

EFFECT OF OZONATED OLIVE OIL GEL AND CHLORHEXIDINE GEL AS AN ADJUNCT TO SCALING AND ROOT PLANING IN CHRONIC PERIODONTITIS – A CLINICAL STUDY

Running Title: Effect of ozonated oil and chlorhexidine gel with SRP

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ABSTRACT

INTRODUCTION :Chronic periodontitis is an infectious condition that causes inflammation in the teeth's supporting tissues, as well as attachment loss and bone loss. To prevent gingivitis and its progression into periodontitis, many chemotherapeutic drugs have been developed. Periodontitis can be managed with a variety of treatments, including both traditional and innovative therapies. The use of ozonated olive oil for periodontal infection control has been suggested in studies..

OBJECTIVE: The goal of this study was to see how well ozonated olive oil gel and chlorhexidine gel worked in conjunction with SRP to treat chronic periodontitis.

MATERIALS AND METHOD : From the Department of Periodontics at Saveetha Dental College in Chennai, a total of 20 participants with localised chronic periodontitis (4-6mm) were chosen. With 10 subjects in each group, they were randomly assigned to the test or ozonated oil group (Group I) or the control or chlorhexidine gel group (Group II). At the beginning and after 21 days, clinical parameters such as probing depth and clinical attachment loss were assessed.

RESULTS : There were statistically significant differences between the ozonated oil (Group I) and chlorhexidine gel (Group II) groups. The change of probing depth from 5.5 ± 0.68 to 2.2 ± 0.63 in case of test group and in control group it is from 5.5 ± 0.68 to 2.3 ± 0.69 (TABLE 1) and clinical attachment loss from 5.4 ± 0.65 to 3.5 ± 0.65 in case of test group and in control group it is from 5.3 ± 0.69 to 3.2 ± 0.63 (P 0.001 in both). However, the difference in probing depth and clinical attachment loss between Group I and Group II at the conclusion of the study period was not statistically significant.

CONCLUSIONS: In individuals with chronic periodontitis, the therapeutic efficiency of chlorhexidine gel and ozonated oil, as well as scaling and root planing, was found to be comparable.

KEYWORDS :Chlorhexidene gel. Chronic periodontitis, scaling and root planning, ozonated oil.

INTRODUCTION:

Periodontitis affects the tooth-supporting mechanisms like the periodontal ligament and the alveolar socket support[1]. Periodontal disease is due to the build up of various metabolic products of the bacteria towards the root surface, which demonstrated by the apical migration of the junctional epithelium along the root surface, gingival crevice deepening, and resulting in periodontal pockets and loss of attachment, which is been the hallmark lesion of periodontal disease. Periodontitis is caused by a number of different microbiological infections[2]. The causative role of *P. gingivalis* in the course of adult periodontitis has long been recognised. *P. gingivalis* is a well known pathogen characteristics that allow it to form the disease.[3,4].

The main goal of treatment for persons with chronic periodontitis is to prevent the disease from progressing and to reduce inflammation[5]. Nonsurgical periodontal therapy or surgical periodontal therapy [6,7] and the Antimicrobial medications are a popular issue, and they may be beneficial in addition to mechanical therapy[8]. Systemic or local drug delivery characterises the mode of administration of these additional medications.[9]. For local administration, the subgingival irrigation technique n, It is possible to use various certain chemical agents at the gingival crevice or pocket directed below the gingival margin at the time of delivery[10]. Antimicrobial agents such as chlorhexidine, hydrogen peroxide etc can be utilised..[11].

Chlorhexidine is the agent for chemical plaque management treatments due to its broad-spectrum antiseptic properties[12,13]. Chlorhexidine, on the other hand, is also avoided as it has a awful taste and tends to develop discolouration of the tooth.[14].

Ozone (O₃) is a gas that occurs naturally in the stratosphere in concentrations of 1–10 ppm, where it is constantly generated from and destroyed into molecular O₂. Because of its ability to filter UV rays, it is one of the most significant gases in the stratosphere, which is essential for the biosphere's biological equilibrium[15]. Ozonated olive oil which is been ozonised with a constant flow of ozone-oxygen in a 5:85 percent ratio until it converts from a greenish-colored liquid to a white gel condition [16,17]. Efficacy against Gram-positive and Gram-negative pathogens towards the periodontal structure has been shown in numerous studies [18]. Periodontology is most commonly used to treat gingivitis, periodontitis, prophylaxis etc.[19].

