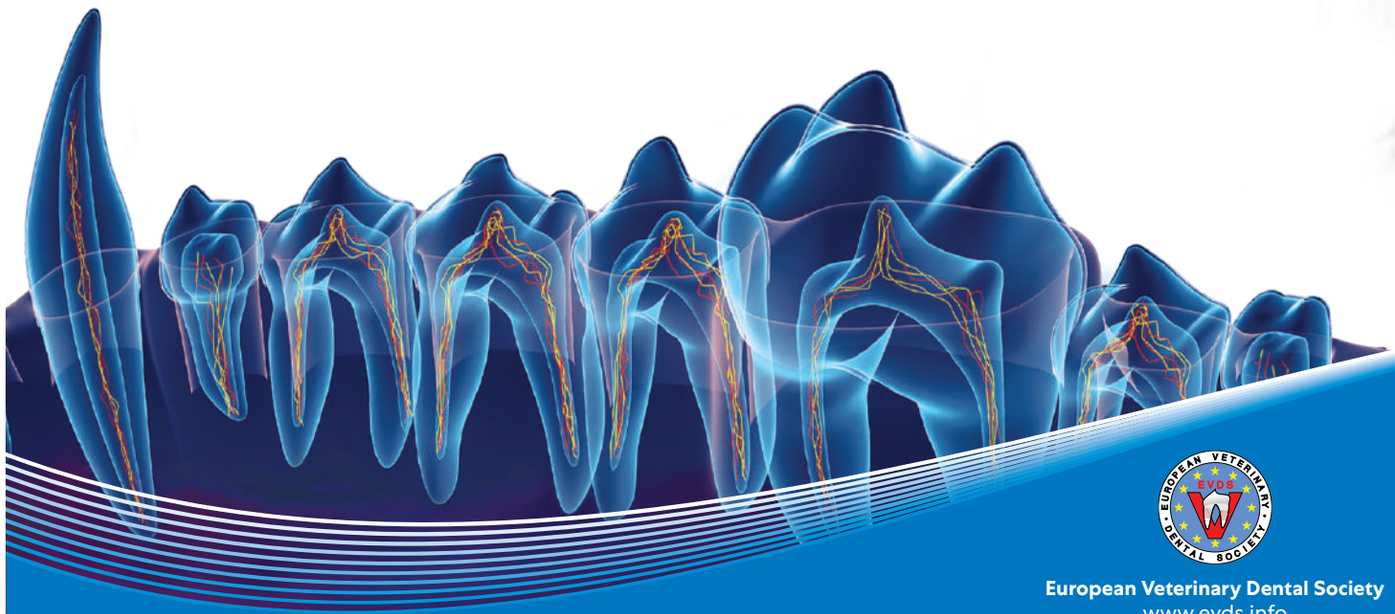
EDUCATIONAL RESOURCE FOR VETERINARIANS

UNDERSTANDING THE NEED FOR DENTAL TREATMENT IN DOGS

2nd Edition. November 2023

Lisa Milella BVSc, MRCVS, DipEVDC

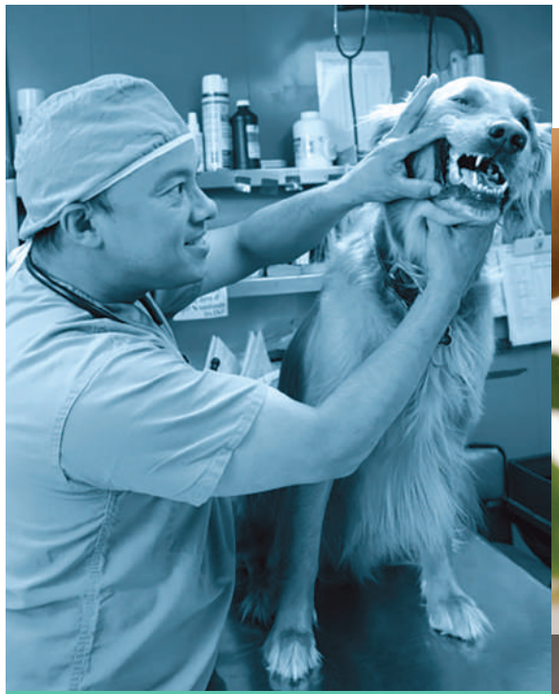


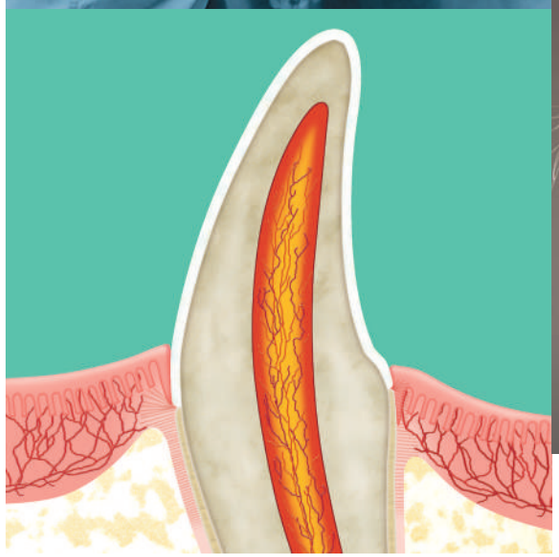
European Veterinary Dental Society
www.evds.info

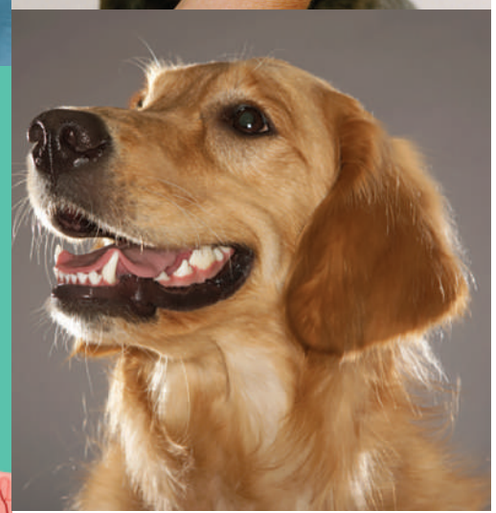
DENTAL CARE

Pedigree

Greenies







INTRODUCTION

Periodontal disease is the most frequently occurring clinical condition in dogs and cats with 4 out of 5 dogs over the age of 3 showing signs of periodontal disease. (Hamp *et al.*, 1984).

As such it can represent up to 40% of the workload of the modern day veterinary practice (Watkins, 2008). Despite the common incidence of periodontal disease, market research across Europe has found that less than 5% of dog owners are aware that their dog may have a problem.

This guide has been produced to provide a practical dental guide to veterinary professionals, with information on the identification, treatment and prevention of dental problems in dogs. It clearly illustrates the progression of disease and shows appropriate diagnoses and treatments.

Finally with the intent of providing life-long care it addresses the role of the pet owner and ways of raising awareness of the importance of a good home oral care regimen.

Lisa Milella BVSc, MRCVS, DipEVDC
Past President of the British Veterinary Dental Association

Co-developed with
Marie-Louise Bennett BSc. (Hons), PhD
Scientific Communications, Mars Petcare

We at Mars Petcare would like to acknowledge our late friend Lisa Milella for the development of this guide. A highly respected veterinary dentist, Lisa dedicated her knowledge and expertise to alleviating the pain of animals with debilitating dental conditions as well as teaching vets all over the world new veterinary dental procedures.

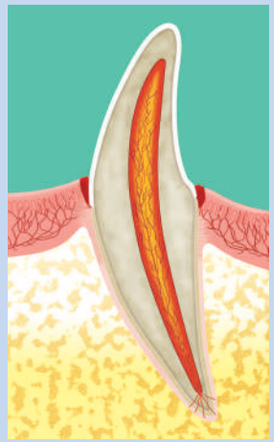
The following are acknowledged for their support with the development of this guide: Jan Schreyer, John Robinson & Norman Johnston.

