

OZONATE YOUR IMPLANTS

Dr Rohit Shah*, Dr Meenakshi Talati, Dr Dipika Mitra***, Dr Silvia Rodrigues*, Dr Gaurav Shetty****, Dr Saurabh Prithyani****, Dr Harshad Vijayakar*******

*- Reader, **-Postgraduate student, ***- Professor, ****- Lecturer, *****- Professor and Head

Department of periodontology

TPCT's Terna dental college and hospital

Sector-22, Nerul, Navi Mumbai-400706

Email ID's: rohitshah17@gmail.com- 9699860609

meenakshitalati@gmail.com -9967822488

drdipikamitra@gmail.com - 9820180406

silvia.rdrags@gmail.com - 7709315422

gauravshettyv@gmail.com -9867373605

saurabh.prithyani@gmail.com- 7208020305

drharshadvijayakar@gmail.com-9820128432

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Corresponding author details:

Dr Rohit Shah,

Reader

Dept of Periodontology

TPCT's Terna dental college and hospital

Sector-22, Nerul, Navi Mumbai-400706

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ABSTRACT:

The oral cavity appears as an open ecosystem, and with oral biofilm formation and development, the inside selection of specific microorganisms have been correlated with the most common oral pathologies including peri-implantitis. The mechanical removal of the biofilm and adjunctive use of antibiotic disinfectants or various antibiotics have been the conventional methods for periodontal therapy. Ozone (O₃) is a triatomic molecule, consisting of three oxygen atoms, and its application in medicine and dentistry has been successfully indicated for the treatment of 260 different pathologies. The ozone therapy has been more beneficial than present conventional therapeutic modalities that follow a minimally invasive and conservative application to dental treatment. Hence this short communication attempts to review the use of ozone in implant dentistry.

Keywords: Biofilm, dental, ozone, implant

INTRODUCTION:

The continued oral biofilm formation and development, with its pathogenicity in the oral cavity is magnified by two of its characteristics: Increased antibiotic resistance and the inability of the community to be phagocytized by host inflammatory cells.¹ The mechanical removal of the biofilm and adjunctive use of antibiotic disinfectants or various antibiotics have been the conventional methods for periodontal therapy.² As the periodontal researchers are continuously looking for alternatives to antibiotic treatments (biofilm resistance), the emergence of ozone therapy seems to hold a promising future.

History

In 1839, Christian Friedrich Schonbein, first noticed the emergence of a pungent gas with an electric smell. According to the Greek language, he called it ozone and presented a lecture entitled “On the smell at the positive electrode during electrolysis of water” at the Basel Natural Science Society.³ Oxygen/ozone therapy has a long history of research and clinical application with humans. As of 1929, more than 114 diseases were listed for treatment with oxygen/ozone therapy. Interestingly enough, in 1930, a German dentist, Dr. E.A. Fisch, used ozone on a regular basis in his dental practice in Zurich, Switzerland, and published numerous papers on the subject.

Mechanism of action:

Ozone (O₃) is a triatomic molecule, consisting of three oxygen atoms. Ozone gas has a high oxidation potential and is 1.5 times greater than chloride when used as an antimicrobial agent against bacteria, viruses, fungi, and protozoa. It also has the capacity to stimulate blood circulation and the immune response.⁴

Ozone therapy provides enhanced antimicrobial, anti-inflammatory, and wound healing effects.⁵

Discussion:

In dentistry, ozone has also been used in the gaseous or aqueous form to inhibit bacterial proliferation, to obtain epithelial wound-healing, to enhance local oxygen supply, eliminate cariogenic bacteria, disinfect the root canals, and promote haemostasis.⁶ Reports also describe that aqueous ozone is highly biocompatible with fibroblasts, cementoblasts, and epithelial cells,⁷ suggesting that aqueous ozone would be suitable for treating oral infectious diseases such as periodontal diseases. The goals of oxygen/ozone therapy are:⁸

1. Elimination of pathogens.
2. Restoration of proper oxygen metabolism.
3. Induction of a friendly ecologic environment.
4. Increased circulation.
5. Immune activation.
6. Simulation of the humoral anti-oxidant system.

