

Appendix C: Client Education Sheets

The pages that follow are copies of my client education sheets. They cover a variety of subjects. Feel free to copy and use them. I would ask that you use them exactly as they appear, as the content and the logo are my property. By leaving my name and logo on the sheets, they can act as written support for your recommendations.



Fraser Hale, DVM, FAVD, DipAVDC

BOARD CERTIFIED
VETERINARY DENTAL SPECIALIST

DENTAL AND ORAL SURGERY FOR PETS

PHONE 519-822-8598
TOLL-FREE 866-toothvet (866-866-8483)
FAX 519-763-6210
WEBSITE Toothvet.ca
EMAIL Toothvet@toothvet.ca
MAIL 159 Fife Road, Guelph, ON, N1H-7N8

D E N T A L D I S E A S E

Most people are very aware of their own teeth. We are subject to a constant barrage of information regarding plaque control, cavity prevention, and the catastrophic effects of bad breath. Many of us also visit our own dentists regularly. Despite this awareness of human dentistry, many pet owners still do not realize that their pets are subject to the same dental concerns.

Why is it important to care for your pet's teeth? For exactly the same reasons it is important to care for your own. The most common disease in pet animals is periodontal (gum) disease. It affects at least 70% of dogs and cats over the age of 5 years. Periodontal disease is the result of bacterial infection of the structures that support the teeth. As it progresses, these structures weaken, leading to loose and lost teeth. While this is going on, the animal is fighting a constant battle with the bacteria in the mouth. As the animal chews its food, the infected and inflamed gums bleed, and a shower of very aggressive bacteria enters the blood stream. These germs are carried throughout the body and can cause infection in many areas.

Among the diseases that have been documented as associated with periodontal disease are kidney infection, liver infection, heart valve infection, fibrosis of the lungs and arthritis. With the immune system constantly challenged by oral bacteria, it is less able to respond to other invasions. Mouths with advanced periodontal disease are sore so animals do not chew their food as well and may have a hard time digesting it properly so

can suffer from malnutrition. The overall effect is that the quality and quantity of life suffer dramatically.

What can you do about dental disease? Plenty. The first step is to look in your pet's mouth. If the gums appear red or inflamed, if there is a foul odour, if you see pus at the gum line or if you see loose or broken teeth, arrange to have your veterinarian do an oral examination as soon as possible. The problem will be assessed and a treatment plan formulated. This will usually involve a professional cleaning and polishing of the teeth and may include extraction of unsalvageable teeth. Once the teeth are clean you will be instructed in home-care. As with your own teeth, plaque and tartar will start to accumulate very rapidly unless you brush regularly.

If you have a young pet and you and your veterinarian can find no signs of dental disease then you can start home-care right away, to prevent severe problems from developing. It is suggested that you start training your pet to accept having its mouth played with as soon as you bring it home. There is no need to brush kitten and puppy teeth, as they will be lost and replaced in the first year, but if you can get them to enjoy having their teeth brushed when they are young, it will make it much easier to carry out your home-care program when the permanent teeth come in. It is suggested, however, that when your pet is teething, (losing baby teeth in favor of permanent teeth) that the gums will be sore and so it would be best not to be playing around with the mouth at that time.

When you brush your pet's teeth, you cannot ask them to rinse and spit. Therefore, it

is important that you use a brushing agent that is safe to swallow. Do not use human toothpaste as it will foam and distress your pet and when swallowed, it can cause stomach upset. Baking soda is also to be avoided, as the very high sodium content can be dangerous, especially to older patients. There are now several products specifically formulated for use on dog and cat teeth.

There are, of course, many other oral and dental diseases that do occur and require treatment. Dogs and cats are very prone to fractured and traumatically injured teeth leading to tooth root (endodontic) abscesses. As well as being constant sources of infection, these teeth are painful.

With many pure bred animals, selective breeding has resulted in orthodontic problems. This can lead to teeth hitting each other in abnormal and painful ways. These conditions are best treated in the young animal, and some can even be prevented by early intervention.

Cats are prone to a cavity-type of problem that starts at or below the gum line, making it difficult to detect until it is well advanced. These 'Resorptive Lesions', as they are called, are extremely painful. Fully anesthetized cats show no pain response with an abdominal incision but will react when a resorptive lesion is probed.

Many owners will say that their pet does not exhibit signs of pain, even when there is an obvious problem. This is not surprising when we think about how dogs and cats act in the wild. As predators, they will often select a weak or distressed animal as an easy meal. If they reveal to the world that they are in pain, or ill, they stand a good chance of being eaten themselves. Also, if they allow dental pain to keep them from eating, they soon grow too weak to hunt and then starve. So, instead, they tend to put up with the pain and carry on.

