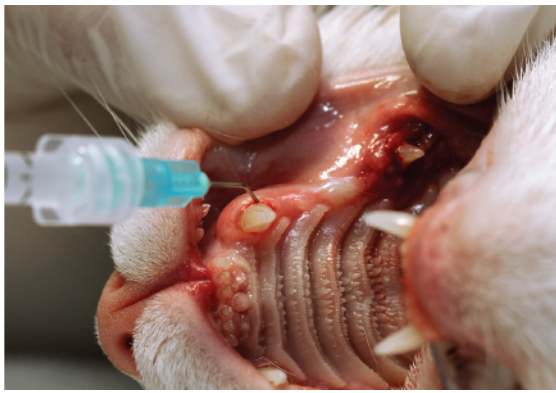


# Local Antimicrobials for Periodontal Disease

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Adjunct use of a locally applied antimicrobial is an option to salvage teeth with moderate to advanced periodontal disease.

An interaction between host defense mechanisms and plaque bacteria can lead to inflammation and attachment loss between the tooth and periodontal tissues (ie, gingiva, periodontal ligament, alveolar bone, cementum). Following the initial stages of gingivitis, there is attachment loss between the gingiva and the tooth and a space between the two develops. This space is known as the *periodontal pocket*.

If periodontal disease is untreated, deeper pockets form, bone loss results, and eventual tooth loss occurs. Periodontitis is chronic and progressive without a known cure; however, it is preventable and manageable.

Locally applied antimicrobial (LAA) agents can complement traditional scaling and root planing and can significantly improve treatment success, especially for reducing the pocket depth and regaining gingival attachment.

## Clinical Impact

LAA agents (see **Locally Applied Antibiotics**, next page) are slow-release products placed as a repository into a prepared periodontal pocket. These antimicrobial products contain either an antibiotic or antiseptic and are biodegradable. Although it is unrealistic to expect complete elimination of bacteria from the oral cavity, reduction in pathogenic bacterial load may contribute to the management of periodontal disease. These subgingival medications work by providing high concentrations of an antimicrobial, proven effective against periodontopathogenic bacteria, directly to diseased tissues. Local antibiotics for periodontal application contain either a tetracycline derivative or

MORE ►

LAA = locally applied antimicrobial

clindamycin; the only FDA-approved local antiseptic product contains chlorhexidine.

LAAAs help reduce or prevent reinfection while a pocket heals. Some agents also work by physically occupying a periodontal pocket and preventing bacterial invasion and foreign body deposition while tissue heals. Local antibiotics with tetracycline derivatives display not only antimicrobial properties but anticollagenase effects as well.<sup>1,2</sup> This property helps block tissue destruction and promotes repair. Local antibiotics with clindamycin offer the additional benefit of reducing the ability of bacteria to aggregate into large clumps.<sup>3</sup>

With use of an LAA, substantially higher doses of the drug can be dispensed in the periodontal pocket than what could be achieved by systemic dosing. For example, the first FDA-approved LAA was a nonresorbable polymer fiber saturated with tetracycline hydrochloride. Placement of this material into a periodontal pocket achieved local tetracycline levels of 1590 mg/mL. A local concentration of 30 mg/mL eliminates most pathogenic bacteria associated with periodontal disease. Despite the high doses of drug that were achieved locally, serum levels of the drug did not exceed 0.1 mg/mL.<sup>4</sup>

## Indications & Contraindications

LAAAs should only be used after intraoral radiography and dental charting have been fully evaluated. Local antimicrobial products are typically considered in dogs with periodontal probing depths  $\geq 4$  mm (normal sulcus depth, 0–3 mm). In cats, the ideal depth has not been established, but because normal sulcus depth is 0 to 1 mm,<sup>5</sup> placement of a local antibiotic can be considered in cats with pocket depths  $\geq 2$  mm.

Surgical intervention (ie, gingival flap repositioning, open-flap curettage, guided tissue regeneration) is generally required to

save a tooth in dogs with periodontal pockets deeper than 6 mm, as closed root planing is ineffective in cleaning pockets.

Caretakers should be informed of the commitment involved and that not all dogs receiving LAA therapy have successful outcomes. Following initial treatment, commitment to home plaque control is key. Depending on disease severity, a follow-up procedure in 3 to 6 months should evaluate response to therapy and provide additional indicated treatment. If the client is not committed to at-home and follow-up care, the most realistic and humane treatment for the pet may be to extract the affected tooth.

