Chair Side Therapeutic Aids in Periodontics

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Abstract

Periodontal diseases are considered as infections of periodontium with a bacterial etiology, an immune response and subsequent tissue destruction .Non surgical and surgical pocket therapy as well as periodontal plastic surgeries are the two important branches of treatment modalities available in this field. This article is an appraisal of new materials used in periodontal therapy procedures which aid us in non-surgical techniques.

Key words: local drug delivery, periodontitis, tetracycline, metronidazole, chlorhexidine, minocycline ,doxycycline

Introduction

There are many treatment modalities available in treating chronic diseases of the periodontium which includes pocket therapy by non surgical means. The materials available in the market for these treatment modalities include various local drug delivery systems .

Local drug Delivery

Local drug delivery devices systems represent a variety of products that combine agents with vectors or devices that can be placed directly into periodontally diseased pockets [1]The advantage of using local therapy over systemic administration is that it may allow the application of antimicrobial agents at levels that cannot be reached by systemic route and may be suitable for agent ,ie antiseptics ,that are too toxic to be delivered by the systemic route. Also the requirements for treating periodontal disease include means for targeting an antinfective agent to the infection sites and sustaining its localized concentration at its effective levels for a sufficient time while evoking no side effects [2].Also the mechanical treatment may not predicatably eliminate the putative pathogens due to their ability to invade the periodontal tissues [3] Thus the various local drug delivery systems are used as an adjunct to scaling and root planing in the treatment of periodontal pockets along with the treatment of isolated pockets.

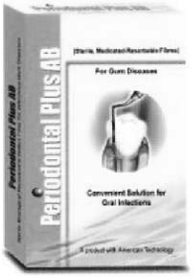
Indications For Local Drug Delivery

1. As adjunct to scaling and root planing in the treatment of chronic periodontitis[4]
2. In sites which do not respond to conventional therapy.
3. In pockets ranging from 5 mm or deep
   (a) In medically compromised or emotionally compromised patients (b) In isolated pockets

The available local drug delivery systems in periodontics include the following antibiotics and antimicrobial agents:-

(a) Tetracycline (b) Metronidazole
(c) Minocycline (d) Doxycycline
(e) Chlorhexidine

Tetracycline Preparations



1. Biodegradable fibers

- **Periodontal Plus Ab (**Advanced Biotech, India)

Periodontal Plus AB is a sustained drug delivery system with multi-modal delivery kinetics .A collagen fibril based formulation, contains tetracycline hydrochloride (2 mg of tetracycline) in 25 mg of collagen fibrils and provides continuous tetracycline for minimum 10 days[4] . By 6 to 12 weeks the collagen fibril itself dissolves and there is no trace of it left as the healing process completes

Method of Application

The fibers are moistened with a minimal water and are inserted into the periodontal pocket until the pocket is filled and COE pack is given[5]

2. Non biodegradable fibers

- **Actisite** (Proctar and Gamble,Cincinnati)

They are ethylene vinyl acetate fibers saturated with 25% tetracycline[6]

Actisite® Periodontal fiber for periodontal pocket placement consists of a 23 cm (9 inch) monofilament of ethylene/vinyl acetate copolymer, 0.5 mm in diameter, containing 12.7 mg of evenly dispersed tetracycline hydrochloride. Actisite® fiber provides continuous release of tetracycline for 10 days.When placed within a periodontal pocket, At the end of 10 days of treatment, all fibers must be removed. Fibers lost before 7 days should be replaced.

Method of Application

The fiber is placed in an overlapping pattern into the periodontal pocket until it fills the pocket 1mm apical to the gingival margin and a serrated cord packing instrument is helpful in fiber placement .Post operative instructions require the patient not to brush or floss in that area and rinse twice with chlorhexidine mouth wash.[7]

➢ **Minocycline Preparations**

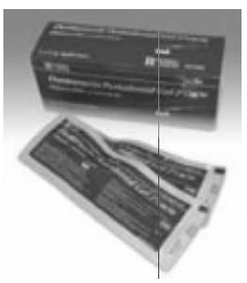
- **Arestin** (Orapharama Inc , USA)

2% minocycline hydrochloride microencapsulated in a bioabsorbable polymer of polyglycolide co-DL lactide.[8]

Method of Application

It is placed into the periodontal pocket using a disposable plastic cartridge (containing 1mg minocycline on a stainless steel handle by inserting tip to the base of the periodontal pocket and withdrawing it.

