Ozone Treatment of a Combined Lesion in a Localized Aggressive Periodontitis Patient: A Case Report

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Abstract
Aggressive periodontitis is a severe destructive form of periodontitis. In this case-report, we present successful treatment of combined lesions in a localized aggressive periodontitis patient. 32 year old male patient was referred to Gaziosmanpasa University Faculty of Dentistry Department of Periodontology. Patient was diagnosed based on intraoral and radiographic examination. After intraoral examination, root-canal treatment was indicated for a combined lesion at maxillary right first molar tooth. Clinical attachment loss was 10 mm. In order to increase efficacy of treatment, disinfection of periodontal pockets with ozone were performed. Patient was recalled at 4th week, 3rd month and 1st year. At 1 year follow up appointment, no bleeding on probing, sign of inflammation or pus formation was observed. Clinical attachment loss decreased from 10 mm to 5 mm. Pocket disinfection with ozone might be useful in treatment of combined lesions.

Keywords
Aggressive periodontitis; Endodontic-periodontal lesions; Gaseous ozone

Introduction
Periodontitis is a chronic infectious disease characterized by tissue destruction in periodontal tissues. It starts with the localized inflammatory reaction of gingival tissue against microorganisms in dental plaque. With the progress of inflammation, alveolar bone destruction, pocket formation and/or gingival recession occur. Loosening of teeth, occasional pain, disrupted chewing function, discomfort and even tooth loss might also occur [1, 2].

Aggressive periodontitis (AgP) is a severe, destructive, progressive form of periodontitis which affects only systemically healthy population. The age of onset of the disease is generally under 35 years of age. Localized form of AgP (LAGP) usually begins in adolescence and first molars and central incisors are the main teeth affected by the disease. LAGP is characterized by the localized distribution of the lesions and in order to be classified as LAGP, maximum two teeth other than these have to be affected [1]. Destructive and progressive nature of LAGP generally cause severe clinical attachment loss (CAL) and pocket formation. In some cases the destruction reach the apical area of the relevant tooth and even cause periapical lesions. These lesions are called combined lesions and in these cases along with periodontal treatment, root-canal treatment is also mandatory. However not all the lesions involving apical area are caused by periodontal destruction. There are three types of combined lesions:

• Primary endodontic originated
• Primary periodontal originated and
• Real combined lesions which occur simultaneously

The pulp and periodontium are intimately related. As the tooth develops and the root is formed, three main avenues for communication are created: dentinal tubules, lateral and accessory canals, and the apical foramen. Endodontic lesion which has spread into the periapical tissues can connect to or mimic...
a periodontal lesion [3]. Whether the endodontic-periodontal pathway is also available in the opposite direction has long been a matter of speculation, with only a few studies having dealt with the matter. Findings have been very contradictory, as some researchers have reported substantial pathologic change and frequent necrosis in the pulp tissue due to periodontal disease, especially with the presence of lateral or accessory canals [4]. On the other hand, other investigators stated that pulps of the periodontally affected teeth remain healthy regardless of the severity of the periodontal lesion [5]. In contrast, Langeland et al. demonstrated that pathologic changes do occur in the pulp when periodontal disease is present; however, the pulp does not succumb as long as the apical foramen is not involved [6]. They suggested that periodontal disease rarely jeopardizes the vital functions of the pulp, unless the disease process has reached a terminal stage. Nevertheless, severe bone loss in LAgP might easily reach apical foramen, involve pulp tissue resulting in a combined lesion.

With an attempt to increase efficacy of periodontal treatment, certain antimicrobial agents have been studied over time. One of them is gaseous ozone which was reported to be used in dentistry for the first time at 1935 [7]. Until today, the indications of ozone were supporting hemostasis, increasing local oxygen supply and inhibition of bacterial proliferation [8]. Other than these, bactericidal, fungicidal and virucidal effects, immunomodulatory effects, antiinflammatory effects, biosynthetic, bio-energetic and analgesic effects were also reported [9]. Besides, atraumatic and biocompatible nature of ozone make it desirable as an adjunctive therapeutic agent for dental use.