Studies have shown that dogs and cats have pain thresholds and tolerances almost identical to human subjects. This means that if something hurts you, it would hurt your pet to the same degree and in the same way. If you have ever had a toothache, you know the meaning of pain.

As veterinary dentists catch up to their human counterparts, more treatment options become available. No longer must we extract all diseased teeth, as many reparative and restorative procedures are now available. Some veterinarians will be able to provide these services in their own hospitals. For those veterinarians who choose not to make the large investment in time and money to equip themselves to offer advanced dental services, referral options are available.

Dogs and cats feel dental pain
in the same way and
to the same degree as we do.

One final point, dogs and cats, use their mouths for many of the same essential and recreational functions that we use our hands. It follows that their teeth are as important to them as our fingers are to us. A pet with a sore mouth and missing teeth faces both physical and emotional challenges.

Fortunately, with an increasing emphasis on preventative medicine, veterinary dentistry is starting to get the attention it deserves. The keys to a healthy mouth and a happier pet are, be aware of what problems can arise, watch for them, take steps to prevent them and treat them as soon as they are noticed.



Fraser Hale, DVM, FAVD, DipAVDC

BOARD CERTIFIED
VETERINARY DENTAL SPECIALIST

DENTAL AND ORAL SURGERY FOR PETS

PHONE 519-822-8598
TOLL-FREE 866-toothvet (866-866-8483)
FAX 519-763-6210
WEBSITE Toothvet.ca
EMAIL Toothvet@toothvet.ca
MAIL 159 Fife Road, Guelph, ON, N1H-7N8

DENTAL HOME CARE

With your own teeth, what your dentist and hygienist do is only a small, though essential, part of your oral hygiene program. **You** are responsible for the daily brushing, rinsing and flossing that are required to slow the constant progression of periodontal disease. The same is true for your pet. You are responsible for every aspect of your pet's daily care and care of the teeth becomes more important as we expect our pets to live longer and longer.

Brushing your pet's teeth is the main component of home-care. The purpose is to remove plaque before it becomes tartar. Plaque is a slime comprised of bacteria, saliva and food particles which adheres to the teeth and fills the pocket between the tooth and gum. Left undisturbed, plaque rapidly collects minerals from the saliva to form the rock-like brown deposits known as tartar or calculus. By brushing daily, you remove plaque and so tartar builds up slower. As with all things, the results will depend on the effort you give it.

The first step is to have your veterinarian perform a thorough oral examination to determine if there is any dental disease, which needs to be treated *before* you start your brushing program. It would be inadvisable to start brushing your pet's teeth if there was advanced gum disease as you could cause serious damage to the inflamed tissues as well as pain to your pet. Also, brushing will not remove tartar that has already developed.

Once the examination has been completed, your veterinarian will out-line the treatment plan. If there is dental disease the plan will include a thorough cleaning of all teeth, both above and below the gum line. Any teeth that have extensive disease beyond the point of being salvageable will have to be extracted. There may well be some seriously diseased teeth which might

be saved through more extensive procedures and you will need to discuss with your veterinarian what your expectations and desires are regarding the various treatment options.

The only way to properly carry out dental procedures on pets is with them anesthetized. Fortunately, the drugs available today make the anesthetic risk lower than the risk of dental neglect.

Now that we have the teeth clean and healthy, it is up to you to keep them that way. As mentioned before, this is done by brushing your pet's teeth daily. A program is outlined below which will help you get started with this highly rewarding habit.

Bear in mind that these are guidelines, not hard rules. Each animal is different and so the program may need to be modified to your pet's needs. Some owners can start brushing their pet's teeth on the first day whereas with others, it may take weeks of gradual effort to build up to brushing. Be patient because if you try to progress too rapidly, you might make your pet mouth-shy making it very difficult to proceed.

If handled properly, many animals come to truly enjoy their home-care and the extra time you spend each day with your pet will increase the bond between you.

**MANY PETS REALLY
ENJOY HAVING
THEIR TEETH
BRUSHED**

In order for the homecare program to work, your pet must actually enjoy the activity so that it becomes something you do *for you pet*, not *to you pet*. In order to achieve this, we must employ a program of gradual behaviour modification coupled with lots of rewards and affection. We must also

proceed slowly and be very consistent. The first step is to decide who is going to be responsible for homecare, when it is going to happen each day and where it is going to happen.

Guidelines For Dental Home-Care

Remember that Homecare is for prevention, not for treatment of established problems. Never start a homecare program until you have confirmation that the mouth is clean, healthy and pain-free.

