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## ORIGINAL RESEARCH

### Comparison of 0.1% Octeinidine Dihydrochloride With 0.2% Chlorhexidine on Dental Plaque, Gingivitis, Stain and Taste Perception among Young Adults – A Randomized Controlled Trial

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#### ABSTRACT:

**Aims & objectives:** The present study was undertaken for comparing efficacy of 0.1% octeinidine dihydrochloride with 0.2% chlorhexidine on dental plaque, gingivitis, stain and taste perception among young adults. **Materials & methods:** A total of 60 patients were included and were randomly divided into 2 equal groups: Group A (n=30): patients, who had undergone oral prophylaxis, were advised to regularly use 0.1% octeinidine dihydrochloride mouthwash (twice daily) and brush (twice daily), and Group B (n=30): patients who had undergone oral prophylaxis, were advised to regularly use 0.2% chlorhexidine mouthwash (twice daily) and brush (twice daily). The gingival status was assessed by the using Loe and Silness index, and dental plaque by using Silness and Loe index. Plaque index and gingival index was recorded at baseline and after 21 days whereas Modified Lobene index was used to record staining of tooth. The staining of tooth was recorded at baseline and after 21 days. A 5 item questionnaire was also used to assess patients self – assessment regarding the taste perception of prescribed mouthwashes. **Results:** On comparison between the groups, the mean Plaque score at baseline was found to be statistically non-significant, whereas after 21 days no significant difference was found. While comparing means Plaque score after 21days, significant difference was found within the groups. On comparing mean gingival Index at baseline both Groups showed statistically non-significant result, whereas after 21 days no significant difference was observed in both the groups. The results of taste perception rating included questions on: the taste perception, duration of taste, alteration in taste perception, and convenience in using and duration of rinsing time which was found to be statistically non-significant in both the groups while the effect of taste on food and drink shows statistically significant result. **Conclusion:** From the above results, the authors concluded that 0.1% octeinidine dihydrochloride is a better mouth rinse than chlorhexidine.

**Key words:** Chlorhexidine, Octeinidine dihydrochloride, Gingivitis

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#### INTRODUCTION

Antiseptic mouth rinse solutions are used in many clinical situations for different prophylactic and therapeutic purposes. It is difficult to decide which product is suitable for a particular purpose because of the variations of the antimicrobial efficacy and kinetics of the solutions.<sup>1</sup> The main indications are either the improvement of dental health (plaque and gingivitis elimination in particular) or the prevention of infections caused by bacteria of the oral cavity in specific situations such as tooth extraction, intraoral surgical procedures or immuno-suppression due to cancer therapy or transplantation.<sup>1-3</sup>

The removal of plaque is the main key of prevention and the first step in treatment of periodontal disease. There are physical and chemical approaches for controlling the plaque where the former is more common and cost-effective but because of its dependence to individuals hand skill it cannot be reliable all the time, so the use of chemical methods as a complementary way has been demonstrated to meet the adequate plaque control. Chlorhexidine gluconate is the most effective anti-plaque agent. Unfortunately, it has side effects, unpleasant taste and tooth staining. Octeinidine dihydrochloride is a broad spectrum topical anti-microbial agent. It inhibits plaque

formation and dental caries in rats, primates and human.<sup>4</sup>  
<sup>6</sup> Hence; the present study was undertaken for comparing efficacy of 0.1% octeinidine dihydrochloride with 0.2% chlorhexidine on dental plaque, gingivitis, stain and taste perception among young adults.

## MATERIALS & METHODS

The present study was conducted in the department of Public Health Dentistry among 60 patients aged 18 to 25 years. The subjects included in the study are having age  $\geq 18$  years and have more than 16 natural teeth present in their oral cavity, whereas subjects having severe systemic diseases (e.g., diabetes, hepatitis, HIV, tuberculosis, cancer); the presence of orthodontic appliances or removable dentures; antibiotic therapy; current users of tobacco in any form; hypersensitivity or allergy to the test product were excluded. Subjects who have signed written informed consent and fulfill the eligibility criteria were recruited in this study. Before conducting the study ethical approval was taken through Institutional Ethical Review Board of Kothiwal Dental College and research centre.

All of the 60 patients were randomly divided into 2 equal groups:

- Group A (n=30): patients, who had undergone oral prophylaxis, were advised to regularly use 0.1% octeinidine dihydrochloride mouthwash (twice daily) and brush (twice daily)
- Group B (n=30): patients who had undergone oral prophylaxis, were advised to regularly use 0.2% chlorhexidine mouthwash (twice daily) and brush (twice daily)

Before the commencement of the study, the intraexaminer reliability was determined on a randomly selected group of 6 patients. The kappa value for intraexaminer reliability was found to be 0.91.

