**Papers presented at the**

**10th World Veterinary Dental Congress**

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**Introduction:** Carbonic anhydrase (CA) 6 is the secretion form isozyme, and firstly found in the sheep saliva. CA6 is mainly thought to enhance buffering capacity of oral cavity and might be involved in regulation of salivary pH and in protection of upper alimentary canal against excess acidity. It is known that CA6 is secreted by acinar serous cells of parotid gland and serous demilune cells of submandibular gland in many mammals (Kivela et al. 1999, Kaseda et al. 2006). Moreover, in situ hybridization technique showed that CA6 mRNA was described to express in only serous acinar cells of the sheep parotid and submandibular glands (Murakami et al. 2003). However, previous our immunohistolocal study in the canine salivary gland indicates that CA6 was detected in serous acinar cells and some striated duct cells (Asari et al. 2007). Secretory ability of CA6 of striated duct cells in canine salivary glands has never been clear. Present study examined protein level synthesize ability of CA6 and mRNA expression ability of CA6 in serous acinar cells and striated duct cells using of the laser microdissection method (LMD) and RT-PCR for a limited harvest and detection of mRNA.

**Materials and Methods:** Anti-canine CA6 antibody was arisen from our original purified canine CA6 isozyme for the protein level histological detection (Asari et al. 2007). Parotid and submandibular glands were obtained from three adult male beagles under anesthesia for the immunohistochemistry. Seven im cryo-sections of salivary gland were made and mounted on glass slides covered with PEN foil for the microdissection system (Leica Laser Microdissection System, Leica Microsystems). The mRNA of CA6 was analyzed by RT-PCR method routinely.

**Results:** Canine CA6 strongly reacted to serous acinar cells of parotid gland (Fig.1) and serous demilune of submandibular gland, while weak immuno-reactions were seen in striated duct cells in ductal regions of parotid (Fig.1) and submandibular glands. Total RNA extracted from tissue samples harvested by LMD was then subjected to RT-PCR, and agarose electrophoresis of RT-PCR products showed the target band at 441 bp for serous acinar cells, striated duct cells of parotid gland, and serous demilune, striated duct cells of submandibular gland. The band was the strongest for serous acinar cells of parotid gland. The band for striated duct cells of parotid and submandibular glands was weaker than that for acinar cells, but was very well defined (Fig.2).

**Discussion:** CA in serous acinar and ductal epithelial cells is involved with saliva formation. Mucous acinar cells were not found to be reactive for any cytotoxic CA (Asari et al. 2000b). In many mammals, including humans, secretory CA6 in mainly salivary gland is detected in acinar cells (Fernley et al. 1979, Kadoya et al. 1987, Ogawa et al. 1990, Parkkila et al. 1990, Ogawa et al. 1993, Parkkila et al. 1997) suggesting that CA6 present in whole saliva. When CA6 is secreted from cells in the lumen, it may mix with water that is passively transported into the lumen through transportation of Na+ and Cl- into the lumen, and it then flows inside the excretory duct towards the oral cavity. Immunohistochemical studies have shown that ductal contents exhibit strong reactions to CA6 antibody (Kadoya et al. 1987, Parkkila et al. 1990, Ogawa...
et al. 1993). Immunohistochemical studies investigating the localization of cytosolic CA1, CA2 and CA3, and secretory CA6 in salivary glands have clarified the differences in localization among animal species and salivary glands. These studies show that cytosolic CA isozymes are present in either acinar or ductal epithelial cells, while CA6 isozymes are found in acinar cells of the parotid gland and serous demilune of the submandibular gland. For example, in the bovine parotid gland, serous acinar cells contain highly active cytosolic and secretory CA2 and CA6, but striated duct cells only contain CA2 not CA6 (Asari et al. 2000a). This is also true in rats and humans. In rat or human parotid glands, while serous acinar cells contain CA6 striated duct cells only contain cytosolic CA1 and CA2 (Kadoya et al. 1987, Parkkila et al. 1990). However, a recent immunohistochemical study on the localization of secretory CA6 in the canine parotid gland found that, although much weaker, reactions were also seen in striated duct cells (Asari et al. 2007). Secretory CA6 protein in canine ductal epithelia detected by immunohistochemical analysis might have been CA6 originating from serous acinar cells, subsequently absorbed by ductal epithelial cells during the process of saliva formation. The reaction could also have been nonspecific or could have represented artificial products formed during the process of sample preparation. Present study was conducted to determine secretory CA6 in the canine salivary gland and ductal epithelia. In order to clarify this point, LMD were used to harvest target tissues. In other words, serous acinar cells and striated duct cells in parotid and submandibular glands were separately dissected, and the gene expression of CA6 in each cell type was closely investigated at the tissue level. Our results confirmed mRNA encoding CA6 in serous acinar cells and striated duct cells, and as a result, CA6 is synthesized in both cells in dogs. Present results confirmed mRNA encoding CA6 and anti canine CA6 antibody positive reactions in serous acinar cells and some striated duct cells. CA6 secreted by some canine striated duct cells might have the role of saliva formation.