1. When to start? **As soon as possible.** Eight to 12 weeks old is best. Pets don't need maintenance this young, but by brushing once or twice weekly they will become familiar with the routine when the permanent teeth erupt. It is a good idea to stop brushing while your pet is losing its baby teeth as the mouth will be a bit sore and your poking around with the brush will cause more pain. Once all the permanent teeth are in you can pick up where you left off.
2. The first step is to work with your pet's mouth. With a little patience your pet will soon accept your attention. **Make it fun** for both of you. Use a lot of love and especially praise to gain their confidence. Try to have your practice sessions at the same time each day so your pet gets into a routine. Late in the evening often works well, as everyone involved is generally in a quiet mood then. If your pet is highly motivated by food, try just before dinner with the meal acting as a reward for co-operating. It is also a good idea to have the training sessions at a time when the pet is coming to you seeking attention. In this way, the pet is getting exactly what it wants (attention) as well as bonus treats and so is likely to be quite happy with the situation.
3. Start by handling the muzzle and tickling the lips and soon you will be able to rub the teeth and gums with your finger. Put a few drops of water, flavored with garlic or garlic salt for dogs and tuna juice for cats, in the mouth daily. They will soon look forward to this treat. Immediately after the training session (within seconds), give you pet a reward of some sort. For many animals, a bit of favourite food works well as motivation.
4. Next, use a washcloth or piece of pantyhose, wrapped around the end of your finger and flavored as above, to gently rub the teeth.
5. Finally, use a soft toothbrush to brush the teeth. There are several veterinary brushes available and many human brushes are well suited to animal use as well. Hold the brush at a 45-degree angle to the tooth and brush back and forth or from gum to tip. Brushing the tongue side of the teeth is less critical. Use the garlic water or tuna juice. **Make it a game.**
6. There is an ever-growing selection of veterinary tooth washes, pastes and gels. Your veterinarian can help you select the one best suited to your situation. These products can increase the effectiveness of your home-care program but remember, **it's the brushing which does most of the cleaning.** Brushing at least three times weekly is recommended (daily is much better). Human toothpaste is to be avoided, as it will cause stomach upset if swallowed. Baking soda, with its very high sodium content can be dangerous to older patients. Hydrogen peroxide can be too harsh for the gums and must not be swallowed.
7. It helps to give abrasive foods and toys such as dry kibble, rawhide strips and dense rubber chew toys. There are now a number of diets on the market that have been shown to help reduce calculus and/or plaque accumulation. **Avoid natural bones, dried cow hooves and hard nylon toys, as these are hard enough to fracture teeth.**
8. By following a consistent program of home-care, you will greatly improve you pet's dental health. This will mean fewer professional cleanings, less tooth loss and a happier, healthier pet. However, please remember that there is no substitute for professional veterinary care. We must work as a team to ensure a long and happy life for your pet.

When selecting a diet, treat or product, look for the Veterinary Oral Health Council Seal of Approval and note if the product has been approved to help control calculus, plaque or both. With home-care, plaque control is the primary objective.



Fraser Hale, DVM, FAVD, DipAVDC

BOARD-CERTIFIED
VETERINARY DENTAL SPECIALIST

DENTAL AND ORAL SURGERY FOR PETS

PHONE 519-822-8598
TOLL-FREE 866-toothvet (866-866-8483)
FAX 519-763-6210
WEBSITE Toothvet.ca
EMAIL Toothvet@toothvet.ca
MAIL 159 Fife Road, Guelph, ON, N1H-7N8

ENDODONTICS: Indirect Pulp Capping

INTRODUCTION:

Endodontics involves the treatment of the pulp of the teeth. Often this involves removing diseased pulp tissue to remove pain and infection and allow the patient to retain the use of the affected tooth. Sometimes we can prevent problems with early treatment.

To better understand what follows, a brief anatomy lesson is in order.

The portion of the tooth that is normally visible above the gum-line is called the *crown* and the portion below the gum-line is called the *root*. As we move closer to the tip of the crown, we say we are moving *coronally* and as we move closer to the tip of the root we are moving *apically*. The crown is covered with a thin coating of non-living, non-porous *enamel*, which is the hardest substance in the body. Underneath the enamel of the crown is a living tissue called *dentin*. Dentin makes up the bulk of the tooth and is also the material the root is made of. In the center of the dentin is a hollow chamber known as the *endodontic canal* or *pulp chamber*; this is where the tooth's nerves and blood vessels are located.

