

Comparison Of Ozonated Water And 10 Percent Povidone Iodine As Subgingival Irrigant In The Management Of Chronic Periodontitis

Research Article

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Abstract

Background: Mechanical plaque control is the first line of management of chronic periodontitis. In recent years, a variety of adjuncts including irrigants, chemical plaque controlling agents, vitamin supplements, systemic and local antibiotics, local drug delivery, herbal extracts, probiotics and LASER are gaining importance.

Aim: The aim of the study was to assess the efficacy of ozonated water and 10 percent povidone iodine as sub gingival irrigant in the management of chronic periodontitis.

Materials and Methods: The present randomized clinical trial was carried out from June 2020 to December 2020 among 40 chronic periodontitis patients who reported to the Department of Periodontics, Saveetha Dental College and Hospitals, Chennai, India. Participants were assigned to two groups [Group 1 (10% povidone iodine), Group 2 (ozonated water)]. Scaling and root planing was done for all the participants and then the pocket was irrigated with respective irrigant. The clinical parameters including Loe and Silness Gingival Index (GI), Pocket Depth (PD), Silness and Loe Plaque index (PI) were recorded at baseline and after 1 week. The data was analyzed using Statistical Package for Social Sciences (SPSS Software, Version 23.0). Unpaired t-test was done to compare the mean values of gingival index, plaque index and pocket depth between the groups.

Results: In group 1, the mean gingival index was reduced from 2.89 ± 0.03 to 2.20 ± 0.03 . In group 2, the mean gingival index was reduced from 2.92 ± 0.02 to 1.48 ± 0.01 . When plaque index was compared between both the groups, in group 1, the mean plaque index was reduced from 2.87 ± 0.02 to 2.40 ± 0.03 . In group 2, the mean plaque index was reduced from 2.86 ± 0.05 to 1.42 ± 0.01 . When probing depth was compared between both the groups, in group 1, the mean plaque index was reduced from 5 ± 0.02 to 3 ± 0.03 . In group 2, the mean plaque index was reduced from 4 ± 0.05 to 2 ± 0.01 . The difference in all the clinical parameters in both the groups was found to be statistically significant ($p=0.000$).

Conclusion: Significant improvement in gingival index, plaque index and pocket depth suggests that subgingival ozonated water irrigation could be an effective adjunct to scaling and root planing in the management of chronic periodontitis.

Keywords: Ozonated Water; Povidone Iodine; Subgingival Irrigation; Innovative Technique; Periodontitis.

Introduction

Periodontitis is an inflammatory condition caused by a specific group of microorganisms. It affects the supporting structures of the oral cavity leading to increased pocket depth, clinical attachment loss, recession, mobility, bone loss, furcation involvement, pathologic migration and tooth loss [1-7]. Even though the primary etiology of the disease is dental plaque, the disease is aggravated by variety of risk factors including smoking, stress, genetic

factors, systemic diseases and hormonal distress [8-16].

Scaling and root planing (SRP) therapy is considered as the gold standard for periodontal disease [17]. However, SRP is subjected to certain restrictions, such as the failure to insert deeper periodontal pockets, bifurcations and the failure to eliminate microorganisms because of their tissue invading nature [18-20]. To overcome this, variety of adjuncts including irrigants, chemical plaque controlling agents, vitamin supplements, systemic and lo-

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cal antibiotics, local drug delivery, herbal extracts, probiotics and LASER are gaining importance.

Irrigants are effective at flushing out plaque, bacteria and their toxins that become trapped in the small spaces between teeth and under the gumline, preventing the buildup of harmful bacteria. The most widely studied subgingival irrigants are chlorhexidine and various percentages of povidone iodine solution. Chlorhexidine (CHX) is considered a “gold standard” antibacterial solution and is extensively used as a mouthwash and irrigating solution. [21]. However, it has certain side effects on long term usage such as loss of taste sensation, staining of the teeth and in some cases, parotid swelling. Povidone iodine is the most broad-spectrum and potent antiseptic available [21, 22].

It has a bactericidal effect against most bacteria including putative periodontal pathogens, fungi, mycobacteria, viruses, and protozoa. Povidone-iodine remains an effective antibacterial agent when used directly into the periodontal pocket even at low concentrations [23].

Currently, ozone therapy is gaining popularity as a modern non-invasive method of treatment. It is a powerful oxidizing agent with a high antimicrobial power against oral pathogens [24]. The antimicrobial effect of ozone is a result of its action on cells by damaging its cytoplasmic membrane due to ozonolysis of dual bonds and also ozone-induced modification of intracellular contents because of secondary oxidant effects [25]. Ozonated water can be used to irrigate the subgingival area during scaling and root planing [26].