➤ Three basic forms of application to oral tissue are applied:⁹

- 1) Ozonated water,
- 2) Ozonated olive oil, and
- 3) Oxygen/ozone gas.

- Ramzy et al (2005)¹⁰ irrigated periodontal pockets with ozonized water in 22 patients suffering from aggressive periodontitis

Highly significant improvement in pocket depth, plaque index, gingival index and bacterial count was recorded related to quadrants treated by scaling and root planning together with ozone application. They also reported significant reduction in bacterial count in sites treated with ozonized water.

- Huth et al (2007)¹¹ examined the effect of ozone on the influence on the host immune response.

Their results showed that that NF-kappaB activity in oral cells in periodontal ligament tissue from root surfaces of periodontally damaged teeth was inhibited following incubation with ozonized medium.

- In the study by Karapetian et al (2006)¹², periimplantitis treatment with conventional, surgical and ozone therapy methods was investigated, and it was found that the most effective bacteria reduction was in the ozone-treated patient group.
- Matsamura K et al. treated implants with ozone and found that there was regeneration of periodontal cells similar to that around natural teeth.¹³

- El Hadary et al. evaluated that short-term administration of cyclosporine A, when administered with topical ozonated oil, may influence bone density and the quality of dental implant osseointegration.¹⁴

Application of ozone in dentistry:

- Uses in Periodontology- Gingivitis, Periodontitis, Periimplantitis, Surgical cuts, Prophylaxis
- Dental and oral pathology- Caries, Root canal treatment, Tooth whitening, Dentinal hypersensitivity, Abscess, Granuloma, Fistulae, Aphthae, Herpes infection, Stomatitis – Candidiasis
- Surgery- Implantation, Re-plantation, Extraction, Wound Healing, Coaguloopathy - prolonged bleeding
- Prosthodontics and restorative dentistry- Stumps and crown disinfection, Cavity disinfection
- Orthodontics and orthopedics- TMJ dysfunctions, Trismus, Relaxation, Myoarthopathy

One of the important uses of ozone could be in implant dentistry. In this short communication we suggest the extensive application of ozone in implant dentistry.

The dental implant procedure is a detailed and meticulous one, requiring two visits and several months of sterility and undisturbed healing. Regardless of all modern techniques, any invasive medical procedure has a risk of infection. It doesn't matter how advanced our equipment or how sterile we and our tools are, bacteria are always a constant threat.

Ozone kills those bacteria by oxidizing them while leaving our body's own healthy bacteria alone. By utilizing ozone therapy while performing a dental implant procedure, the mouth can be kept infection free for the longest time.

Ozone can be applied as a gas or in aqueous form. By using special techniques, we can temporarily completely remove harmful bacteria from the oral cavity. This ensures the implant itself and the surrounding tissue is as clean as and sterile it is currently possible to be. This is a huge step in promoting and enabling fast healing and continued comfortable environment for the dental implant by using a completely natural gas.

SUGGESTED PROTOCOL FOR USE OF OZONE IN IMPLANT DENTISTRY:

Ozone can be potentially used in:

1. Disinfection of impression trays.
2. Disinfect the prepared osteotomy implant site before placement of implant
3. Disinfection of cover screw if contaminated with saliva and in subsequent visits.

4. In immediate implant placement cases to sterilize and disinfect the infected fresh extraction socket.
5. Disinfection of gingival former, impression post and laboratory analogue
6. Disinfection of implant impression.
7. Disinfection of abutment.
8. Disinfection of crown and bridge prosthesis.
9. To disinfect all implant instruments
10. To disinfect the hex drivers and torque ratchet
11. To promote healing post implant placement
12. To increase blood supply to healing implant site.
13. As a proven treatment modality for peri-implantitis.¹⁵
14. It is used in implants for prevention of infection and enhancement of bone regeneration. Ozone is bubbled into the socket for about 40 seconds for disinfection, followed by placement of the implant into the socket

CONCLUSION:

Dentistry is rapidly changing as we are now using modern science techniques to practice it. In comparison with classical medicine modalities such as antibiotics and disinfectants, ozone therapy is quite inexpensive, predictable and conservative. The ozone therapy has been proven to be more beneficial than present conventional therapeutic modalities especially as adjunctants. This state of the art and successful technology allows us to take a minimally invasive and conservative approach to dental and successful implant treatment. Treating patients with ozone therapy reduces the treatment time with a great deal of difference and it eliminates the bacterial count more precisely thus promoting healing. The treatment is completely painless and increases the patients' acceptability and compliance with minimal adverse effects. Although more clinical research needs to be done to standardize indications and treatment procedures of ozone therapy in implantology, still many different approaches are so promising, or already established, that hopefully the use of ozone therapy becomes the standard treatment for disinfection of operation sites in dentistry and implantology. Also ozone with its inherent properties of sterilization and being antimicrobial in nature, it holds true promise to dramatically increase the success rate of dental implants. It also could prevent implant failures occurring due to residual infection and use of contaminated parts and/or instruments. Ozone can also play a vital role in managing peri-implantitis cases and hence should be widely employed in the field of implant dentistry.

REFERENCES:

- 1 Thomas JG, Nakaishi LA. Managing the complexity of a dynamic biofilm. *J Am Dent Assoc.* 2006;137:10–5.
- 2 Walker CB. The acquisition of antibiotic resistance in the periodontal micro flora. *Periodontol* 2000. 1996;10:79–88.
- 3 Stübinger S, Sader R, Filippi A. The use of ozone in dentistry and maxillofacial surgery: A review. *Quintessence Int.* 2006;37:353–9.
- 4 Nogales CG, Ferrari PH, Kantorovich EO, Lage-Marques JL. Ozone therapy in medicine and dentistry. *J Contemp Dent Pract.* 2008;9:75–84.
- 5 Ripamonti CI, Cislighi E, Mariani L, Maniezzo M (2011) Efficacy and safety of medical ozone (O₃) delivered in oil suspension applications for the treatment of osteonecrosis of the jaw in patients with bonemetastases treated with bisphosphonates: preliminary results of a phase I-II study. *Oral Oncology* 47: 185-190.
- 6 Huth KC, Paschos E, Brand K, Hickel R (2005) Effect of ozone on noncavitated fissure carious lesions in permanent molars - a controlled prospective clinical study. *Am J Dent* 18: 229-232
- 7 Nagayoshi M, Fukuizumi T, Kitamura C, Yano J, Terashita M, et al. (2004) Efficacy of ozone on survival and permeability of oral microorganisms. *Oral Microbiol. Immunol* 19: 240-246
- 8 Mollica P, Harris R. Integrating oxygen/ ozone therapy into your practice. [Online]. [Cited 2010 January 13];[4 screens]. Available from: URL:[http://www. Toxin free smile. Dom/ images/ozone integrating % 20 oxygen ozone 20% therapy your practice. Pdf](http://www.Toxin free smile. Dom/ images/ozone integrating % 20 oxygen ozone 20% therapy your practice. Pdf).
- 9 Kumar KN. *Journal of Evolution of Medical and Dental Sciences.* Volume1.Issue4.October 2012 : 546
- 10 Ramzy MI, Gomaa HE, Mostafa MI. *Management of Aggressive Periodontitis Using Ozonized Water. Egypt. Med. J. N R C.* 2005;6(1):229–245.
- 11 Huth , Saugel , Jakob *Effect of aqueous ozone on the NF-kappaB system. J Dent Res.* 2007
- 12 Karapetian VE, Neugebauer J, Clausnitzer CE. *Comparison of Different Periimplantitis Treatment Methods.*2006
- 13 Matsamura K, Ikumi K, Nakajima N. A trial of regeneration of periodontal ligament around dental implants. *J Dent Res* 2002; 81: 101. [58]
- 14 El Hadary AA, Yassin HH, Mekhemer ST, Holmes JC, Grootveld M. Evaluation of the effect of ozonated plant oils on the quality of osseointegration of dental implants under the influence of Cyclosporin A an in vivo study. *J Oral Implantol* 2011; 37(2): 247-57.
- 15 S Arakawa, MSugisawa, A Leewananthawet. Application of Ozone Nanobubble Water (ONBW) to Peri-Implantitis Treatment. *Dentistry.*2017;7(12):1-6.