DEVELOPMENT:

As a tooth erupts (develops) it starts out with a very large endodontic canal (also known as a pulp chamber), a thin dentinal wall in the crown and root and a fully developed enamel crown. This newly erupted tooth is relatively weak and easily broken. As the tooth ages and continues to develop, the dentinal wall grows inward and so becomes thicker as the pulp chamber becomes narrower. This thickening of the dentinal wall greatly strengthens the tooth. Depending on the species and breed, the teeth have obtained the majority of their final strength by three years of age.

INDICATIONS:

The main indication for indirect pulp capping is an acute injury to the tooth in which a portion of the crown is fractured off, leaving only a thin layer of dentin covering the pulp underneath. As the dentin is porous, bacteria may penetrate to the pulp and cause a pulp infection. Also, with only a thin layer of dentin to protect it, the pulp will be irritated by heat, cold and touch, causing pain.

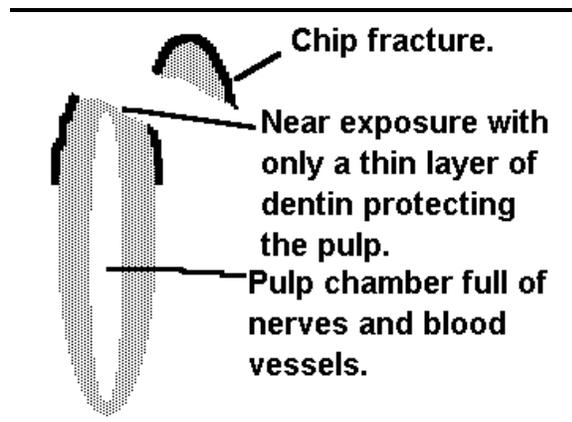
Untreated, a near-exposure will lead to pulp death and a chronically painful peri-apical abscess. These abscesses, as well as causing

discomfort, act as a constant source of bacterial infection to the rest of the body, potentially leading to premature kidney failure or heart valve failure and other diseases.

When the injury to the tooth is fresh; before disease has a chance to get well established, it is possible to cover the nearly exposed dentin with restoratives. This protects it from bacterial invasion and environmental irritations, thus relieving pain and preventing pulp death.

ADVANTAGES:

The advantages of indirect pulp capping are many. It is a relatively painless procedure with very little risk of complication. It gives rapid relief from the pain associated with nearly exposed pulp. It protects the pulp from irritation and so prevents more serious endodontic disease. Finally, though it often requires great attention to detail in the finishing, it is the least challenging endodontic procedure to perform.



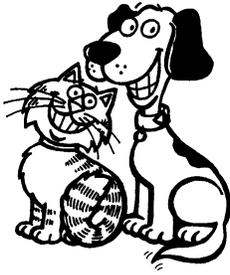
LIMITATIONS:

If the pulp is visible beneath the fracture area and is seen to be brown or gray, it is too late for indirect pulp capping. In this situation, the pulp is dead and a full endodontic procedure is indicated.

Early diagnosis and treatment greatly improve the chance of success.

If the pulp appears pink, then the tooth may be a candidate for indirect pulp capping. However, there is no way to know for certain whether the pulp has already become irreversibly irritated by the time treatment is sought. If it has, it will go on to die and a full endodontic procedure will be indicated. Therefore, the treated tooth should be radiographed after six to twelve months and the patient monitored for signs of dental pain. These signs would include refusal to eat hard food or play with chew toys. Should a problem be detected down the road, a full endodontic procedure would be indicated.

No restorative material, short of a metal crown, is more fracture-resistant than natural tooth. If the pet continues with the behavior that led to the initial injury, a conservative restoration will likely be damaged in time. Owners are instructed to check the tooth at least weekly to inspect the restoration and seek veterinary attention should damage be detected.



Fraser Hale, DVM, FAVD, DipAVDC

BOARD CERTIFIED
VETERINARY DENTAL SPECIALIST

DENTAL AND ORAL SURGERY FOR PETS

PHONE 519-822-8598
TOLL-FREE 866-toothvet (866-866-8483)
FAX 519-763-6210
WEBSITE Toothvet.ca
EMAIL Toothvet@toothvet.ca
MAIL 159 Fife Road, Guelph, ON, N1H-7N8

ENDODONTICS: Direct Pulp Capping

INTRODUCTION:

Endodontics involves the treatment of the pulp of the teeth. Generally this involves removing diseased pulp tissue to remove pain and infection and allow the patient to retain the use of the affected tooth.

To better understand what follows, a brief anatomy lesson is in order. The portion of the tooth that is normally visible above the gum-line is called the *crown* and the portion below the gum-line is called the *root*. As we move closer to the tip of the crown, we say we are moving *coronally* and as we move closer to the tip of the root we are moving *apically*. The crown is covered with a thin coating of non-living, non-porous *enamel*, which is the hardest substance in the body. Underneath the enamel of the crown is a living tissue called *dentin*. Dentin makes up the bulk of the tooth and is also the material the root is made of. In the center of the dentin is a hollow chamber known as the *endodontic canal* or *pulp chamber*; this is where the tooth's nerves and blood vessels are located.