- **Dentomycin Gel** (Cynamid international Ledlre division ,Wayne,NJ) 2%w/v dentomycin



Method of Application

It is applied directly to the pocket base with its easy to use pre-filled applicator, so you can combat residual plaque and calculus in deep, irregular pockets

and molar furcations of the tooth. The active ingredient, Minocycline, binds to the surface of the tooth for simple adjunctive therapy. Simply by applying every 14 days over three or four applications, key periodontal pathogens will be significantly reduced.

- **Periocline** (Orapharma inc .USA)

Minocycline hydrochloride 2.1% w/v.It is supplied as a 0.5 mg injector, containing 20 mg minocycline hydrochloride and is used as an Ointment

➢ **Doxycycline Preparations**

- **Atridox** (Atrix laborataries inc. USA)

It is a Doxycycline gel 10%, It contains 450 mg of atrigel which is bioabsorbable composed of 36.7 % polylactide acid (PLA) dissolved in 63.3% NMP (N-methyl-2-pyrrolidone)[9]

Method of Insertion

It is supplied in a gel and is flown to the bottom of the pocket . The gel delivers sustained minimum inhibitory concentration levels of doxycycline for upto a 7 day period. Subsequently the gel biodegrades. A cause of concern is the release of acidic and necrotic monomers which are formed as a byproduct of the degradation of the gel. The gel will get completely resorbed by 8 to 10 week and the patient may be advised to remove any residual material with tooth brush and dental floss at the end of 1week[6]

Metronidazole Preparations

Elyzyol Gel (Product of Colgate Palmolive Ltd., UK) It is a metronidazole gel 25% W/V

Metronidazole gel 1g contains Metronidazole Benzoate corresponding to 250 mg Metronidazole

Method of Application

Elyzol dental gel is delivered into the gingival pocket. The composition of Elyzol dental gel is characterised by a melting point below body temperature, allowing it to flow freely when applied into the pocket thus assuring a good distribution[10]

➢ **Chlorhexidine Preparations**

- **Periocol CG (India)** *(*Eucare pharmaceuticals, Chennai)

Small orange shaped chip ,easy to insert, 2.5 mg of chlorhexidine gluconate in a sterile matrix of type 1 collagen The Size of the chip :-4.5*5.5mm[11]

Method of Insertion

The periodontal pocket is isolated and surrounding area is dried before the chip insertion and the chip is inserted with a tweezer to the maximum pocket depth and the chip biodegrades completely within 7-10 days .

- **Periochip** (Dexcel Pharma Inc., Edison, NJ)

PerioChip® (chlorhexidine gluconate) is a small, orange-brown, rectangular chip (rounded at one end) for insertion into periodontal pockets. Each PerioChip contains 2.5 mg of chlorhexidine gluconate in a biodegradable matrix of hydrolyzed gelatin[12] (cross-linked with glutaraldehyde). PerioChip also contains glycerin and purified water The size of the chip is 4*5*.35mm and weighs 7.4 mg

Method of Insertion

Grasp the chip with a suitable flat ended forcep and and insert the curved end first apically into the periodontal pocket .After insertion the chip should rest subgingivally at the base of the pocket

Chlosite (TRACOM Ltd.)

Chlorhexidine is present at a concentration of 1.5% of which 0.5% is in the form of fast releasing digluconate and 1% is in the form of slow releasing dihydrochloride[13]

Method of Insertion

Easily applied to the deepest portion of the periodontal pocket by means of a thin rounded-tip needle while continuing to extrude the material , the needle is slowly withdrawn until it reaches the superior margin of the pocket. It is available as 1 Syringe of 0.25 ml (5 applications),1 syringe of 0.5 ml (10 applications) and 1 Syringe of 1 ml (20 applications)

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