

## **Misconceptions in Feline Dentistry**

As general practitioners, feline dentistry is a daily feature of our lives. Whether we are performing it, recommending it or cursing it, we can't escape it. Increased access to good quality CPD has significantly improved our dental standards in recent years, but misconceptions still persist. We'll discuss three common misconceptions here, but first, let's address the most notorious: no, it's not okay to burr roots.

### **Misconception 1: periodontal disease is not painful**

Despite the known high prevalence, feline periodontal disease is underdiagnosed.<sup>1</sup> Because cats are obligate nasal breathers, halitosis and the visible aspects of periodontal disease are hidden. Additionally, as a species, cats tend to mask signs of pain,<sup>2</sup> so pain and disease are difficult to detect, particularly for owners.<sup>1,3</sup>

As periodontal disease is not readily detected by owners, it is underrepresented as a presenting condition in the clinic.<sup>4,5</sup> Often treatment is delayed until late in the disease progression,<sup>6</sup> and may be delayed further by owners' reluctance to bring cats to the vets.<sup>7</sup>

While mild disease may be no more than uncomfortable, severe periodontal disease is painful. Anecdotally, we know this from our own experiences at the dentist and, more significantly, we witness the improved quality of life in our patients following treatment.

Furthermore, the more severe the periodontal disease, the more painful it is. A 2017 behavioural observation study, found that secondary dental parameters (such as halitosis, hypersalivation, difficulty in prehension and multiple attempts to hold food) were associated with higher pain scores.<sup>8</sup> As secondary parameters are markers of more severe disease, we can conclude that pain increases with disease severity.<sup>8</sup>

### **Misconception 2: periodontal disease can be diagnosed by visual assessment alone**

A persistent misconception is that the amount of dental calculus corresponds to the severity of periodontal disease.<sup>9,10</sup> In contrast to traditional opinion, calculus is not a primary cause of periodontal disease.<sup>9,11</sup> It provides a rough surface that predisposes to plaque accumulation,<sup>9,11,12</sup> and it increases the available surface area to which plaque can adhere.<sup>13</sup> However, abundant calculus can be associated with only minimal gingivitis,<sup>9,12</sup> and more advanced gingivitis can be seen in the absence of

calculus.<sup>12</sup> Therefore, visual assessment of calculus is not sufficient to determine the severity of periodontal disease.<sup>9,10,12</sup>

In fact, there are three main steps in assessing periodontal disease: an oral evaluation in the conscious patient,<sup>9,14,15</sup> periodontal probing under general anaesthetic,<sup>16,17</sup> and dental radiography.<sup>16,17</sup>

Assessment in the conscious patient provides an overview of disease<sup>1</sup> and allows the clinician to formulate a preliminary diagnostic plan.<sup>1,14</sup> Initially, a thorough history should be taken focusing particularly on halitosis,<sup>1,14</sup> dysphagia,<sup>1,14</sup> ptyalism,<sup>1,14</sup> head shaking,<sup>1</sup> bruxism,<sup>1,18</sup> teeth chattering,<sup>1,18</sup> and behaviours associated with oral pain and dental disease.

Next the clinician should perform a conscious dental examination, assessing oral pain,<sup>14</sup> gingival inflammation,<sup>1</sup> calculus deposits,<sup>1</sup> gingival recession,<sup>1</sup> and bone loss.<sup>14</sup> A test strip to measure dissolved thiol levels can be used to help assess gingival health and periodontal disease.<sup>1,14,18,19</sup> However, although periodontal disease may be detected during the conscious examination, the clinician will probably underestimate the severity of disease.<sup>14</sup> It is only during anaesthesia that a complete periodontal assessment can be accomplished.<sup>1,9,12,14,16,17</sup>

The periodontal examination under anaesthetic should be conducted in a structured manner with simultaneous dental charting.<sup>1</sup> Following a thorough investigation of the oral cavity, periodontal probing depth (PPD), gingival hyperplasia, gingival recession, furcation exposure, and mobility should be evaluated.<sup>1,18</sup>

PPD should be measured using a graduated probe at 4-6 locations on every tooth.<sup>1,14,18</sup> The probe is inserted under the free gingival margin of the tooth, directed apically, until resistance is encountered.<sup>9,18</sup> The normal PPD in cats is less than 0.5 mm (1 mm for the canine tooth)<sup>9</sup> so a periodontal pocket is diagnosed when PPD exceeds 0.5 mm.<sup>18</sup>

However, hyperplasia of the gingiva can lead to the presence of plaque-retaining pseudopockets,<sup>1,9</sup> where the height of the gingival margin increases without any change to the junctional epithelial attachment.<sup>9</sup> In other words, an increased PPD exists without attachment loss. Conversely, in gingival recession, attachment loss can occur without an increased PPD,<sup>1</sup> i.e. when gingiva and alveolar bone are lost at the same rate.<sup>9</sup> Both gingival hyperplasia and gingival recession are markers of periodontal disease.

