European Journal of Musculoskeletal Diseases
ISSN 2038-4106 print - ISSN 2975-044X online

Case Report

TREATMENT OF A DENTAL ELEMENT WITH ISOLATED PERIODONTITIS USING OXYGEN-OZONE THERAPY. A CASE REPORT

E. Maetzke

Dental Centre Maetzke, Borgosatollo, Brescia, Italy

**Correspondence to*:
Elisabetta Maetzke, DDS
Dental Centre Maetzke,
Via Giordano Bruno 9,
25010 Borgosatollo, Brescia, Italy
e-mail: elisabetta.maetzke@gmail.com

ABSTRACT

The case of a patient with a single tooth suffering from periodontal disease, treated with oxygen-ozone infiltrations and root canal therapy with ozonated water, is reported. The patient, who in the past had already suffered from periodontitis with purulent exudate of the lower incisor group on the lingual side, was previously treated with antibiotic therapies associated with root planing techniques. In this case, the corpuscular and serous exudate gradually disappeared thanks to the treatment with oxygen-ozone therapy, and a good mucogingival seal was gradually reconstituted. The dental element completely lost its mobility; consequently, it was possible to proceed with the prosthesis of the element. The obtained stability of the tooth and the reformation of the ligament system with the maintenance of the mucogingival seal are evidence of recovery from periodontitis.

KEYWORDS: *periodontitis, oxygen, ozone, medical ozone, biofilm, gingivitis*

INTRODUCTION

The effectiveness of treatment with oxygen-ozone in cases of periodontitis has been known for several years, and numerous reports on this subject exist (1-10).

It has been documented that ozone therapy can be helpful in the effective treatment of periodontal lesions with narrow periodontal pockets in patients with aggressive periodontitis and a poor prognosis (11). Gingival and periodontal diseases are a significant dentistry concern (12-31). Most of the factors and causes that contribute to the etiology of these diseases are reduced or treated with ozone in all its forms of application, such as gas, water (32-33), and oil (34-35), which reduces the majority of and causes in the etiology of these diseases. The beneficial biological effects of ozone, its anti-microbial activity, oxidation of bio-molecules precursors and microbial toxins implicated in periodontal diseases, and its healing and tissue regeneration properties make the use of ozone well indicated in all stages of gingival and periodontal diseases.

In light of these considerations, we report the case of a patient who presented a single tooth suffering from periodontal disease, successfully treated with oxygen-ozone infiltrations and root canal therapy with ozonated water.

CASE REPORT

Received: 14 March 2024
Accepted: 19 April 2024

ISSN 2038-4106 print
ISSN 2975-044X online

G.L., male, born in 1956. He came to our attention with a compromised tooth number 24. There was spontaneous pain, pain on percussion, and inability to chew, alongside evident periodontal purulent budding with mobility of the element ranging between 2 and 3. The periodontal probing highlights a 4-walled pocket with a probing depth of 12 mm distal and palatal, 11 mm buccal and medial. An intraoral radiograph confirmed the situation of periodontal compromise (Fig. 1).

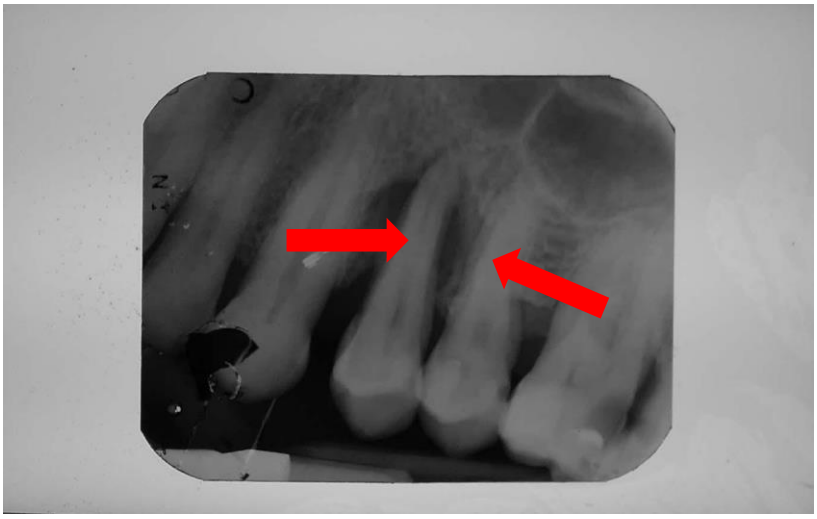

Fig 1. *Diagnostic evaluation radiograph at patient recruitment with periodontal compromise in tooth 24 (**arrows**).*

