

The Effects of Sub Gingival Application of Ozonated Olive Oil Gelatin Film in Patients with Chronic Periodontitis

Dr. C. P. Vijeyakumar¹, Dr. S. Thangakumaran², Dr. Sasikumar³,
Dr. Santhosh⁴

¹MDS, Senior Lecturer, Department of Periodontics, JKK Nattraja Dental College and Hospitals, Komarapalayam

²MDS, Ph.D., Professor and Head, Department of Periodontics, JKK Nattraja Dental College and Hospitals, Komarapalayam

³MDS, Associate Professor, Department of Periodontics, JKK Nattraja Dental College and Hospitals, Komarapalayam

⁴MDS, Associate Professor, Department of Periodontics, JKK Nattraja Dental College and Hospitals, Komarapalayam

Corresponding Author: Dr. C.P. Vijeyakumar

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ABSTRACT

This study evaluates the effects of sub gingival application of ozonated olive oil gelatin film as an adjunct to scaling and root planning in patients with chronic periodontitis.

Materials & methods: Thirty patients were randomly selected and equally divided into Group I received SRP only, group II received SRP and ozonated olive oil gelatin film. Subgingival application of ozone gel was performed following initial SRP and after 7 and 14 days. Clinical measurements included Probing pocket depth (PPD), plaque index (PI), gingival index (GI), Oral hygiene index-simplified (OHI-S) and clinical attachment level (CAL) were recorded at baseline and after 21 days.

Results: The results showed improvement in all clinical parameters in (group II) which was maintained up to 21 days (P<0.001).

Conclusion: The study concluded that Ozonated olive oil gelatin film could be a promising adjunct to SRP in the treatment of Chronic periodontitis.

Keywords: Ozone, Chronic periodontitis, SRP

INTRODUCTION

Periodontal disease has a multifactorial etiology. Elimination of periopathogens containing biofilms remains the primary goal of periodontal treatment. Although mechanical debridement such as scaling and root planning (SRP) reduces the level of sub-gingival bacteria, it does not eliminate all the pathogens which resides deep into the connective tissue.[1] For the shortcomings of systemic administration, local delivery systems containing antibiotic or antiseptic agents were introduced.[2] These systems allow the therapeutic agents to be delivered directly into the diseased site with no appreciable systemic effects.

In the past years, therapeutic effect of ozonated oil was attributed to its antibacterial, antifungal, antiviral, antiparasitic, antihypoxic, analgesic and immunomodulatory effects on biological systems. In dentistry ozone therapy can be used in various specialties. Particularly in periodontics the sub gingival ozonated oil application on human and animal models have been shown to improve cellular function, improve healing of tissue, and scavenge the defective tissue in the

biological system, promoting the healthy cells to survive and multiply more rapidly.[3] Apart from Ozonated oil, Ozonated olive oil [4] has a valuable antimicrobial activity against bacteria, fungi, viruses. Extra virgin olive oil [5] (EVOO) contains more than 36 phenolic compounds.

Although all of the phenolic compounds in EVOO have known beneficial effects, one specific compound known as oleocanthal, has been discovered to have powerful natural anti-inflammatory benefits.[6,7] Oleocanthal is unique only to olive oil and it has anti-inflammatory property. This property was homologous with the non-steroidal anti-inflammatory drug (NSAID) - Ibuprofen. NSAIDs have many known side effects such as gastric irritation, nausea, vomiting etc. But olive oil is a natural anti-inflammatory agent that can be safely consumed by anyone. Oleocanthal inhibits cyclooxygenase 1 and 2 (COX 1 & 2) enzymes in a dose dependent manner.

Based on the anti-inflammatory, anti-microbial, anti-oxidant properties of ozonated olive oil, the present study is conducted to evaluate the clinical effects of subgingival application of ozonated olive oil gelatin film as an adjunct to scaling and root planing in patients with chronic periodontitis

MATERIALS AND METHODS

A randomized, controlled, split mouth clinical study was conducted to evaluate the effectiveness of subgingival application of Ozonated olive oil gelatin film as an adjunct to scaling and root planing compared with scaling and root planing alone in patients with chronic periodontitis. The protocol was reviewed and approved by institutional ethical board.

The study related procedures were explained to the patients before they sign an informed consent form. A total of 30 subjects each with bilateral 5-6 mm probing pocket depth (PPD) were recruited from the outpatient in Department of Periodontics,

J.K.K. Nattraja Dental College and Hospitals, Kumarapalayam, Tamilnadu.

Criteria for Grouping:

Selected sites were randomly divided into control sites and experimental sites as follows. Group I consist of 30 sites, in which scaling and root planning was done (control sites). Group II consists of 30 sites, in which scaling and root planning was followed by the placement of the Ozonated olive oil gelatin film inside the pocket (Test sites).

Clinical parameters

The following variables were measured at baseline and at 21 days. Plaque index (PI) (Silness and Loe 1964) Gingival index (GI) (Loe and Silness 1963) Oral hygiene index-Simplified(OHI-S) (Greene and Vermillion 1964) Probing Pocket Depth (PPD) according to (Ramfjord, 1967) [8], Clinical attachment level (CAL) according to (Ramfjord, 1967). Non-surgical Periodontal therapy at baseline full mouth ultrasonic scaling was done. Under local anesthesia with 2% lignocaine solution (1:80,000), root planning was done in the test and control sites using area-specific double-ended Gracey curettes (Hu-Friedy).

The test site was isolated with cotton rolls to prevent contamination with saliva. The Ozonated olive oil gel was carried with a tweezer and placed in the periodontal pocket. The pocket opening was covered with Coe-Pak to retain the material in the pocket, as well as to prevent the ingress of oral fluids. Oral hygiene maintenance instructions were given. Subjects were recalled at 7th and 14th day for application of Ozonated olive oil gelatin film. Clinical parameters were repeated after 21 days.