The main purpose of this study was to assess how successful it was to treat chronic periodontitis using ozonated olive oil gel and chlorhexidine gel in conjunction with SRP.

MATERIALS AND METHODS:

Saveetha Dental College's Department of Periodontics conducted the current research. A placebo-controlled, randomised, double-blind clinical trial was carried out. The study involved a total of 20 participants. The inclusion criteria were individuals with localised chronic periodontitis (4-6mm), patients aged 18–65 years old with clinical attachment loss, and willingness to offer consent. Patients taking antibiotics or receiving dental treatment in the previous 3–4 weeks, as well as those with any systemic disease, pregnant or lactating women, and periodontal diseases, were excluded. The institutional ethics committee gave its blessing to the project. At the outset, the patient's history was gathered and a full periodontal examination was conducted.

Group 1 SRP + subgingival chlorhexidine treatment (Control)

Group 2 Ozonated olive oil + SRP (Test).

Clinical criteria assessed were probing depth and clinical attachment loss. Ultrasonic scalers and Gracey curettes were used to perform SRP until the root surfaces were resistive to touch. A disposable 10 ml plastic syringe was used to irrigate the periodontal pocket at the end of the therapy using a sterile plastic syringe with a blunt tip which contains chlorhexidine and ozonated oil. The oil has been administered sub-gingivally were the excess oil was visible from the edge of the gingiva after the isolation of the teeth were done with cotton rollers and completely dried. This procedure was done for each tooth that needed to be extracted. To remove any surplus oil, a cotton roll was employed. At the time of application, supra-gingival brushing instructions were told. Importance of oral

hygiene was educated to all of the patients. At the end of 21 days, patients were checked again, and clinical data were obtained.

SPSS Software was used for statistical analysis. An independent t-test was used to compare the means of the parameters between the test and control groups at the beginning and at the end of 21 days. A paired t-test was used to analyse the change over time for each group of the considerable parameters, with p0.05 being statistically significant.

RESULTS:

The study shows, both the test and control groups improved on clinical measures of probing depth and clinical attachment loss. There were no significant side effects reported by patients who received periodontal therapy. The change of probing depth from 5.5 ± 0.68 to 2.2 ± 0.63 in case of test group and in control group it is from 5.5 ± 0.68 to 2.3 ± 0.69 (TABLE 1) and clinical attachment loss from 5.4 ± 0.65 to 3.5 ± 0.65 in case of test group and in control group it is from 5.3 ± 0.69 to 3.2 ± 0.63 (TABLE 2). When the test and group kept for control were compared, there was a difference in clinical markers such as PD and CAL at baseline and after 21 days which were statistically significant.(GRAPH 1,2)

