

## Ozone Therapy in the Treatment of Periodontal Disease

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The main goal of the conventional periodontal therapy is to control infection and thereby curb disease progression. The mechanical removal of the oral biofilm and adjunctive use of antimicrobial agents have been the conventional methods for periodontal therapy. However, no consensus has been reached on whether conventional periodontal therapy can eliminate periodontal pathogens.<sup>1-3</sup> It has been known that medical ozone therapy eliminated 260 different pathogens. Thus, applications of medical ozone may provide a potential benefit in the treatment of periodontal diseases by reducing and eradicating subgingival periodontopathogenic species in inaccessible sites.<sup>4-11</sup>

Applications of medical ozone are a new treatment modality that has been developing rapidly

within various medical specialties since the 1930s. In 1933, Dr. E.A. Fish, first used ozone on a regular basis in his dental practice, and published numerous papers on the subject.<sup>4,8</sup> Ozone (O<sub>3</sub>) is a triatomic molecule, consisting of three oxygen atoms. It is an unstable gas and quickly gives up nascent oxygen molecule to form oxygen gas. It is naturally produced by the photo dissociation of molecular oxygen (O<sub>2</sub>) into activated oxygen atoms, which then react with further oxygen molecules.<sup>12-14</sup> Medical ozone is made from pure medical oxygen. It is produced commercially in ozone generators, which involves sending an electrical discharge through a specially-built condenser containing oxygen. Due to the property of releasing nascent oxygen, it has been used in human medicine as an antimicrobial agent against bacteria, viruses, fungi, and protozoa. This effect of ozone is a result of its

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action on cells by damaging its cytoplasmic membrane due to ozonolysis of dual bonds and also ozone-induced modification of intra cellular contents (oxidation of proteins loss of organelle function) because of secondary oxidants effects. This action is non-specific and selective to microbial cells; it does not damage human body cells because of their major antioxidative ability.<sup>14</sup> In the addition, there are several known actions of ozone on human body, such as stimulating of micro-circulation, immunostimulating and analgesic, antihypoxic and detoxicating, bioenergetic and biosynthetic (activation of the metabolism of carbohydrates, proteins, lipids) etc.<sup>12-16</sup>

While ozone has been evaluated by many clinical studies, the recent studies have reported controversial results about the benefits of its for periodontal treatment. Some current studies showed that a number of the periodontal pathogens are susceptible to medical ozone, suggesting that it is advantageous for conventional periodontal therapy<sup>4-11</sup>, whereas others reported that adjunctive use of ozone showed no significant benefits.<sup>17-20</sup>

The some systematic reviews conclude that the inclusion of the ozone as an adjunct to conventional periodontal treatment seems to be therapeutically useful.<sup>12-16</sup> Therefore, ozone when used as an adjunct to conventional periodontal therapy kills more bacteria than when conventional periodontal therapy is used alone. Further studies are required to investigate efficacy and cost benefits of this treatment modality.

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