Gel application

The selected teeth were isolated carefully with cotton rolls and thoroughly dried and the gel was applied carefully subgingivally and interproximally until excess gel was observed from the gingival margin.

Excess gel was removed with a cotton roll and patients were instructed not to eat, drink, or rinse for at least 30 min and to refrain from chewing hard or sticky

foods, brushing near the gel treated site or using inter-dental aids. Gel application was performed after initial SRP and at 7, 14 days.

Ozonated olive oil gelatin film & placement



Statistical analysis

All the results were tabulated and statistically analyzed using Statistical package for social science (SPSS version 12). Intragroup comparison was done using paired *t*-test. The difference between groups was statistically analyzed using independent sample *t*-test.

RESULTS

In the present study mean plaque index, gingival index, OHI-S scored at baseline were 1.65±0.91, 1.65±0.09, 3.29±0.32 respectively and after 21 days these were reduced to 0.81±0.19, 0.79±0.18, 1.52±0.43. There was statistically significant reduction in the plaque index, gingival index, OHI-S were observed 21 days post-treatment ($p < 0.001$). (Table 1)

In our study the mean PPD in Group I, at baseline was 5.03±0.18 mm, and at 21 days reduced to 3.03±0.18 mm. In Group II, at baseline the mean PPD was 5.33±0.47 mm, and at 21 days reduced to 2.83±0.59 mm. There was statistically significant reduction in PPD after 21 days post-therapy in both groups ($p < 0.001$). (Table 2). Group II showed more statistically significant

reduction in PPD at 21 days post-therapy, compared to group I ($p < 0.001$). The results were in accordance with Issac AV et al., (2015).[9] In his study the use of ozonated water resulted in probing pocket depth reduction and it was due to the prevention of free radical mediated tissue destruction, anti-inflammatory and immune stimulating effect of ozone.

In the present study the mean CAL at baseline in Group I was 4.06 ± 0.12 mm, and at 21 days reduced to 2.14 ± 0.12 mm (CAL gain~ 2mm). In Group II, at baseline the mean CAL was 4.36 ± 0.28 mm, and at 21 days reduced to 1.43 ± 0.29 mm (CAL gain~ 2.8 mm). There was statistically significant gain in CAL after 21 days post-therapy in both groups ($p < 0.001$). Group II showed more statistically significant gain in CAL at 21 days post-therapy, compared to group I ($p < 0.001$)(Table 2). This was in accordance with the study done by Ramzy MI et al., (2005)[10] where subgingival irrigation with ozonized water improved the clinical attachment level by the formation of thin junctional epithelium on the diseased cementum.

Table 1: Comparison of mean values of Plaque index, gingival index, Oral hygiene index between groups 1 and 2 at baseline and postoperative stages(21 days)

Index	Time						Paired Samples t-test	
	Baseline			PO - 21 Days			t-value	P-value
	Mean	SD	SE	Mean	SD	SE		
Plaque Index	1.657	.091	.017	.815	.194	.035	27.825	.000(P<0.001)
Gingival Index	1.652	.093	.017	.792	.183	.033	27.729	.000(P<0.001)
OHI Index	3.293	.327	.060	1.528	.433	.079	22.419	.000(P<0.001)

Table 2: Comparison of Mean values of Control (Group 1) and Test (Group 2) Groups between Baseline and Post operation (21 days)

Group		Time						Paired Samples t-test	
		Baseline			PO - 21 Days			t-value	P- value
		Mean	SD	SE	Mean	SD	SE		
Group 1	PPD	5.033	.183	.033	3.033	.183	.033	@	@
	CAL	4.06	.12	.02	2.14	.12	.02	@	@
Group 2	PPD	5.333	.479	.088	2.833	.592	.108	23.924	.000(P < 0.001)
	CAL	4.36	.28	.07	1.43	.29	.09	20.526	.000(P < 0.001)

Note: @ - t-test could not be carried out since the difference between the variances is zero

DISCUSSION

The present study was designed to evaluate the clinical effects of subgingival application of ozonated olive oil gelatin film as an adjunct to scaling and root planing in patients with chronic periodontitis. In this study ozonated olive oil gelatin film selected over ozonated water as the retention of ozone molecules were more in olive oil compared to other oils as well as ozonated water. In the present study mean plaque index, gingival index, OHI-S scored at baseline were reduced after 21 days. There was statistically significant reduction in the plaque index, gingival index, OHI-S were observed 21 days post-treatment ($p < 0.001$).

In our study the mean PPD were reduced after 21 days post treatment in group 2 compared to group 1. There was statistically significant reduction in PPD after 21 days post-therapy in both groups ($p < 0.001$). Group II showed more statistically significant reduction in PPD at 21 days post-therapy, compared to group I ($p < 0.001$). The results were in accordance with Issac AV et al., [9] In his study the use of ozonated water resulted in probing pocket depth reduction and it was due to the prevention of free radical mediated tissue destruction, anti-inflammatory and immunostimulating effect of ozone.

In the present study the mean CAL were reduced after 21 days post treatment in group 2 compared to group 1. There was statistically significant gain in CAL after 21 days post-therapy in both groups ($p < 0.001$). Group II showed more statistically significant gain in CAL at 21 days post-therapy, compared to group I ($p < 0.001$). This was in accordance with the study done by

Ramzy MI et al.,[10] where subgingival irrigation with ozonized water improved the clinical attachment level by the formation of thin junctional epithelium on the diseased cementum.

Hence Ozonated olive oil gelatin film can be used as a potent local drug delivery system in non surgical periodontal therapy.

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