An initial dental hygiene session was conducted with antibiotics in order to remove any possible root tartar deposits. Subsequently, the pulp vitality of the element was verified with the C-Pulse tester. The vitality was found to be at the lower limits of the norm. Therefore, it was decided to devitalize the dental element to eliminate any possible bacterial focus. Intraoral X-ray control was carried out at the end of treatment and one year later. In the following paragraph, the therapeutic program of the sixteen sessions is described in depth.

Therapeutic Program

First session

Under topical anesthesia, the dental element was exposed to the pulp chamber, and the two roots, buccal and palatal, were probed. After the initial reaming of the canal with the removal of pulp residues, the roots and pulp chamber were irrigated with ozonated water for ten minutes.

Subsequently, after incomplete drying of the roots and pulp chamber, the cavity was filled with temporary enamel soft cement. A 30G needle connected to a syringe of oxygen-ozone mixture at 40 μg/ml was introduced, and the tooth was filled under pressure to make the gaseous mixture reach the collateral canaliculi. Leaving the gas in contact with the dentinal walls of the pulp chamber and canals for five minutes, the Enamel Soft plugging was removed by reciprocating it. During all root canal perfusion procedures with a gas mixture, the dental assistant maintained continuous suction near the tooth to prevent even the smallest amount of gas from inhaling by the patient and the operating staff. The walls of the root canals were reamed to remove the first layer of infected dentin and facilitate access of the various medications to all the accessory dentinal canaliculi. The tooth was rinsed in succession with sodium hypochlorite with water, and the excess water was removed; then, the canals were filled with calcium hydroxide and suitable temporary cement was placed to close the cavity.

The periodontal pockets surrounding the tooth were washed with recently produced ozonated water. The leakage of purulent exudate was evident. The area of adherent mucosa surrounding the dental element 24 on both the vestibular and palatal sides and the fornix were then infiltrated with 10 cc of oxygen-ozone gas mixture at 15 μg/ml.

The patient was advised to apply Ozoral gel at home, in the lesion area, 4 times a day for the entire duration of the outpatient treatment.

Second session

Under topical anesthesia, the temporary cement was removed from tooth 24, the calcium hydroxide was removed by rinsing, and the root canal was washed with ozonated water for ten minutes. The cavity was plugged again with Enamel Soft temporary cement, and the gaseous oxygen-ozone mixture at 40 μg/ml was introduced.

The Enamel Soft buffer was removed and rinsed in succession with 2.5% sodium hypochlorite and water. After partial drying, the pulp chamber and root canals were filled with calcium hydroxide, and the cavity was closed with temporary cement based on zinc oxide with a low shrinkage coefficient. The periodontal pockets were washed with ozonated water. Purulent exudate was still present. Adherent mucosa and fornix were infiltrated with 10 cc of oxygen-ozone gas mixture at 15 μg/ml.

Third session

The dental cavity was reopened under topical anesthesia. The calcium hydroxide was removed and irrigated for ten minutes with ozonated water. After drying, the cavity hole was plugged with Enamel Soft, and a suitable quantity of oxygen-ozone gas mixture at 40 μg/ml was injected into the cavity, changed several times. The elastic packing was removed, and the root canals were checked to ensure they could remain dry. Subsequently, the traditional maneuvers were performed to close the 2 root canals with root canal cement and gutta-percha cones and with the vertical condensation technique.

The periodontal pockets were washed with ozonated water. There was serous exudate, not macroscopically corpuscular. Adherent mucosa and fornix were infiltrated with 10 cc of oxygen-ozone gas mixture at 15 μg/ml.

Fourth session

Under topical anesthesia, the dental cavity was reopened and closed with a suitable permanent composite filling, taking care to keep the dental element in slight disclusion. The periodontal pockets were washed with ozonated water. There was a serious exudate that was not macroscopically corpuscular. At the end of irrigation, modest bleeding appeared. Adherent mucosa and fornix were infiltrated with 10 cc of oxygen-ozone gas mixture at 15 μg/ml.