Fig. 1. Serous acinar cells in the canine parotid gland. (arrow heads) and striated duct cells (arrow) show immuno-reactions for anti-CA6. The scale in figures is 100 im.

Fig. 2. After the LMD, total RNA extracted from tissue samples was subjected to RT-PCR, and agarose electrophoresis of RT-PCR products showed the target band at 441 bp for serous acinar cells (Lane 1) and striated duct cells (Lane 2) of the parotid gland, serous demilune (Lane 3) and striated duct cells (Lane 4) of the submandibular gland. The band was strongest for the serous acinar cells of the parotid gland. The band for the striated duct cells of the parotid and submandibular glands was weaker than that for the acinar cells, but was well defined. Lane 5 was negative control; skeletal muscle. Furthermore, the internal standard (canine GAPDH: 334 bp) was amplified in all tissue samples.
Introduction: Veterinary Dentistry is a specialization whose purpose is solving the oral illnesses or with oral appearances in animals. Such specialization, respected as scientific discipline, is adding specialists all over the world due to the importance of the oral health of animals and of the complex relations between their oral and systemic health. The present study shows a questioning reflection around the veterinary physician acting as an interventor on dogs and cats oral health given their peculiar particularities. The referred study uses a bibliographic research compared to the results of a quantitative nature field research which verifies the services rendered on veterinary dentistry among the veterinary clinics of the city of Santa Maria, RS.

Materials and Methods: The field research accomplished from June 17, 2006 to July 19, 2006 had 23 veterinary clinics of the city of Santa Maria, RS, as samples. It has been composed by the application of a questionnaire containing the following four questions: a) is there any odontologic attendance on that clinic? b) Which is the odontologic service rendered by this clinic? c) Which is the information source applied by the professional (s) in order to use their knowledge regarding the theme? d) Do the professional (s) have master’s degree on the Veterinary Dentistry area? The applied questions were of the closed type, that is, they already had answers for the magazines usage; 12 for the books usage, 12 for internet consultations, and 5 for courses on the area; 10 for internet consultations, and 5 for courses. None of the professionals of the 23 clinics researched affirmed to have been in any courses of master’s degree or doctorate. The updating of odontologic knowledge there have been 12 answers for the magazines usage; 12 for the books usage, 12 for courses on the area; 10 for internet consultations, and 5 for congresses. None of the professionals of the 23 clinics researched affirmed to have been in any courses of master’s degree in Veterinary Dentistry in a level of specialization, master’s degree or doctorate.

