

Ozonated Water Versus 0.2% Chlorhexidine in the Treatment of Chronic Periodontitis with and Without Tobacco Chewing Habit- A Randomized Control Clinical Study



Medical Science

KEYWORDS : Ozonated Water, Chlorhexidine, Tobacco, Subgingival Irrigation

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ABSTRACT

Aim: To Evaluate the Effect of Ozonated Water (O3) Versus 0.2% Chlorhexidine (Chl) as an Adjunct to Scaling and Root Planing (SRP) in the Treatment of Chronic Periodontitis with and without tobacco chewing habit. Material &

Method: A randomized, split-mouth design was performed in 10 subjects of chronic periodontitis with and without tobacco chewing habit. Scaling and root planing was performed followed by Subgingival Irrigation with O3, Group I (SRP + O3) or with Chl, Group II (SRP + Chl) for an approximate period of 5 min with a 2 ml syringe, once weekly for 6 weeks. Gingival Index (GI), Plaque Index (PI), Probing Pocket Depth (PPD), Clinical Attachment Level (CAL) were assessed at baseline and after 6 weeks. Result: Group I and Group II showed statistically significant differences with respect to PI, GI, PPD, CAL from the baseline to 6 weeks. The difference between Group I and Group II, in subjects with and without tobacco chewing habit, was not statistically significant with respect to the PI, GI, PPD, CAL. Also when we compared effect of SRP + O3 and SRP + Chl in subjects with and without tobacco chewing habit, it was not statistically significant. Conclusion: Subgingival irrigation with O3 and Chl is beneficial as an adjunct to scaling and root planing to enhance periodontal health in Chronic Periodontitis patients with and without tobacco chewing habit.

Introduction

In India, the habit of oral Smokeless Tobacco (ST) use is more prevalent than tobacco smoking.^[1,2] It has been suggested that ST use may be significantly associated with severe periodontal disease with increased periodontal destruction and attachment loss.^[3,4]

Several different forms of oral ST products, which differ in their contents, are available in India. These products include betel quid with tobacco, zarda (prepared by boiling pieces of tobacco leaves in water with slaked lime), gutkha and pan masala (powdered tobacco mixed with areca nut, slaked lime and catechu), khaini (tobacco with slaked lime) and mawa (a mixture of areca nut, tobacco and slaked lime). Studies have shown that about 7–27% of regular ST users have gingival recession and may lose the bone around the teeth and experience tooth loss.^[5]

In patients with chronic periodontitis, thorough subgingival debridement (in conjunction with supragingival plaque control) is an effective treatment in reducing probing pocket depth and improving the clinical attachment level.^[6] However, the effectiveness of mechanical debridement is limited by various factors such as inaccessibility to periodontal pockets, tissue invasive micro-organisms, concave tooth surfaces, the unfavourable anatomy of roots, the overhanging margins of restorations, the bacterial invasion into dentinal tubules & intra oral microbial translocation. Therefore, now a days there has been considerable interest in the use of chemotherapeutic agents to assist root detoxification and periodontal pocket disinfection.^[7]

The present study was undertaken to compare effect of ozonated water and chlorhexidine in the treatment of chronic periodontitis with and without having tobacco chewing habit based upon clinical parameters such as Plaque Index (PI), Gingival Index (GI), Probing Pocket Depth (PPD) and Clinical attachment level (CAL)

Material & Method

A randomized, split-mouth design was performed in 10 subjects of chronic periodontitis with and without tobacco chewing habit. Five subject of chronic periodontitis without having tobacco chewing habit include following selection criteria:

- Subjects aged between 25 and 65 years with minimum of 3 teeth in each quadrant and diagnosed with chronic moderate

to severe periodontitis.

- Patients with at least one site in each quadrant with PPD \geq 5mm.
- Individuals with known systemic disease, immunocompromised individuals, and pregnant or lactating females were excluded from the study.