In healthy teeth, the furcation (the area between the roots of multi-rooted teeth) is filled with alveolar bone.<sup>9</sup> If the probe can be inserted into this area, bone loss is present.<sup>11</sup> Bone loss can also be assessed by the degree of tooth mobility; the tooth

becomes mobile when the periodontal ligament is weakened, and the supporting alveolar bone is lost.<sup>1,18</sup>

The remaining essential element of periodontal assessment is radiography.<sup>14,16,18,20</sup> Without radiography, the majority of periodontal pathology cannot be diagnosed, and the clinician cannot formulate an accurate treatment plan.<sup>14</sup> In one study, 41.7% of cats with no abnormal findings on initial examination were found to have radiographic pathology.<sup>21</sup> In the same study, of the cats that did have abnormal findings on the initial examination, 53.9% were found to have additional radiographic pathology.<sup>14,21</sup> Dental radiography is, therefore, an essential part of any feline periodontal assessment.<sup>1,9,12,14,18</sup>

### **Misconception 3: Feline periodontal disease requires antibiotics**

Confusion about the pathogenesis of periodontal disease has, over time, led to the excessive use of antibiotics.<sup>1</sup> Understanding the pathogenesis improves our understanding of proper treatment modalities<sup>6</sup> and allows us to approach treatment logically.<sup>13</sup>

Periodontal disease can be divided into two stages: gingivitis and periodontitis.<sup>12</sup> Gingivitis is the initial, and reversible, stage where inflammation is confined to the gingiva.<sup>12</sup> Periodontitis develops secondarily as inflammation progresses and affects the deeper supporting structures.<sup>12</sup> Periodontitis leads to attachment loss and irreversible bone loss.<sup>12</sup>

Periodontal disease develops when plaque (the specialised biofilm within the oral cavity<sup>13</sup>) incites the host's immune response.<sup>12,13,17</sup> The entire oral cavity is covered with a thin layer of glycoproteins called the pellicle,<sup>9,13</sup> to which free-living bacteria attach.<sup>9,13</sup> Secondary bacterial colonisers attach to the primary colonisers within a polysaccharide matrix, forming plaque,<sup>13</sup> and a mature biofilm forms within 24 hours.<sup>13</sup>

This biofilm protects the bacteria from antibiotics.<sup>13</sup> Antibiotic doses that would kill free-living bacteria often fail to affect those within the biofilm.<sup>13</sup> Furthermore, the bacteria in the biofilm can share resources; antibiotic-resistant bacteria can secrete a protective enzyme to benefit neighbouring bacteria,<sup>13</sup> and plasmid transfer of resistance genes can occur between bacterial species.<sup>13</sup> Consequently, bacteria within a biofilm are 1,000 to 1,500 times more resistant to antibiotics than free-living bacteria.<sup>6,12</sup> Therefore, antibiotics alone are never an appropriate treatment for feline periodontal disease<sup>9</sup> and should be reserved for patients with local or systemic signs of infection.<sup>22</sup>

Gingivitis can usually be controlled by thorough cleaning.<sup>22</sup> Daily use of chlorhexidine will prevent plaque accumulation and, consequently, gingivitis.<sup>22</sup> However, pre-existing plaque must be removed mechanically.<sup>22</sup> This is achieved either by brushing or by in-clinic treatment of 0.12% chlorhexidine lavage, supra- and subgingival scaling, polishing, and sulcal lavage.<sup>12,23</sup>

In contrast to gingivitis, periodontitis requires professional periodontal treatment.<sup>22</sup> Periodontal pockets exceeding 0.5 mm require deep cleaning and, potentially, perioceutic treatment.<sup>23</sup> Periodontal flap surgery or extraction is necessary when periodontal probing depths extend beyond the mucogingival junction.<sup>17,23</sup> Similarly, stage 2 or 3 furcation exposures, mobility, and loss of gingiva all require surgery.<sup>17,23</sup>

Extractions and oral surgery induce a transient bacteremia, which is rapidly eliminated by a healthy immune system.<sup>22</sup> Prophylactic antibiotics during surgery should, therefore, be reserved for immunosuppressed patients that cannot tolerate this bacteremia.<sup>22</sup>

## **Conclusion**

As vets, we meet many clients who would do anything for their cats. However, we frequently encounter ignorance, denial or resistance from clients about the state of their cats' mouths. If we are proactive and debunk the old misconceptions, we can help those clients make the right decisions for their cats.

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