Our team has extensive knowledge and research experience that has translated into high quality publications[27-46]. Through extensive literature search, it was revealed that there is a lack of adequate studies comparing the efficacy of ozonated water and 10 percent povidone iodine as sub gingival irrigant in the management of chronic periodontitis. In this context, the aim of the study was to assess the efficacy of ozonated water and 10 percent povidone iodine as sub gingival irrigant in the management of chronic periodontitis.

Materials and Methods

Study Population:

The present randomized clinical trial was carried out from June 2020 to December 2020 among 40 chronic periodontitis patients who reported to the Department of Periodontics, Saveetha Dental College and Hospitals, Chennai, India. The ethical clearance was obtained from the Institutional Ethical Committee and a written informed consent was obtained from all the study participants.

Inclusion Criteria:

Patients who were systemically healthy, presence of at least 20 teeth, probing depth of 4-5 mm, presence of bleeding on probing (BOP) and presence of plaque in at least 30% of the sites were included in the study.

Exclusion Criteria:

Smokers, pregnant or lactating mothers, patients under long term medications, systemically compromised patients were excluded from the study.

Study Design:

The sample size was 40 with 20 participants in each group [Group 1 (10% povidone iodine), Group 2 (ozonated water)]. Participants were assigned to the groups by a person not involved in the study. Scaling and root planing was done for all the participants using Gracey curettes and then the pocket was irrigated with respective irrigant using a syringe. The syringe was gently inserted into the depth of periodontal pockets to assure delivery of irrigant solution. Repeated irrigation ensured that irrigant solution filled up pockets for a period of 5 min and oral hygiene instructions were reinforced. The clinical parameters including Loe and Silness Gingival Index (GI), Pocket Depth (PD), Silness and Loe Plaque index (PI) were recorded (baseline). All the subjects were recalled after 1 week and the same parameters were recorded.

Statistical Analysis:

The data was analyzed using Statistical Package for Social Sciences (SPSS Software, Version 23.0). Descriptive and inferential statistics were done for data summarization and presentation. Unpaired t-test was done to compare the mean values of gingival index, plaque index and pocket depth between the groups. The analysed data was interpreted as graphs and tabulations.

Table 1. Comparison of mean gingival index, plaque index and pocket depth between the study groups using unpaired t-test.

		Levene's test for equality of variances		t-test for equality of means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean difference	Std. error difference	95% confidence interval of the difference	
									lower	upper
Gingival Index	Equal variances assumed	35.007	0	10.77	78	0	1.045	0.097	0.852	1.238
	Equal variances not assumed			10.77	54.15	0	1.045	0.097	0.850	1.240
Plaque Index	Equal variances assumed	66.557	0	9.355	78	0	0.933	0.100	0.734	1.131
	Equal variances not assumed			9.355	49.51	0	0.933	0.100	0.732	1.133
Pocket Depth	Equal variances assumed	25.406	0	10.53	78	0	1.95	0.185	1.581	2.319
	Equal variances not assumed			10.53	55.84	0	1.95	0.185	1.579	2.321

Figure 1. Comparison of difference between ozonated water and 10% povidone iodine in terms of gingival index. X-axis depicts the types of subgingival irrigant and Y-axis depicts the mean gingival index. Blue bar depicts the baseline gingival index, green bar depicts gingival index after a week. The reduction in gingival index was higher among the patients who had undergone subgingival irrigation with ozonated water. The difference between both the groups was found to be statistically significant with the p value of 0.000 (unpaired t-test).

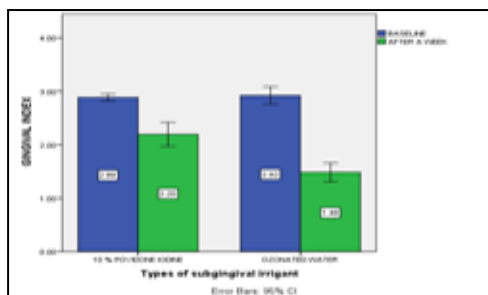


Figure 2. Comparison of difference between ozonated water and 10% povidone iodine in terms of plaque index. X-axis depicts the types of subgingival irrigant and Y-axis depicts the mean plaque index. Blue bar depicts the baseline plaque index, green bar depicts plaque index after a week. The reduction in plaque index was higher among the patients who had undergone subgingival irrigation with ozonated water. The difference between both the groups was found to be statistically significant with the p value of 0.000 (unpaired t-test).

