




Systemic antibiotics Vs Local antibiotics in the Treatment of Periodontal Diseases

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Guidelines for use of antibiotics in periodontal therapy

- ▶ 1. The **clinical diagnosis and situation** dictate the need for possible antibiotic therapy as an adjunct in controlling active periodontal disease
- ▶ 2. Continuing disease activity, as measured by continuing attachment loss, purulent exudate, and/or continuing periodontal pockets of $>_5$ mm, that bleed on probing, is an indication for microbial analysis and further periodontal therapy.
- ▶ 3. When used to treat periodontal disease, antibiotics are selected based on the microbial composition of the plaque, the patient's medical status and the current medications.

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- ▶ 4. Antibiotics have been shown to have value in reducing the need for periodontal surgery in patients with chronic periodontitis.
 - ▶ 5. Antibiotic therapy should not be used as a monotherapy. That is, must be part of the comprehensive periodontal treatment plan.
 - ▶ 6. Slots and co-workers have described a series of steps using antimicrobial agents for enhancing regenerative healing. They recommend starting antibiotics 1 to 2 days before surgery and continuing for a total of at least 8 days.

Systemic antibiotics

1- TETRACYCLINE

2- DOXYCYCLIN

3-METHRANIDAZOLE

4-AMOXICILLIN

5-AUGMANTINE

Tetracycline

Tetracycline is in the [tetracyclines](#) family of medications. It works by blocking the ability of bacteria to make proteins.

Tetracyclines have a broad spectrum of antibiotic action both [Gram-positive](#) and [Gram-negative](#)

Common side effects include

vomiting, [diarrhea](#), rash, and loss of appetite.

Other side effects include poor [tooth](#) development if used by children less than eight years of age,

[kidney problems](#), and [sunburning](#) easily.

Use during [pregnancy](#) may harm the baby.,



Clinical Usage:

Tetracyclines have been widely used in the treatment of periodontal diseases.

They have been frequently used in treating refractory periodontitis, including localized aggressive periodontitis

Doxycycline



is an antibiotic that is used in the treatment of a number of types of infections caused by bacteria and protozoa.

Doxycycline is a broad-spectrum antibiotic of the tetracycline class. Like other agents of this class it kills bacteria and protozoa by inhibiting protein production.

Common side effects include diarrhea, nausea, vomiting, a red rash, and an increased risk of a sunburn. If used during pregnancy or in young children may result in permanent problems with the teeth including changes in their color.

Its use during breastfeeding is probably safe.

Doxycycline 100-200mg Once daily for 21 days

Metronidazole

Flagyl is an antibiotic effective against anaerobic bacteria and certain parasites, and is believed to disrupt bacterial DNA synthesis.

Side Effects Metronidazole also inhibits

warfarin metabolism. Patients undergoing

anticoagulant therapy should avoid metronidazole because

it prolongs prothrombin time.



Clinical Usage.

Metronidazole has been used clinically to treat acute necrotizing ulcerative gingivitis, chronic periodontitis, and aggressive periodontitis.

It has been used as monotherapy and also in combination with both root planing and surgery or with other antibiotics.

The most commonly prescribed regimen is 250-500 mg tid for 7 days

Van Winkelhoff 1992, Microbiological and clinical results of metronidazole plus amoxicillin therapy in Actinobacillus actinomycetemcomitans-associated periodontitis. J Periodontol. **1992** Jan;63(1):52-7.

Methods:

- 118 patients with AA associated periodontitis. After ScRp, 250 mg Metro + 375 Amox, TID for 7 days

▶ **Results:**

- ▶ After treatment, A.a. could no longer be detected in 114 of the 118 patients (96.6%).
- ▶ Significant decrease in PDs and gain of CAL in most patients

Augmentine

The combination of amoxicillin with clavulanate potassium makes Augmentin

Common side effects include diarrhea, vomiting, and allergic reactions. It also increases the risk of yeast infections, headaches, and blood clotting.

It is relatively safe for use during pregnancy.



Clinical Usage

Augmentin may be useful in the management of patients with localized aggressive periodontitis.

Augmentin halted alveolar bone loss in patients with periodontal disease that was refractory to treatment with other antibiotics,

Slots and Ting 2002, Systemic antibiotics in the treatment of periodontal diseases. [Periodontol 2000](#). 2002;28:106-76.

- ▶ If microbiological testing is unavailable, metronidazole–amoxicillin combination therapy (250–500 mg of each, three times daily for 8 days) may be a reasonable antibiotic first choice in periodontics.
- ▶ **Metro + amox: the appropriate combination in 70% of advanced periodontics patients.**
- ▶ Metronidazole + amoxicillin 250 mg of each
Three times daily for 8 days

- ▶ locally delivered drugs are applied in the periodontal pocket when administered locally these agents can be found in greater concentrations in the **gingival crevicular fluid** (GCF) The general purpose is to reduce the number of bacteria present in the diseased periodontal pocket
- ▶ Notably some periodontal pathogens are able to invade periodontal tissues, thereby making mechanical therapy alone sometimes ineffective
- ▶ The local administration of anti-infective agents however, generally directly to the pocket, has remarkable potential to deliver higher concentrations directly to the infected sites and reduce possible systemic side effects

Local antibiotics

Tetracycline- containing fibers

Subgingival Doxycyclin

Subgingival Minocyclin

Subgingival Metronidazol

Chlorhexidine chips: Periochip

Tetracycline-Containing Fibers

25% tetracycline hydrochloride. 23 cm length, 0.5 mm diameter fiber.