Hamp, S.E., Olsson, S.E., Farsø-Madsen, K., Viklands, P. and Fornell, J. (1984). A macroscopic and radiological investigation of dental diseases in the dog. Veterinary Radiology 25: 86-92.
Watkins, J.D. (2008). Letter submitted to Veterinary Record June 7.

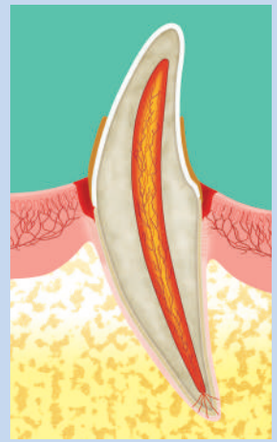
European Veterinary Dental Society
www.evds.info

OVERVIEW – ANATOMY & PHYSIOLOGY

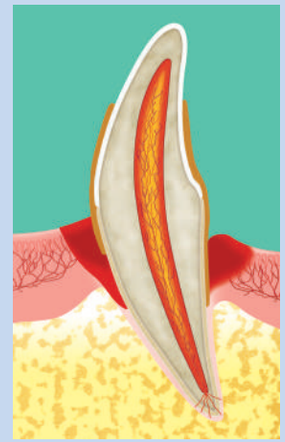
Clinically healthy
no signs of gingival inflammation or periodontal disease clinically evident.



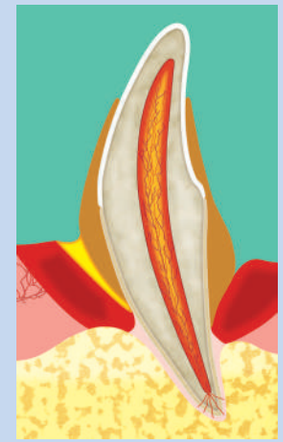
Gingivitis
gingivitis only, no attachment loss, the height and architecture of the alveolar margin are normal.



Early Periodontitis
less than 25% attachment loss (by probing or radiographically) or at most a grade 1 furcation involvement in multirooted teeth, early radiologic signs of periodontitis.



Moderate Periodontitis
25-50% of attachment loss (by probing or radiographically) or a grade 2 furcation involvement in multirooted teeth.



Advanced Periodontitis
more than 50% attachment loss (by probing or radiographically) or a grade 3 furcation involvement in multirooted teeth.

KEY TERMS:

Plaque: An off-white, sticky accumulation on surface of the teeth made up of food particles, bacteria and bacterial products. Plaque is the fundamental cause of periodontal disease and other oral disease, but can be dislodged from the teeth by light scraping – such as brushing.

Calculus: Calculus, also known as tartar or scale is formed when saliva and gingival crevicular fluid – which have high levels of minerals – calcify the plaque on the teeth. Calculus, which has a rough porous surface that harbours further plaque, can form in less than 48 hours from the start of plaque accumulation. Calculus can only be removed by scaling.

Periodontium: The periodontal tissues are the supporting structures of the tooth and include the gingiva, the alveolar bone, the cementum and the periodontal ligament.

Gingivitis: Gingivitis is the inflammation of the gingival tissue without any loss of attachment.

Gingivitis is caused by plaque along the gingival margin and in the dental sulcus and can be prevented by good oral hygiene techniques. It is a prerequisite for the development of periodontitis, but will not always progress into periodontitis. Gingivitis is the only completely reversible stage of periodontal disease.

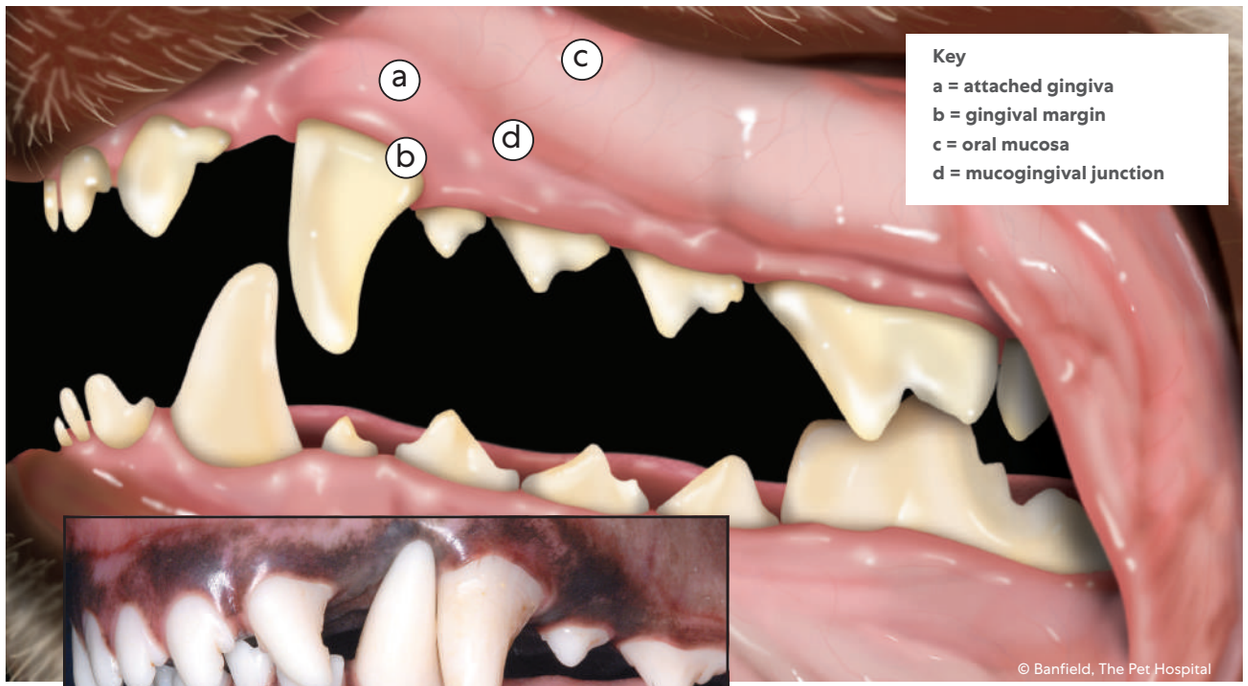
Periodontitis: Periodontitis is the progressive inflammation and destruction of periodontal tissues, which leads to attachment loss. This tissue destruction is only partly due to bacterial activity, but mainly due to the host's inflammatory and immune response. The destruction of the tooth supporting tissues will lead to tooth mobility over time and finally to tooth loss.

Periodontal pocket: When periodontitis develops, the gingival attachment to the tooth migrates apically along the root, with loss of the attachment of the periodontal ligament. This results in the formation of a periodontal pocket.

Gingival Recession: Gingival recession is the migration of the gingival margin away (apically) from its normal position at the base of the crown.

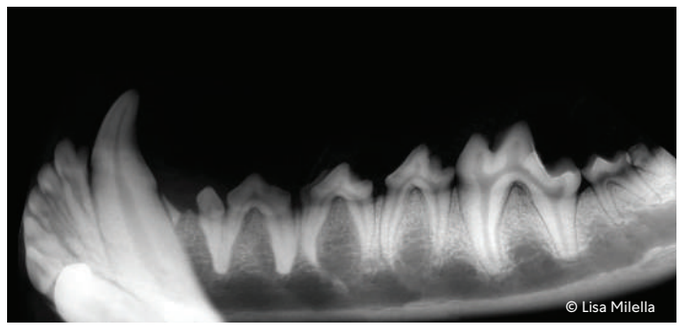
Furcation: The furcation is the area between the roots of multirooted teeth. The area is usually filled by alveolar bone, when periodontitis occurs the furcation bone is resorbed. Furcation involvement is graded from 0-3 depending on how far a probe can be introduced in the furcation area.

