

“Local drug delivery along with SRP in management of Periodontal Pocket.”

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Abstract:

Local drug delivery (LDD) in periodontitis is an effective antimicrobial therapy along with the mechanical instrumentation (SRP). After delivery of antimicrobial agent its concentration significantly exceeds the minimum inhibitory concentration (MIC) and remains in the periodontal pocket for a while. For almost more than 30 years LDD has been used along with the mechanotherapy (scaling and root planing ; SRP) and evaluated its potency. In the present case report we have taken tetracycline fibers as a local drug delivery (LDD) agent in the localized periodontal pocket after SRP and thorough curettage.

Keywords: LDD, SRP, Curettage, Localized Pocket, Tetracycline Fibers.

Introduction

Periodontitis is an infection of the periodontal apparatus which damages soft and hard tissues if not treated.⁽¹⁾ Periodontitis has a bacterial etiology and an immunologic response.⁽²⁾ Generally, the host response can sustain against the subgingival subclinical infections and bacterial challenges. It gets resolved without any clinical symptoms of the disease.⁽³⁾ If the host-parasite response gets disturbed it can destroy the healthy periodontium⁽⁴⁾. Basic or conventional therapy including scaling and root planing [SRP] and ultrasonic debridement without chemotherapy is sometimes sufficient to lower the bacterial infection and maintenance of periodontal health.^(5,6)

Adjunctive chemotherapies are often beneficial to enhance the result of mechanical instrumentation (SRP) or boosting outcomes of conventional therapy.^(7,8) Sometimes SRP alone may not reduce or eliminate the anaerobic infection at the base of the pocket or does not provide benefit to the structures which are inaccessible to periodontal instrumentation.⁽⁹⁾ To overcome this, SRP with antimicrobial agents can be an effective treatment modality in the localized periodontal pocket. Since systemic drug delivery has reduced patient compliance and increased drug toxicity acquired bacterial resistance, which limits its use.⁽¹⁰⁾

To deliver antimicrobial agents into periodontal pockets several procedures are required which include SRP, Curettage, irrigation, and native application using sustained(<24hrs) and controlled(>24hrs) drug delivery devices. The success of any drug delivery system is upon the

concentration of drug into the periodontal pocket.⁽¹¹⁾ It is easier for the confinement of the drug long enough to form efficacious results. Since local drug delivery is in a position to try and do the above requirements it is important to critically assess the ability of these treatment methods to achieve or maintain periodontal health.

The Concept of Local drug delivery is given by Dr.Max Goodson in 1979.⁽¹²⁾ In case of deeper pockets with bone defects, mechanical debridement along with some regenerative procedure can be planned whereas shallow pockets with horizontal bone loss can be managed By SRP and systemic or local antibacterial agents.

Application of local drug delivery agents into the localized periodontal pocket helps in the control of bleeding on probing, reduction of probing pocket depth, Stabilisation of attachment levels. If the patient has multiple deep pockets with considerable bone loss i.e. presence of active periodontal infection, It is indicated for surgical therapy however if the patient has localized or few pockets and stable periodontium (without bone loss) SRP along with LDD can be planned.

The commonly used drug delivery agents are:

- a) Tetracycline fibers
- b) Metronidazole gel
- c) Chlorhexidine chip
- d) Minocycline gel
- e) Doxycycline polymer

In this case report, the role of tetracycline fibers in periodontal therapy is assessed, as tetracyclines are broad-spectrum antibiotics and achieve high concentration in the

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sulcular fluid. Although some research article have mentioned about tetracycline concentration in the gingival crevice fluid varies gradually from patient to patient.¹² An important parameter of using tetracycline among antibiotics is that, they have antimicrobial action, and also have ability to inhibit the activity, intracellular expression of metalloproteinases (MMPs) (the zinc-dependent enzymes). The tetracycline fibers are marketed as periodontal plus AB (Trade name) which is tetracycline impregnated collagen fibers. Tetracycline fibers are resorbable and brownish. Tetracycline causes chelation of zinc (as well as calcium), which inhibits the activity of the collagenase enzyme. This action helps in the prevention of degradation of collagen in the periodontal ligaments and favors the reduction of gingival pockets and loss of tooth attachment.

Case report

A 32-year-old female patient visited the Department of Periodontics, Nair Hospital Dental College Mumbai. The patient complained of bleeding gums and pus discharge from the upper right posterior tooth region. Earlier examination revealed localized probing pocket depth i.e. PPD (6-7mm), bleeding on probing, and suppuration or pus formation at the right maxillary first molar. Mild gingival inflammation was observed. The patient was in good general health and without any deleterious habit.

Thorough oral prophylaxis was done and oral hygiene instructions were explained and demonstrated to the patient. The patient was asked to use 0.12% chlorhexidine mouthwash twice a day and kept on follow-up.

After phase 1 therapy (SRP) patient was assessed for treatment compliance and other parameters like BOP and PPD. BOP and suppuration were reduced but probing pocket depth (PPD) were almost 5-6mm in the maxillary 1st molar region. (Figure 1)



Figure 1: Probing pocket depth after phase 1 therapy.

Deep curettage (the scraping of the gingival wall of a periodontal pocket to remove diseased soft tissue) done with maxillary 1st molar and probing pocket depth measured. Pocket depth was found to be increased by 1mm indicating

removal of diseased soft tissue from the apical portion of the pocket. (Figure 2)



Figure 2: Probing pocket depth after Curettage

After curettage pocket irrigated with 0.2% chlorhexidine solution diluted with saline. Pocket isolated and tetracycline fibers were inserted into the pocket with the help of tissue forceps or curette. (Figure 3)



Figure 3: Insertion of tetracycline fibers.

Post Operative instructions given to the patient and asked not to brush or use floss on the treated areas to avoid dislodging of the tetracycline fibers. Also advised to rinse twice daily with 0.2% chlorhexidine mouthwash. A periodontal dressing was placed for 7 days and after that patient was kept on maintenance.

The follow-up did after 30 days of treatment. Probing pocket depth (PPD) was found to be approximately 2-3 mm, gingival status was found to be improved, and bleeding on probing (BOP) was not observed. (Figure 4)



Figure 4: Follow up after 30 Days.

Discussion

In mild-moderate periodontal diseases SRP alone can remove the plaque buildups but cannot reach the bottom of deeper pockets leaving behind the subgingival bacterias. If we combine SRP along with locally delivered broad spectrum antibiotics it will be helpful for reducing the bacterias from subgingival areas.^(13,14) The tetracyclines are broad-spectrum antibacterial agents which became an integral part of clinical practice in the late 1940s. Goodson et al observed that tetracyclines have major effect on periodontal microbes and clinical symptoms of the disease when placed into the gingival sulcus.⁽¹⁵⁾ Lindhe et al also found that tetracycline fibers can change the composition of microbial flora in subgingival region.⁽¹⁶⁾ These are bacteriostatic agents that are effective against many Gram-negative species like lactobacillus actinomycetamcomitans (AA). Rodrigues et al⁽¹⁷⁾ did a comparison of antibiotic resistance profiles with local and systemic tetracycline and proved that there are fewer chances of bacterial resistance with locally delivered tetracycline. There are few studies that explained that LDD with tetracycline fibers also has an important role within the treatment of peri-implantitis.⁽¹⁸⁾

Conclusion :

To conclude, SRP is an extremely efficacious treatment modality for controlling early to moderate periodontitis. Hence a combination of both (SRP and LDD) has beneficial contribution in the control of the periodontal disease. However LDD reduce the potential of developing antibiotic resistance and have a greater range of success in refractory lesions.

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