## Techniques & Equipment

The most important step in improving periodontal status is professional dental cleaning with meticulous subgingival removal of plaque and calculus. Subgingival debridement includes scaling and root planing (SRP) by manual instrumentation, ultrasonic scalers, or both. SRP is standard nonsurgical treatment for periodontitis.<sup>6</sup> If subgingival cleaning is not done, LAA application will not significantly benefit the patient. Of note, properly performed SRP is technique sensitive, and clinicians are encouraged to receive training from qualified individuals.

Once a pocket has been thoroughly cleaned and debrided, the LAA should be prepared and applied according to manufacturer recommendations. Most LAAAs can be introduced into a cleaned pocket site via blunt tip cannula. In contrast, chlorhexidine gluconate in the form of a small rectangular chip (PerioChip, periochip.com) should be placed using forceps.

After placement of the LAA, treated areas should not be brushed for 1 to 2 weeks, depending on the selected product. In some cases, an oral medicated rinse should be considered to help control plaque. Application of a polymer surface barrier to

**Table.**

**Locally Applied Antibiotics**

Agent	Species	Biodegradation	Physical Barrier	Anticollagenase
Minocycline hydrochloride	Humans	21 days	No	Yes
Clindamycin hydrochloride	Dogs, cats	7–10 days	Yes	No
Doxycycline	Dogs	3–6 weeks	Yes	Yes
Chlorhexidine gluconate	Humans	7–10 days	No	No

LAA = locally applied antimicrobial, SRP = scaling and root planing

## Products at a Glance

### Minocycline hydrochloride (Arestin, arestin.com)

Labeled for human use only, Arestin is a fine powder in a single-dose cartridge. The material is fairly easy to administer (**Figure 1**), is bioresorbable, and provides antibacterial activity against anaerobes and facultative anaerobes for 21 days.<sup>10</sup>

### Clindamycin hydrochloride (Clindoral, trilogicpharma.com)

Clindoral is introduced to the pocket via blunt tip cannula. As it warms to body temperature, it thickens to a gelatinous consistency. This bioadhesive matrix remains in place (potentially acting as a barrier against food particles and debris) and is then bioresorbed. Clindoral must be applied to thoroughly dried tissues; this can be problematic in the oral environment.

### Doxycycline (Doxirobe, pfizerah.com)

The active ingredient (doxycycline) is released at high concentrations locally and shows bacteriostatic activity against pathogens associated with periodontal disease. The gel-like material is introduced with a cannula and hardens to wax-like consistency when exposed to water or oral fluids. Most practitioners can overcome the set material's sticky nature with proper instruction and practice.

### Chlorhexidine gluconate (PerioChip, periochip.com)

PerioChip, a biodegradable, rectangular chip rounded at one end, is placed via forceps to its maximum depth into the cleaned pocket. The chip can be maneuvered further with a plastic instrument. The size of the chip limits application to periodontal pockets  $\geq 5$  mm deep.

1 Application of an LAA in a canine patient.





the teeth can be effective in plaque management. One product (OraVet, oravet.com) has been shown to significantly reduce plaque accumulation for up to 2 weeks following professional application.<sup>7,8</sup>

## Advantages

LAAs only require one anesthetic procedure for placement, as they are biodegradable. Depending on the type selected, products generally remain active for several days to weeks. Because the agents have minimal systemic absorption, there are no known systemic adverse effects. Different methods of product placement are generally easy and quick to use. In addition, product placement requires no additional home care.

## Disadvantages

General anesthesia is required for full oral evaluation, preparation of periodontal pockets, and placement of LAAs. Clients should be informed of the risks involved with general anesthesia. Although local agents are fairly affordable, clients should also be informed of the costs associated with their use. Follow-up care is necessary to improve and maintain the periodontal status.

Although LAAs are considered safe, potential adverse events may include discomfort at deposition site, tooth pain, erythema, and allergic responses.<sup>4</sup> Subgingival products should be avoided in patients with a history of hypersensitivity to the specific antimicrobial derivative.

To avoid interference with tooth development in dogs younger than 1 year of age or in the embryos of pregnant bitches, products with tetracycline derivatives should not be used.

## Efficacy

Improved success in reducing the periodontal pocket depth is a realistic expectation when using an LAA in conjunction with SRP (compared with SRP alone).<sup>9</sup> Therapeutic response highly depends on individual response, owner compliance in proper plaque control, and whether follow-up professional care is provided. Early detection, diagnosis, and treatment are essential for success.