DEVELOPMENT:

As a tooth erupts (develops) it starts out with a very large endodontic canal (also known as a pulp chamber), a thin dentinal wall in the crown and root and a fully developed enamel crown. This newly erupted tooth is relatively weak and easily broken. As the tooth ages and continues to develop, the dentinal wall grows inward and so becomes thicker as the pulp chamber becomes narrower. This thickening of the dentinal wall greatly strengthens the tooth. Depending on the species and breed, the teeth have obtained the majority of their final strength by three years of age.

INDICATIONS:

One indication for direct pulp capping is an acute injury to the tooth in which living pulp has been exposed to the outside world. Once exposed to the bacteria in the mouth, the pulp quickly becomes infected and inflamed. This initial inflammation is painful, as many readers will know from personal experience. As time goes on, the pulp starts to die, relieving pain in the short term, but allowing infection to advance apically, eventually causing a chronically painful peri-apical abscess.

These abscesses, as well as causing discomfort, act as a constant source of bacterial infection to the rest of the body, often leading to premature kidney failure or heart valve failure.

Abscessed teeth are a constant source of pain and infection.

When the injury to the tooth is fresh; before disease has a chance to get well established, it is possible to remove only the contaminated pulp in the coronal portion of the canal and reseal the tooth with various layers of filling materials. The advantage to this procedure, especially in a young animal with immature teeth, is that it leaves the pulp intact within the root of the tooth so that the dentin can continue to grow inwardly and strengthen the tooth.

Another indication is when a tooth has had a crown-reduction procedure to alleviate an orthodontic problem.

ADVANTAGES:

Compared to extraction of the affected tooth, which is the only alternative, endodontics offers many advantages. It is less traumatic to remove pulp than the whole tooth, often takes less time to do properly and so is safer for the patient. Endodontics avoids the potential complications of extraction such as oronasal fistulae, dry socket, tongue protrusion, jaw fracture and hemorrhage. As well, with endodontics, the patient retains the use of the tooth.

LIMITATIONS:

Published recommendations suggest that, for pulp capping to be successful, the pulp should have been exposed for less than forty-eight hours although there are reports of success in cases where the injury was older. The longer the pulp is exposed to oral bacteria, the poorer the prognosis. After the window of opportunity has closed, the chances are much higher that the tooth will go on to develop an abscess unless complete removal of the pulp and sealing of the canal is carried out.

The portion of the crown that has the pulp removed will no longer be alive. It is prone to discolouration and will not continue to grow in strength. The latter means that the tooth is more prone to further fractures if the patient continues with the habits that led to the initial injury. To prevent further damage to the tooth, it can be protected with a metal prosthetic crown.

As with all surgical procedures, there is some risk of postoperative complications. Therefore, the treated tooth should be radiographed after six to twelve months and the patient monitored for signs of dental pain. These signs would include refusal to eat hard food or play with chew toys. Should a problem be detected down the road, a full root canal procedure would be indicated.

Bear in mind, also, that the treated tooth will have a filling in it. The owner is instructed to look at the tooth weekly to ensure that the filling is in place and to report it if it becomes dislodged.



Fraser Hale, DVM, FAVD, DipAVDC

BOARD-CERTIFIED
VETERINARY DENTAL SPECIALIST

DENTAL AND ORAL SURGERY FOR PETS

PHONE 519-822-8598
TOLL-FREE 866-toothvet (866-866-8483)
FAX 519-763-6210
WEBSITE Toothvet.ca
EMAIL Toothvet@toothvet.ca
MAIL 159 Fife Road, Guelph, ON, N1H-7N8

ENDODONTICS: Total Pulpectomy

INTRODUCTION:

Endodontics involves the treatment of the pulp of the teeth. Generally this involves removing diseased pulp tissue to remove pain and infection and allow the patient to retain the use of the affected tooth.

To better understand what follows, a brief anatomy lesson is in order. The portion of the tooth that is normally visible above the gum-line is called the *crown* and the portion below the gum-line is called the *root*. As we move closer to the tip of the crown, we say we are moving *coronally* and as we move closer to the tip of the root we are moving *apically*. The crown is covered with a thin coating of non-living, non-porous *enamel*, which is the hardest substance in the body. Underneath the enamel of the crown is a living tissue called *dentin*. Dentin makes up the bulk of the tooth and is also the material the root is made of. In the center of the dentin is a hollow chamber known as the *endodontic canal* or *pulp chamber*; this is where the tooth's nerves and blood vessels are located.

