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### RESEARCH ARTICLE

#### TO EVALUATE THE EFFICACY OF SUB GINGIVAL IRRIGATION WITH OCTENIDOL AND CHLORHEXIDINE ON PERIODONTAL INFLAMMATION.

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#### Abstract

**Background:** To evaluate the efficacy of octenidol and Chlorhexidine in periodontal pockets and the practicability of patient self therapy by using sub gingival irrigation.

**Methodology:** 40 subjects with periodontal pockets (4-6mm) were enrolled and 30 were responded to treatment, divided randomly into 2 groups (Group 1 octenidol & Group 2 Chlorhexidine). Prior to scaling all clinical parameters (SBI, PI, PD & CAL) were recorded. Sub gingival irrigation done in both groups at 0,7,14 days on premolars and molars. Data were analyzed by SPSS (p<0.05).

**Results:** A significant reduction in periodontal inflammation and clinical parameters from base line to 14days were observed and maintained for 21 days without irrigation. When intergroup comparisons were made no statistical significance was observed in all clinical parameters except for sulcus bleeding index (SBI) showed highly significant difference in octenidol group.

**Conclusion:** sub gingival irrigation with octenidol and Chlorhexidine are effective in reducing periodontal inflammation and in controlling sub gingival plaque. Intermittent treatment of this kind by the patient at home might reduce to more manageable levels, the frequency of hygiene visits and the need for rigorous interdental oral hygiene.

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#### Introduction:-

The primary etiological factor for inflammatory periodontal disease is bacterial plaque. So the principal goal in the prevention of inflammatory periodontal disease is removal of bacterial plaque.<sup>1</sup> Various Mechanical and chemical

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methods are available presently for treating periodontal diseases. However, antibiotics appear to reduce the severity of gingivitis and may be useful in managing some form of periodontitis. Based on potential problems associated with the prolonged use of systemic antibiotics for controlling plaque, a wide variety of studies have been directed to topical or sub gingival debridement of antimicrobial agents. These agents can control colonization of the teeth by oral microorganisms which will prevent the development of gingivitis and further progression of periodontitis.<sup>2</sup>

Chlorhexidine has long been used as an antiplaque agent on the basis of the non-specific plaque hypothesis.<sup>3</sup> Sub gingival application of Chlorhexidine may lead to changes in the sub gingival flora which selectively decreases the re-establishment of a pathogenic flora.<sup>4</sup> So that Chlorhexidine may be used as a chemical agent adjunct to mechanical therapy.

Ocetidine (N,N'-(1,10-Decanediyldi-1 (4H)- pyridinyl-4-ylidene) bis-[1-octanamine] dihydrochloride), a new bispyridine compound developed by the Sterling-Winthrop Research Institute.<sup>2</sup> It appears to possess substantial antiplaque activity. In monkeys, daily topical administration of octenidine resulted in a significant reduction of plaque accumulation over a seven day period (**Emilson et al 1980**).<sup>5</sup> Ocetidol is a highly effective bactericide against the leading germ group of infectious diseases of the periodontitis and gingivitis types, otherwise known as odontogenic infections. It is used for the regeneration of inflammatory diseases in the oral cavity and for daily application at home with restricted oral hygiene capacity. With its active ingredient Ocetidine, it inhibits bacteria rapidly and persistently, prevents them from forming again and ensures healthy oral flora.<sup>6</sup>

Ocetidol is superior over Chlorhexidine in Supportive treatment of Multi-resistant Staphylococcus aureus (**MRSA**). It does not discolor the teeth and it is alcohol free. So the present study is undertaken to evaluate the efficacy of sub gingival irrigation with octenidol and Chlorhexidine on periodontal inflammation.<sup>7</sup>

### **Methodology:-**

A total sample of 30 patients with periodontal pockets (4-6mm) was selected from the Out patients, Department of Periodontics, Lenora institute of dental sciences, Rajahmundry, Andhrapradesh. The sample of the study was randomly divided into 2 groups, one of which received octenidol and other received Chlorhexidine. All of them were instructed to brush their teeth once daily and none had received any instructions in interdental cleaning aids. The study was approved by Ethical Committee, Lenora Institute of Dental Sciences.

Prior to scaling all clinical parameters including: Sulcus bleeding Index (SBI) (Muhlemann & Son 1971), Pocket depth (PD), Plaque Index (PI) (Silness & Loe 1964) and Clinical attachment level (CAL) were recorded. Test sites were in relation to approximal surfaces of premolars and molars. The present study was based on the following inclusion and exclusion criteria after obtaining informed consent from the patients.

### **Inclusion criteria:-**

- Patients with age group of 20-50 years.
- Patients with at least 26 natural teeth with diagnosis of chronic gingivitis with localised periodontitis are enrolled in the study.
- Patients with pocket depth 4-6mm in premolars and molars were included in this study.

