ISSN: 2581-5989
PubMed - National Library of Medicine - ID: 101738774

International Journal of Dental Science and Innovative Research (IJDSIR)
IJDSIR : Dental Publication Service
Available Online at:www.ijdsir.com
Volume – 8, Issue – 3, June – 2025, Page No. : 100 - 104

Effects of Ozonized Oil vs Chlorhexidine 1% Gel in Non-Surgical Periodontal Treatment: A Comparative Clinical Study

[1]Dr. Hemant Sharma, Third Year PG Resident, Department of Periodontology, Mahatma Gandhi Dental College and Hospital, Jaipur

[2]Dr. Meenakshi Meena, Professor, Department of Periodontology, Mahatma Gandhi Dental College and Hospital, Jaipur

[3]Dr. Ashish Yadav, HOD and Professor, Department of Periodontology, Mahatma Gandhi Dental College and Hospital, Jaipur

Corresponding Author: Dr. Hemant Sharma, Third Year PG Resident, Department of Periodontology, Mahatma Gandhi Dental College and Hospital, Jaipur

Citation of this Article: Dr. Hemant Sharma, Dr. Meenakshi Meena, Dr. Ashish Yadav, "Effects of "Ozonized Oil vs Chlorhexidine 1% Gel in Non-Surgical Periodontal Treatment: A Comparative Clinical Study", IJDSIR- June – 2025, Volume – 8, Issue – 3, P. No. 100 – 104.

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Periodontal disease is the complex of dysbiotic microbiota present in dental plaque biofilm. Disrupting and removal of the dental plaque biofilms from the tooth surface is the ultimate goal of any periodontal therapy. Recent studies have suggested that ozonated oil can improve gingival health. The methodology was designed to see the effects of Ozonized (sunflower oil) oil compared to chlorhexidine gluconate gel 1% in the treatment of periodontal disease, whether applied in the dental office or at home.

There was statistically significant difference observed between Group A and Group B for MPI, BOP, PPD and CAL respectively at different time intervals. ($p<0.05$)

Keywords: Chlorhexidine (1%) Gel, Ozone-Based Oil

Introduction

Periodontitis is a chronic multifactorial inflammatory disease initiated by dysbiotic microorganisms in the dental biofilm, and further progression is mediated by host immunoinflammatory response. Periodontal disease is the complex of dysbiotic microbiota present in dental plaque biofilm. Disrupting and removal of the dental plaque biofilms from the tooth surface is the ultimate goal of any periodontal therapy. Recent studies have suggested that oil when ozonized, may enhance gingival health.[1,2]

Chlorhexidine (CHX) is a highly effective widely used broad-spectrum antimicrobial agent considered as the gold standard for chemical plaque control. Broad-spectrum antimicrobial activity, substantivity, and

lack of toxicity are some of its properties.[3] However, prolonged use of CHX may cause tooth staining, altered taste sensation, impaired wound healing, mucosal erosion, and reduced attachment of fibroblast to tooth surface.[4] These drawbacks of CHX motivate us to seek for a novel antimicrobial therapy, with lesser adverse effects.

Scaling and root debridement is still considered as the gold standard in non-surgical periodontal treatment. However, this does not completely eliminate the pockets and periodontopathic bacteria, particularly at the furcation, root concavities, interproximal areas and sites with deeper pockets that have limited accessibility to periodontal instrumentation. In order to overcome these problems, adjunctive therapies, such as local or systemic antimicrobials have been extensively researched to improve the outcome of periodontal therapy. Changing the subgingival environment may be a useful strategy to inhibit the growth of highly anaerobic subgingival microflora. Oxygenating and redox agents, molecular oxygen, hyperbaric oxygenation, hydrogen peroxide, etc. may be beneficial to achieve this. Ozone therapy is a relatively recent strategy for management of many diseases including oral diseases like dental caries and periodontal disease.[5]

Ozone disrupts microbial cell walls in seconds, leading to immediate cell lysis[6]. Anti-inflammatory, immunostimulating and immunomodulatory properties of ozone address the host response component of periodontal pathogenesis.[7,8]

Hence this study was aimed to evaluate the efficacy of ozonized oil as compared to chlorhexidine (1%) gel in addition to standard scaling and root planing (SRP) for treating periodontitis.

Materials and Methods

Study population

Out patients reporting to the Department of Periodontology, Mahatma Gandhi Dental College and Hospital, Jaipur, were enrolled for the study.