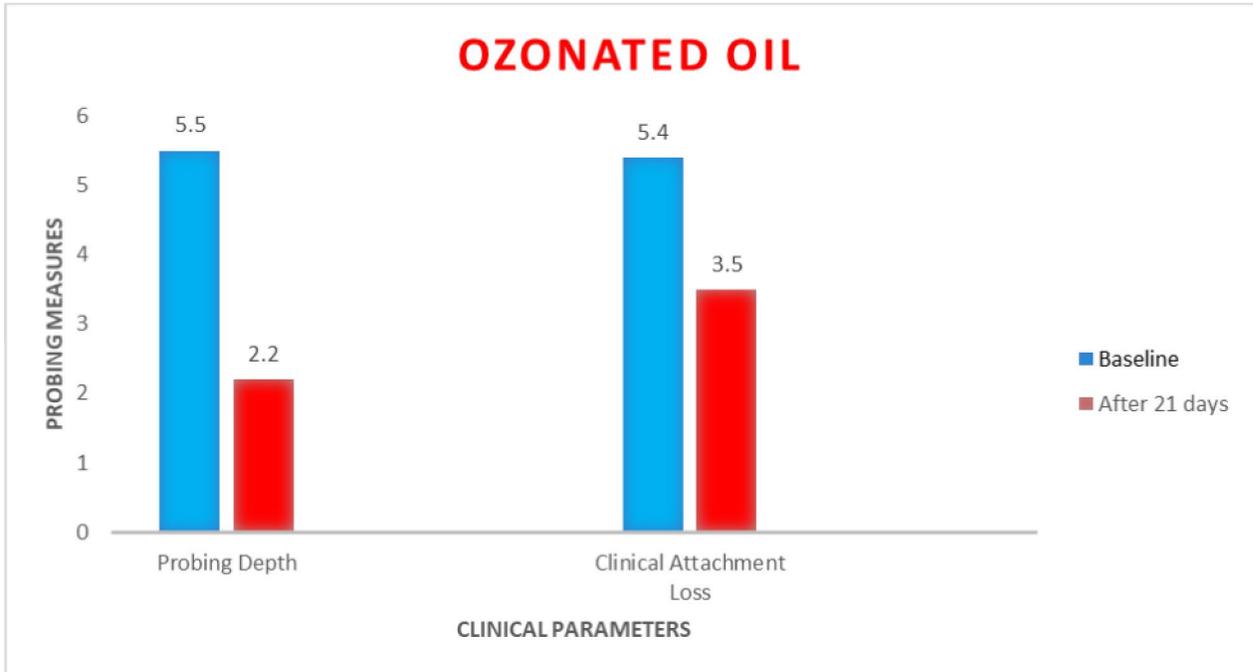
CLINICAL PARAMETER	GROUP NAME	SAMPLE SIZE	TIME OF ASSESSMENT	MEAN	STANDARD DEVIATION	P value
PROBING DEPTH	OZONATED OIL (TEST GROUP)	10	BASELINE	5.50	0.687	1.000
			AFTER 21 DAYS	2.20	0.632	0.442
	CHLORHEXIDINE (CONTROL GROUP)	10	BASELINE	5.50	0.687	1.000
			AFTER 21 DAYS	2.30	0.699	0.442

TABLE 1: Table showing the significant change of probing depth value from the baseline to the follow up after 21 days with test and control group

TABLE 2: Table showing the significant change of clinical attachment loss value from the baseline to the follow up after 21 days with test and control group

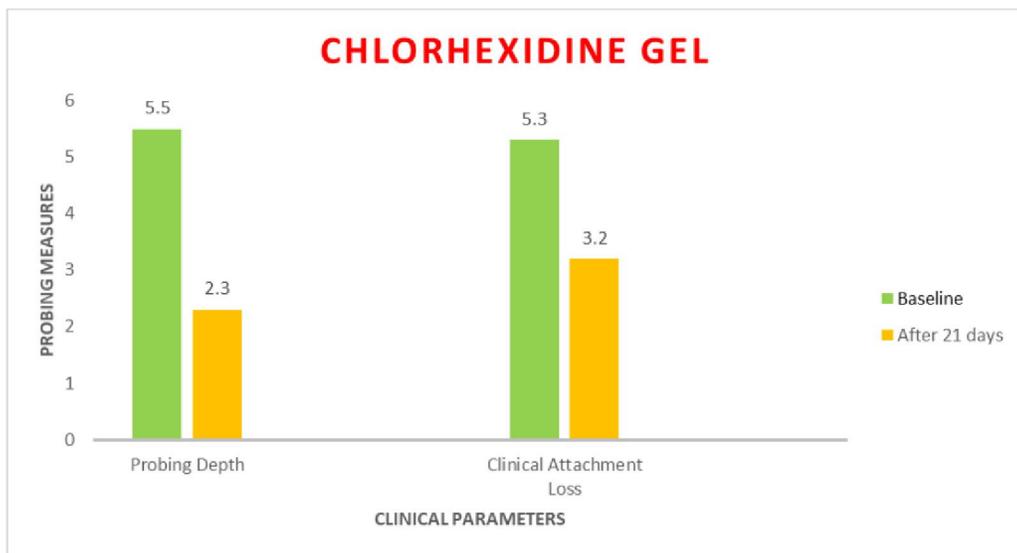
CLINICAL PARAMETER	GROUP NAME	SAMPLE SIZE	TIME OF ASSESSMENT	MEAN	STANDARD DEVIATION	P value
CLINICAL ATTACHMENT LOSS	OZONATED OIL (TEST GROUP)	10	BASELINE	5.40	0.655	1.000
			AFTER 21 DAYS	3.50	0.655	0.495

