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Periodontal disease is probably the most common disease seen in small animal practice, with the great majority of dogs and cats over the age of three years having a degree of disease that warrants intervention. Periodontal disease is a collective term for a number of plaque-induced inflammatory lesions that affect the periodontium. The primary cause of gingivitis and periodontitis is accumulation of dental plaque on the tooth surfaces. Calculus (tartar) is only a secondary etiologic factor. It is a unique infection in that it is not associated with a massive bacterial invasion of the tissues. Gingivitis is inflammation of the gingiva and is the earliest sign of disease. Individuals with untreated gingivitis may develop periodontitis. The inflammatory reactions in periodontitis result in destruction of the periodontal ligament and alveolar bone. The result of untreated periodontitis is ultimately exfoliation of the affected tooth. Thus, gingivitis is inflammation that is not associated with destruction (loss) of supporting tissue. It is reversible. In contrast, periodontitis is inflammation where the tooth has lost a variable degree of its support (attachment). It is irreversible. Infection of the periodontium may cause discomfort to the affected animal. There is also strong evidence that a focus of infection in the oral cavity can cause disease of distant organs. Consequently, prevention and treatment of periodontal diseases is, contrary to common belief, not a cosmetic issue, but a general health and welfare issue!

Pathogenesis
The pathogenic mechanisms involved in periodontal disease include:
1. Direct injury by plaque microorganisms and
2. Indirect injury by plaque microorganisms via inflammation

The microbiota in periodontal pockets are in a continual state of flux; periodontitis is a dynamic infection caused by a combination of bacterial vectors that change over time. As a result, the molecular events that trigger and sustain the inflammatory reactions constantly change. Many microbial products have little or no direct toxic effect on the host. However, they possess the potential to activate non-immune and immune inflammatory reactions that cause the tissue damage. It is now well accepted that it is the host’s response to the plaque bacteria, rather than microbial virulence per se, that directly causes the tissue damage.

Gingivitis and periodontitis
In gingivitis, the plaque-induced inflammation is limited to the soft tissue of the gingiva. Sulcus depths are normal (i.e. periodontal probing depths are 1-3mm in the dog and 0.5-1mm in the cat). As periodontitis occurs, the inflammatory destruction of the coronal part of the periodontal ligament allows apical migration of the epithelial attachment and the formation of a pathological periodontal pocket (i.e. periodontal probing depths increase). If the inflammatory disease is permitted to progress, the crestal portion of the alveolar process begins to resorb. Alveolar bone destruction type and extent are diagnosed radiographically. The resorption may proceed apically on a horizontal level. Horizontal bone destruction is often accompanied by gingival recession so periodontal pockets may not form. If there is no gingival recession the periodontal pocket is supra-alveolar, i.e. above the level of the alveolar margin. The pattern of bone destruction may also proceed in a vertical direction along the root to form angular bony defects. The periodontal pocket is now intra- or sub-alveolar, i.e. below the level of the crestal bone.

Disease progression is generally an episodic occurrence rather than a continuous process. Tissue destruction occurs as acute bursts of disease activity followed by relatively quiescent periods. The acute burst is clinically characterised by rapid deepening of the periodontal pocket as periodontal ligament fibres and alveolar bone are destroyed by the inflammatory reactions. The quiescent phase is not associated with clinical or radiographic evidence of disease progression. However, complete healing does not occur during this quiescent phase, because sub-gingival plaque remains on the root surfaces and inflammation persists in the connective tissue. The inactive phase can last for extended periods.

Predisposing factors
Other conditions, such as physical or psychological stress and malnutrition may impair protective responses, such as the production of antioxidants and acute phase proteins, and can aggravate periodontitis but do not actually cause destructive tissue inflammation. A genetic predisposition to destructive inflammation of the periodontium may be important in some individuals. Undisturbed plaque accumulation results in gingivitis. While some individuals with untreated gingivitis will develop periodontitis, not all animals with untreated gingivitis do so. It cannot be predicted which individuals with gingivitis will develop periodontitis. However, animals in which clinically healthy gingivae are maintained will not develop periodontitis. Consequently,
the aim in periodontal disease prevention and treatment is to establish and maintain clinically healthy gingivae to prevent periodontitis.

**Diagnosis and treatment**

Periodontal disease is diagnosed based on clinical findings (gingival inflammation, attachment loss) and radiography. The treatment of periodontal disease is aimed at controlling the cause of the inflammation, i.e. dental plaque. Conservative or cause-related periodontal therapy consists of removal of plaque and calculus, and any other remedial procedures required, under general anaesthesia, in combination with daily maintenance of oral hygiene. In other words, the treatment of periodontal disease has two components:

1. Maintenance of oral hygiene
2. Professional periodontal therapy

Maintenance of oral hygiene is performed by the owner and is often called home care. Its effectiveness depends on the motivation and technical ability of the owner and the cooperation of the animal. Professional periodontal therapy is performed under general anaesthesia and includes supra- and sub-gingival scaling, root planing and tooth crown polishing.

**Summary for treatment of gingivitis**

- Educate the owner to understand the disease process
- Train and motivate the owner to perform daily homecare
- Institute daily home care regimen by the owner. Ideally tooth brushing with a pet toothpaste in conjunction with a dental hygiene product
- Professional periodontal therapy (supra- and sub-gingival scaling and polishing) under general anaesthesia to remove dental deposits (plaque and calculus)
- Regular check ups to ensure that the owner is following recommendations and to boost the owner’s motivation.

**Summary for treatment of periodontitis**

- Educate the owner to understand the disease process
- Train and motivate the owner to perform daily homecare
- Institute daily tooth brushing regimen by the owner
- Professional periodontal therapy: this includes supra- and sub-gingival scaling and polishing, root planing and extraction of unsalvageable teeth under general anaesthesia
- Regular check ups to ensure that the owner is following recommendations and to boost the owner’s motivation
- Periodontal surgery may be indicated in specific circumstances

Periodontal surgery is the term used for certain specific surgical techniques aimed at preserving the periodontium. Periodontal surgery techniques include closed curettage, gingivoplasty, various flap techniques, osseous surgery, guided tissue regeneration and, of course, implants. The techniques create accessibility for professional scaling and polishing and establish a gingival morphology that facilitates plaque control by home care regimes. Some techniques are aimed at regeneration of periodontal attachment lost e.g. guided tissue regeneration.

Periodontal surgery is never first line treatment for periodontal disease. Conservative management of periodontal disease (i.e. thorough supra- and sub-gingival scaling, root planing and polishing), in combination with daily meticulous home care, is always the first step. Periodontal surgery should only be performed where the owner has shown the ability to keep the mouth clean. If a client cannot maintain good oral hygiene measures in his pet then in the interest of the well being of the animal there is no indication for periodontal surgery. Instead teeth affected by periodontitis should be extracted.