octenidine, Chlorhexidine, Gingivitis*

Introduction

Approximately 3.58 billion people worldwide suffer from dental caries and periodontal disease, two common oral illnesses that are commonly ignored.[1] While brushing and flossing are mechanical techniques of controlling plaque and can be somewhat efficient in maintaining oral hygiene, they are not enough to remove all plaque, especially in areas of the mouth that are difficult to reach.[2] Consequently, it is advised to utilize a chemical method to maintain optimal dental hygiene, such as using an antimicrobial mouthwash every day, especially for those who are susceptible to periodontitis.[3]

Unlike toothpaste, mouthwash is a liquid that, when used to cleanse the entire oral cavity, including hard and soft oral surfaces, can dramatically reduce the total oral microbial burden.[4,5] Antimicrobial mouthwash is helpful for elderly patients who are unable to clean their teeth in order to maintain good oral hygiene. According to Prasad et al. (2016), it is especially helpful for elderly and special needs individuals, as well as those who are unable to brush their teeth due to illness or surgery, in maintaining good dental hygiene. Commercial mouthwashes contain a variety of ingredients, including antiseptics, astringents, breath fresheners, essential oils (EOs), flavorings, and more, and have antimicrobial and breath-freshening qualities.[6]

A commonly used and proven ingredient in mouthwashes that works well against the development of plaque, gingivitis, and oral microbial growth is chlorhexidine gluconate (CHX). However, when it must be taken for an extended period of time, its benefits are limited by the accompanying side effects, which include taste modification, cytotoxicity, supragingival calculus formation, mucosal irritation, and tooth discoloration. In the 1980s, octenidine dihydrochloride (OCT), a new antibacterial cationic surfactant molecule, was created at the Sterling-Winthrop Research Institute in Rensselaer, NY. Through high adherence to lipid components and binding to negatively charged microbial surfaces, OCT breaks down the cell membranes of bacteria, yeast, and fungi. Data show that there is very little systemic absorption of OCT after it is administered topically or orally. Nevertheless, no information has been published about medication interactions, metabolism, secondary pharmacodynamics, or microbiological resistance. It is mostly excreted in faeces; no reports of buildup within the body have been made (EPAR, 2009).[7-12] Hence; the purpose of the study was to evaluate the efficacy of mouthwashes with 0.1% octenidine and 0.2% chlorhexidine in patients with gingivitis and periodontitis.

Material and Method

Two groups of 40 patients with gingivitis and sixty with periodontitis each participated in this clinical investigation. Then, as an addition to SRP, 20 patients from each group were prescribed chlorhexidine mouthwash and 20 patients were directed to use OCT mouthwash. At baseline and three months later, clinical measures such as the Oleary plaque index (PI), bleeding index, probing pocket depth (POD), and clinical attachment loss (CAL) were assessed. Every patient was counselled on the need to brush their teeth twice daily. The O'Leary Plaque Index (PI), Gingival Bleeding Index (GBI), Probing Pocket Depth (POD), and Clinical Attachment Loss (CAL) were all measured at baseline and 90 days.

Following the patients' informed permission. Age range of 20 to 50 years, at least 26 natural teeth, a diagnosis of periodontitis and persistent gingivitis, and a pocket depth of 5 to 6 mm are the inclusion criteria. Patients with systemic illnesses, women who were nursing or pregnant, sensitive to mouthwash, and those who had taken systemic antibiotics within the previous six months were not allowed.

Two groups were randomly selected from among the subjects. Twenty subjects were assigned to the Gingivitis group (SRP+ CHX), thirty patients to the SRP + OCT group, and twenty to the Periodontitis group (SRP + 0.1% OCT) and another group (SRP+CHX). Each subject used 15 ml of OCT three times and 10 ml of 0.2% CHX twice.

For statistical analysis, the data was first input into a Microsoft Excel spreadsheet and then imported into SPSS version 23. The mean and standard deviation of the data were included in the visual display. A student independent t-test was employed to determine statistically significant differences in key attributes across groups. A statistically significant P value was defined as one that was 0.05 or less.