Five subject of chronic periodontitis with having tobacco chewing habit include following selection criteria:

- Individuals with PPD >5mm or clinical attachment level >3 to 6 mm.
- Oral ST users (who had the habit of oral ST consumption at least 10 times a day for the past 5 years and were still continuing the habit) were included.
- Use of other forms of tobacco (smoking or dry snuff, which is inhaled), a history of discontinuous use of ST or a history of any form of periodontal treatment or antibiotic therapy during the 6 month period before the study, were excluded from the study
- Individuals with known systemic disease, with aggressive periodontitis, immunocompromised individuals, and pregnant or lactating females were excluded from the study.

Clinical parameters

- Gingival Index (Loe and Silness, 1967)
- Plaque Index (Turesky-Gilmore-Glickman modification of Quigley Hein Index, 1970)
- Probing Pocket Depth (PPD)
- Clinical Attachment Level (CAL)

Method

- Each half (right and left) of the oral cavity were randomly assigned into two groups of 10 subjects:
- Group I- SRP + Ozonated water (O₃), Group II- SRP + 0.2% chlorhexidine (Chl).
- The clinical parameters were assessed at baseline.
- Periapical radiographic and/or digital OPG examinations were done to confirm the diagnosis.
- Scaling and root planing were performed by using ultrasonic scaler and area specific gracey curettes respectively.
- Individual were subject to Subgingival Irrigation with either freshly prepared Ozonated Water by ozone generator or with 0.2% Chlorhexidine.
- Excess irrigant solution were continuously aspirated.
- The Subgingival Irrigation was carry out for an approxi-

mate period of 5 min with a 2 ml syringe, once weekly for 6 weeks.

- Following the irrigation protocol, the patients were reinforced in their oral hygiene maintenance.
- The clinical parameters were assessed again after 6 weeks.



Figure 1. Subgingival Irrigation with Chlorhexidine



Figure 2. Subgingival Irrigation with Ozonated Water

Result

Group I and Group II showed statistically significant differences with respect to PI, GI, PPD, CAL from the baseline to 6 weeks. The difference between Group I and Group II, in subjects with and without tobacco chewing habit, was not statistically significant with respect to the PI, GI, PPD, CAL which is shown in table 1 and 2 respectively. Also when we compared the effect of SRP + O₃ and SRP + Chl in subjects with and without tobacco chewing habit, it was not statistically significant.

Table 1: A comparison of the pre and post values of PI, GI, PPD, CAL scores between group I and group II in chronic periodontitis having tobacco chewing habit

Group	Sample	Mean±SD (Baseline)	P Value (Baseline)	Mean±SD (6weeks)	P Value (6weeks)
PI					
Group I	5	2.9 ± 0.29	>0.05	0.82± 0.40	>0.05
Group II	5	3.01±0.32		1.6±0.23	
GI					
Group I	5	2.14±0.36	>0.05	0.40±0.16	>0.05
Group II	5	2.17±0.42		0.51±0.39	
PPD					
Group I	5	4.58±0.53	>0.05	3.21± 0.77	>0.05
Group II	5	3.96±0.44		3.06±0.81	
CAL					
Group I	5	5.12±0.87	>0.05	3.76 ±0.58	>0.05
Group II	5	4.83±0.73		3.81±0.86	

A P value of < 0.05 was considered to be statistically significant (Unpaired t-test); SD- Standard Deviation

Table 2: A comparison of the pre and post values of PI, GI, PPD, CAL scores between group I and group II in chronic periodontitis without having tobacco chewing habit

Group	Sample	Mean± SD (Baseline)	P Value (Baseline)	Mean±SD (6weeks)	P Value (6weeks)
PI					
Group I	5	2.769+0.39	>0.05	0.796+0.34	>0.05
Group II	5	2.313+0.47		0.857+0.4	
GI					
Group I	5	2.022+0.12	>0.05	0.331+0.34	>0.05
Group II	5	2.054+0.33		0.311±0.35	
PPD					
Group I	5	3.811± 0.46	>0.05	2.845+0.47	>0.05
Group II	5	3.810+0.59		2.793+0.76	
CAL					
Group I	5	4.046+0.23	>0.05	3.080+0.27	>0.05
Group II	5	4.094+ 0.73		3.036+0.94	

A P value of < 0.05 was considered to be statistically significant (Unpaired t-test); SD- Standard Deviation

Discussion

Chronic Periodontitis is an infectious disease resulting in inflammation within the supporting tissues of the teeth, progressive attachment loss, and bone loss.^[8]

The present study was undertaken to evaluate and compare the efficacy of subgingival irrigation of (4mg/l) ozonated water [Figure 2] and 0.2% chlorhexidine [Figure 1] as an adjunct to scaling and root planing in the treatment of chronic periodontitis with and without having tobacco chewing habit. The clinical result showed significant reduction of plaque index, gingival index, probing pocket depth and CAL in patients with chronic periodontitis.