	CHLORHEXIDINE (CONTROL GROUP)	10	BASELINE	5.30	0.699	1.000
			AFTER 21 DAYS	3.20	0.632	0.495



GRAPH 1: Graph showing the effect of ozonated oil in the values of probing depth and clinical attachment loss from baseline to after 21 days

GRAPH 2: Graph showing the effect of chlorhexidine gel in the values of probing depth and clinical attachment loss from baseline to after 21 days



DISCUSSION:

In the mouth, periodontal disease is very complicated[20]. The involvement of microbes and their responses obtain from the host were more established. Periodontitis begins and progresses because of bacterial accumulations in the sub-gingival pockets [21]. Mechanical therapy helps in the sub-gingival bacteria removal. Due to a number of circumstances, like tooth surfaces, margins of restoration, and the periodontal pockets that are inaccessible, limit its effectiveness, the mechanical technique can be complemented with an antibacterial agent.[22]. Excision of contaminated tissues and modification of the environment to produce the ideal conditions for the rehabilitative process with diligent maintenance follow up are all part of the surgical therapy [23]. The non-surgical periodontal therapy is based on bacteriological results as well as the pathogenic microorganisms' sensitivity to antimicrobial medicines [24].

Chlorhexidine has grown in popularity as a significant mouth antibacterial and as a periodontal treatment adjunct[25]. It's a broad-spectrum antiseptic that Gram+ve& Gram-ve pathogens are all killed by it [28,29]. Ozonated oils are created when ozone reacts with unsaturated fatty acids in vegetable oils..[26,27].

The researchers wanted to see how treatment of *P. gingivalis* as a cause of chronic periodontitis with commercially available ozonated olive oil was found to be beneficial. Ozone can be delivered in several different ways. It becomes exceedingly unstable when it dissolves in water and decomposes swiftly through a complex chain of processes, making it impossible to store.[30].

From the baseline value to the value recorded after 21 days, both groups improved in critical clinical criteria such as probing depth and clinical attachment loss, according to the current study's findings. Both groups demonstrated statistically significant reductions in the mean value after 21 days in terms of bacteriological data.

Singlaet al.[31]conducted a research in which gingival massage was performed using It was discovered that chlorhexidine gel, can be utilised as preventative agents in preserving and developing a better oral health. Nagayoshiet al.[32] investigated the different ozone water concentrations effects (0.4, 2.1, and 4.1 mg/ml in distilled water) on the inactivation of cariogenic bacteria over time. In a study by Kshitish and Laxman [34], ozone irrigation resulted in a larger percentage plaque reduction (11%), gingival index (28%), and bleeding index (27%) when compared to chlorhexidine. The experimental groups, in contrast to the control groups, Patel et al. [26,36] reported found of ozonated olive oil in conjunction along with scaling and root planing treatment improved clinical and microbiological markers significantly over time.

In a study by Sorokina&Lukinych [33,35], which used a combination of irrigation done in the subgingival region and water, in which plaque growth was demonstrated to be minimised. This was attributable to the periodontium's powerful anti-inflammatory effects after ozone irrigation of periodontal pockets. A more beneficial strategy is to compare the whole surgical procedure of using ozonated olive oil vs. treatment of chronic periodontitis deep pockets along with the antibiotics. On the other hand, using ozonated olive oil as an adjuvant to scale and root planing treatment increased dentinal hypersensitivity significantly. Montevecchiet al.[27] discovered that against *S. aureus* and the periodontal infection *P. gingivalis* than chlorhexidine digluconate and povidone-iodine ozonated olive oil was more effective.

In the current study, we assessed the function of both the ozonated oil and chlorhexidine gel against the chronic periodontitis towards the study basis stated as well as the properties of ozone and chlorhexidine. The current study was single-centered, with data gathered over a specific time period. The study's main purpose was to perform extensive research in order to find a non-surgical periodontal therapy adjunct. Future research could take a multicenter approach, with a large sample size and people of various countries and ages.

CONCLUSION:

In individuals with chronic periodontitis, the therapeutic efficiency of chlorhexidine gel and ozonated oil, as well as scaling and root planing, was shown to be comparable.

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