Discussion: The periodontal diseases affect a high percentile of accompanying animals, mainly dogs (Cox & Lepine 2003). Most of the veterinary clinics of Santa Maria states to treat periodontal diseases. For the accomplishment of the endodontic treatment is fundamental to have the basic knowledge on endodontic, the physiology, the pathology, the diagnosis, the equipments, the tools, and the filling techniques, besides the postoperative processes (Leon-Roman & Gioso 2002). However, in Santa Maria, this kind of intervention is carried out by professional (s) without qualification in level of post-graduation. In spite of the complexity of the prophylactic process (Cox & Lepine 2003), professionals of a large number of veterinary clinics researched states to carry out the procedure even without having academic qualification for that. Even though they believe in Veterinary Dentistry as being a specific area of the veterinary physicists (Correa & Venturini 2005), the own authors affirm that those professionals do not have technical bases for this kind of attendance. Nevertheless, most of the veterinary clinics of Santa Maria act on the area.

Conclusion: The importance of the professional understanding and of the development of the odontologic specialty in the treatment of dogs and cats has fundamental importance for these animals health. Though, is notorious the establishment of an impasse and of a conflict of interests characterized by the following situation: veterinary physicians do not accept the dentists to act on odontologic treatment of dogs and cats but they also do not consider themselves as being able to act on this specialty once that their basic curriculum of formation does not embrace this knowledge. In Santa Maria, the veterinary professionals acting on the area of Veterinary Dentistry occurs in a large scale and in an empirical way even without academic qualification, which is necessary in face of the importance involving the procedures. Such situation indicates urgency in the sense that the local high teaching institutions plan and perform courses to make veterinary physicians able to practice Veterinary Dentistry for the technical and ethical responsibility around the thematic.

Introduction: The periodontal disease is the most common illness in dogs and cats, characterized by a destruction of teeth supporting tissues. One of the main objectives of periodontal therapy is the morphologic and functional reconstruction of the lost tissues of support periodontal. The enamel matrix derivative proteins (EMDP) has been introduced in the periodontal field impelling the studies about the periodontal regeneration to a new stage, because they act as biological modifiers, which present stimulate properties of periodontal tissue.

Case Report: The implications of the enamel matrix proteins derivative (EMDP) used in the periodontal regeneration, illustrating in practice its use in a 10 year-old dog, of Pinscher breed, which was submitted to EMD application in infra-bony lesion between the fourth premolar and first molar left inferior. After accomplishment of mucoperiostal flap, the enamel matrix proteins were applied onto the surface of the exposed root. Six months after the procedure, increased bone radiographic level and decrease of the probing depth were observed.

Discussion and Conclusion: The enamel’s proteic matrix was verified in animals and in humans and it seems to stimulate a new cementum formation, which allows a periodontal ligament and alveolar bone formation, mimicking what happens during tooth development and promoting the periodontal regeneration. These enamel proteins, mainly the amelogenin, are present in the odontogenesis during the root formation. When produced and secreted by Hertwig’s epithelial root sheath, they stimulate the differentiation of the mesenquimal cells in cementoblasts, wich form acellular cementum on the root surface. Therefore, through a sequence of procedures, there is the formation of support periodontal.

Clinical studies demonstrated that Emdogain®, a commercial formula of EMDP of swine origin, associated to periodontal surgeries, showed significant clinical attachment gain, probing depth reduction and alveolar bone gain. EMDP may be effective in the induction of periodontal regeneration.


INDEX TERMS: Periodontal disease, enamel matrix derivative proteins, periodontal regeneration.

Introduction: Implantology is a rapidly growing discipline in dentistry. Implants offer a solution for tooth replacement in an edentulous space. In dogs and cats, the main causes of tooth loss are due to either periodontal disease or trauma.

Literature Review: There is very little veterinary literature available on dental implants in dogs or cats. However, a number of implant studies were performed with the use of dogs as a study model. A medline and CAB abstracts search was carried out exclusively for this abstract.