The gingival status was assessed by the using Loe and Silness index, and dental plaque by using Silness and Loe index. Plaque index and gingival index was recorded at baseline and after 21 days whereas Modified Lobene

index was used to record staining of tooth. The staining of tooth was recorded at baseline and after 21 days. A 5 item questionnaire was also used to assess patients self – assessment regarding the taste perception of prescribed mouthwashes. All the results were recorded in Microsoft excel sheet and were analysed by SPSS software.

## RESULTS

The study was conducted among a sample of 60 patients, 25males and 35females. On comparison between the groups, the mean Plaque score at baseline was found to be statistically non-significant (p-value=0.096), whereas after 21 days no significant difference was found (p-value=0.093). While comparing means Plaque score after 21days, significant difference was found (p-value=0.001) within the groups.

On comparing mean gingival Index at baseline both Groups showed statistically non- significant result (p-value=0.383), whereas after 21 days no significant difference was observed in both the groups (p-value=0.429). While comparing mean gingival score within the groups, significant difference were observed by day 21.

On comparison of mean staining score at baseline both Groups showed statistically significant result (p-value=0.000), whereas after 21 days also significant difference was observed in both the groups (p-value=0.000). On comparing mean stain score within the groups, significant difference in staining scores were observed by day 21(p-value=0.000) as shown in (Table).

The results of taste perception rating included questions on: the taste perception, duration of taste, alteration in taste perception, convenience in using and duration of rinsing time which was found to be statistically non-significant in both the groups while the effect of taste on food and drink shows statistically significant result (p-value=0.001).

**TABLE 1:** Comparison of mean plaque; gingival and staining score between baseline and after 21 days in octeinidine dihydrochloride and chlorhexidine groups

Index Scores	Duration	Octeinidine	Chlorhexidine	P – Value
Plaque	Baseline	1.43(±0.71)	1.85(±0.55)	0.096
	21 Days	0.73 (± 0.54)	1.04(± 0.51)	0.093
Gingival	Baseline	1.31 (± 0.43)	1.30 (± 0.58)	0.383
	21 Days	0.59 (± 0.49)	0.64 (± 0.29)	0.429
Stain	Baseline	0.00	0.00	0.000
	21 Days	0.05(±0.10)	1.12 (±0.36)	0.000

**TABLE 2:** Comparison on mean plaque score, gingival score and stain index within 0.1% octenidine dihydrochloride group

Index	Duration	Mean Score (S.D)	P- Value
Plaque	Baseline	1.43(±0.71)	0.000*
	21 DAYS	0.73 (±0.54)	
Gingival	Baseline	1.31 (±0.43)	0.000*
	21 DAYS	0.59 (±0.49)	
Stain	Baseline	0.00	0.000*
	21 DAYS	0.05(±0.10)	

\*: Significant

**TABLE 3:** Comparison on mean plaque score, gingival score and stain index within 0.2% chlorhexidine group

Index	Duration	Mean Score (S.D)	P- Value
Plaque	Baseline	1.85(±0.55)	0.000*
	21 Days	1.04 (±0.51)	
Gingival	Baseline	1.30 (±0.58)	0.000*
	21 Days	0.64 (±0.49)	
Stain	Baseline	0.00	0.000*
	21 Days	1.12 (±0.36)	

\*: Significant

**TABLE 4:** Comparison of variables related to taste perception

Parameter		Chlorhexidine	Octenidine	P-Value
Taste Of The Product	Good	16.67%(5)	16.67%(5)	0.803
	Normal	23.33%(7)	16.67%(5)	
	Bad	60%(18)	66.66%(20)	
Duration Of Taste	Long	73.33%(22)	73.33%(22)	1.000
	Short	26.67%(8)	26.66%(8)	
Effect Of Taste On Food & Drink	Good	23.33%(7)	56.66%(17)	0.008*
	Bad	76.67%(23)	43.33%(13)	
Convinnence	Convinnent	60%(18)	60%(18)	0.121
	Non-Convinnent	40%(12)	40%(12)	
Rinsing Time	Long	80%(24)	33.33%(10)	0.118
	Short	20%(6)	66.66%(20)	