Sample Size Calculation: The sample size was calculated using Openepi software (v3.0) at 95% confidence interval and 80% power Shinkai R, et al.

The calculated sample size 9 samples per group

Two groups of ten subjects each with periodontitis were selected, with age group of 25 to 70 years were selected with bilateral periodontal disease were enrolled (split-mouth study design was adopted). After nonsurgical periodontal therapy (SRP), the subjects were selected by single blinded method and divided into two groups: Study group were with ozone-based oil, while Control group were treated with a chlorhexidine 1% based gel for two weeks. Parameters examined in both the groups were; probing pocket depth (PPD) and clinical attachment loss (CAL).

After the baseline assessment, the follow up visit will be at 7, 21 and 28 days. Variables evaluated will be; modified plaque index, bleeding on probing, probing pocket depth and clinical attachment loss.

Unpaired t test was applied to compare the parameters between two groups, comprising of ten subjects in each group.

- **Group A:** Ten healthy individuals with clinical signs of periodontal inflammation belonging to age group of 25-70 years were selected in the Control group. They were treated with a chlorhexidine-based gel 1% to aid oral hygiene maneuvers for 2 weeks after the first visit.
- **Group B:** Ten healthy individuals with clinical signs of periodontal inflammation belonging to age group of 25-70 years were selected in the Test group

were treated in the same way with Ozonated oil (ozonated sunflower oil was used).

Inclusion Criterion

- Subjects diagnosed with gingivitis/ periodontitis. (PPD ≥ 4 mm and CAL ≥ 2 mm)
- Can maintain good oral hygiene after initial treatment.

Exclusion Criterion

- No previous periodontal therapy done in past 6 months
- Subjects currently on antibiotics, steroids, or hormonal therapy
- Subjects with any systemic disorder or medically compromised patients
- Subjects who have smoking or tobacco chewing habits
- Pregnant Females or Lactating Mothers
- Subjects who declined study's terms and conditions

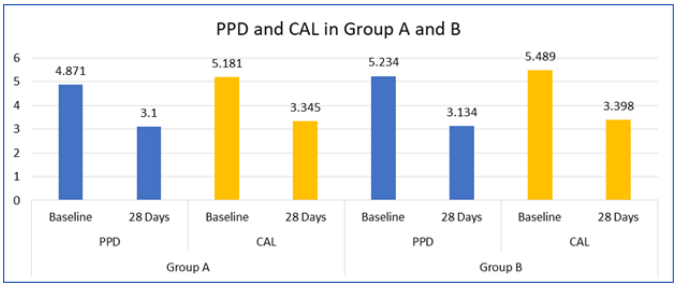
Informed written consent form was signed by the subjects or by their family members and ethical clearance was taken from the institution prior to this study.

Statistical Analysis

Statistical analysis was done with Statistical Package for Social Sciences (IBM SPSS Statistic for window, version 21.0. Armonk, NY: IBM Corp.) at 95% CI and 80% power to the study. Kolmogorov-Smirnov and Shapiro Wilk test was done to check for normal distribution of the data. Based on distribution of data appropriate parametric or non-parametric test were applied for statistical analysis of the results. Statistical significance was calculated at $p<0.05$.

Results

Statistically significant differences were observed in MPI from baseline to 7 days, 14 days, 21 days, and 28 days respectively. ($p<0.001$). Similar observation in BOP from baseline to 14 days, 21 days, and 28 days respectively ($p<0.001$). Although no statistically significant difference was seen between baseline and 7 days in BOP respectively ($p>0.05$). There was a statistically significant difference observed between Group A and Group B for PPD and CAL respectively at different time intervals. ($p<0.05$).



Discussion

One of the common available forms of oxygen atom (allotrope) is Ozone. One molecule of Ozone is made of three oxygen atoms. As the oxygen molecule is made of two atoms of oxygen and one increased atom in this molecule makes Ozone molecule highly reactive and strong oxidative too. It was observed that this property of ozone proved as beneficial for killing microorganisms, especially anaerobic ones.

After going through many related literature and practical use it was observed that Ozone can be used in either gaseous or aqueous form.

Use of Ozone gas directly on patients was very challenging due to its unstable nature, therefore an aqueous form was preferred and was used as a local applicant. The outcome of local application of aqueous form of ozone and oils rich monosaturated fatty acids are compounds such as ozonides, aldehydes, peroxides etc. These compounds along with ozone are responsible for killing of both aerobic and anaerobic bacteria present in the oral cavity.