Result

Up until day 90, the OCT group's mean GBI reduction was greater than the CHX group. GBI averages within the groups were compared, and the results showed a significant decrease from day 90 to baseline. When compared to the CHX group, octenidine significantly altered the GBI and O'leary plaque index in the gingivitis and periodontitis group. The octenidine group showed a considerable improvement when the means of the O'leary Plaque Index were compared between the two groups. When mean Probing depth (PD) values were compared across the groups, both groups considerably decreased PD from baseline to 90 days. There was a noticeable difference between the groups. (Table 1)

Table 1: Different variable comparison in the chlorhexidine and octenidine group.

	Chlorhexidine	Octenidine	
Periodontitis	**Mean ± SD**	**Mean ± SD**	**p-value**
Periodontal probing depth pre -op	7.25 ± 1.23	7.32 ± 1.28	>0.5
Periodontal probing depth post-op	4.90 ± 1.25	3.75 ± 0.50	<0.5
Clinical attachment loss pre -op	4.44 ± 0.35	4.67 ± 0.45	>0.5
Clinical attachment loss post -op	4.27 ± 0.58	4.88 ± 0.54	>0.5
O'leary plaque index pre -op	46.06 ± 3.43	45.65 ± 3.67	>0.5
O'leary plaque index post -op	27.33 ± 5.01	19.05 ± 5.55	<0.5
Gingival bleeding index pre -op	3.13 ± 0.34	2.45 ± 0.45	>0.5
Gingival bleeding index post -op	1.65 ± 0.24	0.89 ± 0.35	<0.5
	Chlorhexidine	**Octenidine**	
Gingivitis	**Mean ± SD**	**Mean ± SD**	**p-value**
O'leary plaque index pre -op	46.04 ± 6.05	43.88 ± 5.05	>0.5
O'leary plaque index post –op	23.53 ± 5.32	18.76 ± 3.06	< 0.5
Gingival bleeding index pre -op	1.90 ± 0.43	1.95 ± 0.54	>0.5
Gingival bleeding index post -op	1.87 ± 0.34	1.10 ± 0.30	<0.5

Discussion

According to the ecologic plaque hypothesis, every disease results from imbalances in the resident microflora's proportions, which are brought on by unfavorable changes in the surrounding environment. Biofilms in the oral cavity are akin to a double-edged sword. Eliminating the pathogenic germs and preserving the helpful ones is crucial. Disease is caused by an increase in harmful bacteria that compete with beneficial bacteria in the oral cavity due to poor maintenance of oral hygiene and significant environmental changes. For instance, increasing sugar consumption combined with increased acid generation by cariogenic microorganisms causes caries by tipping the balance in favour of caries-causing germs like mutans streptococci and other caries-causing microbes at the expense of bacteria linked to health problems.[13-17] Plaque buildup in gingivitis causes an increase in gingival crevicular fluid flow, which provides several periodontopathic microorganisms with vital nutrients. The site becomes more anaerobic due to the subgingival microflora's metabolism, and as a result of increasing colonization of disease-causing bacteria and proteolysis, the local pH rises. Therefore, the doctor should develop a three-pronged strategy for the prevention of oral diseases: Three strategies are suggested: (a) enhance oral hygiene; (b) directly target pathogenic bacteria; and (c) maintain the oral environment by avoiding risky behaviours.[13,14] Dental plaque gets accumulated at clean areas of the teeth, making these sites susceptible to disease. Patient motivation is of utmost importance in mechanical plaque control. Comprehensive mechanical and oral hygiene practices can help reduce dental biofilm, even though it cannot be completely eradicated.[18-20] It is commonly acknowledged that the best defense against dental disorders linked to oral biofilms is consistent brushing of teeth and the use of various mechanical devices. Because mechanical plaque control has not proven to be helpful, patients may benefit further from chemotherapy-induced antiplaque medicines. The antiplaque agents can decrease the rate of new plaque accumulation, decrease or remove existing plaque, suppress the growth of pathogenic microflora, or inhibit the production of virulence factors.[21-24]

The results of this study showed that OCT and CHX are effective in controlling plaque8 and reducing periodontal inflammation. From baseline to 90 days, clinical markers demonstrated a considerable reduction. At a dose of 0.1%, OCT demonstrated complete suppression of plaque growth over an extended period of time.[25,26] Both groups showed a substantial decrease in pocket depth but not in clinical attachment level when mean clinical attachment levels were compared within groups; however, significant changes were observed when mean clinical attachment levels were compared between groups. This could be caused by a reduction in GBI and plaque, which would lessen tissue inflammation. The assessment of the microbiome's study limitations was overlooked.

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