ST products have been in existence for thousands of years among populations in South America and Southeast Asia in varied forms (mentioned above). ST is consumed without burning the product and can be used orally and through nasal route. Oral ST products are placed in the mouth, cheek or lip and sucked (dipped) or chewed.^[9] The relationship between the use of oral ST products and localized gingival recession and severe periodontitis has been suggested in the literature by the reports of *Christen et al.*^[10] and others. *Kumar et al.*^[11] had shown a significant impact on the severity of periodontal diseases among tobacco users as compared to non-users and the risk of periodontal pockets increased as the duration and frequency of tobacco consumption increased amongst the green marble mine labourers of Rajasthan in a population sample of 585, belonging to lower socioeconomic strata.

Chlorhexidine has emerged as an important oral antiseptic agent and is used as an adjunct to periodontal therapy. It is a broad spectrum antiseptic with antimicrobial effects on Gram-positive as well as Gram-negative bacteria, some viruses and fungi.^[12] However, due to the undesirable effects such as brownish discoloration of teeth, some restorative materials, the dorsum of tongue and taste disturbance, after prolonged use, several alternatives to chlorhexidine have been investigated.^[13]

Ozone gas, is considered to be an oral antiseptic agent because it is a stronger antimicrobial agent. It kills bacteria, fungi and viruses and does not induce microbial resistance. Application of Ozone in dentistry is based upon physical and chemical properties such as antimicrobial action, immunostimulatory action, antihypoxic, biosynthetic and detoxicating effect.^[14] Ozone gas is not recommended for intra-oral use, for safety concern.^[15] Ozone gas dissolved in water and oils were and are still commonly used in different fields of dentistry.^[16,17] Ozone therapy should be contraindicated in pregnancy, glucose-6-phosphate-dehydrogenase deficiency, hyperthyroidism, severe anemia, severe myasthenia, active haemorrhage.^[18]

In this study, PI, GI, PPD and CAL was more (not significant) in ST than non-tobacco users. The mechanism of action, as ex-

plained by *Mavropoulos et al.*^[19], was neurogenic inflammation induced by activation of sensory nerves and the subsequent release of vasodilatory peptides from their peripheral endings, known as “axon reflex”.

Patel et al.^[7] found that the adjunctive use of the Ozone with Scaling and Root Planing resulted in a significant improvement of clinical parameters as well as microbiological parameters over the time and in comparison to the control groups. The Ozone as monotherapy also showed a significant improvement in clinical parameters as well as microbiological parameters over the time without any documented side effects. However, there was a significant increase in dentinal hypersensitivity following Ozone as an adjunct to scaling and root planing therapy. However, in our study patient were relieved from post scaling hypersensitivity after sub gingival irrigation with ozonated water. A Study conducted by *Kshitish and Laxman*^[20] found higher percentage of reduction in plaque index (12%), gingival index (29%) and bleeding index (26%) using ozone irrigation as compared to chlorhexidine. *Montevicchi et al*^[21] found that, ozonated oil is a more effective antiseptic than chlorhexidine digluconate and povidone-iodine against *S. aureus* and the periodontal pathogen *P. gingivalis*.

Limitation

Since this study has shown reduction in plaque score, gingival score, probing pocket depth and gain in clinical attachment level, further research can be carried out on a larger sample. Also, the lack of significance between the groups could be due to the smaller sample size.

Conclusion

In this study, adjunctive use of the ozonated water and chlorhexidine with SRP resulted in a significant improvement in reduction of plaque, gingivitis & gain in periodontal attachment and therefore both are efficient in improving periodontal conditions.

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