In this report, a periodontally induced endodontic lesion in a young individual diagnosed with localized aggressive periodontitis is presented. The aim of this case report was to present the positive results of ozone disinfection procedure on combined lesion in conjunction to nonsurgical periodontal therapy and root-canal treatment in LAgP.

**Material-Methods**

A 32 year old male patient with complaints of gingival bleeding, gingival recession, tooth sensitivity and tooth mobility referred to Gaziosmanpasa University Faculty of Dentistry. Detailed medical and oral examination was performed. Patient was systemically healthy and was not under any medication. Oral examination showed that patient had severe periodontal destruction at central incisors and first molars. The patient was diagnosed as LAgP. Mean full mouth plaque index score was 1.7 and mean full mouth gingival index score was 2.0. There was 10.0 mm attachment loss, 8.5 mm periodontal pocket, pus formation and severe inflammation at tooth 16 (Figure 1). Vitality test showed that tooth was not vital and first degree mobility was observed.

Non-surgical periodontal treatment was performed and oral hygiene instructions were given. Root-canal treatment was also performed.

**Endodontic treatment**

With local anesthesia (Articain, Ultracain, Sanofi Drugs, Istanbul, Turkey), an access cavity was prepared. Tooth was isolated with rubber-dam and the root canal length was determined with an apex locater. Root canal was shaped with rotary Ni-Ti files (Dentsply, Maillefer, Ballaigues, Switzerland) using crowndown technique. Three times irrigations were performed with 2.5% NaOCl. Root canal filling was also performed in that session with AH Plus (Dentsply De Trey, Konstanz, Germany) and gutta-percha (Diadent, Chongju, Korea) using lateral condensation technique.

**Topical ozone application**

A gaseous ozone generator was used for topical ozone application (Ozonytron, MIO International Ozonytron GmbH, München, Germany) (Figure 2). This device has a special tip for intra-pocket placement and subgingival application. The application was performed according to the manufacturer’s instructions. Gaseous ozone was applied and excess ozone was aspirated.
Ozone administrations were repeated 3 times. Firstly; immediately after scaling and root planning, secondly; one day after first application and thirdly; immediately after root-canal treatment. Patient was recalled 4 weeks, 3 months and a year after.

All treatment including non-surgical periodontal treatment, root-canal treatment and ozone applications were performed within one week.

**Follow-up**

Clinical examination was performed at the recall sessions of 4 weeks and 3 months. After a year follow-up, the final clinical attachment level of tooth decreased from 10 mm to 5 mm. There was no sign of inflammation, pus formation or endodontic lesion (Figure 3 and Figure 4).

**Discussion**

Periodontal diseases are major causes of tooth loss in adults. Periodontal therapy aims to eliminate or reduce bacterial colonization of periodontopathogenic bacteria. However, elimination of these pathogens and complete removal of etiological factors with sole mechanical debridement is not possible especially in severe and progressive forms of disease such as LAgP. Scaling and root planning is not enough to achieve a successful treatment outcome in LAgP and periodontal surgery is a single-shot weapon which we can only use once or twice at most. In this regard, adjunctive agents increasing the success of nonsurgical therapy could be a life saver.

With low cost, reproducible applications and easy access, ozone is a reasonable choice for supporting mechanical debridement. Ozone was also shown to be effective against major periodontopathogenic bacteria such as *A. actinomycetemcomitans* and *P. gingivalis* [9]. Sigrun et al. has shown that ozone has strong antibacterial efficacy against periodontopathogenic bacteria and might be a useful tool as an adjunctive agent [10].

**Conclusions**

In this case report, we observed that subgingival ozone application in 3 sessions provided an improvement in clinical parameters of a deep periodontal pocket. Ozone has no side effects in aforementioned applications and might help improving the prognosis of teeth with severe periodontal loss. As a result we can suggest that topical ozone application might be used before periodontal surgery and it may delay the need for surgery.

**Reference**

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