### **Exclusion criteria:-**

- Patients with systemic diseases and orthodontic bands.
- Patients who were sensitivity to mouth wash.
- Patients who were receiving systemic antibiotics in last six months.

The irrigation device consisted of 10ml disposable plastic syringe and blunt plastic tips as showed in figure 1. The irrigation solution used is either 0.2% Chlorhexidine gluconate solution or 0.1% octenidol solution. These were supplied in identical bottles, distinguishable only by a random code number. The key to the code remained unbroken until all the data had been collected. Irrigation device

The teeth to be treated were shown and periodontal pocketing explained briefly to the patient. They were shown how to assemble and use the irrigation device. With 10ml of solution in the syringe, the investigator inserted the needle gently into the pocket until resistance was felt, without causing discomfort to the patient. About 1ml of solution was deposited into each pocket by the patient themselves without any injury to the tissues<sup>8</sup> as shown in figure 2. An

individual irrigation technique was checked on day 7 and if any fault should be corrected. Except on days 0 and 7, pockets were irrigated by the patient once only at night for 14 days. At day 21, irrigation devices and solutions were taken from the patient. Clinical parameters were assessed at 0,7,14 and 21 days.

Analyses were performed using commercially available software (SPSS). Mann Whitney U test were carried out for inter group comparisons<sup>7</sup> and Paired t test used for analyzing intra group comparisons<sup>7</sup>. The null hypothesis was rejected at the 0.05 level of significance.

**Figure 1:-** Irrigation Devices and Blunt Plastic Tips for Sub gingival irrigation.



**Figure 2:-** Technique of Sub Gingival Irrigation



### **Results:-**

The study was conducted with a sample of 40 patients, in that 30 were responded to treatment. The study sample was randomly divided into two Groups for sub gingival irrigation (Group1- octenidol and Group 2- Chlorhexidine).

When comparison of means of Sulcus Bleeding Index (SBI) in both Groups: Octenidol group has higher reduction of mean SBI than Chlorhexidine group and continued until day 21 ( $P=0.000$ ) as shown in (Table 1). When comparing means of SBI within the groups, there was significant reduction from baseline to 7 days and this reduction was greatest by day 21 ( $P<0.001$ ) as shown in (Table 1a&1b).

When comparison of means of Plaque Index (PII) in both Groups: octenidol group showed significant improvement by day 7 ( $P<0.001$ ). However, day 14 and 21 no significant difference was observed in both the groups as shown in

(Table 2). When comparing means of PII within the groups, there was significant reduction in PII scores were observed by day 21 ( $P < 0.001$ ) as shown in (Table 2a & 2b).

When mean Probing depth (PD) values were compared in between the groups there was no significant difference was observed as shown in (Table 3). When mean PD was compared within the groups, both groups showed significant PD reduction from baseline to 21 days ( $P < 0.001$ ) as shown in (Table 3a & 3b).

When comparison of means of Clinical attachment levels (CAL) in between the groups there was no significant difference was observed by day 7 and day 21, but the difference was significant by day 14 in octenidol group as shown in (Table 4). When Comparing means of CAL within the groups: highly significant difference was observed from day 0 to day 21 ( $P < 0.001$ ) as shown in (Table 4a & 4b).

**Table 1:-** Comparison of Means of Sulcus bleeding index (SBI) between Group I and Group II

Sulcus bleeding index (SBI)					
DAY	GROUP I	GROUP II	Difference	Z value	P value
	MEAN±SD	MEAN±SD	MEAN±SD		
0	2.75±0.45	2.53±0.52	0.22±0.07	-1.240	0.215 NS
7	1.13±0.34	1.87±0.35	0.74±0.01	-4.062	0.000 S
14	0.63±0.50	1.53±0.52	0.90±0.02	-3.730	0.000 S
21	0.13±0.34	0.73±0.59	0.60±0.25	-3.062	0.002 S

Statistical Analysis: Mann Whitney U test.

Statistically significant if  $P < 0.05$

**Table 1a:-** Comparison of Means of Sulcus Bleeding Index (SBI) In Group I with Different Time Periods.

sulcus bleeding index (SBI)					
DAY	GROUP I : Day 0	GROUP I	Difference	t value	P value
	MEAN±SD	MEAN±SD	MEAN±SD		
7	2.75±0.45	1.13±0.34	1.63±0.11	13.000	<0.001 S
14		0.63±0.50	2.13±0.05	13.729	<0.001 S
21		0.13±0.34	2.63±0.11	21.000	<0.001 S

Statistical Analysis: Paired t test.