\*: Significant

## DISCUSSION

Numerous chemical agents have been developed so far, chlorhexidine (CHX) as a gold standard appears to be the most effective antimicrobial agent for reduction of both plaque and gingivitis. Its effectiveness can be attributed to its bactericidal and bacteriostatic effects and its substantivity within the oral cavity (8 h after rinsing). However, the adverse-effects of CHX limit the long-term use of this antiseptic agent and include taste alteration, excess formation of supragingival calculus, soft-tissue lesions in young patients, allergic responses, and staining of teeth and soft tissues. This kind of discoloration especially in the interproximal areas, and tongue are often caused by a precipitation reaction between tooth-bound chlorhexidine and chromogens from food or beverages.<sup>5-8</sup> Octenidine dihydrochloride was developed at the Sterling Winthrop Research Institute as a potential topical antimicrobial agent. In a previous study this compound was found to be effective in inhibiting the growth of plaque forming bacteria and in reducing the development of plaque in experimental animals.<sup>7-9</sup> Hence; the present study was undertaken for comparing efficacy of 0.1% octenidine dihydrochloride with 0.2% chlorhexidine on dental plaque, gingivitis, stain and taste perception among young adults.

In the present study, on comparison between the groups, the mean Plaque score at baseline was found to be statistically non-significant (p-value=0.096), whereas after 21 days no significant difference was found (p-value=0.093). While comparing means Plaque score after 21days, significant difference was found (p-value=0.001) within the groups. Lorenz K et al assessed the impact of different concentrations of an octenidine dihydrochloride mouthwash on salivary bacterial counts. Rinses of 0.10, 0.15, and 0.20% OCT were compared to a saline placebo rinse regarding the reduction of salivary bacterial counts (SBCs) in 90 gingivitis patients over 4 days. Changes in plaque (PI) and gingival index (GI), taste perception, and safety issues were evaluated. At baseline, the first OCT (0.10, 0.15, 0.20%) rinse resulted in a decrease of SBC (reduction by 3.63-5.44 log<sub>10</sub> colony forming units [CFU]) compared to placebo (p < 0.001). Differences between OCT concentrations were not verified. After 4 days, the last OCT rinse again resulted in a significant SBC decrease (3.69-4.22 log<sub>10</sub> CFU) compared to placebo (p < 0.001). Overall, SBC reduction between baseline and day 4 was significantly higher in OCT 0.15 and 0.20% groups compared to OCT 0.10% and placebo. Due to its low toxicity and pronounced antibacterial properties, octenidine dihydrochloride (OCT) is a

promising candidate for the use in antiseptic mouth rinses.<sup>10</sup>

In the present study, on comparing mean gingival Index at baseline both Groups showed statistically non-significant result (p-value=0.383), whereas after 21 days no significant difference was observed in both the groups (p-value=0.429). While comparing mean gingival score within the groups, significant difference were observed by day 21. On comparison of mean staining score at baseline both Groups showed statistically significant result (p-value=0.000), whereas after 21 days also significant difference was observed in both the groups (p-value=0.000). On comparing mean stain score within the groups, significant difference in staining scores were observed by day 21. Robrish et al also reported that OCT had a more persistent antimicrobial effect on the organisms in plaque than that obtained by CHX. Dogan et al in their in vitro and in vivo study compared the short-term relative antibacterial effects of OCT and CHX. Although, the initial antimicrobial activities of OCT and CHX are comparable, but because of better persistent antimicrobial activity of octenidine, we may suggest that OCT has promising effect on Mutans streptococci and Lactobacilli. Therefore, octenidine can be a better alternative for mouth rinse in comparison to chlorhexidine.<sup>11, 12</sup>

In the present study, the results of taste perception rating included questions on: the taste perception, duration of taste, alteration in taste perception, convenience in using and duration of rinsing time which was found to be statistically non-significant in both the groups while the effect of taste on food and drink shows statistically significant result (p-value=0.001). Dogan AA et al determined the absolute and relative antibacterial activity of octenidine dihydrochloride (OCT) against total and cariogenic bacteria in saliva samples of patients with fixed orthodontic appliances during 5 days of usage. The study group consisted of 5 male and 13 female subjects who were selected from patients in the Clinic of Orthodontics. Each patient was given physiologic saline (PS), chlorhexidine gluconate (CHX), polyvinylpyrrolidone-iodine complex (PVP-I), and OCT every morning for 5 days, each separated by a 2-week interval. Total and cariogenic bacteria in saliva samples of orthodontically treated patients with fixed appliances were collected during 5 days of usage. OCT showed an ultimate reduction of total viable oral bacteria, Lactobacillus species, and Streptococcus mutans in vivo. OCT also had a significantly greater inhibitory effect than 0.2% CHX and 7.5% PVP-I, from the beginning of the study until the fifth day after the orthodontic appliances were bonded. OCT compared favorably with respect to CHX and PVP-I complex in orthodontically treated patients with fixed appliances.<sup>13</sup>

## CONCLUSION

From the above results, the authors concluded that 0.1% octenidine dihydrochloride is a better mouth rinse than chlorhexidine. However; further studies are recommended.

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