OVERVIEW – ANATOMY & PHYSIOLOGY

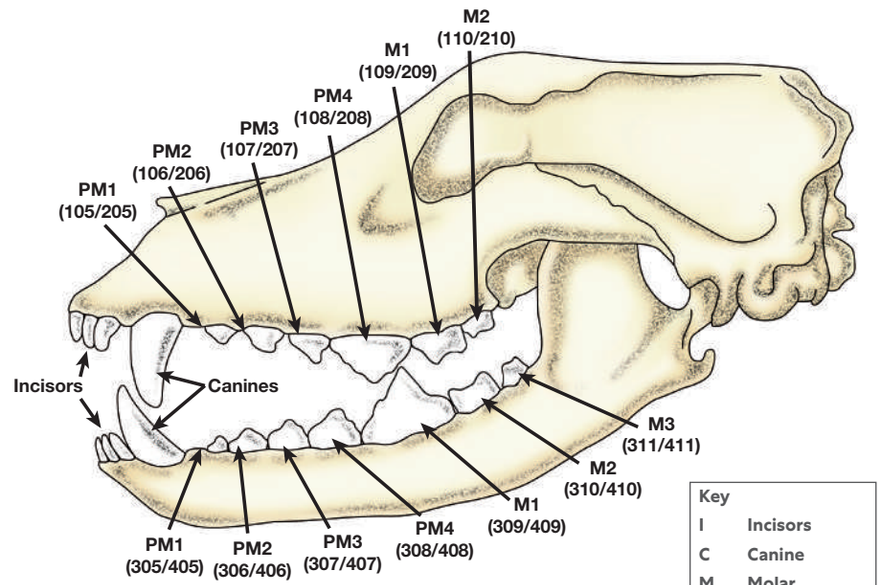


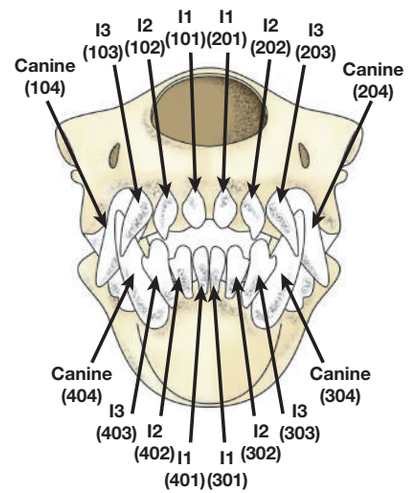
Healthy teeth and gums

Radiography of a healthy mouth – upper jaw



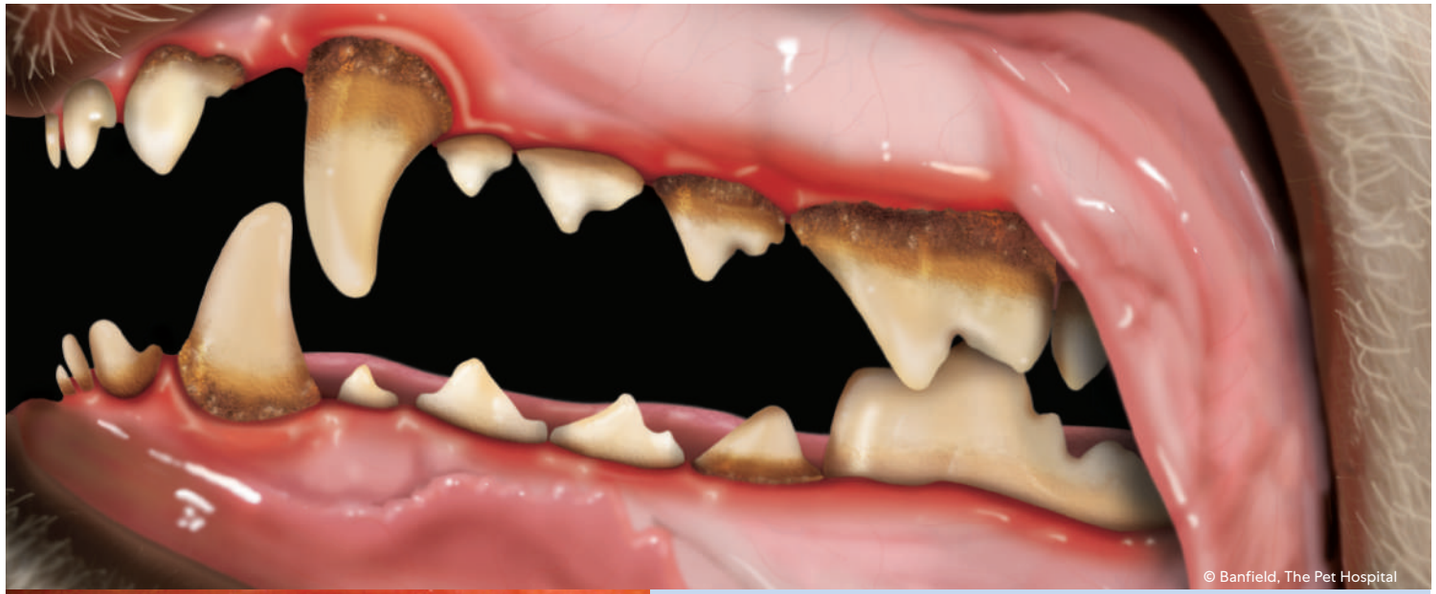
Radiography of a healthy mouth – lower jaw





FIRST PRESENTATION

Typical scenario for a dog, aged 3+ prior to treatment



What is seen in this picture?

- Red swollen gums (gingivitis)
- Gums prone to bleeding
- Moderate calculus build-up
- Halitosis

Comment

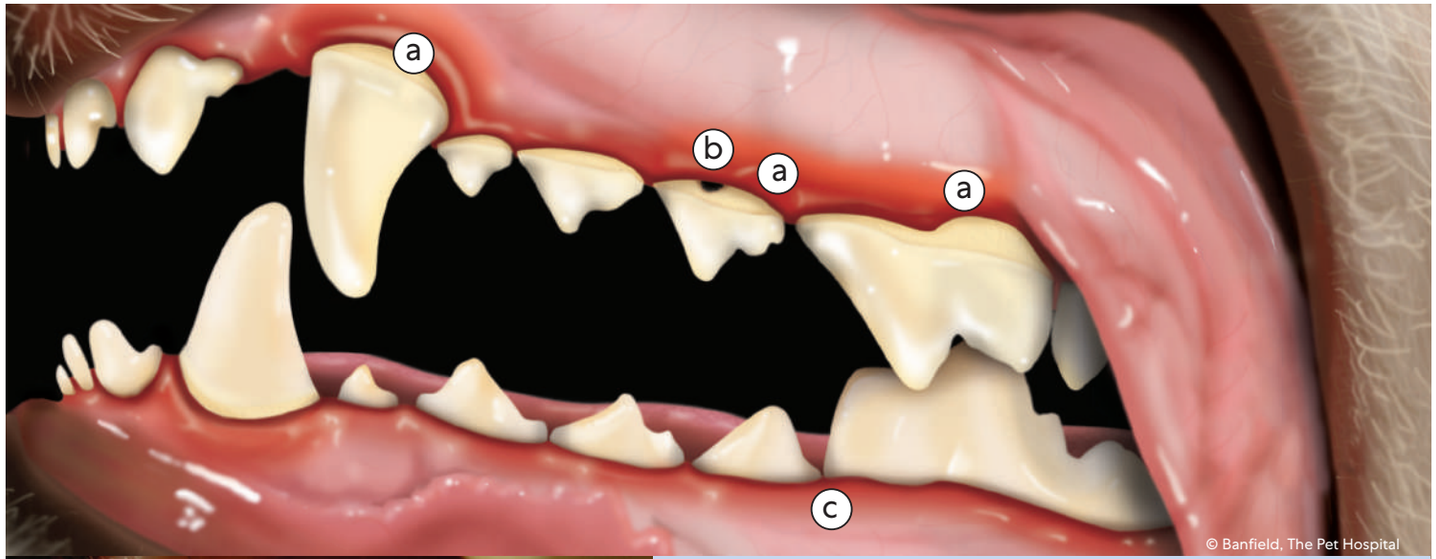
- Periodontitis is a progressive disease
- First presentation represents a key opportunity to discuss preventative home care with owners

Overview

- Plaque builds up within hours on a clean tooth, and can cause gingivitis within 48 hours
- Undisturbed plaque can mineralise to form calculus within days
- Calculus then provides a rough surface facilitating plaque accumulation
- If home care to remove plaque was undertaken from an early age, this could have been prevented in most cases

FIRST PRESENTATION

Typical scenario for a dog, aged 3+ after scale & polish



© Banfield, The Pet Hospital

What is seen in this picture?