When packed into a periodontal pocket, it sustained tetracycline concentrations exceeding **1300 µg/ml** for 10 days.

No change in antibiotic **resistance** to tetracycline was found after tetracycline fiber therapy

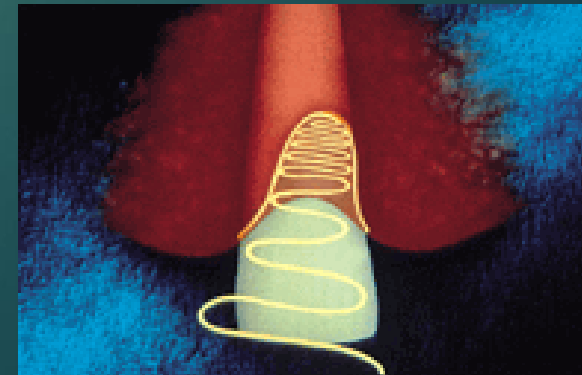
Disadvantages

length of time required for placement (≥ 10 minutes per tooth)

the considerable learning curve required to gain proficiency at placement

the need for a second patient appointment

oral **candidiasis** in a few patients.



Subgingival Doxycycline

- ▶ 10% Doxycycline hyclate gel
- ▶ Crevicular concentration of 1900-3000 μL for 1-7 days
- ▶ Two syringe system, liquid polymer and doxycycline powder.
- ▶ Approved by FDA as a stand alone therapy for reduction PD&BOP
- ▶ **The 2003 workshop on periodontics found significant improvement in CAL**
- ▶ **Garrett 1999**
 - ▶ 411 patients with moderate to severe chronic periodontitis
 - ▶ Doxycycline is equally effective as ScRp (0.7 -0.9 mm AL gain/Probing depth reduction 0.9-1.3 mm)



Subgingival Minocycline (Arestin)

Recently approved by FDA

locally delivered, sustained-release form of 2% minocycline gel

Improvements with minocycline gel include probing depth, clinical attachment level, and bleeding index.






Van Steenberghe 1993, Subgingival Minocycline Hydrochloride Ointment in Moderate to Severe Chronic Adult Periodontitis: A Randomized, Double-Blind, Vehicle-Controlled, Multicenter Study. J Periodontol. **1993** Jul;64(7):637-44.

- ▶ Subgingival minocycline ointment in pts with **moderate to severe periodontitis** resulted in:
 - ▶ At 12 weeks an additional pocket reduction of
 - ▶ 0.23 mm for pockets \geq 5mm
 - ▶ 0.93 mm for pockets \geq 7mm

Subgingival Metronidazole

- ▶ Contains 25% metronidazole.
- ▶ No additional improvements were detected, neither in the microbiological nor in the clinical data ,when scaling and root planing was combined with the metronidazole gel application (Novan. J Clin Periodontol 1997)



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- ▶ The AAP 2006 statement on local delivery antimicrobial agents as adjunctive therapy in the treatment of periodontitis reports that the clinician may consider its use for localized residual probing depth \geq 5 mm and inflammation after conventional therapies
 - ▶ Additional PD reductions in the range of 0.25-0.5 were achieved.

Local administration

Narrow effective range

High dose at treated site, low levels elsewhere

May act locally on biofilm associated bacteria better

Re-infection from non-treated sites

Infection limited to the treated site

Distribution pattern of lesions and pathogens,
identification of sites to be treated

Systemic administration

Wide distribution

Variable levels in different body compartments

May reach widely distributed microorganisms better

Systemic side effects

Requires good patient compliance

Identification of pathogens, choice of drug

Reference

- ▶ <http://www.trendsperioimplantresourcecenter.com/content/local-antibiotics-periodontal-therapy>
- ▶ Antibiotics and Antiseptics in periodontal therapy text book
- ▶ Van Winkelhoff 1992, Microbiological and clinical results of metronidazole plus amoxicillin therapy in Actinobacillus actinomycetemcomitans-associated periodontitis. J Periodontol. **1992** Jan;63(1):52-7.
- ▶ Slots and Ting 2002, Systemic antibiotics in the treatment of periodontal diseases. [Periodontol 2000](#). 2002;28:106-76.
- ▶ Van Steenberghe 1993, Subgingival Minocycline Hydrochloride Ointment in Moderate to Severe Chronic Adult Periodontitis: A Randomized, Double-Blind, Vehicle-Controlled, Multicenter Study. J Periodontol. **1993** Jul;64(7):637-44.

Thank
You