Statistically significant if  $P < 0.05$

**Table 1b:-** Comparison of Means of Sulcus Bleeding Index (SBI) In Group II with Different Time Periods.

Sulcus bleeding index (SBI)					
DAY	GROUP II: Day 0	GROUP II	Difference	t value	P value
	MEAN±SD	MEAN±SD	MEAN±SD		
7	2.53±0.52	1.87±0.35	0.66±0.17	5.292	<0.001 S
14		1.53±0.52	1.00±0.00	10.247	<0.001 S
21		0.73±0.59	1.80±0.17	16.837	<0.001 S

Statistical Analysis: Paired t test.

Statistically significant if  $P < 0.05$

**Table 2:-** Comparison of Means of Plaque index (PII) between Group I and Group II.

Plaque index (PII)					
DAY	GROUP I	GROUP II	Difference	Z value	P value
	MEAN±SD	MEAN±SD	MEAN±SD		
0	2.31±0.48	2.60±0.51	0.29±0.03	-1.581	0.114 NS
7	1.13±0.34	1.73±0.59	0.60±0.25	-3.331	0.001 S
14	1.00±0.00	1.20±0.41	0.20±0.41	-1.852	0.064 NS
21	1.00±0.00	1.00±0.00	0.00±0.00	0.000	1.000 NS

Statistical Analysis: Mann Whitney U test.

Statistically significant if  $P < 0.05$

**Table 2a:-** Comparison of Means of Plaque index (PII) in Group I with different time periods.

Plaque index (PII)					
DAY	GROUP I : Day 0	GROUP I	Difference	t value	P value
	MEAN±SD	MEAN±SD	MEAN±SD		
7	2.31±0.48	1.13±0.34	1.19±0.14	11.783	<0.001 S
14		1.00±0.00	1.31±0.48	10.967	<0.001 S
21		1.00±0.00	1.31±0.48	10.967	<0.001 S

Statistical Analysis: Paired t test.  
Statistically significant if P<0.05

**Table 2b:-** Comparison of Means of Plaque index (PII) in Group II with different time periods.

Plaque index					
DAY	GROUP II: Day 0	GROUP II	Difference	t value	P value
	MEAN±SD	MEAN±SD	MEAN±SD		
7	2.60±0.51	1.73±0.59	0.87±0.00	4.516	<0.001 S
14		1.20±0.41	1.40±0.00	10.693	<0.001 S
21		1.00±0.00	1.60±0.00	12.220	<0.001 S

Statistical Analysis: Paired t test.  
Statistically significant if P<0.05

**Table 3:-** Comparison of Means of Probing depth (PD) between Group I and Group II.

Probing depth (PD)					
DAY	GROUP I	GROUP II	Difference	Z value	P value
	MEAN±SD	MEAN±SD	MEAN±SD		
0	6.19±0.75	5.73±0.59	0.46±0.16	-1.774	0.076 NS
7	4.25±0.58	4.07±0.46	0.18±0.12	-1.020	0.308 NS
14	3.31±0.48	3.40±0.51	0.09±0.03	-.501	0.617 NS
21	3.19±0.40	3.00±0.38	0.19±0.02	-1.299	0.194 NS

Statistical Analysis: Mann Whitney U test.  
Statistically significant if P<0.05

**Table 3a:-** Comparison of Means of Probing depth (PD) in Group I with different time periods.

Probing depth (PD)					
DAY	GROUP I : Day 0	GROUP I	Difference	t value	P value
	MEAN±SD	MEAN±SD	MEAN±SD		
7	6.19±0.75	4.25±0.58	1.94±0.17	13.508	<0.001 S
14		3.31±0.48	2.88±0.27	15.999	<0.001 S
21		3.19±0.40	3.00±0.35	16.432	<0.001 S

Statistical Analysis: Paired t test.  
Statistically significant if P<0.05

**Table 3b:-** Comparison of Means of Probing depth (PD) in Group II with different time periods.

Probing depth (PD)					
DAY	GROUP II: Day 0	GROUP II	Difference	t value	P value
	MEAN±SD	MEAN±SD	MEAN±SD		
7	5.73±0.59	4.07±0.46	1.66±0.00	13.229	<0.001 S
14		3.40±0.51	2.33±0.00	12.486	<0.001 S
21		3.00±0.38	2.73±0.00	23.127	<0.001 S

Statistical Analysis: Paired t test.  
Statistically significant if P<0.05

**Table 4:-** Comparison of Means of Clinical attachment level (CAL) between Group I and Group II.

Clinical attachment level (CAL)					
DAY	GROUP I	GROUP II	Difference	Z value	P value
	MEAN±SD	MEAN±SD	MEAN±SD		
0	6.63±0.62	6.13±0.64	0.50±0.02	-1.960	0.050 NS
7	4.38±0.89	4.33±0.62	0.05±0.27	-.592	0.554 NS
14	3.25±0.45	3.67±0.62	0.42±0.17	-2.012	0.044 S
21	3.19±0.66	3.47±0.52	0.28±0.14	-1.188	0.235 NS

Statistical Analysis: Mann Whitney U test.