- Gingival recession exposing root cementum (a)
- Early furcation exposure on multirooted teeth (b)
- Periodontal probing depth, 4mm on the mesial root of the lower molar (c)


© Lisa Milella

Recommended treatment

- Oral examination under general anaesthesia using a periodontal probe and explorer probe to examine every tooth and chart all findings
- Super and sub-gingival scale & polish and root planing (removing diseased cementum and calculus deposits on the surface of the root)
- Home care is required to prevent further progression of periodontitis:
  - The furcation defect at (b) will harbour plaque and will require careful cleaning
  - The area of the periodontal pocket around (c) will also require thorough brushing to prevent bone loss around the root of the molar

Overview

- The changes seen are irreversible. Scaling and polishing the teeth does not lead to reversal of the attachment loss
- Periodontitis will continue to progress if the recommended treatment is not carried out at this stage

9-12 MONTHS LATER

Typical scenario for a dog – if no periodontal treatment or home care was performed

What is seen in this picture?

- Marked gingivitis
- Visible gingival recession
- Moderate calculus accumulation

Comment

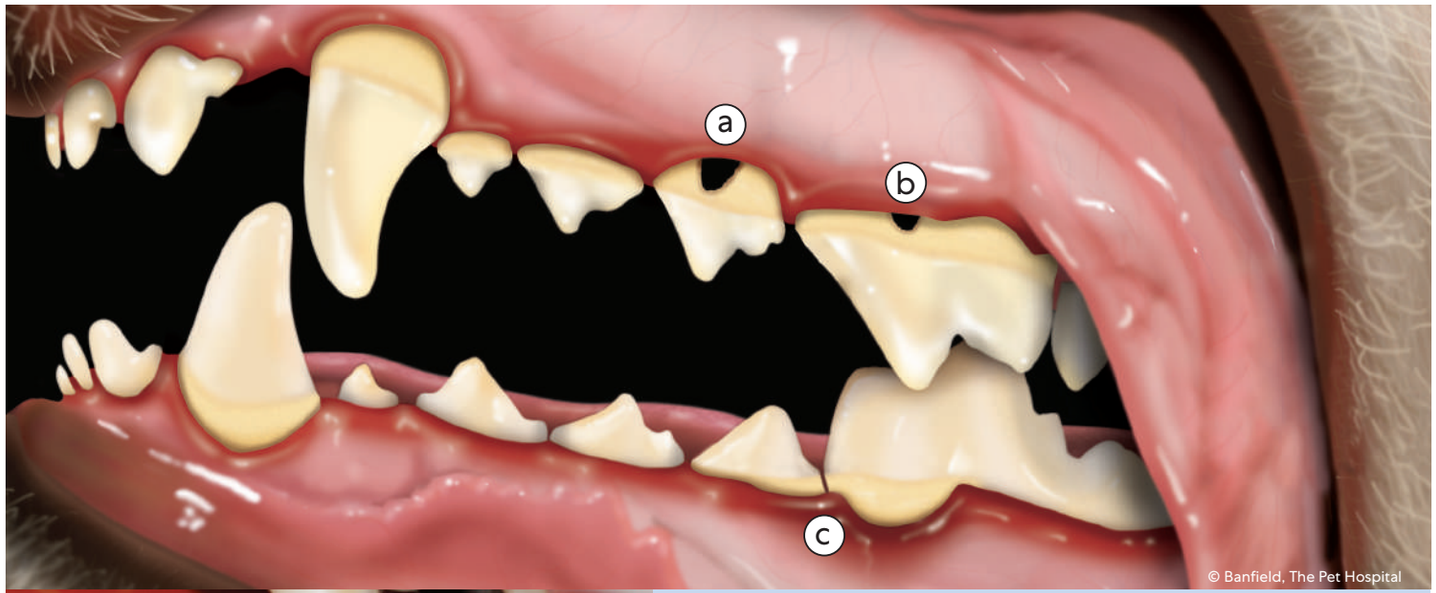
- Gingival recession does not always occur and the extent of attachment loss and pocket formation may only be detected using a periodontal probe during examination under general anaesthesia
- To prevent progression of periodontitis – thorough periodontal treatment with daily home care is essential

Overview

- If no treatment is performed following the scale and polish additional accumulation of calculus will occur, along side a worsening of periodontitis, with further loss of the supporting structure of the tooth
- Changes can occur within 6 months in high risk patients, especially small breed dogs

9-12 MONTHS LATER

Typical scenario for a dog if no periodontal treatment or home care was performed – after scale and polish



What is seen in this picture?

- Marked gingival recession
- Grade 3 furcation exposure 'through & through' (a) (b)
- Periodontal probing depth 6mm on the mesial root of the lower molar (c)

Recommended treatment

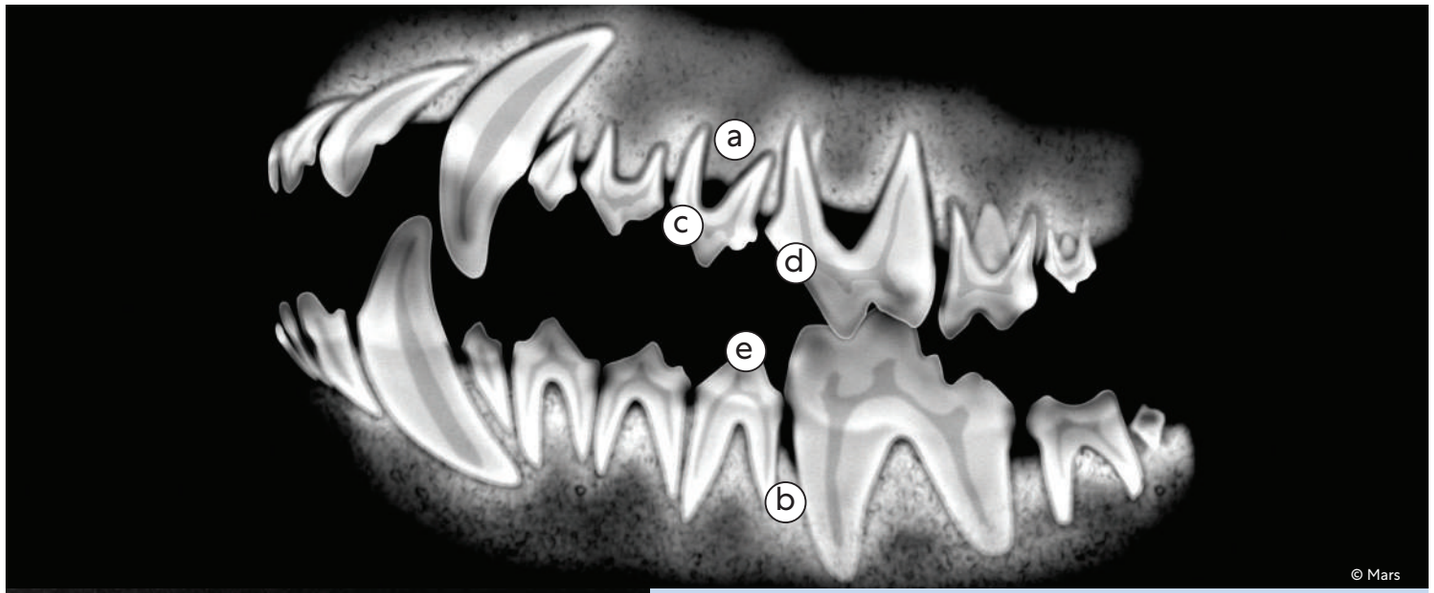
- Oral examination and pocket measurement around every tooth root should be performed
- Radiography is required to determine the extent of the disease progression (see next page)