In total pulpectomy, the goal is to remove all of the pulp as well as any diseased dentin lining the chamber. The chamber is then filled with dental cements and packing materials to seal the tooth against further contamination, and a filling is put in the crown to seal the access hole.

INDICATIONS:

The main indications for pulpectomy are dead or chronically inflamed pulp. Pulp can be killed a number of ways. The most common is when the tip of the tooth is broken off, by some trauma, exposing the pulp to the outside world. Once exposed to the bacteria in the mouth, the pulp quickly becomes infected and inflamed. This initial inflammation is painful, as many readers will know from personal experience.

As time goes on, the pulp starts to die, relieving pain in the short term, but allowing infection to advance apically, eventually causing a chronically painful peri-apical abscess. Pets often do not display this pain in obvious ways. Signs include refusal to eat hard foods or chew on previously

enjoyed toys, chewing on one side of the mouth, excessive drooling or licking of lips and a grouchy attitude.

These abscesses, as well as causing discomfort, act as a constant source of bacterial infection to the rest of the body, potentially leading to premature kidney failure or heart valve failure.

Another way for the pulp to be injured is in chewing hard substances. If an animal bites down hard on a rock or stick, etcetera, (remember that a dog's jaw can generate compressive forces several times greater than those produced by a human jaw) it can cause trauma to the pulp, which then becomes inflamed. As the pulp resides in a rigid chamber, there is no room for it to swell. Therefore, its blood supply is cut off and it dies. This dead pulp will eventually abscess. When a tooth is injured in this manner, it becomes discoloured and appears pink, purple or gray.

ADVANTAGES:

Compared to extraction of the affected tooth, which is the only alternative, endodontics offers many advantages. It is less traumatic to remove pulp than the whole tooth and so causes much less pain for the patient.

Endodontics avoids the potential complications of extraction such as oro-nasal fistulae, dry socket, tongue protrusion, jaw fracture and hemorrhage. As well, with

endodontics, the patient retains the use of the tooth.

LIMITATIONS:

Once the pulp of the tooth has been removed, the tooth is, of course dead. In many cases it will have been dead before surgery anyway. A dead tooth is not as strong as a living tooth, so if the patient continues with the behavior that led to the initial injury (chewing rocks etcetera) there is a chance more of the tooth will be broken off and/or the filling dislodged. This can often be prevented by protecting the tooth with a metal crown.

Compared to extraction, Endodontics offers many advantages.

It is not possible to look at the tip of the root to ensure that the apex of the root has been completely sealed. If the seal is not complete, the procedure may fail and need to be repeated. For this reason, it is always recommended to radiograph the treated tooth one year post-operatively to ensure that all is well. As well, owners should monitor the patient for the signs mentioned earlier and check, on a weekly basis, that the filling is in place.



Fraser Hale, DVM, FAVD, DipAVDC

BOARD CERTIFIED
VETERINARY DENTAL SPECIALIST

DENTAL AND ORAL SURGERY FOR PETS

PHONE 519-822-8598
TOLL-FREE 866-toothvet (866-866-8483)
FAX 519-763-6210
WEBSITE Toothvet.ca
EMAIL Toothvet@toothvet.ca
MAIL 159 Fife Road, Guelph, ON, N1H-7N8

RESORPTIVE LESIONS (RLs)

Introduction:

One of the most common and most painful afflictions in cats is a condition referred to as Resorptive Lesions (sometimes called “neck lesions”). They appear as holes in the enamel and underlying dentin of the teeth, arising at or below the gum-line.

Unlike cavities in humans, which are the result of bacterial enzymes and acids digesting the teeth, RLs are the result of the cat's own body resorbing the teeth. Specifically, cells known as *odontoclasts* are found in these defects where they cause the tooth structure to dissolve. The cause of RLs has not been definitely determined at the time of writing (March 2004).

RLs Are Extremely Painful!

As RLS are a progressive destruction of the tooth, they are graded as to severity to allow for appropriate treatment selection.

Stage I are early defects extending less than 0.5 mm into the tooth and involving root cementum only.

Stage II have significant erosion involving dentin but not yet into the pulp.

Stage III have caused considerable loss of crown structure and involve the pulp.

Stage IV have caused extensive loss of the crown of the tooth.

Stage V have caused complete loss of the crown with portions of the root system still visible on radiographs.

Many early RLs start on the root surface deep within the socket. Once they break through the level of gingival attachment and become contaminated with oral bacteria, they become inflamed and very painful.