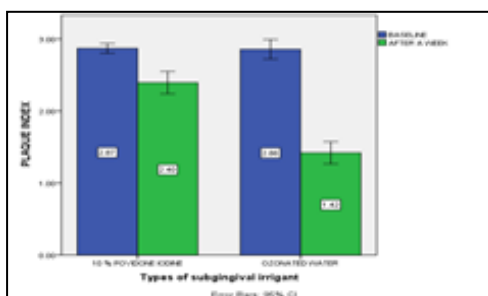
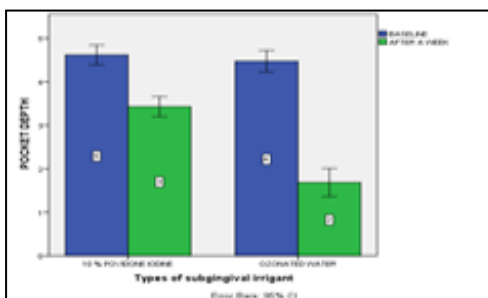


Figure 3. Comparison of difference between ozonated water and 10% povidone iodine in terms of pocket depth. X-axis depicts the types of subgingival irrigant and Y-axis depicts the mean pocket depth. Blue bar depicts the baseline pocket depth, green bar depicts pocket depth after a week. The reduction in pocket depth was higher among the patients who had undergone subgingival irrigation with ozonated water. The difference between both the groups was found to be statistically significant with the p value of 0.000 (unpaired t-test).



Results

In the present study 40 periodontitis patients were enrolled. 20 patients were enrolled in group 1 (10% povidone iodine), while the remaining 20 patients were enrolled in group 2 (ozonated water). Clinical parameters like gingival index, plaque index and pocket depth were compared at baseline and after 1 week.

In group 1, the mean gingival index was reduced from 2.89±0.03 to 2.20±0.03. In group 2, the mean gingival index was reduced from 2.92±0.02 to 1.48±0.01. The difference in gingival index between both the groups was found to be statistically significant (p=0.000). [Figure 1, Table 1].

When plaque index was compared between both the groups, in

group 1, the mean plaque index was reduced from 2.87±0.02 to 2.40±0.03. In group 2, the mean plaque index was reduced from 2.86±0.05 to 1.42±0.01. The difference in plaque index between both the groups was found to be statistically significant (p=0.000). [Figure 2, Table 1].

When probing depth was compared between both the groups, in group 1, the mean plaque index was reduced from 5±0.02 to 3±0.03. In group 2, the mean plaque index was reduced from 4±0.05 to 2±0.01. The difference in plaque index between both the groups was found to be statistically significant (p=0.000). [Figure 3, Table 1].

Discussion

The present study assessed the effect of ozonated water and povi-

done iodine as an adjunct to scaling and root planing in the treatment of chronic periodontitis.

Issac AV *et al.*, [48] evaluated the effect of ozonated water as subgingival irrigant on microbiologic parameters and clinical parameters. The study results showed a greater reduction in pocket depth and gain in clinical attachment. Also, the total anaerobic count was significantly reduced by ozonated water subgingival irrigation along with scaling and root planing compared to scaling and root planing alone. Katti SS *et al.*, [49] studied the clinical effects of ozonated water on periodontal tissues. The study revealed that subgingival irrigation with ozonated water is beneficial as an adjunct to conventional scaling and root planing in the management of chronic periodontitis.

Al Habashneh R *et al.*, [50] determined the clinical and biological effects of the adjunctive use of ozone in nonsurgical periodontal treatment by conducting a randomized controlled clinical trial and found improvement in periodontal health when irrigation was done with ozonated water as an adjunctive therapy. Similarly Vasthavi C *et al.*, [51] evaluated the effect of ozone as an adjunct to scaling and root planing in the treatment of chronic periodontitis and found beneficial effects of ozone.

The results of the present study are in accordance with the previous studies as there was significant reduction in gingival index, plaque index and pocket depth when ozonated water was used as a subgingival irrigant as compared with 10% povidone iodine among patients with chronic periodontitis. However, more randomized controlled trials need to be conducted with long term follow ups to confirm the efficacy of ozone as a subgingival irrigant.

Conclusion

Significant improvement in gingival index, plaque index and pocket depth suggests that subgingival ozonated water irrigation could be an effective adjunct to scaling and root planing in the management of chronic periodontitis.

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