Overview

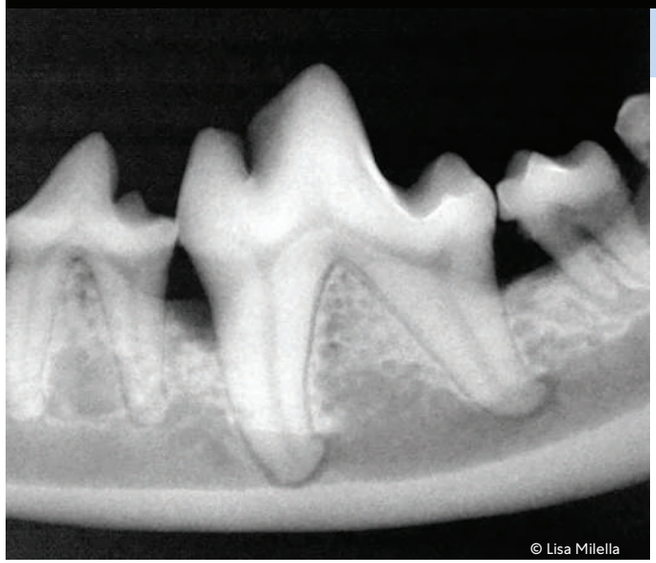
- The extent of attachment loss has worsened due to the lack of sub-gingival periodontal treatment and follow-up home care, and will continue to do so without intervention
- The full extent of the attachment loss can only be evaluated by examination under anaesthesia, pocket measurement around each tooth root and with the use of intra-oral radiographs

9-12 MONTHS LATER

Radiography – the full extent of the disease is revealed



© Mars


© Lisa Milella

What is seen in this picture?

- Horizontal bone loss (a)
- Vertical bone loss (b)

Recommended treatment

- Periodontal treatment, including subgingival curettage and root planing together with extraction of teeth c, d & e
- On-going home care is essential to prevent further progression and bone loss at other teeth

Overview

- Without radiography the root and alveolar bone cannot be fully assessed
- The full extent of the disease is often under estimated
- Radiography also aids in the planning of treatment
- Radiographs can help owners understand the extent of the disease

TOOTH SECTIONING FOR TOOTH EXTRACTION

A range of educational videos have been produced, to demonstrate how dog and cat teeth can be sectioned in practice.

The resource has been developed by John G A Robinson BDS, Dentist to the Veterinary Profession, with the support of Mars Petcare.

Why section teeth?

All 2 and 3 rooted teeth should always be sectioned to allow extraction as single root pieces because...

- Roots diverge and so have a different direction of removal from the socket
- Some rotation of the individual root can be employed
- Single root pieces can be loosened separately with less risk of breakage

Variation from normal root morphology

It should always be remembered that a tooth could be different from the normal morphology;

- There may be an extra root e.g. especially the upper 3rd premolar tooth
- A root can have a different shape e.g. more curved (kink or hook) or a bulge
- There may be changes from pathology – mainly resorption

It is strongly advised to obtain a dental radiograph when there is any doubt.

Introduction to sectioning technique

Video 1

Principles of tooth sectioning shown on a 2 rooted premolar tooth

Video 2

Sectioning mandibular carnassial tooth

Video 3

Sectioning maxillary (upper) teeth

Video 4

To watch the videos, please visit:
www.thewebinarvet.com/mars-petcare

European Veterinary Dental Society
www.evds.info

DENTAL CARE · Pedigree · Greenies

INTRA-ORAL (DENTAL) RADIOGRAPHY

This is just radiography, with a small variation, where small image receptors are placed inside the mouth medial to the area to be imaged. This enables images to be obtained without the superimposition of structure on the contra-lateral side of the head.

When do you need to take a dental radiograph ?

Intra-oral (dental) radiography is indicated when additional diagnostic information is required of the structures beneath gum level i.e. the tooth roots and their bony support.

Common clinical situations that require a radiograph include the following;

- Confirming whether a tooth pulp is non-vital (necrotic) in a tooth that is fractured, discoloured or has sustained trauma. The main signs are either or both of
  a) Peri-apical changes (in the periodontal ligament and the bone at root tip region)
  b) a wider pulp canal (due to cessation of dentine deposition).
- Assessing a tooth prior to extraction
- Identifying the problem when a tooth extraction is not progressing as expected, such as abnormal root morphology or ankylosis.
- Assessing root remnants (including those resulting from fracture during an extraction) for size, shape, number, integrity and position. Also to check that removal is complete.
- Detection and evaluation of tooth root fractures and bony fractures
- Confirmation that a tooth is missing rather that un-erupted (ectopic) or partly remaining. Buried teeth may have associated infection or give rise to cysts
- Assessing presence, type and extent of root resorption.
- Assessing the amount and pattern of bone loss and remaining support of teeth in periodontal disease.

Equipment

X-ray generator

A dental X-ray machine is ideal as the machine head can easily be adjusted to obtain the correct angle of the X-ray beam and also the distance from the subject. Having it situated close to the dental treatment table makes it quick and easy to use.

A standard veterinary X-ray machine can be used but is more challenging as it requires the animal's head position to be adjusted to give the required beam angle.

Small image receptors

The three common sizes are;

- Size 2 - adult Periapical (approx. 3 x 4 cm)
- Size 0 - child Periapical (approx. 2 x 3.5 cm)
- Size 4 - Occlusal (approx. 5.5 x 7 cm)

Using a smaller size makes positioning of the receptor inside the mouth easier. A smaller size obviously images a smaller area showing fewer structures and with less margin for error when there are technique errors.

Types or receptors currently used;

- DR (direct digital). An electronic sensor tablet directly connected by a wire cable to an external electronic device (computer) with software.
- CR (indirect digital). Phosphor screen film, contained in protective pouches, are removed from the mouth after exposure and then run through a scanner machine which send the electronic image to a linked computer.
- Non screen X-ray film. The high definition film is in individual protective pouches. After they are exposed the film is wet processed using developer and fixer fluids in a light free environment. There are specific dental radiograph automatic processor machine and also manual light safe boxes. Veterinary radiograph processors can not handle the small dental films.

Comparison of equipment options

Digital dental radiography is now the most common. DR and CR systems have high initial expense but are now affordable even for smaller general veterinary practices.

By having a digital system, intra-oral (dental) radiography can be mastered much more easily and the effort required to get consistent good quality results will be so reduced that there should be no reason not to obtain all images required.

DR compared to non screen X-ray film

Pros

- Very quick & easy to obtain image
- CAN LEAVE SENSOR IN SITU so when positioning error occurs it can be adjusted from the prior attempt position
- Lower ongoing costs / no chemicals to buy & dispose
- Image consistent (avoids processing errors)
- Shorter exposure time (less patient radiation dose), some older X-ray generators may not have low enough exposure time
- Can manipulate the image with the software package
- Easier storage & retrieval – can print copy for client

Cons

- Large initial Capital expense
- Expensive if breakage to sensor or wire
- Sensor more bulky – positioning harder
- Only size 2 & 0 (at extra cost) – no size 4
- Image quality slightly less (compared to a perfect wet film technique)

CR compared to DR

Pros

- Large size 4 sensor available (and custom vet shapes e.g. rabbit)
- Phosphor screens less bulky (but can be bent)
- Screens less expensive to replace if damaged
- Image quality comparable

Cons

- More expensive to buy initially
- More expensive to run – sleeves & servicing & repairs
- Can't leave in position and get image
- Slower to get image
- More stages and fiddly
- Software not as easy – extra stages and glitches

European Veterinary Dental Society
www.evds.info

INTRA-ORAL (DENTAL) RADIOGRAPHY

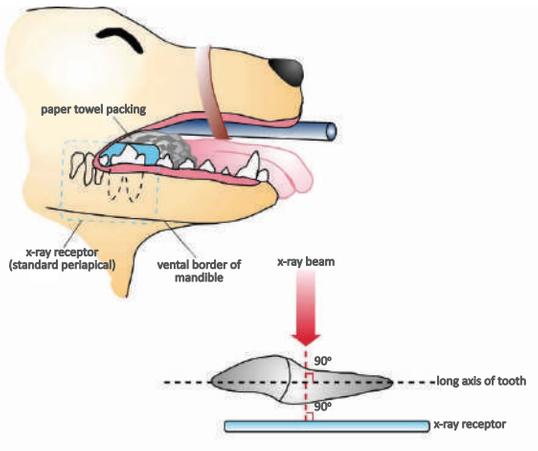
Techniques for intra-oral radiography

The image receptor is positioned inside the mouth behind (medial) to the structures to be examined. It should be as close to and as near to parallel as possible to the subject.
The receptor is held in position by placing some packing behind it but without causing it to bend. Some screwed up paper towel makes a good packing.