Clinical literatures prove that, use of CHX for many days may cause; tooth staining, altered taste sensation,

impaired wound healing, mucosal erosion, and reduced attachment of fibroblast to tooth surface. CHX has been considered as the gold standard in dental remedy, but looking at its unusual side effects inspired many professionals to explore other options with the same therapeutic nature.

So, Ozonizing oils rich in monosaturated fatty acids could be more advantageous than CHX.

Conclusion

The results obtained from the present study suggested that- Ozonized oil (sunflower oil) can be a better replacement to the already proven gold standard; Chlorhexidine Gluconate 1% gel. Very limited work on this was available to prove it clinically better than CHX. More long-term studies with larger sample size are required to prove its effectiveness.

References

1. Hajishengallis G. Periodontitis: from microbial immune subversion to systemic inflammation. Nat Rev Immunol. 2015;15(1):30-44. 10.1038/nri3785.
2. Ranjith A, Niranjana JM, Baiju KV. Adjunctive benefit of ozonized water irrigation with mechanical debridement in the management of Stage III periodontitis: A randomized controlled clinical and biochemical study. Int J Dent Hygiene. 2021; 00:1–7.
3. Arweiler NB, Boehnke N, Sculean A, Hellwig E, Auschill TM. Differences in efficacy of two commercial 0.2% chlorhexidine mouthrinse solutions: A 4-day plaque re-growth study. J Clin Periodontol 2006; 33:334-9.
4. Cline NV, Layman DL. The effects of chlorhexidine on the attachment and growth of cultured human periodontal cells. J Periodontol 1992; 63:598-602.
5. Saini R. Ozone therapy in dentistry: a strategic review. J Nat Sci Biol Med. 2011;2(2):151-153.
6. Baysan A, Whiley RA, Lynch E. Antimicrobial effect of a novel ozone- generating device on micro-organisms associated with primary root carious lesions in vitro. Caries Res. 2000;34(6):498-501. 10.1159/000016630.
7. Tartari APS, Moreira FF, Pereira MCDS, et al. Anti-inflammatory effect of ozone therapy in an experimental model of rheumatoid arthritis. Inflammation. 2020;43(3):985-993. 10.1007/s10753-020- 01184-2.
8. Zeng J, Tang Z, Zhang Y, et al. Ozonated autohemotherapy elevates PPAR-γ expression in CD4+ T cells and serum HDL-C levels, a potential immunomodulatory mechanism for treatment of psoriasis. Am J Transl Res. 2021;13(1):349-359.
9. Sanz M, Herrera D, Kebschull M, et al; On behalf of the EFP Workshop Participants and Methodological Consultants. Treatment of stage I–III periodontitis—The EFP S3 level clinical practice guideline. J Clin Periodontol. 2020; 47:4–60. https:// doi.org/ 10. 1111/jcpe.13290
10. Scribante, A., Gallo, S., Pascadopoli, M., Frani, M., & Butera, A. (2023). Ozonized gels vs chlorhexidine in non-surgical periodontal treatment: A randomized clinical trial. Oral Diseases, 00, 1–8. https:// doi.org/10.1111/odi.14829
11. Colombo, M.; Gallo, S.; Garofoli, A.; Poggio, C.; Arciola, C.R.; Scribante, A. Ozone Gel in Chronic Periodontal Disease: A Randomized Clinical Trial on the Anti-Inflammatory Effects of Ozone Application. Biology 2021, 10, 625. https://doi.org/ 10.3390/biology10070625
12. Kist, Stefan & Kollmuss, Maximilian & Jung, Jette & Schubert, Sören & Hickel, Reinhard & Huth, Karin. (2017). Comparison of ozone gas and sodium hypochlorite/chlorhexidine two-visit disinfection

protocols in treating apical periodontitis: a randomized controlled clinical trial. Clinical oral investigations. 21. 10.1007/s00784-016-1849-5.

13. Checchi, Luigi & Montevecchi, Marco & Checchi, Vittorio & Zappulla, Franco. (2009). The Relationship Between Bleeding on Probing and Subgingival Deposits. An Endoscopical Evaluation. The open dentistry journal. 3. 154-60. 10.2174 /1874210600903010154.
14. Nambiar S, Malothu S, Karmakar S, Varkey A, Chandra D, Chava VK. Comparison of ozonated olive oil and chlorhexidine gel as an adjunct to nonsurgical periodontal therapy for the treatment of chronic periodontitis: A randomized controlled clinical trial. J Pharm Bioall Sci 2022;14:S94-8.