Fifth session

Under topical anesthesia, the periodontal pockets were washed with ozonated water. Serous exudate was still present, followed by modest bleeding. Adherent mucosa and fornix were infiltrated with 10 cc of oxygen-ozone gas mixture at 15 μg/ml.

Sixth session

Under topical anesthesia, the periodontal pockets were washed with ozonated water. There was slight bleeding. Adherent mucosa and fornix were infiltrated with 10 cc of oxygen-ozone gas mixture at 15 μg/ml.

Seventh session

Under topical anesthesia, the periodontal pockets were washed with ozonated water. There was slight bleeding. Adherent mucosa and fornix were infiltrated with 10 cc of oxygen-ozone gas mixture at 15 μg/ml.

Eighth session

Under topical anesthesia, the periodontal pockets were washed with ozonated water. There was no evidence of serous exudate or bleeding. Adherent mucosa and fornix were infiltrated with 10 cc of oxygen-ozone gas mixture at 15 μg/ml.

Ninth session

Under topical anesthesia, the residual periodontal pockets were washed with ozonated water. Adherent mucosa and fornix were infiltrated with 10 cc of oxygen-ozone gas mixture at 15 μg/ml.

Tenth session

In topical anesthesia, it was verified that the gingival attachment reformed around the collar of the dental element. Therefore, it was preferable not to disturb the formation process, and washing with ozonated water was not performed. Adherent mucosa and fornix were infiltrated with 10 cc of oxygen-ozone gas mixture at 15 μg/ml.

Eleventh session

There was no probing along the entire dental circumference. Under topical anesthesia, the adherent mucosa and fornix were infiltrated with 10 cc of an oxygen-ozone gas mixture at 15 μg/ml.

Twelfth session

The gum attack was reconstituted with no probing and no bleeding. Under topical anesthesia, the adherent mucosa and fornix were infiltrated with 10 cc of an oxygen-ozone gas mixture at 15 µg/ml. A control intraoral X-ray was performed (Fig. 2).

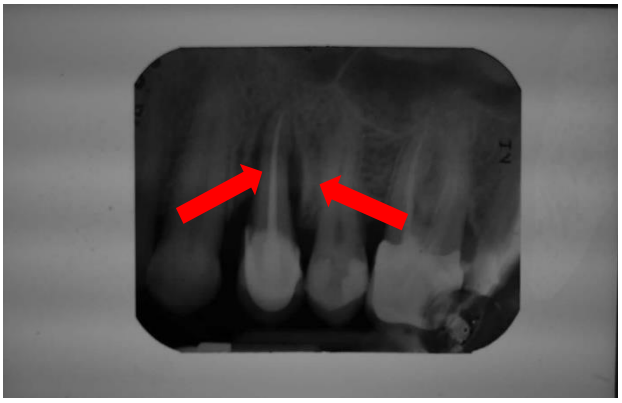

Fig. 2. *X-ray after the twelfth session: initial volumetric reduction of the radiolucent area (**arrows**) can be seen.*

Thirteenth session

Under topical anesthesia, the tooth was prepared according to the Loi technique with minimal invasion of the newly formed gingival sulcus. A temporary tooth was constructed according to Loi to protect the gum line. Adherent mucosa and fornix were infiltrated with 10 cc of oxygen-ozone gas mixture at 15 µg/ml.

Fourteenth session

An impression of the stump of tooth 24 was taken with precision material to prepare the zircoceramic crown, which would be the definitive covering of the tooth. Adherent mucosa and fornix were infiltrated with 10cc of oxygen-ozone gas mixture at 15 µg/ml.

Fifteenth session

After a test and careful control of the occlusal contacts, the zircoceramic prosthetic crown was cemented onto the abutment with a definitive cement. The excellence of the cement was carefully removed from the mucogingival sulcus. The possible presence of probing was checked, but no pathological value was found in the entire circumference of the dental collet with no exudation and no bleeding. Adherent mucosa and fornix were infiltrated with 10 cc of oxygen-ozone gas mixture at 15 µg/ml.

