More Than Just A Layer: How Ozone is Used in Dentistry

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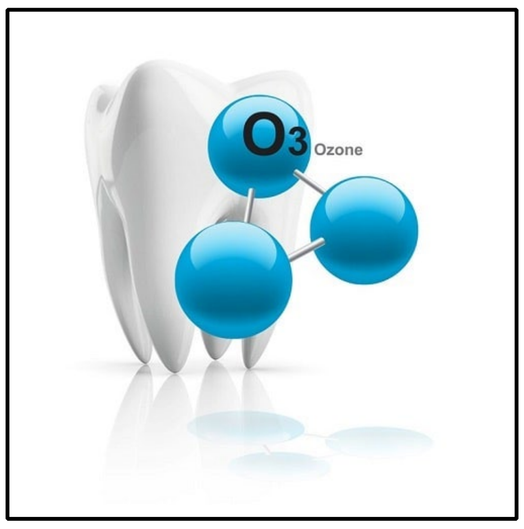
What is Ozone?

Ozone was discovered in 1840 by Christian Friedrich, thus making him the "Father of Ozone" (Naik et al., 2016). Ozone is an unstable blue-colored gas with 3 atoms of oxygen in a circular structure. An ozone mixture contains 95%-99.95% oxygen and 0.05%-5% pure oxygen (Malik et al., 2020). Among the forms of ozone are gas, oil, and liquid aqueous solution. Ozone possesses a number of properties which include a potent reparative agent for pulp tissue, antimicrobial, immune stimulator, vasodilator, and it is completely biocompatible. The non-invasive, non-traumatic, and painless nature of ozone therapy makes it more appealing to patients. However, it is impossible to store ozone for long periods of time because within 1 hour, only half of the mixture remains ozone.



Forms of Ozone

- **Gaseous Ozone**
  - Has the ability to go deep and reach the surface of carious dentin, dentinal tubules, and even accessory root canals where local application of antibiotic or disinfectant cannot reach (Sen & Sen, 2020).
- **Ozonated Aqueous Solution**
  - Best irrigation solutions for gingival sulcus, periodontal pockets, and during removal of infected debris in root canal of tooth (Sen & Sen, 2020).
  - Can be used as a preprocedural mouth rinse for the patient undergoing dental treatment to disinfect their oral cavity (Sen & Sen, 2020).
  - Can be used in the water supply to dental chair, piezo reservoir, and during ultrasonic scaling procedure (Sen & Sen, 2020).
- **Ozonated Oil**
  - Occurs naturally in plant extracts. Ozonated oils suchs as *Oleozone* & *Brioperoxoil* are great against Staphylococci, Streptococci, Enterococci, Pseudomonas, Escherichia coli, and Mycobacteria (Malik et al., 2020).

Associated Risks

- **Contraindications include:**
  - Pregnancy, hyperthyroidism, severe myasthenia, severe anemia, immunocompromised patients, glucose 6 phosphate dehydrogenase deficiency, alcohol intoxication, myocardial infarction, hemorrhage, and ozone allergy (Sen & Sen, 2020).
- **Complications with using ozone:**
  - Ozone is a very unstable gas. If there is any oxygen within the mixture during the formation of ozone, it will immediately become toxic nitrogen dioxide. It cannot be stored and must be used immediately (Suh et al., 2019) (AlZarea, 2019).
  - If ozone is not used correctly, it can cause pulmonary complications (Suh et al., 2019).
- **Risk with Gaseous Ozone Application:**
  - Epiphora, rhinitis, coughing, headache, nausea, and vomiting (Suh et al., 2019).

How is it used in dentistry?

- **Today ozone therapy has shown a high success rate in managing various dental issues such as**:
  - Wound healing
  - Dental Caries
  - Oral lichen planus: chronic inflammatory condition of the oral mucosal tissue
  - Gingivitis
  - Periodontitis
  - Dentin hypersensitivity
  - Plaque and biofilm reduction
  - Halitosis
  - TMJ Disorders

(Suh et al., 2019)

Conclusion

- Ozone therapy is a new topic in dentistry and with further research and experimentation it will be a major asset to incorporate into daily dental treatment in the future.
- There are many different forms of ozone such as gas, aqueous solution, and oil that can be used in dental treatment. It is not one size fits all. Hence, it can be used to treat various health conditions
- It's been proven to accelerate periodontal wound healing due to its stimulations of Cytokines Beta 1.
- It is important for dental professionals to be aware of the benefits of incorporating ozone therapy into treatment to improve the patients overall oral health.

References

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