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Treatment of acute periodontal abscess using a biofilm decontaminant gel (HYBENX®) in patients on periodontal maintenance therapy: A case series

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Abstract

The aim of this present case series is to show the treatment effect of the biofilm decontamination approach on acute periodontal abscesses in patients on periodontal maintenance therapy. Five clinical cases showing acute periodontal abscess were treated using an oral tissue decontaminant material (HYBENX® gel) that contains a concentrated aqueous mixture of hydroxybenzenesulfonic and hydroxymethoxybenzene acids and sulfuric acid. The material was administered deep into the pocket on the root surface and left in the site for 30 seconds. No anesthesia was used and instrumentation was not performed before the treatment. All of the treated cases healed well and rapidly and 6 months post-operatively showed a significant reduction in probing depths, no bleeding on probing and minimal tissue recession.

Conclusion: From the present cases it can be concluded that this novel approach of Biofilm Decontamination using HYBENX® gel seems to be a very promising technique for the treatment of acute periodontal abscess, having an added advantage of avoiding the use of any systemic or local antibiotics.

Keywords: Periodontal abscess, decontaminant gel, periodontal maintenance

Introduction

Periodontal abscess is a local purulent infection of the periodontium, considered one of the few emergency conditions in periodontics requiring immediate care [1]. It is regarded as a health hazard not only because it can seriously compromise the affected teeth, but also because it is a major reservoir of bacteria that can spread and cause infections in other body sites [2]. Numerous therapeutic protocols have been proposed for the management of acute periodontal abscess includes establishing drainage via pocket lumen, sub gingival scaling root planing with curettage of infected tissue and administration of systemic antibiotics as an adjunct. However, these procedures are time-consuming, often painful to the patient and also there might be a risk of emergence of bacterial resistance with use of systemic antibiotics. Most of the patients even complain of dentinal hypersensitivity post-treatment of abscess due to tissue shrinkage on healing.

Recent pharmacological research on the treatment of biofilm induced diseases has shifted from the antimicrobial effect to the effects of substances that destroy the biofilm so that bacteria cannot survive. An Oral tissue decontaminant (HYBENX®, EPEIN Medical Ltd) (Figure.1) is a new and safe product developed which contains sulfonic/sulfuric acid solution has showed characteristic of contact desiccant since it has a strong affinity for water [3]. The chemical action is due to interaction between the sulphate group and water molecules. A sulphate group has strong negative surface charge, while water molecules show a positively charged surface on one side. A sulphate group tends to match up its large negative surface to the many positive surfaces of water molecules and become reversibly bound, forming hydrogen bonds, and thus acting as a strong desiccant (Figure.2) [4]. Thus desiccation of water in plaque biofilm matrix coagulates and shrinks the matrix and microbes. The biofilm material precipitates, contracts together and separates from the root surface, allowing eradication of plaque microbes.

The aim of this present case series was to validate the efficacy of this new therapeutic protocol

of Oral tissue decontaminant (HYBENX®) without any instrumentation and systemic antibiotics in the treatment of acute periodontal abscesses in patients on maintenance therapy.

Case Presentation

This present case series includes 5 patients (3 males and 2 females, aged 38 to 65 years; mean age: 49 years) who were on periodontal maintenance therapy, reported to the Department of Periodontics, with acute periodontal abscess. They were informed in detail about the nature of the planned treatment and signed a written informed consent. The patients presented with severe pain, impaired chewing function, gingival swelling and bleeding on probing (BOP), mild to moderate tooth mobility, pus and suppuration, probing depths (PDs) ranging from 7 to 11mm (Table 1). Patients allergic to sulphonated compounds, pregnant women and lactating mothers were excluded.

Therapeutic procedure

No local anaesthesia was used for this procedure. HYBENX gel was slowly administered deep into the pocket via the cannula attached to the syringe. The material was left for 30 seconds and then rinsed with copious water irrigation to visualize white dehydrated superficial tissues. No instrumentation was performed and no systemic antibiotics were prescribed.

The pain or discomfort experienced by the patients during the treatment was recorded using a Visual Analogue Scale (VAS) System.

