



Clinical Evaluation of Application of Oxygen Releasing Gel as an Adjunct To Scaling and root planing In Chronic Periodontitis - A Case Report

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ABSTRACT

Periodontitis is amongst the most common inflammatory diseases which is initiated by the Gram negative anaerobic bacteria harbouring the subgingival biofilm region which poses a challenge to patients in performing oral hygiene procedures. It is characterized by connective tissue breakdown and attachment loss, pathological apical migration of the junctional epithelium leading to formation of pocket, mobility of tooth, and complete loss of tooth. Eliminating infections by conventional mechanical therapy helps in removal of subgingival plaque. The local drug delivery allows the therapeutic drug to be directly delivered at the diseased site (periodontal pocket) with minimal side effects. This is a case report showing use of oxygen releasing gel as an adjunct to scaling and root planning in the management of chronic periodontitis.

KEYWORDS: local drug delivery, oxygen releasing gel, chronic periodontitis.

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INTRODUCTION

Periodontitis is defined as a group of related diseases which out-turns in the desolation of the tooth supporting structure. It is initiated by oral microflora in biofilm leading to periodontal attachment loss. It is caused by colonisation of Gram negative anaerobic bacteria in the subgingival region where it is inconvenient for the patient to reach during oral hygiene practices [1-2].

Potential periodontal pathogens causing the disease are *Aggregatibacter actinomycetemcomitans*, *Porphyromonas gingivalis*, *Prevotella intermedia* which under hypoxia increases oxidative stress in periodontal ligament and induces a collapse of the protective mechanisms leading to the increase in reactive oxygen species (ROS) and progression of inflammatory oral diseases [3-4]. Eliminating these bacteria and preventing disease progression, is a primary goal of periodontal therapy. Conventional non-surgical therapy like, scaling and root planning (SRP) are aimed at disrupting the biofilm and maintenance for a long period [5].

Systemic and local antimicrobial drugs are used as an adjunct to mechanical periodontal therapy. Despite various advantages the systemic antibiotic therapy show various complications too. This increases the chances of development of resistance, alteration of commensal microflora and adverse effects like anaphylactic reaction, gastric disturbances, superinfection, nausea, vomiting, etc. The potential benefits of local drug delivery include better patient compliance, improved drug access to the site of disease and lower drug dosage with minimal side effects. The resident anaerobic bacteria in the periodontal pocket interact with the host inflammatory reactions leading to a lower oxygen or hypoxic environment.

The effectiveness of local delivery agents can be observed by visualizing the decreased gingival inflammation and reduced pocket depth clinically and suppression of pathogenic microbiota microbiologically. Oxygen releasing oral gel contains a unique formula based on active oxygen and lactoferrin in which both are powerful ingredients with a synergistic effect. The gel is easy to apply locally on troubled spots or wounds in the mouth.

CASE STUDY AND TREATMENT

A healthy 28-year-old male reported to the Department of Periodontics and Oral Implantology with a chief complaint of food lodgement in lower right back tooth region. The patient was otherwise healthy without any systemic disease and non smoker. Complete case history and oral examination of the patients

was taken into consideration and consent was signed before treatment. The periodontal pocket depth in 47 was 6mm(On distal aspect) (Fig.1). It was diagnosed as chronic localised moderate periodontitis. Plaque collection was done using curette and transferred into a sterile test tube which was sent to the laboratory for microbiological investigation (colony count for *P. gingivalis*). Complete mechanical therapy was performed along with oxygen releasing gel placement IRT 47 (Fig. 2) and then Oral hygiene instructions were given. It was packed with periodontal dressing to provide isolation to the area. Patient was then recalled after 1 month and 3 months and a marked reduction in pocket depth of 1 mm and 3 mm was seen respectively(Fig 3- 4). At 3 months plaque sample was collected again and sent was microbiological evaluation and significant reduction in colony count of *P.gingivalis* was seen at 3 months post operatively from baseline (Fig 5-6).



