Proper Diagnosis of

PERIODONTAL DISEASE

Brook A. Niemiec, DVM, FAVD, Diplomate AVDC
Southern California Veterinary Dental Specialties & Oral Surgery,
San Diego, California

Periodontal disease is the number one problem in small animal medicine.\(^1\,^2\) In fact, the classic university study reported that, by 2 years of age, 80% of dogs and 70% of cats have some form of periodontal disease.\(^3\)

In contrast, a recent large clinical study from general practices reported that by 10 years of age, only 24% of patients were clinically diagnosed with periodontal disease.\(^4\) Therefore, it appears this disease is significantly under diagnosed, likely due to lack of dental education.

The significant adverse consequences of periodontal disease (Table) show why diagnosis is so important.\(^5\,^6\)

Veterinarians have many misconceptions about periodontal disease. This article outlines some common pitfalls encountered by veterinarians and provides some practical tips that can be implemented in general practice. (See Dental Definitions on page 67.)

**FALLACY #1. The amount of calculus on teeth is an accurate measurement of periodontal disease.**

While it is true that periodontal disease is typically associated with calculus, it is primarily elicited by plaque and, thus, can be seen in the absence of calculus (Figure 1).\(^7\,^9\) Conversely, widespread supragingival calculus may be present with little to no periodontal disease (Figure 2).

Use the degree of gingival inflammation to judge the need for professional therapy—not the amount of calculus.\(^10\) While this is a radical change in thought, it is a much more accurate measure of disease. However, evaluation of degree of visible gingival inflammation may still lead to underestimation of the severity of periodontal disease (see Fallacy #2, page 66).\(^9\)

<table>
<thead>
<tr>
<th><strong>TABLE</strong></th>
<th><strong>Adverse Consequences of Periodontal Disease</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LOCAL/REGIONAL CONSEQUENCES(^3)</strong></td>
<td><strong>POSSIBLE SYSTEMIC CONSEQUENCES(^4)</strong></td>
</tr>
<tr>
<td>Abscess</td>
<td>Adverse pregnancy effects</td>
</tr>
<tr>
<td>Jaw fracture</td>
<td>Diabetes mellitus</td>
</tr>
<tr>
<td>Ocular problems/ vision loss</td>
<td>Early mortality</td>
</tr>
<tr>
<td>Oronasal fistulas</td>
<td>Heart, liver, renal disease</td>
</tr>
<tr>
<td>Osteomyelitis</td>
<td>Valvular endocarditis</td>
</tr>
</tbody>
</table>

**Key Point**

It is critical to remember that, while calculus acts as an irritant, it is in and of itself essentially nonpathogenic.\(^1\,^8\,^9\)
PRACTICAL DENTISTRY

PRACTICAL TIP: Lights/solutions that identify plaque/calculus can be used in conscious patients in the examination room to demonstrate the level of calculus (Figure 3). Plaque and early calculus can be invisible to the naked eye in natural light. Therefore, they can easily be missed, especially on wet teeth. Plaque-disclosing solutions and lights allow veterinarians to visually identify plaque/calculus.

FALLACY #2. Color change of the gingiva is the first sign of periodontal disease.
The first clinical sign of gingivitis was believed to be color change of the gingiva, termed marginal gingivitis. While this is a reliable sign of disease, it is now known that increased gingival bleeding on probing or brushing occurs first. In fact, bleeding is a more objective measure of inflammation than subtle color change. In addition, gingival color change is not a reliable indicator in dark pigmented patients (Figure 4).

PRACTICAL TIP: Consider carefully probing or brushing tractable patients’ teeth on conscious examination to demonstrate level of inflammation. In addition, ask clients about a history of bleeding during brushing or after chewing hard/rough toys. If either of these are positive, a diagnosis of early gingivitis can be made despite a lack of gingival color change.

FALLACY #3. A visual oral examination is sufficient for diagnosis of periodontal disease.
This is completely untrue for both conscious and anesthetized examinations. Significant gingivitis can exist without periodontal pockets and, conversely, deep periodontal pockets can be present without significant gingival inflammation (Figure 5).

Periodontal Probe
Normal sulcal depths in:
- Dogs are 0 mm to 3 mm
- Cats are 0 mm to 0.5 mm.
This is not common knowledge in most veterinary hospitals, and emphasizes the point that periodontal disease cannot be accurately diagnosed without a periodontal probe, which determines sulcal depth and identifies pockets. Various periodontal probes are available; one such probe...
(Niemiec EXPRO, dentalaireproducts.com) is color coded to indicate the various depths (and severity) of periodontal pockets (Figure 6).

Even in anesthetized patients, periodontal probing may be challenging and inaccurate in some cases. Ledges of calculus or tight interproximal spaces (Figure 7) may preclude the standard insertion path and result in a missed pocket. Therefore, careful probing and dental radiographs are critical to accurate assessment of periodontal health.

Periodontal Diagnostic Strip
An additional diagnostic tool that can be used in the examination room is a periodontal diagnostic strip (eg, OraStrip, perio-dx.com). This product measures the production of thiols, which are produced by periodontal pathogens. A quick swipe along the maxillary gingival margins reveals visual evidence of severity of periodontal infection and may, therefore, be used to improve client compliance with dental recommendations.