Once the lesion extends into the pulp chamber of the tooth, it is not only very painful, but bacteria in the mouth now have easy access to the tip of the tooth root where an abscess can develop. Tooth root abscesses have been well documented as chronic sources of infection that can lead to infections in other organ systems. The net result is that the cat ages more rapidly as organs start to fail due to long term exposure to infection.

Treatment:

What can be done? Early detection is the key, as well as the challenge. As this problem often starts deep within the dental socket, careful examination with the patient anesthetized is essential. Dental X-rays are also critical for evaluating the presence of and extent of the lesions. This should be done each time your cat is presented to have its routine dental treatment.

For a very few, carefully selected stage I and stage II defects, the tooth might be saved by filling the lesion with a special restorative that binds chemically to the tooth as well as releasing fluoride into the tooth. However, most lesions, by the time they are detected are not restorable. Also, since we

do not know the cause, we cannot say for certain that placing a filling will stop the progression of the lesion.

In all stage III, IV and V lesions, too much of the tooth has been lost to allow restoration. In these cases, the only humane treatment for the patient is extraction of the affected tooth to remove the source of pain and infection.

Prevention:

As we do not yet fully understand the causes of this feline peculiarity, we cannot make iron-clad recommendations for its prevention. We may be closer to an answer now than ever before and the next few years may provide us with preventative recommendations. For now, all we can say for certain is that a cat that has had one or more RLs will likely have more in the future and so annual radiographic examination to find and manage new lesions is recommended.

Limitations:

Restoring lesions today does nothing to prevent other ones from developing in the future. As well, long-term studies have shown a very poor success rate with

restorations as the resorptive process continues under or at the margins of the restoration. Finally, the restoratives used are quite technique sensitive (they need to be handled just right or they will not stick to the tooth).

Current thinking is that teeth with very early lesions can be restored, as long as the operator is confident in his/her technical ability and the owners can commit to long-term home-care. The teeth should then be rechecked every six to twelve months.

Improvement in attitude after treatment of painful teeth can be dramatic

Dental Pain:

Many owners of cats with neck lesions report that their cats do not *appear* to be in pain. From an evolutionary standpoint, this is not surprising. Cats in the wild that display to the world that they are ill or distressed are likely to become the prey of a larger animal quickly. Also, if they allowed dental pain to put them off food, they would soon become too weak to hunt and would starve. Therefore, they adopt a stoic attitude and carry on. On the other hand, the improvement in attitude and demeanor after restoration or extraction of painful teeth can be dramatic.

Conclusion:

Whether you opt for extraction or restoration, do not leave neck lesions untreated. They cause significant pain and suffering and must be dealt with.



Fraser Hale, DVM, FAVD, DipAVDC

BOARD CERTIFIED
VETERINARY DENTAL SPECIALIST

DENTAL AND ORAL SURGERY FOR PETS

PHONE 519-822-8598
TOLL-FREE 866-toothvet (866-866-8483)
FAX 519-763-6210
WEBSITE Toothvet.ca
EMAIL Toothvet@toothvet.ca
MAIL 159 Fife Road, Guelph, ON, N1H-7N8

JUVENILE CANINE DENTISTRY

Introduction:

Congratulations on your new puppy. Like most clients with a brand new puppy, you want to do all the right things so that you will have a healthy, happy and well-mannered pet. You will be seeing a lot of your veterinarian over the next several months to ensure that your pet is properly immunized, is free of internal and external parasites, is getting the right food, is growing properly, is being trained properly and so on.

One area that requires close monitoring is the growth and development of the mouth and teeth. This is an area of the body where things can change very rapidly and if a problem goes unnoticed for some time, there may be permanent damage.

Puppies are usually eight to twelve weeks old when they are taken to their new homes. By this age, they should have a full set of primary or deciduous (baby, milk) teeth. Each quadrant of the mouth should have three incisors at the front, one long, sharp canine tooth and then three premolar teeth behind the canines.

Most of the permanent or adult teeth start as buds forming at the root tip of the deciduous teeth, so if a deciduous tooth fails to develop by twelve weeks of age, likely the permanent tooth that should follow will not develop either.

Starting around three months of age, the developing permanent incisors should be erupting, and as they do, they should cause resorption of the roots of the deciduous incisors. Therefore, the deciduous teeth become loose and fall out. This exfoliation of the deciduous teeth often goes unnoticed by the owners as the tiny

crowns of the baby teeth are lost in toys or are swallowed. Next, the permanent canines start to erupt between four and five months of age, followed by the premolars and the molars. All the permanent teeth should have erupted by six months of age in most dogs. Giant breeds sometimes develop more slowly.

