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Editorial

Ozone in Dentistry: Boon or Bane?

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Three oxygen atoms combine to form ozone, also known as triatomic oxygen or trioxygen. At the stratosphere, ozone occurs naturally in concentrations of 1 to 10 ppm as a gas. Ozone's molecular oxygen can quickly transform into atomic oxygen depending on environmental factors like pressure, heat, and short half-lives. Due to its chemical makeup, ozone is the third most potent oxidant that does not have radical characteristics. In comparison to atmospheric oxygen, ozone is more energetic, 1.6 times more dense, and 10 times more soluble in water. In 1840, Sconbein called this chemical "Ozein", which is Greek for "to smell". Dr. Fisch employed ozonated water in dentistry for the first time in the nineteenth century and shared it with German surgeon Dr. Erwin Payr. Modern science is applied in dentistry, but it is also evolving and changing throughout time. Ozone therapy can be used as a model to aid in healing and is an alternative to conventional methods. We now perform less invasive, more conservative work thanks to emerging technology.

Ozone can be used in dentistry as a potent antimicrobial agent, according to the main feature. It works well against fungi, viruses, and Gram (+,) bacteria. As it reacts with the double bonds of the hydrocarbons in the cell membrane and causes the change of the cell content by the action of the secondary oxidant, ozone exhibits antimicrobial activity by causing damage to the cell membrane. Ozone has an impact on cellular and humoral immunity because it increases immune cell proliferation and immunoglobulin synthesis, speeds up macrophage phagocytosis sensitivity and activates additional macrophage functions. Ozone alters cell metabolism by raising the partial oxygen pressure in the tissues and enhancing oxygen transport in the body. Ozone also encourages the creation of intracellular proteins by activating ribosomes and mitochondria.

Ozone therapy has created new possibilities for treatment modalities in dentistry because of its characteristics, which include antimicrobial and immune-stimulating effects.

Many etiological variables contribute to oral lesions, with microorganisms playing a significant part in this. The cornerstone of successful dental therapy is the elimination of these microbial infections. Numerous research has looked at how ozone affects a range of bacteria involved in biofilm development. The administration of ozone has many positive benefits on oral tissues, such as the elimination of different mucosal abnormalities, improved wound healing, and accelerated turnover of oral cells. Ozone is a potential antiseptic, and under most circumstances, the aqueous form of ozone demonstrated lower cytotoxicity than gaseous ozone or known antimicrobials.

An ecological niche of caries-producing organisms is what causes dental caries. The ability of ozone to remove carious lesions

has been extensively discussed in the literature. This is linked to the fact that ozone not only has strong antimicrobial effects but also oxidizes the pyruvic acid created by cariogenic bacteria into acetate and carbon dioxide. Deep pits and cracks are challenging to clean, making it very probable that food will become lodged there and proliferate bacteria. It has been discovered that using ozone in certain situations is very effective. It is advised to clean the cracks before ozone treatment. This makes it possible for the ozone to easily reach caries. Following the ozone treatment, it is advised to apply a remineralizing agent and seal any clean cracks. The smear layer is removed by ozone, exposing the dentin that has been covered by the remineralizing chemical. The use of ozone before applying etchant and sealant is justified by data from studies examining the effectiveness of ozone on dental materials. Ozone gas has a strong bactericidal effect on microorganisms in the dentinal tubules of deep cavities when used for an extended period, which improves the clinical success of restorations.

The use of ozone as an antibacterial in endodontics has enormous promise. When ozone is prescribed with the proper concentration, timing, and delivery into root canals following conventional cleaning, shaping, and irrigation, it is beneficial. The literature has frequently reported on the possible use of ozone gas, ozonated water, and ozonized oil in endodontic therapy. The anaerobic odor coming from infected teeth can be significantly reduced by using ozonized oils as an intra-canal dressing or ozonated water as an intracanal irrigant in necrotic canals that are infected. Ozone promotes bone healing and tissue regeneration when used as an irrigant.

Enamel and dentin can be worn away by tooth structure loss brought on by a variety of reasons, including attrition, abrasion, erosion, and trauma from occlusion, which can result in hypersensitivity. Ozone application is a good way to lessen root sensitivity in addition to exposed enamel and dentin discomfort. Ozone starts the process of removing the smear layer and widens and opens the dentinal tubules. When ozone is applied, sensitivity is immediately terminated and lasts longer than when using conventional techniques.