Sixteenth session

The treated tooth was checked, and the periodontal probing and bleeding were negative. Adherent mucosa and fornix were infiltrated with 10cc of oxygen-ozone gas mixture at 15 µg/ml (Fig. 3).

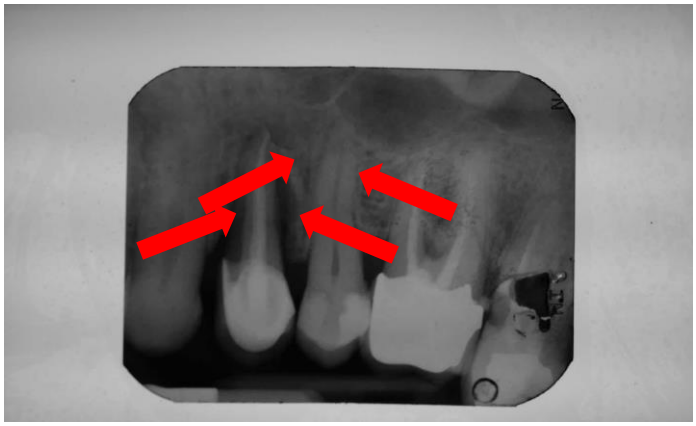

Fig. 3. *One-year follow-up X-ray: further bone regrowth and lengthening of the medial bony papilla (**arrows**) can be seen.*

DISCUSSION

Periodontal diseases are a group of pathologies involving the tooth and its supporting tissues. We can find anatomical and functional alterations at the gingival, ligament, vascular, bone, and dentinal levels. Often, the lesions caused by periodontal disease lead, among other things, to decreased tooth stability and, ultimately, to tooth loss.

The causes of periodontal disease are numerous: they include diabetes, malnutrition, alcoholism, smoking, hormonal changes, poor hygiene, occlusal trauma, and recurrent infections. Periodontal disease is a multifactorial syndrome that is not yet fully understood. The triggering causes may be periodontal and/or of endodontic origin. There is a genetic propensity to develop periodontal disease. There are also initially aseptic forms on a purely inflammatory basis, which often become super-infected, resulting in periodontitis (1-8).

The first sign of onset is usually gingivitis, which may go unnoticed by the patient (3-6). In this case, provoked bleeding may occur. There may be pain and the affected teeth may begin to show mobility. In manifest periodontitis, anaerobic bacterial morphologies are present to the detriment of cocci, which are predominantly aerobic and present in a more significant percentage in the mucous membranes with physiological trophism (5-12).

The patient presented in this article is healthy; he does not take drugs, he does not smoke, he has a marked propensity to produce tartar, he is a locksmith, and in 2008 he developed periodontitis on 4 lower incisors, lingual side, with purulent exudate and tooth mobility. He was treated with cycles of scaling and root planing associated with 3 cycles of antibiotic therapy. Healing occurred with a modest loss of mucogingival attachment. In 2020, the patient came to our attention for the annual dental hygiene recall with a 24 in a state of acute periodontitis, showing positive survey on the entire circumference of the tooth, purulent exudate, red and soft gums, pain on percussion and chewing and mobility of the element ranging between 2 and 3. At the beginning of treatment, the intraoral radiograph showed a loss of bone attachment covering more than two-thirds of the root with flattening of the bony peak of the mesial papilla. It was decided to start the first dental hygiene session with antibiotic prevention of endocarditis of 2 grams one hour before the treatment and 1 gram 6 hours after. This decision was dictated by observing the massive presence of pus in the pockets to be cured. At the end of the session, the pockets were irrigated with ozonated water until the bleeding stopped.

It was also decided to undertake the treatment of this periodontopathic dental element in a conservative, closed-air manner, making use of ozone considering its multiple properties, primarily antibacterial, antifungal, virustatic, anti-inflammatory, vasotrophic, normalizing of microcirculation and able to fragment the bacterial protective biofilm. In this way, we avoided using another multi-cycle antibiotic therapy.

Since the radiographic picture was not clear regarding the genesis of the pathology, it was decided to attribute a mixed periodontal and endodontic characteristic to the lesion even if, in the past, the patient had already shown similar pathology on other dental elements without endodontic compromise, recovering the state of eutrophism and maintaining the vitality of the elements involved. The decision was made after the pulp vitality test, which gave results at the lower limits of the normality range. The patient was advised of the therapy he would be subjected to. He was found suitable for using ozone for infiltration as he was free from G6PD enzymatic deficiency, thyroid pathology, and general pathology.