Discussion: There are three types of implants available: subperiosteal, transosseous and endosseous. The most common form of implant used today is the endosseous implant. There are a number of endosseous implant systems in the market place, with each system offering varying levels of simplicity of use with different implant surface treatments to speed up osseointegration (direct bone to implant contact-BIC) with a subsequent shorter treatment times and a quicker return to function for the patient. Only a few of the implant systems available today, have sufficient evidence offering long term success to support their use in patients. The success of implant placement and BIC depends on a number of factors including case selection and planning, the quality and density of bone at the implant site and the surgical skills of the implantologist to position the implant in the optimal position for osseointegration and finally the placement of the definitive restoration. Factors affecting implant surgery: Patient factors, Any
Systemic factor that affects bone healing may be detrimental to implant placement and osseointegration. Factors may include systemic illnesses such as diabetes mellitus, malnutrition, vitamin or mineral deficiencies. Patients should have an undisturbed wound healing capacity and implants should not be used before jaw growth is complete except in orthodontic patients (Buser et al. 2000). Surgeon factors: The training and skill of the surgeon, knowledge of the anatomy of the implant site including vital structures such as blood vessels, sinus cavities and nerves. Drilling technique to avoid excessive heat production and possible bone necrosis. Local factors - Host site: Local factors including bone quality and density, hard or soft tissue deficits, local pathology including periodontal disease and infection. Bone quality can be assessed at the time of surgery. Cutting resistance relates well to bone density during surgery. The use of bone taps may not be required and may even be contraindicated when placing implants into poor quality bone sites. Healing with osseointegration is achieved more frequently in the mandible than the maxilla (Ellegaard et al. 1997). The height and orofacial dimensions of the alveolar ridge are also very important to the success or failure of the implant placement and osseointegration. Tooth loss due to periodontal disease often involves marked alveolar bone loss both in height and width. Uncontrolled periodontitis would be a contraindication for implant placement. Implant design: Endosseous implants are usually made of commercially pure titanium. Titanium is a reactive metal that on exposure to air forms titanium oxide on its surface. Titanium oxide offers a corrosion resistant surface. Most implant systems used today are solid screw type implants made of titanium. The threaded portion of the implant offers a larger surface area for engaging the bone to provide initial stability of the implant. Secondary stability is achieved by osseointegration in which bone directly contacts the implant surface. Treatment of the implant surface (with sand blasting and/or acid etching) within a surface roughness range of 1–2μm has been shown to increase the rate of osseointegration thereby improving early stability of the implant. This improvement is thought to be due to a combination of factors, including increasing the surface area of the implant for integration to occur, modulating cellular activity to promote migration and differentiation of osteoblasts, and to improve fibrin adhesions and stabilisation of the blood clot. Alterations in surface morphology through acid etching provides a bioactive surface with good wettability through increased surface area and protein absorption. There is increased adsorption of fibrinogen and concentration of complement factor 3. There is early bone apposition onto its surface with increased bone to implant contact (Abrahamsson et al. 2004). Further improvements to the rate of osseointegration may be obtained by altering the surface chemistry of the implant surface (Buser et al. 2000), either by minimizing contaminants in the titanium oxide layer or by the addition of fluoride ions which can stimulate osteoblasts to form new bone (Stanford 2006). Implants can have either an external hex, internal hex or morse taper connection (ITI-Straumann) to the abutment. The morse taper internal screw retained abutment offers the least microgap between the implant and the abutment, therefore reducing biofilm growth. The morse taper also distributes stress away from the abutment screw, thus minimising screw loosening or fracture. Abutments can be either machined or custom made out of titanium or porcelain. The definitive crown can either be screw retained or cement retained to the abutment. Screw retained crowns may be lost due to screw loosening or screw fracture but are better suited when the implant is surrounded by a high gingival cuff. Cement retained crowns are usually easier to manufacture in the laboratory and it is easier to achieve a