The use of ozone is essential in the discipline of periodontics. Gram-positive and gram-negative oral bacteria as well as oral C. albicans could be killed by ozonated water. This is indicative of its capability to manage contagious germs in tooth plaque. Before scaling and root planing, ozone has also been used successfully as a pretreatment rinse to irrigate periodontal pockets. Additionally, patients with acute necrotizing ulcerative gingivitis responded better to ozonated oils.

Ozone therapy has been reported to be an effective treatment for many soft tissue lesions, including aphthous ulcers and herpes labialis. The accelerated healing abilities of ozone are responsible for this use.

Numerous microorganisms, most notably C. albicans, frequently live inside dentures. Effective denture plaque control should be started to stop such results since denture stomatitis, a manifestation of plaque collection on the surface of the denture is frequently seen in clinical practice. Ozone as a denture cleanser is one effective way to achieve this. Ozone can be used to clean removable partial denture alloys without affecting their physical characteristics.

Ozone therapy offers a wide range of uses in oral surgery, including simple extractions, treatment of severe jaw infections, and osteotomies. The release of oxygen into the tissues is facilitated by ozone, which also improves numerous erythrocyte characteristics and speeds up wound healing. It has been demonstrated and concluded in the literature that using ozone successfully in cases of temporomandibular joint arthrocentesis is an efficient conservative method for treating internal derangement. Additionally, ozone has been suggested as a therapeutic intervention for jaw osteonecrosis caused by bisphosphonates.

The use of ozone therapy in pediatric settings is primarily supported by the fact that applying ozone is a rapid, simple, painless, and effective technique. These elements of the therapy significantly increase patient compliance and treatment tolerance while also improving operator efficiency. The key to a successful pediatric treatment, which can be very successfully accompanied by employing ozone therapy, is developing a positive rapport with a child patient.

Diffuse opacity is the most frequent type of enamel opacity known to have damaged teeth bonded with bonding material after orthodontic treatment. Additionally, noticeable white spot lesions have been observed to appear 4 weeks after orthodontic treatment.

Ozone is a harmful gas that should not be inhaled, as this should be remembered. Ozone can cause severe damage to the eyes and lungs. Because of this, prolonged exposure to ozone can cause some side effects, including epiphora, irritation of the upper airways, bronchoconstriction, rhinitis, cough, headaches, and vomiting, depending on the duration of the exposure.

Ozone can be a promising medicinal agent in the field of dentistry, according to scientific investigations. Ozone has atraumatic applicability and antibacterial benefits, but it also carries a hazardous risk and can have catastrophic repercussions if used incorrectly. Because of this, many physicians approach ozone with suspicion. Based on the research done thus far, it can be concluded that ozone can be utilized in addition to dental therapies as well as treatments like local antibiotics and antiseptics. As a result, more clinical research on ozone therapy needs to be done, and clear guidelines need to be established. Ozone needs more research, though, before it can be used regularly in dental procedures [1-10].

Bibliography

1. Bocci VA. "Scientific and medical aspects of ozone therapy. State of the art". *Archives of Medical Research* 37.4 (2006): 425-435.

2. Azarpazhooh A and Limeback H. "The application of ozone in dentistry: A systematic review of literature". *Journal of Dentistry* 36.2 (2008): 104-116.

3. Saini R. "Ozone therapy in dentistry: A strategic review". *Journal of Natural Science, Biology and Medicine* 2.2 (2011): 151-153.

4. Tiwari S., *et al*. "Dental applications of ozone therapy: A review of literature". *The Saudi Journal for Dental Research* 8.1-2 (2017): 105-111.

5. Nogales CG., *et al*. "Ozone therapy in medicine and dentistry". *The Journal of Contemporary Dental Practice* 9.4 (2008): 75-84.

6. Baysan A., *et al*. "Antimicrobial effect of a novel ozone-generating device on micro-organisms associated with primary root carious lesions *in vitro*". *Caries Research* 34.6 (2000): 498.

7. Holmes J. "Clinical reversal of root caries using ozone, double-blind, randomised, controlled 18-month trial". *Gerodontology* 20.2 (2003): 106-114.

8. Tessier J., *et al*. "The use of ozone to lighten teeth. An experimental study". *Acta Odontológica Latinoamericana* 23.2 (2010): 84-89.

9. Stubinger S., *et al*. "The use of ozone in dentistry and maxillofacial surgery: A review". *Quintessence International* 37.5 (2006): 353-359.

10. Batinjan G., *et al*. "The use of ozone in the prevention of osteoradionecrosis of the jaw". *Saudi Medical Journal* 35.10 (2014): 1260-1263.