



Ozone Therapy: A Boon in Non-Surgical Periodontal Therapy

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Received: June 21, 2019; Published: July 18, 2019

Abstract

Periodontitis is an infectio-inflammatory disease that causes periodontal destruction mobility followed by tooth loss in individual. The aim of using ozone in periodontitis is its scavenging action, antimicrobial and immune enhancement with good biocompatibility versatility of ozone in field of medicine and dentistry. Ozone is used as adjunct to scaling and root planning under non-surgical periodontal therapy the first objective of review is the mechanism of action, advantages and contraindications of ozone therapy in periodontics. Also it's a review of various clinical trials that got positive results from using ozone as adjunct to scaling and root planning. The review is made as milestone for future researchers in field of ozone in medicine and dentistry.

Keywords: Ozone Therapy; Mechanism; Periodontitis

Ozone a lifesaving gas present in stratosphere saving the life from ultraviolet radiation but that just not enough to say about this versatile gas it has many values in field of medicine and dentistry it has lots of beneficial effect because of its scavenging action. The three atom oxygen has free electron in its outermost shell [1]. Chronic periodontitis an infectio-inflammatory is characterized by frequent bone loss, attachment loss, mobility and finally tooth loss. Although there are many surgical procedure for curing the infectious disease but using ozone is one of the non-invasive method for cure and also it is useful in those who are systemically not indicated for surgeries. Non surgical periodontal therapy is benchmark in cases of periodontitis using ozone has given lots of beneficial effects.

History

It was, Van Marum in 1785 found that air near the electrostatic machine has characteristic spark and odor. 1840, Schonbein termed this gas name ozon in greek it means smell. Werner Von Siemens in 1857 discovered siemen type ozone generator. In 1931, Dr. E. A. Fisch, used ozonated water in dentistry and is pioneered as its use in medicine.

Composition of medical grade ozone

Ozone is mixture of pure oxygen and pure ozone in the ratio of 0.05-5% of O₃ and 95-99.5% of O₂.

Various roots of administration of ozone in periodontics

Ozonated water, Ozonated gas and Ozonated oil.

Mechanism of action

It is potent anti-microbial, scavenger of free radical, immune enhancing, and nucleosynthetic [2].

Antimicrobial effect

The antimicrobial action of ozone is good against both aerobic and anaerobic bacteria fungi and viruses. This effect is because of ozonolysis effect of ozone in cytoplasmic membrane of bacteria.

Scavenging action

Ozone upon dissociation gives oxygen molecule which is helpful for providing oxygen in inflamed tissues for better healing and also nascent oxygen clears the inflammatory cells and cellular debris.

Immune - enhancing

Ozone stimulates both cellular and humoral immunity thereby it increases the immunocompetent cells and also immunoglobu-

lins. It also increases the production of interleukin and prostaglandins in inflammatory sites for better healing.

Nucleosynthetic

It increases the production of protein by stimulating mitochondria and ribosomes.

Goals of ozone therapy

- Elimination of periodontopathogens
- Restoration of proper oxygen circulation in periodontium
- Immune stimulation
- Stimulation of scavenging mechanism
- Proper oxygen circulation

Ozone in non – surgical periodontal therapy

Periodontal diseases are caused by multiple factors but the most virulent factor is microbiota in periodontium. It was Thannomsub., *et al.* 2002 who used ozonated water for mouth irrigation on cell growth and ultra structure of certain periodontopathogens. In 2004 Nagayoshi., *et al.* found the efficacy of ozonated water permeability and survival of oral microbiota i.e. gram negative bacteria, such *Porphyromonas gingivalis* and as *Porphyromonas endodontalis* more susceptible than gram positive bacteria. Huth., *et al.* in 2006, in research postulated that aqueous form of ozone is a potent antiseptic [3]. Muller P. (2007) found there was no significant reduction in use of ozone + Scaling and root planning in chronic periodontitis patients with gasiform ozone. There was no change in *Actinomyces naeslundii*, *Streptococcus sobrinus*, *Streptococcus oralis* and *Lactobacillus Veillonella dispar*, *Fusobacterium nucleatum* population [4]. Durga K., *et al.* (2010) studied the reduction in bleeding on probing and plaque index [5]. K Dhingra (2011) studied on orthodontic patients with gingivitis and found ozone irrigation beneficial for periodontal therapy [6]. Francesco Carinci studied on 20 patients with 40 sites with use of aqueous ozone found lesser *T. forsythia* count [7]. Sila Cagri Isler (2018) found that ozone can be used even as adjunct to regenerative therapy for peri-implantitis [8]. Safinaz Saleh Mohamed Saeed (2017) on his study in chronic periodontitis patients found reduction in *P. gingivalis* count on moderate to severe chronic periodontitis patients [9].

Contraindications of using ozone therapy

- Active hemorrhage
- Pregnancy

- Glucose- 6- phosphate dehydrogenase deficiency (favism)
- Hyper thyroidism
- Severe myasthenia
- Severe anemia

Ozone toxicity

Evidences show that bronco-pulmonary system is overt sensitive for ozone gas this should never be inhaled the lining of respiratory tract is very thin and watery that contain minimal amount of anti-oxidants present on it that makes mucosal cell vulnerable to oxidation. Direct administration of O_2-O_3 is prohibited by European Society of Ozone therapy since 1983.

Conclusion

Ozone application for treatment of periodontitis is one of newer approach that has been proved to be cost effective, predictable and user friendly with non – invasiveness. Best for apprehensive patients who cannot go for surgery and systemic ill patients in which surgeries are not possible. Ozone irrigation is best adjunct for scaling and root planning for periodontitis. Further studies need to be conducted for indications, dosage, contraindication mechanism of action and changes in microbial and biochemical characters.

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Volume 3 Issue 8 August 2019

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