Parallel Technique

Parallel placement is only possible for mandibular teeth which are caudal to the symphysis that is the caudal (distal) root of the 2nd premolar and backwards.

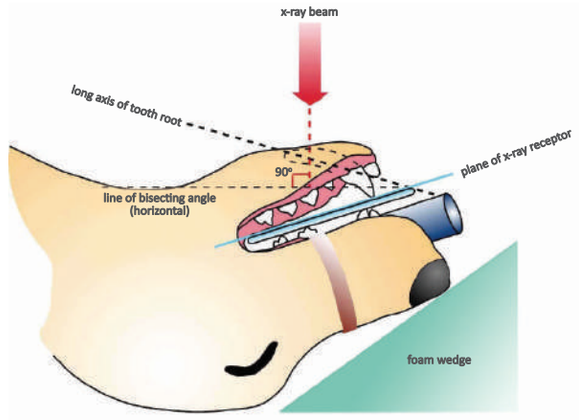
The animal is placed in lateral recumbence with the side to be radiographed uppermost. The receptor is placed lingual to the premolar or molar to be imaged and is then gently pushed ventrally to get the lower edge of the level receptor with the inferior border of the mandible. With the receptor held parallel to the subject, the X-ray beam is positioned perpendicular to both.



The Bisecting Angle Technique

When radiographing teeth, other than the posterior mandibular teeth, it is not possible to place the film parallel to the subject. The receptor is still placed inside the mouth, behind the subject tooth, at the smallest possible angle to the long axis of the subject.

If the X-ray beam was directed at 90 degrees to the film, the image would be shortened. If the beam was at 90 degrees to the long axis of the tooth, the image would be elongated.



To achieve an image that is the same proportions as the subject the bisecting angle technique is employed. An imaginary plane is visualized half way between the plane of the receptor and a plane through the long axis of the tooth (i.e. at the bisecting angle) and the X-ray beam is directed at 90 degrees to this plane.

Two tongue spatulas can be used to visualize the planes outside the mouth and so aid the positioning of the beam. It is of very useful to have a mental image of the normal orientation, length and morphology of the tooth roots. A common problem is to 'miss the apex' of a tooth, especially canines, by poor estimation of length or position.

If using a veterinary X-ray machine with a beam that is limited to a vertical direction, the animal needs to be placed in a suitable position;

- sternal recumbence for maxillary incisors
- lateral or sternal recumbence for maxillary canines, premolars and molars
- dorsal recumbence for the mandibular incisors and canines

The head position is then adjusted to make the bisecting angle plane absolutely horizontal.

A dental X-ray generator machine, being very manoevrable doesn't require these animal positioning but they are still a good starting point.

The canine teeth can be viewed latero-medially or rostro-caudally, depending on the reason for examination. Sometimes, e.g. checking for root fractures, it is best to use both.

The bisecting angle technique can be used when an occlusal size receptor is placed across the tops of the teeth (on the occlusal plane), as in the diagram above. The receptor is easy to hold in place by closing the mouth and its angulation is easy to see.

John G A Robinson BDS, Former Dentist to the Veterinary Profession

European Veterinary Dental Society
www.evds.info

LONG TERM

If the recommended treatment was not carried out

What is seen in this picture?

- Severe gingivitis and ulceration
- Heavy calculus accumulation – most teeth
- Missing teeth
- Mobile teeth
- Extreme halitosis

Comment

- In many small breed dogs this rapid progression in periodontal disease may occur within a year
- In many large breed dogs this progression in periodontal disease may occur within 3 years. In certain breeds, e.g. Greyhounds, the progression may be more rapid
- This infection may no longer be limited to the oral cavity; the pet's systemic health can also be negatively affected (DeBowes et al., 1996)

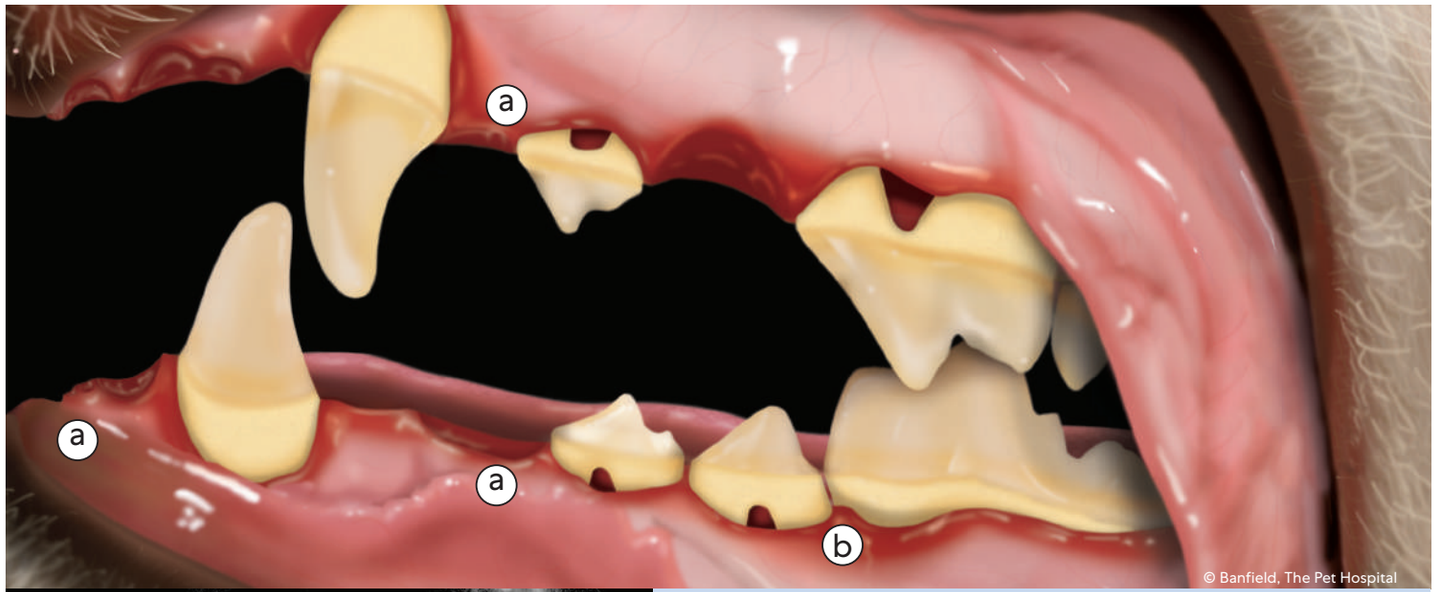
Overview

- No regular periodontal treatment or home care ultimately results in tooth loss – of further concern is the general health and wellbeing of the pet
- As well as advanced periodontitis resulting in extreme discomfort and pain, other organ systems in the body may be detrimentally affected

DeBowes, L. J., Mosier, D., Logan, E. et al. (1996). Association of periodontal disease and histologic lesions in multiple organs from 45 dogs. Journal of Veterinary Dentistry 13: 57-60.

LONG TERM

If the recommended treatment was not carried out – after scale & polish



© Banfield, The Pet Hospital

What is seen in this picture?

