Systemic antibiotics Vs Local antibiotics in the Treatment of Periodontal Diseases

BY: ABRAHEEM JAMAL ABRAHEEM & AYOUB NAGIBB BURWEISS
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.
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. Doxycycline
3. Metronidazole
4. Amoxicillin
5. Augmentine
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.

**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
Augmantine

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.
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.
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
Local antibiotics
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.

- 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 ≥ 5mm
    - 0.93 mm for pockets ≥ 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)
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.
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<th><strong>Local administration</strong></th>
<th><strong>Systemic administration</strong></th>
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<tr>
<td>Narrow effective range</td>
<td>Wide distribution</td>
</tr>
<tr>
<td>High dose at treated site, low levels elsewhere</td>
<td>Variable levels in different body compartments</td>
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<tr>
<td>May act locally on biofilm associated bacteria better</td>
<td>May reach widely distributed microorganisms better</td>
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<tr>
<td>Re-infection from non-treated sites</td>
<td>Systemic side effects</td>
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<tr>
<td>Infection limited to the treated site</td>
<td>Requires good patient compliance</td>
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<td>Distribution pattern of lesions and pathogens, identification of sites to be treated</td>
<td>Identification of pathogens, choice of drug</td>
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Antibiotics and Antiseptics in periodontal therapy text book


Thank You