While this product may be a valuable tool for any patient, there are several presentations in which it may be particularly valuable:

- **Patients without significant gingival inflammation or calculus**, especially patients with dark pigmented gingiva
- **Small and toy breed dogs**, which often have severe disease of the molar teeth in an otherwise healthy mouth

(Dental Definitions)

- **Calculus**: Hardened dental plaque (also called tartar); its rough surface provides an ideal medium for further plaque formation. Dental plaque becomes hardened as a result of continued accumulation of minerals from saliva
- **Closed Root Planing**: Nonsurgical periodontal therapy that removes plaque, calculus, and granulation tissue from the root surface and smooths the diseased/roughened root (also called scaling/root planing)
- **Plaque**: Biofilm—formed by colonizing bacteria—that develops naturally on teeth and attaches to their smooth surfaces; hardened plaque becomes calculus
- **Probing**: Process that identifies periodontal pockets and evaluates their depth; helps determine extent of periodontal disease during oral examination
- **Scaling**: Dental cleaning technique that removes supragingival and subgingival plaque and calculus; typically performed along with polishing of the teeth
fairly healthy mouth; this disease is typically difficult
or impossible to completely evaluate on conscious
oral examination, but infection is demonstrated
on the test strip (Figure 8, page 67).
• Patients receiving nonanesthesia dentistry;
these patients typically have significant disease
despite clean crowns, and test strips elucidate
hidden disease and facilitate proper therapy
(Figures 9 and 10).

PRACTICAL TIP: Visual examination is not
accurate, and a complete oral examination and
probing is not possible, without general anesthesia.
Therefore, consider:
1. Performing a complete oral examination
(including periodontal probing) on every
anesthetized patient
2. Taking digital pictures of the pathology found;
then sharing a completed dental chart and
printout of the pictures with the client. Dental
work can be scheduled for a later date.

FALLACY #4. Periodontal probing is not
necessary if dental radiography is performed.
Numerous studies support full-mouth radiographs
on all dental patients to further eliminate missed
pathology.22-24 At a minimum, radiograph every
area of pathology noted on dental examination,
including any periodontal pocket > 3 mm in dogs
and > 0.5 mm in cats.12,15-17

Dental radiographs are critical when evaluating
periodontal disease; however, they are NOT a
substitute for clinical examination for several
reasons.15,19,25-29
1. Periodontal bone loss does not become
radiographically evident until 30% to 50% of
mineralization is lost;25,30 therefore, radiographic
findings will always underestimate bone loss.15,31

Figure 10. Intraoral pictures (A and B) of a
dog that received regular anesthesia-free
cleanings (as recently as 2 weeks prior to presentation); there is
significant inflammation—indicated by significant
hemorrhage and attachment loss (6 mm).

Figure 9. Intraoral picture of dog that received
regular anesthesia-free dental cleanings (as
recently as 2 weeks prior to presentation); there is
significant inflammation—indicated by significant
hemorrhage and attachment loss (6 mm).
2. Dental radiographs are a 2-dimensional image of a 3-dimensional space; any overlying structures can easily obscure periodontal pockets (Figure 11).

3. The first stage of furcation exposure (F1) is not evident radiographically.

4. Errors of angulation can greatly affect the radiographic appearance of alveolar bone loss.

**PRACTICAL TIP:** Expose full-mouth radiographs on all small breed (< 15 lb) dogs because:
1. Periodontal disease is more prevalent in these dogs
2. They are more likely to have heavy calculus and tight contacts that may complicate probing.

**FALLACY #5.** Only mobile (loose) teeth need to be extracted.
This is wholly inaccurate. Well before mobility occurs, teeth can:
- **Commonly demonstrate extensive disease**
  beyond a level that can be cleaned with standard scaling/root planing (especially true for larger, multirooted teeth, such as the carnassials, maxillary fourth premolars/first molars, and mandibular first molars)3,32,35
- **Develop deep periodontal pockets**; pockets > 5 mm to 6 mm cannot be effectively cleaned with closed root planing (Figure 12).
  Teeth with furcation Stage 2 or 3 cannot be effectively cleaned with closed root planing (Figure 13). Therefore, **teeth with pockets > 6 mm or furcation Stage 2 or 3 require extraction or referral for periodontal flap surgery.** These procedures are taught through several hands-on continuing education resources.

For a complete description of furcation and its stages, read **Dental Diagnosis: Periodontal Disease of the Mandible** (July/August 2013 issue), available at tvpjournal.com.

---

**FIGURE 11.** Dental radiograph of right maxillary canine (104, dog); the tooth appears normal (A); however, periodontal probing reveals a deep periodontal pocket on the palatal surface (B), which was not seen radiographically due to overlying structures.

**FIGURE 12.** Intraoral picture of deep (9-mm) periodontal pocket on mesial surface of right mandibular canine (404, dog); this tooth requires periodontal flap surgery or extraction.

**FIGURE 13.** Intraoral pictures of canine patients with furcation exposure Stages 2 (A) and 3 (B); these teeth require periodontal flap surgery or extraction.
PRACTICAL TIP: Educate your clients about the various treatments required, or available, for periodontal disease prior to the surgical appointment, and discuss cost. This avoids miscommunication and frustration related to clients’ decisions about dental procedures.

IN SUMMARY
Periodontal disease is a very common, but misunderstood disease process that has numerous deleterious consequences both regionally within the oral cavity and systemically. Utilization of the tools and information provided in this article will aid clinicians in diagnosing and treating this common but significant disease process.

Read Proper Treatment of Periodontal Disease in an upcoming issue of Today’s Veterinary Practice.

References

BROOK A. NIEMIEC
Brook A. Niemiec, DVM, FAADV, Diplomate AVDC, is Chief of Staff of Southern California Veterinary Dental Specialties, with offices in San Diego and Murrieta, California, and Las Vegas, Nevada. He lectures extensively at national and international conferences. He received his DVM from University of California–Davis.