- Some teeth exfoliated during scale & polish (a)
- Marked gingival recession on canines, resulting in tooth mobility
- Through and through furcation exposure
- Periodontal probing depth 9mm (b)


© Lisa Milella

Recommended treatment

- Assess the quality and quantity of bone prior to treatment to reduce the risk of jaw fracture
- The extent of bone loss cannot be ascertained without radiography
- Consider referral to a veterinary dentist

Overview

- Multiple extractions are now required, although these are not without potential complications
- Periodontitis results in bone loss – making the risk of jaw fracture much more likely during extraction, and may also lead to complications such as oronasal fistula

OTHER DENTAL PROBLEMS

TOOTH FRACTURE

Occurrence – common

Assessment
For any tooth with a fractured crown, it should be determined whether there is pulp exposure or not. A red or black spot usually indicates that the pulp is exposed (red = vital pulp, black = necrotic pulp). To confirm whether the pulp is exposed, an explorer probe is used to examine the tooth under general anaesthesia. All teeth with pulp exposure must be treated as they are painful. The upper fourth premolar is prone to fracture but often overlooked.

Treatment
Extraction or referral for root canal treatment.

Prevention
Avoid bones, stones and toys that are harder than the teeth.

ABRASION DAMAGE

Occurrence – common

Assessment
If the wear is slow, tertiary (reparative) dentine will be laid down. Tertiary dentine is a dark brown colour and needs to be differentiated from the black colour seen with a necrotic pulp. An explorer probe run across the surface of the tooth will catch if the pulp is exposed.

Treatment
Extraction or referral for root canal treatment if the pulp is exposed.

Prevention
Use toys and balls designed for dogs (avoid tennis balls and toys with rough surfaces).

DISCOLOURED TEETH

Occurrence – common

Assessment
Teeth can be any colour from pink to black depending on the degree of trauma and extent of pulp damage. Studies have shown that 93% of these teeth contain necrotic pulp (Hale, 2001). Transillumination can sometimes be helpful in these cases. Normal teeth will opalesce evenly when backlit with a bright light (such as a halogen otoscope). Discoloured teeth do not transmit light as the iron salts from degradation of haemoglobin become lodged in the dentine tubules and/or pulp chamber and block transmission of light.

Treatment
Root fill or extract.

Prevention
Avoid giving dogs toys and chews harder than teeth. Frisbees are especially damaging.

CARIES (TOOTH DECAY)

Occurrence – relatively uncommon

Assessment
Any staining on the occlusal surface of the molar teeth should be assessed using an explorer probe. The probe sticks with a slight resistance in carious dentine – indicating caries (tooth decay).

Treatment
If the lesion is superficial then a filling is an option. For advanced lesions the tooth should be extracted.

Prevention
Avoid sugary treats.

European Veterinary Dental Society
www.evds.info

PERIODONTAL DISEASE – HOME CARE

A regular dental home care programme can help prevent periodontal disease occurring

Toothbrushing

Introduction to toothbrushing in five easy stages
Dogs need to be introduced to toothbrushing very gradually, ensuring that they learn to enjoy the experience. Things you will need:

- Dog toothpaste (do not use human toothpaste)
- Clean hands and short nails (for the safety of your dog)
- A pet toothbrush (medium bristles)
- Water
- A quiet area, with little or no distractions
- Patience!

The stages should last for five minutes and should be repeated on five separate days before moving on to the next stage. Every dog is different – so train at their pace. Please be careful inserting your fingers into the dog's mouth. We do not recommend doing this with aggressive dogs or dogs that are prone to biting.

- **Stage 1: Introduction to the taste of toothpaste**

  Wash your hands and smear a small amount of toothpaste on to your index finger.
  Allow the dog to lick the toothpaste from your finger. Repeat a number of times.

- **Stage 2: Get the dog used to contact with its mouth**

  Smear your index finger with toothpaste and then gently slide it into the dog's mouth letting it glide over the outer surface of the teeth and gums.
  Only go as far into the mouth as the dog is comfortable. Repeat a number of times.

- **Stage 3: Introduce the dog toothbrush – canine teeth first!**

  Prepare the toothbrush with water and toothpaste. Let the dog lick some of the toothpaste off the bristles. Gently hold the mouth around the muzzle to stop the dog chewing.

  Start to gently brush the canines only, using an up and downward motion – the toothbrush angled towards the gum line – move the brush away from the gum to the tip of the tooth. At this stage avoid the front teeth (incisors) as this is the most sensitive area in the mouth.

- **Stage 4: The toothbrush – back teeth**

  As before, start by brushing his canines (up and down motion).

  Slowly move along to the teeth behind the canines using a circular motion. Only go as far as the dog is happy with. Brush both sides of the mouth.

- **Stage 5: The toothbrush – all teeth**

  As before, start by brushing the canines and then the back teeth and finish with the incisor teeth.

  Hold the mouth closed around the muzzle and gently lift the upper lip with the thumb and forefinger bridging the muzzle to reveal the incisor teeth. Many dogs are sensitive and may sneeze when brushing the incisor teeth.

  Gently brush the front teeth using an up and down motion (as for the canines). Gradually build up the amount of time spent brushing.

For maximum protection tooth brushing should be performed daily.

Dental Chews & Main Meal

There is a large body of evidence that indicates that regular feeding of specialist dental chews or specialist main meal diets, in conjunction with brushing, will contribute to the control of plaque and tartar and should be a key part of any dental home care programme.

As such the complementary use of dental chews and foods is recommended.

When choosing a dental chew or main meal product, you should look for stated plaque and calculus reduction scores as well as scientifically proven active ingredients.

Certain dental chews, such as PEDIGREE® DentaStix™ Daily Oral Care chews, are designed to have special texture, shape and active properties which help control the accumulation of dental plaque and calculus during mastication.

The texture of a well designed dental product will have a gentle abrasive cleaning effect.

PEDIGREE® DentaStix™ Daily Oral Care chew provides a way of helping to care for the oral health of dogs that is both convenient for owners and enjoyable for the pet.

European Veterinary Dental Society
www.evds.info

DENTAL CARE Pedigree Greenies

STRONG TEETH – HEALTHY GUMS

PEDIGREE® DENTASTIX™ DAILY ORAL CARE CHEWS ARE SCIENTIFICALLY PROVEN TO REDUCE PLAQUE AND TARTAR BUILD UP, PLUS SUPPORT 'GOOD' BACTERIA IN THE DOG'S MOUTH

Chewing **PEDIGREE® DentaStix™ Daily Oral Care** everyday has been proven to reduce plaque accumulation by an average of 30% and calculus accumulation by approximately 60%*. New scientific research demonstrates **PEDIGREE® DentaStix™ Daily Oral Care** supports 'good' bacteria linked to periodontal health.

The specially formulated oral care chew has multifaceted modes of action:

- Active ingredients that reduce the build-up of calculus.
- Texture designed to encourage chewing and remove plaque. Chewing also stimulates the production of saliva, which provides another mechanism to remove plaque.
- A formulation which encourages 'good' bacteria associated with periodontal health.

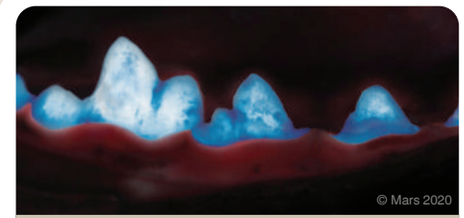
Even dogs that eat **PEDIGREE® DentaStix™ Daily Oral Care** really quickly still take a huge number of chews to do so. In one study, dogs eating the product in the shortest time (40-50 seconds) took between 90 and 130 chews to consume a chew.

THE RESULTS:

Summary of the effect of **PEDIGREE® DentaStix™ Daily Oral Care** chews on plaque and calculus accumulation, relative to a control diet.

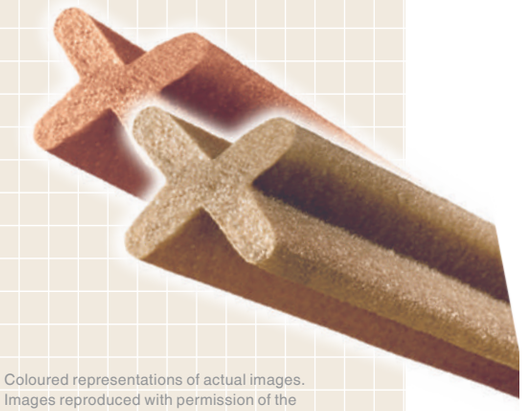
REDUCTION	PLAQUE (%)	CALCULUS (%)
AVERAGE	30.6	61.9
HIGHEST	68.1	97.3
GINGIVAL REDUCTION	25.0	ND

*Independently tested in canine dental efficacy studies at the University of New England, Australia, 2002 & 2003. Brown W and McGenity P. (2005) Effective Periodontal Disease Control Using Dental Hygiene Chews. Journal of Veterinary Dentistry. 22, 16-19.