If everything went according to the plan, by seven or eight months of age, all deciduous teeth will be gone, all permanent teeth will have erupted into the correct position and there will be no swelling or inflammation of the gums. Unfortunately, things do not always go according to the plan.

Persistent Deciduous Teeth:

A common problem, particularly in small breeds, is persistence of deciduous teeth, especially the canines. The exact mechanisms for this are rather complex, but it is enough to know that it is usually an inherited problem in which the permanent tooth erupts beside the deciduous and so does not cause the deciduous root to resorb. Now we have two teeth occupying a space that was designed for just one tooth. This over-crowding can lead to serious and painful orthodontic problems such as lower canine teeth biting into the roof of the mouth.

Another problem with retained deciduous teeth is that the permanent and deciduous teeth are often so close together that there is no gum tissue between them to keep out infection. Therefore, debris and bacteria have easy access to the tooth sockets and deep-seated periodontal disease rapidly develops.

The rule to follow is that there should never be a deciduous tooth and its permanent replacement

visible in the mouth at the same time. If the permanent has broken through the gum and the deciduous tooth is still in place, the deciduous tooth should be extracted immediately. This will then allow the permanent to erupt into its desired location without crowding and with a healthy collar of protective gum tissue.

Waiting until it is time for your puppy to be neutered is a bad idea. By then, the permanent tooth has erupted considerably and will likely be in the wrong place. Also, there may already be deep-seated periodontal disease by then.

It is considered by many to be unacceptable to perform an extraction at the same time as a sterile surgical procedure. During extraction, bacteria in the mouth will have direct access to the blood stream. These bacteria can then travel to all parts of the body, including the other surgical site, where they may colonize the traumatized tissues and suture materials, leading to post-operative infection. It is safer for the animal and provides a better chance for normal development if retained deciduous teeth are extracted as soon as they are noticed.

Many puppies are given their final puppy vaccine at four months of age and then are not seen by their veterinarian again until neutering at six months of age. Therefore, it will be your job to check the mouth at least weekly to ensure that deciduous teeth are falling out properly, as the permanents erupt.

Fractured Deciduous Teeth:

Another common problem in puppies is fracture of deciduous teeth, especially the canines. As you will find out (if you haven't already) puppies do a lot of chewing. Therefore, it is not surprising that these delicate teeth are prone to damage. When a deciduous tooth is broken, there is almost always exposure of the pulp of the tooth. Pulp is the soft tissue inside the tooth, which contains many blood vessels and nerves.

Once exposed to oral bacteria, the pulp becomes infected and inflamed, causing considerable pain to the pet. After a time (several days) the pulp starts to die and the pain subsides. Now the tooth is full of dead pulp and bacteria. The bacteria and their toxic waste products leak out through the root tip and cause infection and

inflammation around the root tip. That in itself is bad enough, but remember that the permanent tooth is trying to develop right beside the tip of the root of that dead deciduous tooth. The result can be a permanently deformed permanent tooth.

Another factor to keep in mind is that a growing puppy is learning all the time. If there is an ongoing source of dental pain, the puppy may grow up being wary of anyone handling its mouth and head. This can lead to behavior problems later in life.

As with retained deciduous teeth, the best thing to do is have a fractured deciduous tooth extracted as soon as it is noticed. Early treatment gives the best chance for the prevention of permanent dental and behavioral problems.

Interceptive Orthodontics:

Some puppies develop orthodontic problems early in life. The most obvious problems are when the lower jaw is either too long or too short. This can lead to deciduous teeth biting in to oral soft tissues, causing pain. Also, abnormal dental interlocks can prevent proper growth of the jaws so the short jaw is prevented from "catching up". Early intervention through Interceptive Orthodontics is the treatment of choice. This usually involves extraction of some deciduous teeth to remove the source of oral trauma and to allow unhindered jaw development. Many severely affected puppies will also have problems when the permanent teeth erupt and will require further dental work in their first year of life.

Conclusion:

The main lesson from all of this is to be observant of your puppy's mouth and teeth and to seek veterinary advice as soon as a problem or question arises. Waiting does no good and can do much harm.

Appendix D: Dental Records & Forms

The section that follows contains the records and forms in use in my practice at the time of writing. These pages are in a constant state of evolution as veterinary dentistry itself evolves. You are welcome to copy any of the consent and waiver forms and some of the dental records. The illustrations of teeth in the dental charts are copyrighted by DentaLabels of Kensington, CA (800-662-7920) and so may not be copied. It may be possible to purchase a license to utilize this artwork for use in your own clinic.

Remove my name and logo from any forms or records that you choose to use. Otherwise, it will imply that I have had some direct involvement in your cases. The abbreviations and classification systems are those currently approved by the American Veterinary Dental College.