

Peer Reviewed



Periodontal Health: *Causes & Consequences*

You have asked...

Are there serious clinical consequences of periodontal disease, and how is good oral health beneficial when treating systemic disease?

The expert says...

These are both good questions that are interrelated, but they need to be answered separately. Many unsubstantiated statements have been made on the consequences of periodontal disease, some of which could include the impression that dogs and cats without immaculately clean teeth are at greater risk for early death from cardiac or renal disease. There is no direct evidence of this and it seems counterintuitive, given that periodontal disease is more severe and more common in toy and small-breed dogs than in larger dogs and that small dogs live longer than larger dogs.¹

One way to approach these issues is through a series of questions and answers.

IS INFECTION OF THE MOUTH COMMON?

Yes: Infection (defined as a presence of infectious organisms and a host response) is common in the mouth.² An extraordinarily wide range of bacteria exists in oral fluid and on oral surfaces: This typically includes organisms associated with infections in other parts of the body, such as *Staphylococcus* or *Streptococcus* species, coliform bacteria, and *Pasteurella* species (particularly in cats), as well as mouth-specific anaerobic organisms and spirochetes.³ Because the bacterial flora in the mouth is so varied, how do you select the single causative organism when culture results reveal presence of several organisms with different susceptibility patterns?

? Ask Yourself...

When evaluating the consequences of periodontal diseases, one must refer to reliable documented data and consider questions such as:

1. Is infection common in the mouth?
2. Does periodontal disease release bacteria into the bloodstream?
3. Is periodontal disease associated with systemic and distant-organ abnormalities?

CONTINUES

The association between periodontal disease and distant-organ or systemic disease is not necessarily a cause-and-effect event.

KEY POINT

Examining the mouth when the pet is young (1–3 years of age) is important, as it allows the veterinarian to recognize pets that are more prone to accumulation of dental plaque and calculus. The owners should be alerted to the need for effective preventive care throughout life.

Any attempt to identify the single organism causing a given oral infection in a clinical patient is a waste.

Oral tissues are bathed in salivary fluid, which is rich in antibacterial substances, and have a more abundant blood supply than does skin (another surface commonly coated with a rich flora). Although all dogs eventually develop localized periodontal disease as a consequence of poor oral hygiene, for many it does not progress beyond gingivitis or superficial or moderate periodontitis (eg, periodontal pocketing, gingival recession).²

Why, then, do some dogs develop horrendous mouths? First, most have little or no natural daily teeth cleansing, as the standard convenience foods that most owners provide are nutritionally excellent but provide little effective chewing activity. Second, the body's reaction to the presence of bacteria varies greatly.

DOES PERIODONTAL INFECTION RELEASE BACTERIA INTO THE BLOODSTREAM?

Yes: Bacterial culture of blood samples taken before, during, and after dental procedures shows a shower effect when a dirty mouth is scaled.^{4,5} This bacteremic shower occurs several times a day during chewing, though the organisms typically are cleared by the reticuloendothelial system within 10 to 20 minutes.

The ADA and the AHA undertook a review of all published studies relating to bacteremia and prophylactic antibiotic treatment and concluded that the risk for a human developing infective endocarditis is higher as a result of the low-key but daily bacteremia associated with eating and tooth brushing than for occasional professional

dental treatment; the ADA and AHA consequently narrowed the circumstances warranting prophylactic antimicrobial treatment in association with dental procedures.⁶

IS PERIODONTAL DISEASE ASSOCIATED WITH SYSTEMIC & DISTANT-ORGAN* ABNORMALITIES?

Yes: There are proven associations between periodontal disease and systemic and distant-organ abnormalities.⁷ Two studies conducted in dogs demonstrated that microscopic inflammatory or degenerative changes in distant organs (kidney, liver, heart) increase with rising severity of periodontal disease,^{8,9} and 2 studies have demonstrated an association between periodontal disease and cardiac¹⁰ or renal¹¹ disease, though the extent of periodontal disease in these studies^{10,11} was recorded inconsistently. Of course, the body has an adept ability to accommodate minor abnormalities, and the association between periodontal disease and distant-organ or systemic disease is not necessarily a cause-and-effect event.

Any injury (including infection) has a measurable effect on the entire body; typically, acute phase proteins (eg, C-reactive protein [C-RP], amyloid A) are used to measure this effect. In a study conducted at University of Pennsylvania and Cornell University, dogs with periodontal disease were treated as indicated, and their C-RP concentrations before and several weeks after the periodontal treatment were measured. Although the differences were moderate, C-RP concentration correlated with severity of periodontal disease and was reduced posttreatment.¹² The latter finding is the first data-driven observation that mirrors what many owners report: Dogs often act younger following treatment of severe periodontal disease.

* I distinguish distant-organ (eg, renal or cardiac) abnormalities from systemic (eg, body-wide change) abnormalities.
ADA = American Dental Association, AHA = American Heart Association, C-RP = C-reactive protein



The evidence for a link between periodontal disease and infective endocarditis in dogs is mixed.^{10,13-16} The studies typically include too few dogs given the number of variables that may affect the result, or the scoring methods for the extent of oral disease are too subjective.

HOW DOES GOOD ORAL HEALTH AFFECT TREATMENT OF SYSTEMIC DISEASE?

Common sense and the evidence noted previously suggest that good oral health is beneficial in the treatment of systemic disease, although no published data have proved this for dogs or cats.

In humans, there is a clear association between diabetes and periodontal disease: People with diabetes are more likely to have periodontal disease, and diabetes is more labile in people with periodontal disease.¹⁸ Dental treatment (if indicated) and effective oral hygiene regimens are now standard parts of managing human diabetes. Because of the variables and additional challenges involved with the requirement for anesthesia for dental treatment in veterinary patients, a well-controlled study with a large enough number of subjects to investigate the periodontal disease–diabetes association in dogs will be difficult to conduct.

THE BOTTOM LINE

Obtaining optimal oral health is a challenge because clients may not understand the need to brush their pet's teeth. Fortunately, oral hygiene can include more than brushing, though brushing remains the gold standard.¹⁷ The Veterinary Oral Health Council (www.VOHC.org) provides a list of products that have met the preset standards for slowing accumulation of plaque and calculus (ie, tartar); these products include dental diets, treats, water additives, gels, and toothpastes. The key is daily use, which is a lot easier if the owner can find a way to make daily oral hygiene a fun interaction.

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

Preventing Periodontal Disease

While waiting for additional studies to confirm the periodontal–systemic connections, veterinarians should practice prevention with these 3 steps¹⁷:

1. Periodic oral examination (“lift the lip” as part of every patient's visit)
2. Effective daily oral hygiene starting from an early age
3. Treating the teeth professionally when indicated, again starting from an early age

KEY POINT

Lift the lip every time! This is key to good oral health and a good way to enhance practice revenue.