PLAQUE COVERAGE WITH DIET ALONE

PLAQUE COVERAGE WITH PEDIGREE® DENTASTIX™ DAILY ORAL CARE



Coloured representations of actual images. Images reproduced with permission of the WALTHAM Petcare Science Institute. Wallis C, Gill Y, Colyer A, Davis I, Allsopp J, Komarov G, Higham S, Harris S. (2016) Quantification of canine dental plaque using Quantitative Light-induced Fluorescence. Journal of Veterinary Dentistry. 33, 26-38.

European Veterinary Dental Society
www.evds.info

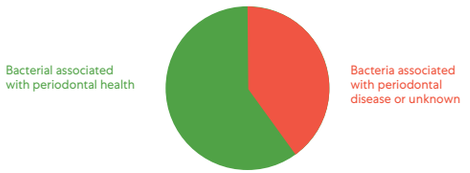
DENTAL CARE · Pedigree · Greenies

STRONG TEETH – HEALTHY GUMS

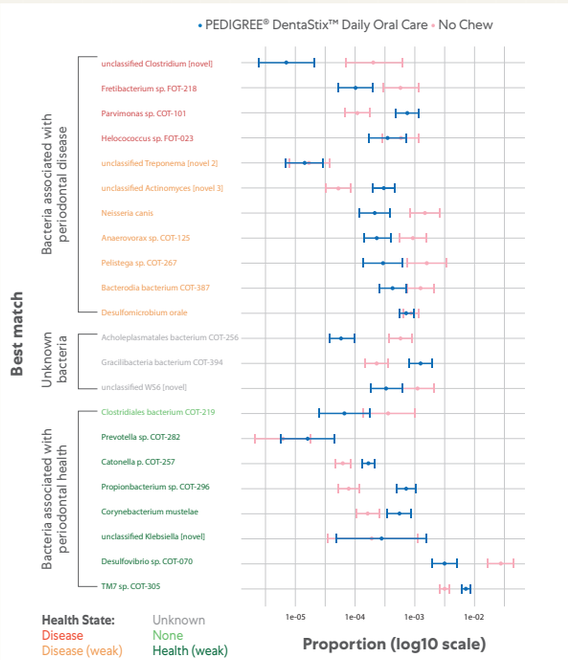
THE LATEST SCIENCE:

PEDIGREE® DentaStix™ Daily Oral Care encourages 'good' bacteria associated with periodontal health.

Microbial composition of canine plaque with PEDIGREE® DentaStix™ Daily Oral Care after feeding for 28 days.



Microbial composition of canine plaque with diet alone (control) after feeding for 28 days.



Effect of feeding a daily oral care chew on the composition of plaque microbiota in dogs. Ruparell A, Warren M, Staunton R, Deusch O, Dobenecker B, Wallis C, O'Flynn C, McGenity P and Holcombe L. 2020. Research in Veterinary Science. 132, 133-141

LOW FAT TREATS

PEDIGREE® DentaStix™ Daily Oral Care and DentaStix™ Daily Fresh chews contain less than 1.7% fat, are free from artificial colours and flavours. Both are designed for daily feeding. Please advise clients to reduce main meal by 10% when feeding **PEDIGREE® DentaStix™ Daily** products.

A FRESH APPROACH TO BAD BREATH

Bad breath is caused by Volatile Sulphur Compounds (VSCs). **PEDIGREE® DentaStix™ Daily Fresh** chews contains a unique blend of active ingredients, to help reduce levels of VSCs – acting on bad breath at its source, rather than simply masking it.

How does it work?

- **Pedigree® DentaStix™ Daily Fresh** contains a unique active ingredient blend of Green Tea Extract and patented Eucalyptus Oil, which are proven to reduce VSCs, helping to freshen breath.
- Eucalyptus Oil helps to freshen breath in the short-term, and Green Tea Extract provides a longer lasting effect.

European Veterinary Dental Society
www.evds.info

DENTAL CARE Pedigree Greenies

NUTRITIONALLY COMPLETE & BALANCED FOR CANINE ADULT MAINTENANCE

Flexible & chewy to encourage dogs to chew and not gulp. Highly digestible and soluble.

Awarded with VOHC seal of approval for plaque and tartar control. The test results below demonstrate that chewing Greenies™, when compared to feeding dry dog food alone, helps improve the control of plaque and tartar accumulation on dogs' teeth.

VOHC testing results

- **48%** LESS PLAQUE
- **54%** LESS CALCULUS
- **59%** LESS GINGIVITIS
- **41%** LESS ORAL MALODOUR

GREENIES™ ARE AVAILABLE IN 4 DOG SIZE-SPECIFIC PACKS: TEENIE, PETITE, MEDIUM AND LARGE.

The EVDS endorses the VOHC seal of acceptance.

The Veterinary Oral Health Council (VOHC) is recognised worldwide as the leading independent pet dental review board. Board-certified veterinary dentists and dental scientists at the VOHC objectively review research and award the seal only to products that meet their high standards.

HOW GREENIES™ DENTAL TREATS WORK...

The unique flexible chewy texture of **Greenies™** gently rubs the teeth and gums. The chew is formulated to last longer – which stimulates saliva flow helping to wash away plaque.

Plaque coverage Control versus Greenies™

PLAQUE COVERAGE WITH DIET ALONE

PLAQUE COVERAGE WITH GREENIES™

Coloured representations of actual images. Images reproduced with permission of the WALTHAM Petcare Science Institute. Wallis C, Gill Y, Colyer A, Davis I, Allsopp J, Komarov G, Higham S, Harris S. (2016) Quantification of canine dental plaque using Quantitative Light-induced Fluorescence. Journal of Veterinary Dentistry. 33, 26-38.

FURTHER READING

MARS Petcare

As the global leader in pet care, we help make millions of pets' lives better by providing quality nutrition and health care, creating foods that pets love and bringing them closer to their owners.

Through our brands, we are working to make a difference in the lives of people and their pets around the world. We are committed to bringing together pets and their owners and strengthening the human-animal bond.

Waltham Petcare Science Institute has been a leading scientific authority on pet nutrition and wellbeing for over 50 years. The knowledge generated through the scientific insights from the institute helps to drive innovation for MARS Petcare and underpins our world leading brands.

For further reading on MARS Petcare oral health science, please refer to the publications which highlight the continuous scientific research supporting our oral care products.

Quantification of canine dental plaque using Quantitative Light-induced Fluorescence

Corrin Wallis, Yadvinder Gill, Alison Colyer, Ian Davis, Judi Allsopp, Gleb Komarov, Susan Higham, Stephen Harris

Journal of Veterinary Dentistry, March 2016 33: 26-38, doi:10.1177/0898756416639787

Validation of Quantitative Light-Induced Fluorescence for Quantifying Calculus on Dogs' Teeth

Corrin Wallis, Judi Allsopp, Alison Colyer, Lucy J Holcombe

Journal of Veterinary Dentistry, 2018 Jul 17. doi.org/10.1177/0898756418786018

Effective periodontal disease control using dental hygiene chews

Brown WY1, McGenity P

Journal of Veterinary Dentistry, 2005 Mar: 22(1):16-9

Effect of feeding a daily oral care chew on the composition of plaque microbiota in dogs

Ruparell A, Warren M, Staunton R, Deusch O, Dobenecker B, Wallis C, O'Flynn C, McGenity P, Holcombe LJ

Research in Veterinary Science, 2020

Effectiveness of oral care interventions on malodour in dogs

Croft C, Patel KV, Inui, T, Ruparell A, Staunton R, Holcombe LJ

BMC Veterinary Research, 2022 18:164 https://doi.org/10.1186/s12917-022-03267-8