Fig1. Periodontal pocket depth at baseline



Figure 2: Gel delivery



Figure 3: Pocket depth at 1 month



Figure 4: Pocket depth at 3 months



Figure 5: *P. gingivalis* at baseline



Figure 6: *P. gingivalis* at 3 months post op

Figure 7: Blue M gel

DISCUSSION

Causes of periodontal pocket are: infection, calculus accumulation etc. Dr. Max Goodson et al in 1979 first gave the concept of controlled delivery for the treatment of periodontitis [6-10]. Periodontitis lesions are associated with a complex subgingival microflora which consists mainly of gram-negative bacterial species, of which the dark-pigmented organism *Porphyromonas gingivalis* is considered a major pathogen. *P. gingivalis* is a strict anaerobic, oral microorganism that is involved in periodontitis, endodontic infections, and odontogenic abscesses in humans [11-13]. *P. gingivalis* is infrequently isolated from individuals with healthy periodontia. Anaerobic culture is most commonly used to detect and quantify major components of the subgingival plaque and to determine the in vitro antimicrobial susceptibilities of oral pathogens [14-16]. Oxygen releasing gel has a unique formula that releases active oxygen radicals that help in reducing the hypoxia and killing the anaerobic bacteria.

CONCLUSION

This study exhibits that SRP help in reducing the periodontal pocket but any additional drug in the form of local drug delivery enhances the repair.

REFERENCES

1. Koul A, Kabra R, Chopra R, Sharma N, Sekhar V. (2020). Comparative evaluation of oxygen releasing formula (Blue-M Gel®) and chlorhexidine gel as an adjunct with scaling and root planing in the management of patients with chronic periodontitis –A clinico-microbiological study. *Journal of Dental Specialities*. 7(2): 111-117.
2. Oosterwaal P, Mikx F, Hof M, Renggli H.(1991).Comparison of the antimicrobial effect of the application of chlorhexidine gel, amine fluoride gel and stannous fluoride gel in debrided periodontal pockets. *Journal of Clinical Periodontology*. 18(4):245-251.
3. Niveda R, Kaarthikeyan G. (2020). Effect of Oxygen Releasing Oral Gel Compared to Chlorhexidine Gel in the Treatment of Periodontitis. *Journal of Pharmaceutical Research International*. ;75-82.
4. Boutaga K, van Winkelhoff A, Vandenbroucke-Grauls C, Savelkoul P. (2012). Comparison of Real-Time PCR and Culture for Detection of *Porphyromonas gingivalis* in Subgingival Plaque Samples. 41:4950-4954
5. Sadaf N, Anoop B, Dakshina B, Shweta B. (2012). Evaluation of efficacy of tetracycline fibers in conjunction with scaling and root planing in patients with chronic periodontitis. *Journal of Indian Society of Periodontology*. 16(3):392.
6. Ramesh A, Prakash A, Thomas B. (2016). Local Drug Delivery in periodontal diseases .A Review. *NUJHS*. 6(1): 74-79.
7. Kalsi R, Vandana K, Prakash S. (2011). Effect of local drug delivery in chronic periodontitis patients: A meta-analysis. *J Indian Soc Periodontol*. 15(4): 304-309.
8. Pragati S, Ashok S , Kuldeep S. (2009). Recent advances in periodontal drug delivery systems. *Int J Drug Deliv*. 1(14): 1-14.
9. Greenstein G, Polson A. (1998). The role of local drug delivery in the management of periodontal diseases: a comprehensive review. *J Periodontol* ;69(5):507-20.
10. Magnusson I. (1998). Local delivery of antimicrobial agents for the treatment of periodontitis. *Compend Contin Educ Dent*;9:19-24
11. Mittal S, Soni H, Sharma DK, Mittal K, Pathania V, Sharma S. (2015). Comparative evaluation of the antibacterial and physical properties of conventional glass ionomer cement containing chlorhexidine and antibiotics. *J Int Soc Prev Community Dent*;5(4):268-75.

12. Hugar SS, Patil S, Metgud R, Nanjwade B, Hugar SM. (2016). Influence of application of chlorhexidine gel and curcumin gel as an adjunct to scaling and root planing: A interventional study. J Nat Sci Biol Med6;7(2):149-54.
13. Fardal O, Turnbull RS. (1986). A review of the literature on use of chlorhexidine in dentistry. J Am Dent Assoc ;112(6):863-
14. Mohammadi Z. (2008). Chlorhexidine gluconate, its properties and applications in endodontics. Iran Endod J. ;2(4):113-25.
15. Dahiya P, Kamal R, Gupta R, Bhardwaj R, Chaudhary K, Kaur S. (2013). Reactive oxygen species in periodontitis. J Indian Soc Periodontol;17(4):411-6.
16. Jain M, Dave D, Jain P, Manohar B, Yadav B, Shetty N. (2013). Efficacy of xanthan based chlorhexidine gel as an adjunct to scaling and root planing in treatment of the chronic periodontitis. J Indian Soc Periodontol. ;17(4):439-43.

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