A specific consent form for using ozone as an alternative to antibiotic therapy was completed. The ozone therapy sessions were conducted under topical anesthesia for better patient compliance. The gaseous mixture of oxygen-ozone was used in the form of infiltrations both in the adherent mucosa surrounding the tooth and in the fornix of the second quadrant. Irrigations of instantaneous ozonated water were used in the periodontal pockets until a mucogingival seal was reformated. At an endodontic level, both forms of oxygen-ozone, water and gas were used, maintaining a long contact time with the endocanal dentin to sterilize the collateral canaliculi that were difficult to reach.

Due to organizational problems with the patient, carrying out more than one weekly session was impossible. The first eight sessions were, carried out on a weekly basis. After that, the patient was treated fortnightly. After the twelfth session, a control intraoral X-ray was performed. After the second oxygen-ozone therapy session, the patient's subjective symptoms disappeared, and the mobility of the tooth decreased.

Gradually, we witnessed the disappearance of the corpuscular exudate and the serous exudate; a good mucogingival seal was gradually reconstituted, and the dental element completely lost its mobility. It was possible to proceed with the prosthesis of the element by placing it in occlusion with its antagonist using a technique that was very respectful of the periodontium. The patient was then checked periodically and subjected to dental hygiene sessions, during which a periodontal survey of both arches was carried out with particular attention to tooth 24.

To date, the element appears to be healthy, not painful or mobile, with negative probing and pink, trophic, and non-bleeding mucous membranes. No gingival retraction occurred. A third control intraoral radiograph was performed, which showed an increase in the bone structure, the gradual reformation of the periradicular cortex, and an increase in the

mesial bone peak, which was flattened. It cannot be declared that there is an integral restitutio ad integrum to date, but it seems that bone healing is still taking place.

The stability of the tooth is related to the reformation of the ligament system, and the maintenance of the mucogingival seal with physiological probing is linked to the recovery from periodontitis.

CONCLUSIONS

The use of oxygen-ozone therapy in dentistry is an easily feasible method. Since the operation is generally performed on an anesthetized field, the patient feels no discomfort. In order to give due weight to the use of ozone in dentistry, it is essential to produce a large number of works that establish the boundaries within which to use this method.