Statistically significant if P<0.05

**Table 4a:-** Comparison of Means of Clinical attachment level (CAL) in Group I with different time periods.

Clinical attachment level (CAL)					
DAY	GROUP I : Day 0	GROUP I	Difference	t value	P value
	MEAN±SD	MEAN±SD	MEAN±SD		
7	6.63±0.62	4.38±0.89	2.26±0.27	9.668	<0.001 S
14		3.25±0.45	3.38±0.17	18.781	<0.001 S
21		3.19±0.66	3.44±0.04	15.413	<0.001 S

Statistical Analysis: Paired t test.

Statistically significant if P<0.0

**Table 4b:-** Comparison of Means of Clinical attachment level (CAL) in Group II with different time periods.

clinical attachment level (CAL)					
DAY	GROUP II: Day 0	GROUP II	Difference	t value	P value
	MEAN±SD	MEAN±SD	MEAN±SD		
7	6.13±0.64	4.33±0.62	1.80±0.02	16.837	<0.001 S
14		3.67±0.62	2.46±0.02	12.854	<0.001 S
21		3.47±0.52	2.66±0.12	21.166	<0.001 S

Statistical Analysis: Paired t test.

Statistically significant if P<0.05

### Discussion:-

Sub gingival plaque control and removal is a fundamental objective of periodontal therapy. Conventional close debridement of sub gingival plaque from root surfaces can be effective, but is time consuming and technically demanding. It has been shown that the chance of failing to remove all of the sub gingival plaque increases in pocket depths greater than 4 mm. As sub gingival plaque accumulates and matures, periodontal breakdown can occur. Therefore, professional maintenance therapy may not always achieve complete or adequate debridement. This has led to the adjunctive use of antibacterial agents, usually in the form of irrigants or systemic antibiotics, to overcome the limited efficacy of the conventional treatment. The primary purpose of irrigation is to non-specifically reduce the bacteria and their by-products which prevent the initiation or progression of periodontal diseases.

In any case, insertion of an identical irrigation needle 3 mm inside a deep periodontal pocket is sufficient to irrigate the apical plaque border (**Hardy et al. 1982**).<sup>9</sup> In Our study patients were advised to carry out the irrigation procedure once daily at night for 14days. Blunt irrigation tips were given to prevent the injury and supervising the patients until they were able to irrigate the involved pockets without problems.

The results of the present study showed that sub gingival irrigation with octenidol and Chlorhexidine are effective in reducing periodontal inflammation and in controlling sub gingival plaque. A significant reduction in periodontal inflammation and clinical parameters from base line to 14days were observed and maintained for 21 days without irrigation.

On evaluation of mean sulcus bleeding index between the two groups were done Octenidol group has significant reduction of mean SBI than Chlorhexidine group. This reduction in clinical parameter up to 21<sup>st</sup> day in octenidol

group may be attributed to well known antimicrobial effects of octenidol and resolution of gingival inflammation. This reduction in bleeding and improvement in gingival health of patients using 0.1% octenidine formulation was suggested by decreased gingival fluid. These results were in accordance with **Patters M R et al (1983)**<sup>2</sup> stated that Octenidol is a highly effective bactericide against the ten tested representatives in the leading germ group of infectious diseases of the periodontitis and gingivitis types.

When comparison of means of Plaque Index (PII) in both Groups: octenidol group showed significant improvement by day 7 than Chlorhexidine group. This is due to antiplaque activity of octenidol. At a 0.1% concentration, Octenidine appeared to completely inhibit plaque formation over a 7 day period. These results were in accordance with **Patters M R (1983)**<sup>2</sup> and **Emilson et al (1980)**<sup>5</sup>. However by day 14 and 21 no significant difference was observed in both the groups.

When mean probing depths and clinical attachment levels were compared in between the groups there was no significant differences was observed, where as when compared within the groups both groups had showed significant pocket depth reduction and clinical attachment level gain. This may be due to reduction in tissue inflammation by the decrease in plaque and sulcus bleeding index scores. This result goes in concurrence with **David L et al (1990)**.<sup>10</sup>

Limitations of the present study include: short sample size, short duration. Microbiological evaluation after sub gingival irrigation was not considered.

### **Conclusion:-**

0.1% octenidol and 0.2% Chlorhexidine applied directly to periodontal pockets reduces periodontal inflammation, even in the absence of effective interdental aids. The level of inflammation is maintained below baseline values for 3 weeks after the two week irrigation period in both the groups. In the light of our results it was stated that sub gingival irrigation with octenidol and Chlorhexidine are effective in reducing periodontal inflammation and in controlling sub gingival plaque. There was no difference found in all the parameters with both groups except for SBI which showed slightly superior effect for octenidol than Chlorhexidine, yet long term studies are to be conducted to know the efficacy and Substantivity of octenidol mouth rinse.

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