



# The effects of subgingival application of ozonated olive oil gel in patient with localized aggressive periodontitis. A clinical and bacteriological study

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Received 17 January 2014; revised 1 April 2014; accepted 1 April 2014

Available online 20 May 2014

## Abstract

This study evaluates the effect of subgingival application of ozonated olive oil gel as an adjunct to scaling and root planing (SRP) in aggressive periodontitis.

**Material & methods:** Thirty patients were randomly selected and equally divided into: Group I received SRP only, group II received SRP and ozonated olive oil gel (*Oxactiv*). Subgingival application of ozone gel was performed following initial SRP and at 7, 14 and 21 days. Clinical measurements included pocket depth (PD), plaque index (PI), gingival index (GI), bleeding on probing (BOP) and clinical attachment level (CAL). Real time PCR was carried out to determine the effect of the treatment on both *Aggregatibacter actinomycetemcomitans* (*Aa*) and *Porphyromonas gingivalis* (*Pg*). Clinical measurements and Plaque samples for PCR were recorded at baseline, one, three and six months after treatment.

**Results:** The results showed improvement in all clinical parameters in (group II) which was maintained up to six months ( $P < 0.05$ ). However, this improvement was best following one month but gradually decrease at 3 and 6 months. Whereas SRP alone resulted in a significant improvement only up to one month for BOP, PPD and CAL parameters and up to three months for the PI and GI scores as compared to baseline values.

**Microbiological results:** Revealed significant reduction of the mean *Pg* and *Aa* DNA copies at 1 and 3 months for (group II), whereas group I resulted in slight reduction up to 1 month only followed by gradual increase reaching baseline values. There was no significant difference between groups at three and six months regarding *Pg* DNA copies. There was a significant difference between groups at the one and three months periods in term of number of *Aa* copies ( $P < 0.001$ ,  $P < 0.05$  respectively).

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Peer review under the responsibility of the Faculty of Dentistry, Tanta University.



**Conclusion:** The study concluded that (*Oxactiv*) gel could be a promising adjunct to SRP in the treatment of aggressive periodontitis.

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**Keywords:** Ozone; Aggressive periodontitis; SRP

## 1. Introduction

Currently, ozone therapy is gaining popularity as a modern non-invasive method of treatment [1]; it is a powerful oxidizing agent with a high antimicrobial power against oral pathogens, without resistance development has been reported not only for gaseous ozone [2,3], but also for ozone in aqueous [4–7]. It is used in various treatment modalities in field of medicine, dentistry, veterinary, food industry, and water treatment. Ozone is being discussed in dentistry as a possible alternative oral antiseptic agent. Its A high level of biocompatibility to fibroblasts, cementoblasts, and epithelial cells [8,5,6,9] suggests its use against oral infectious diseases [3,10].

Ozonated olive oil (*Oxaktiv*) is pure olive oil that has undergone ozonation using a steady flow of ozone–oxygen mixture in the ratio of 5:95% until olive oil transforms from the greenish-colored liquid status to the whitish gel status [11]. Due to the germicidal action of ozone, as well as its oxygenating power, that favors tissue regeneration, it was applied in the treatment of alveolitis following surgical extraction of the lower third molar [12].

Aggressive periodontitis encompasses distinct types of periodontitis that affect people who are otherwise appear healthy [13,14]. It is characterized by familial aggregation and there is a rapid rate of disease progression [15]. An important factor in the pathogenesis of AgP is the infection of the periodontium by pathogenic bacteria which acts as a primary etiologic agent in this disease [16]. Individuals with aggressive periodontitis are usually infected by a gram-negative anaerobic rod species [17]. Its etiology is highly correlated to the presence of *Aggregatibacter actinomycetemcomitans* [18,19], host response defects [20,21], and possibly to genetic inheritance [22,23].

Moreover, studies demonstrated that there are different microbial associations in subgingival plaques *Tannerella forsythia* (*T. forsythia*), *Porphyromonas* seem to be related to the progression of periodontal destruction in aggressive periodontitis [24,25]. Due to the complexity of the aggressive periodontal diseases with regard to systemic factors, immune defects and microbial

flora, control of the disease may not be possible in all instances. Additionally, it has the potential to cause tooth mobility and pathological tooth movement, thus effective treatment and management of those affected are necessary to slow the disease progression [26–28].

The topical application of ozone has been used in management of periodontitis but the literature regarding the direct effect of ozone on the oral tissues is still obscure [29]. This stimulated the idea of the present work in studying the effect of using ozonated olive oil gel as an adjunctive treatment to scaling and root planing as compared to scaling and root planing alone in the treatment of localized aggressive periodontitis.

## 2. Material and methods

In the present study, 30 subjects with localized aggressive periodontitis (21 females and 9 males) whose ages ranged from 21 to 30 years were selected from Periodontology Department clinic, Faculty of Dentistry, Tanta University according to the criteria outlined by Carranza (1998) [30]. Panoramic X ray was done for each patient to confirm the diagnosis. All the selected subjects were ascertained to be in good general health with no history of any systemic disease (hyperthyroidism, glucose-6-phosphate-dehydrogenase deficiency, severe myasthenia) [31] and no history of antibiotic therapy, oral prophylaxis, or periodontal surgery during the last six months. Pregnant or lactating females as well as smokers were excluded, and a written consent was signed by the patients.

### 2.1. Clinical parameters

The clinical examination was carried out with a manual probe (Williams 14 W) from the deepest pocket for each patient. The following clinical measurements were recorded: Plaque index (PI), assessed according to (Silness and Løe 1964) [32], Gingival index (GI), according to (Løe and Silness 1963) [33], Bleeding on probing (BOP) according to (Ainamo and Bay, 1975) [34], Probing depth (PD) according to (Ramfjord, 1967) [35], Clinical attachment level (CAL) according to (Ramfjord, 1967) [35]. Baseline

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