REFERENCES

1. P Swarna Meenakshi. A review on ozone therapy in periodontitis. *Bioinformation*. 2022;18(7):634-639. doi:https://doi.org/10.6026/97320630018634
2. Maarten Meire, Juliana Delatorre Bronzato, Rafael Aiello Bomfim, Brenda. Effectiveness of adjunct therapy for the treatment of apical periodontitis: A systematic review and meta-analysis. *International Endodontic Journal*. 2022;56(S3):455-474. doi:https://doi.org/10.1111/iej.13838
3. Dental Supplement, Lio F, L Ottria, et al. The effectiveness of subgingival irrigant ozone-based as adjuvant for non-surgical periodontal therapy in the treatment of chronic periodontitis: a review. *Journal of Biological Regulators and Homeostatic Agents*. 2020;34(3):27-34.
4. Al Habashneh R, Alsalman W, Khader Y. Ozone as an adjunct to conventional nonsurgical therapy in chronic periodontitis: a randomized controlled clinical trial. *Journal of Periodontal Research*. 2014;50(1):37-43. doi:https://doi.org/10.1111/jre.12177
5. Azarpazhooh A, Limeback H. The application of ozone in dentistry: A systematic review of literature. *Journal of Dentistry*. 2008;36(2):104-116. doi:https://doi.org/10.1016/j.jdent.2007.11.008
6. Makeeva MK, Daurova FY, Byakova SF, Turkina AY. Treatment of an Endo-Perio Lesion with Ozone Gas in a Patient with Aggressive Periodontitis: A Clinical Case Report and Literature Review. *Clinical, Cosmetic and Investigational Dentistry*. 2020;Volume 12:447-464. doi:https://doi.org/10.2147/ccide.s267933
7. Moraschini V, Kischinhevsky ICC, Calasans-Maia MD, et al. Ineffectiveness of ozone therapy in nonsurgical periodontal treatment: a systematic review and metaanalysis of randomized clinical trials. *Clinical Oral Investigations*. 2020;24(6):1877-1888. doi:https://doi.org/10.1007/s00784-020-03289-2
8. Moreo G, Mucchi D, Carinci F. Efficacy ozone therapy in reducing oral infection of periodontal disease: a randomized clinical trial. *Journal of Biological Regulators and Homeostatic Agents*. 2020;34(4 Suppl. 1):31-36. SPECIAL ISSUE: OZONE THERAPY.
9. Khan S, Suh Y, Patel S, et al. Clinical utility of ozone therapy in dental and oral medicine. *Medical Gas Research*. 2019;9(3):163. doi:https://doi.org/10.4103/2045-9912.266997
10. Gupta G, Mansi B. Ozone therapy in periodontics. *Journal of Medicine and Life*. 2012;5(1):59-67.
11. Sinha N, Asthana G, Parmar G, et al. Evaluation of Ozone Therapy in Endodontic Treatment of Teeth with Necrotic Pulp and Apical Periodontitis: A Randomized Clinical Trial. *Journal of Endodontics*. 2021;47(12):1820-1828. doi:https://doi.org/10.1016/j.joen.2021.09.006
12. Talmaç AC, Çalişir M. Efficacy of gaseous ozone in smoking and non-smoking gingivitis patients. *Irish Journal of Medical Science (1971 -)*. 2020;190(1):325-333. doi:https://doi.org/10.1007/s11845-020-02271-x
13. Ramirez-Peña AM, Sánchez-Pérez A, Campos-Aranda M, Hidalgo-Tallón FJ. Ozone in Patients with Periodontitis: A Clinical and Microbiological Study. *Journal of Clinical Medicine*. 2022;11(10):2946. doi:https://doi.org/10.3390/jcm11102946
14. Rapone B, Ferrara E, Santacroce L, et al. The Gaseous Ozone Therapy as a Promising Antiseptic Adjuvant of Periodontal Treatment: A Randomized Controlled Clinical Trial. *International Journal of Environmental Research and Public Health*. 2022;19(2):985. doi:https://doi.org/10.3390/ijerph19020985
15. Bilichodmath S, Deepthi R. Ozone therapy in periodontics: A meta-analysis. *Contemporary Clinical Dentistry*. 2020;11(2):108. doi:https://doi.org/10.4103/ccd.ccd_79_19
16. Gandhi KK, Cappetta EG, Pavaskar R. Effectiveness of the adjunctive use of ozone and chlorhexidine in patients with chronic periodontitis. *BDJ Open*. 2019;5(1). doi:https://doi.org/10.1038/s41405-019-0025-9
17. Tetè G, D'Amicantonio T, Polizzi E. Efficacy Ozone Therapy in Reducing Periodontal Disease. *Materials*. 2023;16(6):2375. doi:https://doi.org/10.3390/ma16062375
18. Hatice Sağlam, Halit Aladağ. Comparison of ıntracanal ozone and low-level laser therapy on postoperative pain in vital teeth with symptomatic apical periodontitis:placebo-controlled randomize trial. *Lasers in Medical Science*. 2023;38(1). doi:https://doi.org/10.1007/s10103-023-03881-4
19. Isler SC, Unsal B, Soysal F, Ozcan G, Peker E, Karaca IR. The effects of ozone therapy as an adjunct to the surgical treatment

of peri-implantitis. *Journal of Periodontal & Implant Science*. 2018;48(3):136. doi:https://doi.org/10.5051/jpis.2018.48.3.136