All the patients reported after one week with decreased inflammation and no edema, pain and no adverse signs or symptoms related to the treatment. 3 and 6 months of follow up for assessment of therapeutic outcomes revealed significant reduction in probing depth, gingival bleeding and no or minimal gingival recession. (Table.1)

Discussion

Modern research has shifted from attacking the microbes directly with antiseptics or antibiotics to destroying the structure of the biofilm and thereby causing the death of the bacteria it contains [5]. A recently introduced Biofilm Decontaminant material (HYBENX gel) has shown to cause rapid and immediate dehydration and coagulation of the biofilm and the subsequent death of the bacteria. This action is due to the sulphuric acid component of the gel which has a strong affinity for water, causing rapid subtraction of water molecules from the biofilm matrix. The desiccation of matrix facilitates the removal of dental plaque, allowing the eradication of plaque microbes [4, 5].

On the basis of this knowledge, the efficacy of this material was tested in the treatment of acute periodontal abscesses. The lesions treated with this approach healed well and very quickly (within a week) with no adverse events. All the cases showed significant reduction in probing depth, no bleeding on probing. No or minimal gingival recession was seen which occurred as a consequence of the healing of the acute abscesses that were associated with a severe tissue swelling. However, patients did not complain of dental hypersensitivity during the follow up period. The Visual Analogue Scale (VAS) score recorded during the material insertion ranged from 0-2, suggested no or minimal pain or discomfort experienced by the patients.

However, the most important aspect of local application of the decontaminant material for the treatment of bacterial biofilm is that no systemic or local antibiotics were used in any of these cases. Avoiding the use of antibiotics in the treatment of periodontitis is an enormous step forward since the indiscriminate and repeated use of local antibiotics can lead to antimicrobial resistance that may be life-threatening for patients.

Table 1: Periodontal and Pain/Discomfort Assessment of the Treated Patients

Case. No	Probing Depth (PD) in mm			BOP			Gingival Recession (GR) in mm			VAS score for pain/ discomfort assessment
	B	3M	6M	B	3M	6M	B	3M	6M	
01	9	3	2	+ve	-ye	-ye	3	3	3	1
02	10	4	2	+ve	-ye	-ye	0	0	0	0
03	9	4	3	+ve	-ye	-ye	0	2	2	0
04	11	3	2	+ve	-ye	-ye	0	0	0	2
05	10	4	2	+ve	-ye	-ye	0	1	1	0



Fig 1: Oral Tissue Decontaminant™ HYBENX® gel, EPIEN Medical.

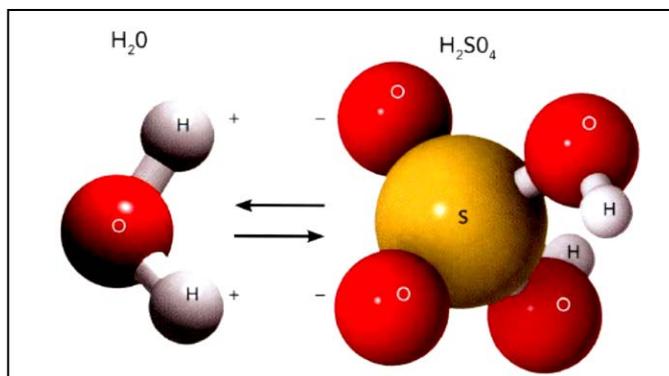


Fig 2: Interaction between sulfate group and water molecules. A sulfate group has a strong negative surface charge, while water molecules show a positively charged surface on one side. A sulfate group tends to match up its large negative surface to the many positive surfaces of water molecules (hydrogen bond).

Photographs
Case 1



Fig 3: Pre-operative Probing Depth (9mm)



Fig 4: Application of HYBENX gel deep into the sulcus and left in pocket for 30seconds.



Fig 5: Area of dehydration after gel application appeared for few minutes.



Fig 6: Post-operative healing of the treated lesion after one week



Fig 7: Post-operative Probing Depth (3mm) after 3months



Fig 8: Post-operative Probing Depth (2mm) after 6months

Case 2



Fig 9: Pre-operative Probing Depth (11mm)



Fig 10: Post-operative Probing Depth (2mm) after 6months.

Case 3



Fig 11: Pre-operative Probing Depth (9mm).



Fig 12: Post-operative Probing Depth (3mm).

Case 4



Fig 13: Pre-operative Probing Depth (11mm).



Fig 14: Post-operative Probing Depth (2mm).

Case 5



Fig 15: Pre-operative Probing Depth (10mm).



Fig 16: Post-operative Probing Depth (2mm).

Conclusion

From the presented case series it can be concluded that the use Oral Tissue Decontaminant (HYBENX gel) seems to be very promising and minimally invasive technique for treatment of acute periodontal abscess, avoiding the use of systemic or local antibiotics. However, further controlled and randomized studies need to be carried for further evaluation.

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