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Case Study

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PHARMACOTHERAPY OF CHLORHEXIDINE CHIP ON MICROORGANISMS IN PERIODONTITIS: A CASE REPORT

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ABSTRACT

Conventional scaling and root planning (SRP) may not completely remove the putative periodontal pathogens; systemic antimicrobials with their adverse effects are replaced by local antimicrobials, producing therapeutic effect in sub-gingival sites. This presentation renders a case of periodontitis which was treated with chlorhexidine chip as a local drug and clinical parameters as well as qualitative assessment of red complex organisms in sub-gingival plaque samples were assessed at base line, tenth and thirtieth day. The significant effective end result was found only on thirtieth day on red complex organisms.

KEYWORDS: Chlorhexidine, local drug, Periodontitis, Red complex bacteria.

INTRODUCTION

The microorganisms which are in the form of colonies affect the ecology of oral cavity. Total elimination of sub-gingival bacteria may not be achievable with conventional periodontal therapy, due to tissue invasiveness. The affective therapy found was the systemic antibiotics but due to the adverse effects and reduced local action questioned its usage. To counter balance this, local drugs were introduced, available in multiple forms as fibres, gels and chips etc.[1]

The Council on Dental Therapeutics of the American Dental Association[2] has accepted CHX as an antiplaque and anti-gingivitis agent. The success of CHX is due to the upstanding characteristics of safety, efficacy and the most considerable is substantivity has both bacteriostatic and bactericidal functions. CHX chip is very effortlessly insert able, and slow release action. Slow releases from these reservoirs were thought to create a bacteriostatic milieu around the teeth. Chlorhexidine possesses most of the characteristics of the ideal antimicrobial described by Van der Ouderaa.[3] Role of CHX chip on clinical parameters and action on red complex was studied and reported in this case report.

CASE REPORT

A 45 years old female patient reported to the Department of Periodontics, with a complaint of food lodgement in the lower left back tooth region for 1 year with no associated bleeding and pain. On clinical examination, there were deposits seen and the probing pocket depth noted was around 5mm (figure 1).

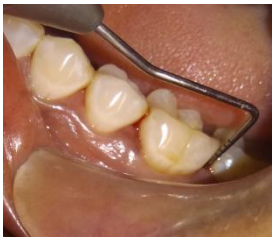

Fig. 1: initial pocket depth with 5mm.

PROCEDURE

Sub gingival plaque sample was collected with the help of curette (Hu-Friedy Mfg. Co., LLC3232N. RockwellSt.Chicago.) Transferred to a eppendorf tube (B1, Basement, Silver Oak Building, Near Mahavir Tower, Mahalaxmi Char Rasta, Mahalaxmi Paldi, Ahmedabad - 380051, Gujarat, India) containing transport medium before the oral prophylaxis to detect red complex organisms (Porphyromonas gingivalis, Tanerella forsythia, Treponema denticola).

After complete oral prophylaxis with the consent of the patient, a CHX chip (Periochip TM manufactured by Perioproducts Ltd, Jerusalem, Israel and is currently marketed in the US under the sponsorship of ASTRA. USA Inc.) Was inserted in the pocket (Fig:2) and a periodontal pack was placed. The patient was instructed to maintain oral hygiene and recalled after 10th day and

after 1month. Sub gingival plaque samples were collected on both recalled days that is on 10th as well as on 30th day. The samples were analysed for qualitative analysis of red complex through polymerase chain reaction (PCR).

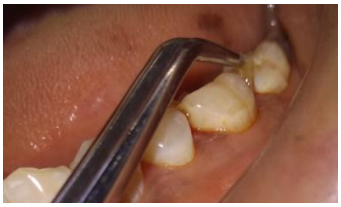

Fig. 2: Chlorhexidine chip placement.

The results showed the presence of Porphyromonas, Tanerella, and the absence of Treponema at baseline. After 10th day and after one month analysis showed the absence of all the organisms at the test site. Pocket probing depth was reduced from 5 mm to 3 mm (Fig 3).

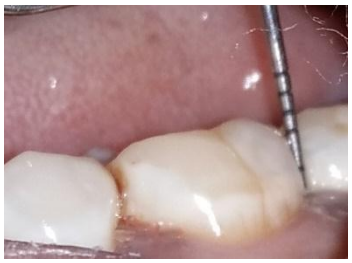

Fig. 3: Post treatment pocket reduction to 3 mm.

DISCUSSION

Periodontal pathogens are susceptible to a variety of antiseptics and antibiotics.[3] Several local drug delivery systems employed as monotherapies improved periodontal health. Methods employed to convey antimicrobial agents into periodontal pockets have included rinsing, irrigation, and local application using sustained and controlled delivery devices.[4] Success of any drug delivery system designed to target periodontal infections depends upon its ability to deliver the antimicrobial agents to the base of the pocket, at a bacteriostatic or bactericidal concentration. It must also facilitate retention of the medicament long enough to ensure an efficacious result. Numerous local drug transport products have undergone preliminary assessments.[5]

Development of resistance to Chlorhexidine is uncommon, Chlorhexidine adheres to organic matter and is considered a substantive drug. Sustained-release increases GCF drug concentration than in systemic therapy. Small chip composed of biodegradable hydrolyzed gelatin matrix, cross-linked with glutaraldehyde and also containing glycerin and water, into which 2.5 mg of chlorhexidine gluconate has been incorporated per chip. It is a FDA approved small, orange brown, chip measuring 4.0x 0.5x 0.35mm.[6] Slow release of therapeutic effect in oral cavity of chlorhexidine gives an anti-inflammatory action using gingival inflammatory action by reducing gingival inflammation.[7]

According to study done by Soskolne et al.[8] there was an initial peak concentration of chlorhexidine in Gingival Crevicular Fluid (GCF) at 2 hour after the chip was introduced. Slightly lower concentrations being maintained over next 96 hrs. Total degradation occurred between 7-10 days after insertion.

In this case report pocket probing depth moderate reduction from base line to tenth day and more reduction to thirtieth day was observed. But the putative red complex organisms' reduction was greater on 30th day.

At present there is limited data regarding local utility of CHX reduces the bacterial burden. Since mixed responses were found but enhancement of clinical parameters like pocket probing depth was seen.

CONCLUSION

Ideally, to attain the optimal benefit from local drug administration, it would be advantageous to know which bacteria need to be suppressed and if they are resistant to any antimicrobial agents. However, local drug delivery systems are usually empirically selected and this may contribute to unpredictable results.

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