20. Vasthavi C, Babu HM, Rangaraju VM, Dasappa S, Jagadish L, Shivamurthy R. Evaluation of ozone as an adjunct to scaling and root planing in the treatment of chronic periodontitis: A randomized clinico-microbial study. *Journal of Indian Society of Periodontology*. 2020;24(1):42-42. doi:https://doi.org/10.4103/jisp.jisp_162_19
21. Huth KC, Quirling M, Lenzke S, et al. Effectiveness of ozone against periodontal pathogenic microorganisms. *European Journal of Oral Sciences*. 2011;119(3):204-210. doi:https://doi.org/10.1111/j.1600-0722.2011.00825.x
22. Huth KC, Quirling M, Maier SF, et al. Effectiveness of ozone against endodontopathogenic microorganisms in a root canal biofilm model. *Int Endod J*. 2009;42(1):3-13. doi:https://doi.org/10.1111/j.1365-2591.2008.01460.x
23. Kist S, Kollmuss M, Jung J, Schubert S, Hickel R, Huth KC. Comparison of ozone gas and sodium hypochlorite/chlorhexidine two-visit disinfection protocols in treating apical periodontitis: a randomized controlled clinical trial. *Clinical Oral Investigations*. 2016;21(4):995-1005. doi:https://doi.org/10.1007/s00784-016-1849-5
24. Naik SV, K R, Kohli S, Zohabhasan S, Bhatia S. Ozone- A Biological Therapy in Dentistry- Reality or Myth????? *The Open Dentistry Journal*. 2016;10:196-206. doi:https://doi.org/10.2174/1874210601610010196
25. Srikanth A, Sathish M, Sri Harsha A. Application of ozone in the treatment of periodontal disease. *Journal of Pharmacy and Bioallied Sciences*. 2013;5(5):89. doi:https://doi.org/10.4103/0975-7406.113304
26. Ajeti N, Pustina-Krasniqi T, Apostolska S, Xhajanka E. The Effect of Gaseous Ozone in Infected Root Canal. *Open Access Macedonian Journal of Medical Sciences*. 2018;6(2):389-396. doi:https://doi.org/10.3889/oamjms.2018.102
27. Tasdemir Z, Oskaybas MN, Alkan AB, Cakmak O. The effects of ozone therapy on periodontal therapy: A randomized placebo-controlled clinical trial. *Oral Diseases*. 2019;25(4):1195-1202. doi:https://doi.org/10.1111/odi.13060
28. Halbauer K, Katica Prskalo, Janković B, Zrinka Tarle, Vlatko Pandurić, Smilja Kalenić. Efficacy of ozone on microorganisms in the tooth root canal. *PubMed*. 2013;37(1):101-107.
29. Colombo M, Gallo S, Garofoli A, Poggio C, Arciola CR, Scribante A. Ozone Gel in Chronic Periodontal Disease: A Randomized Clinical Trial on the Anti-Inflammatory Effects of Ozone Application. *Biology*. 2021;10(7):625. doi:https://doi.org/10.3390/biology10070625
30. Piva A, Avantaggiato P, Candotto V, Pellati A, Moreo G. The use of ozone therapy for treatment of periodontal disease: a split-mouth, randomized, controlled clinical trial. *Journal of Biological Regulators and Homeostatic Agents*. 2020;34(3 Suppl. 1):91-98. DENTAL SUPPLEMENT.
31. Paolantonio M, D'Ercole S, Pilloni A, et al. Clinical, Microbiologic, and Biochemical Effects of Subgingival Administration of a Xanthan-Based Chlorhexidine Gel in the Treatment of Periodontitis: A Randomized Multicenter Trial. *Journal of Periodontology*. 2009;80(9):1479-1492. doi:https://doi.org/10.1902/jop.2009.090050
32. Katti SS, Chava VK. Effect of Ozonised water on Chronic Periodontitis - A Clinical Study. *Journal of international oral health: JIOH*. 2013;5(5):79-84.
33. Laxman V, Kshitish D. The use of ozonated water and 0.2% chlorhexidine in the treatment of periodontitis patients: A clinical and microbiologic study. *Indian Journal of Dental Research*. 2010;21(3):341. doi:https://doi.org/10.4103/0970-9290.70796
34. 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. *Journal of Pharmacy & Bioallied Sciences*. 2022;14(Suppl 1):S94-S98. doi:https://doi.org/10.4103/jpbs.jpbs_565_21
35. Sharath A, Vadhana Vc, Geethapriya P, Vijayasankari V. Effect of sesame oil, ozonated sesame oil, and chlorhexidine mouthwash on oral health status of adolescents: A randomized controlled pilot trial. *Journal of Indian Society of Pedodontics and Preventive Dentistry*. 2019;37(4):365. doi:https://doi.org/10.4103/jisppd.jisppd_244_19