LAA agents reportedly have a diversity of probing depth improvements, attachment level gains, decreased gingival bleeding scores, and improved gingival indices.<sup>9-14</sup> Generally, it is accepted that LAA treatment with SRP should help decrease or stabilize periodontal pocket depth. Positive changes can be noted in as few as 2 weeks following treatment but would be expected to diminish over time, requiring appropriate long-term plaque management and professional follow-up visits.<sup>12</sup> ■ **cb**

See Aids & Resources, back page, for references & suggested reading.

Find More



Look for **Periodontal Health: Causes & Consequences**

by Dr. Colin E. Harvey at [cliniciansbrief.com/periodontal-health-2012](http://cliniciansbrief.com/periodontal-health-2012)

## IVERHART MAX®

(ivermectin/pyrantel pamoate/praziquantel)

**Chewable Tablets**

**CAUTION:** Federal (US) law restricts this drug to use by or on the order of a licensed veterinarian.

**BRIEF SUMMARY:** Please consult package insert for complete product information.

**Indications:** For use in dogs to prevent canine heartworm disease by eliminating the tissue stage of heartworm larvae (*Dirofilaria immitis*) for a month (30 days) after infection and for the treatment and control of roundworms (*Toxocara canis*, *Toxascaris leonina*), hookworms (*Ancylostoma caninum*, *Uncinaria stenocephala*, *Ancylostoma braziliense*), and tapeworms (*Dipylidium caninum*, *Taenia pisiformis*).

**WARNINGS:** For use in dogs only. Keep this and all drugs out of reach of children. In safety studies, testicular hypoplasia was observed in some dogs receiving 3 and 5 times the maximum recommended dose monthly for 6 months (see Animal Safety). In case of ingestion by humans, clients should be advised to contact a physician immediately. Physicians may contact a Poison Control Center for advice concerning cases of ingestion by humans.

**PRECAUTIONS:** Use with caution in sick, debilitated, or underweight animals and dogs weighing less than 10 lbs. The safe use of this drug has not been evaluated in pregnant or lactating bitches.

All dogs should be tested for existing heartworm infection before starting treatment with IVERHART MAX Chewable Tablets, which are not effective against adult *D. immitis*. Infected dogs should be treated to remove adult heartworms and microfilariae before initiating a heartworm prevention program.

While some microfilariae may be killed by the ivermectin in IVERHART MAX Chewable Tablets at the recommended dose level, IVERHART MAX Chewable Tablets are not effective for microfilariae clearance. A mild hypersensitivity-type reaction, presumably due to dead or dying microfilariae and particularly involving transient diarrhea, has been observed in clinical trials with ivermectin alone after treatment of some dogs that have circulating microfilariae.

**ADVERSE REACTIONS:** In clinical field trials with ivermectin/pyrantel pamoate, vomiting or diarrhea within 24 hours of dosing was rarely observed (1.1% of administered doses). The following adverse reactions have been reported following the use of ivermectin: depression/lethargy, vomiting, anorexia, diarrhea, mydriasis, ataxia, staggering, convulsions and hypersalivation.

**ANIMAL SAFETY:** Studies with ivermectin indicate that certain dogs of the Collie breed are more sensitive to the effects of ivermectin administered at elevated dose levels (more than 16 times the target use level of 6 mcg/kg) than dogs of other breeds. At elevated doses, sensitive dogs showed adverse reactions which included mydriasis, depression, ataxia, tremors, drooling, paresis, recumbency, excitability, stupor, coma and death. No signs of toxicity were seen at 10 times the recommended dose (27.2 mcg/lb) in sensitive Collies. Results of these studies and bioequivalence studies support the safety of ivermectin products in dogs, including Collies, when used as recommended by the label.

In a laboratory safety study, 12-week-old Beagle puppies receiving 3 and 5 times the recommended dose once weekly for 13 weeks demonstrated a dose-related decrease in testicular maturation compared to controls.

**HOW SUPPLIED:** IVERHART MAX Chewable Tablets are available in four dosage strengths (see **Dosage** section) for dogs of different weights. Each strength comes in a box of 6 chewable tablets and in a box of 12 chewable tablets, packed 10 boxes per display box.

**STORAGE CONDITIONS:** Store at controlled room temperature of 59°-86° F (15°-30° C). Protect product from light.

For technical assistance or to report adverse drug reactions, please call 1-800-338-3659.

Manufactured by: Virbac AH, Inc. Fort Worth, TX 76137

NADA 141-257, Approved by FDA

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