passive fit on the abutment when compared to screw retained abutments. However cement may extrude into the gingival soft tissues and may be difficult to remove. In the past, implant failure was partly a result of the placement of implants that were too short. With the advent of textured implant surfaces and increased rate of osseointegration, the survival rates for short and for wide-diameter implants has been found to be comparable to those obtained with longer implants and those of standard diameter. The use of a short or wide implant may be considered for use in sites thought unfavourable for implant success, such as those associated with bone resorption, or previous injury and trauma (Renouard & Nisand 2006). Timing of implant placement: Studies have shown that the timing of implant placement is very important to a successful outcome. A study in dogs (Arauja & Lindhe, 2005) showed marked dimensional changes occurred in the bone after extraction of mandibular premolars. There can be marked loss of crestal bone height as well as buccal wall resorption post extraction. These changes will affect the choice of implant length and width and may compromise osseointegration with the possible need for bone regenerating materials. Equipment requirements: Intraoral radiography (preferably digital). Variable speed implant motor with contra angle hand piece with external sterile fluid delivery. Surgical implant kit including solid screw implants, healing caps, cortical round burs, pilot and twist drills, depth gauges, drill taps, screw drivers, tightening wrench and torquing tool. Implant placement and definitive restoration procedure - 1st visit, Site assessment: Maxillary/mandibular impressions and study models, intraoral photos, periapical radio-graph of implant site, site assessment including bone mapping, interocclusal space, mesio-distal space, bucco-lingual width, root angulation of neighbouring teeth. Treatment planning including choice of implant system, length and width of implant and healing cap. Submerged vs. non-submerged implants. 2nd visit, implant placement: Flap design: Preservation of keratinised mucosa: placement of implant: correct angulation, depth; possible need for bone augmentation and resorbable collagen membrane; healing cap placement: one stage, non submerged (healing cap) versus two stage submerged (cover screw) implant surgery. 3rd visit, impression taking for definitive restoration: Assess implant stability and osseointegration with periapical radiograph. An accurate PVS impression (closed or open tray impression) is taken of the implant using a preformed impression coping to give the laboratory technician the exact position of the implant head/shoulder. A periapical radiograph should be...
taken to confirm correct positioning of the impression coping before taking the impression. Bite registration of the incisor/canine region so that the maxillary and mandibular models can be mounted accurately. Shade selection: a good quality intraoral photograph with a closest match shade guide next to a neighbouring tooth. This allows the laboratory technician to get an accurate shade match for the definitive crown. Crown should be manufactured so that it is out of the occlusion. 4th visit, abutment and definitive crown placement: A customised or machined abutment is screw retained to the implant fixture and torqued to manufacturer's recommendations. A periapical radiograph is taken to confirm the correct seating of the abutment before torquing it. The crown is then trial fitted and occlusion checked. If it seats well it is either then screw retained (screw retained crown) or cemented (cement retained crown) into place. The occlusion is checked again and excess cement (cement retained crown) removed as necessary. Meticulous homecare should be performed at all stages of the implant procedure. The use of chemical plaque retardants, antimicrobials and analgesics is warranted. Implant failure: Implant failure occurs due to poor planning prior to surgery, infection at the time of and post surgery, mechanical stresses on the implant fixture and abutment screw which may lead to fracture of the implant or the abutment. Perimplant mucositis and perimplantitis can be seen post implant placement if plaque control is not optimal. The microbiota involved in periimplantitis are very similar to that seen in advanced periodontitis (Mombelli et al. 1987).

Conclusions: The osseointegration of implant fixtures in dogs is highly predictable. Case selection and appropriate treatment planning are imperative in obtaining a successful outcome. It cannot be stressed enough that for restored implant cases, a high level of plaque control through homecare is needed to maintain the restoration and the endosseous implant.

Veterinary dentistry tends to mimic the human dental field and although early days, the use of implants in dogs and cats may be another area of growth in the discipline of veterinary dentistry.


INDEX TERMS: Implant, osseointegration, dog, cat.
cleared by the reticulo-endothelial system. Furthermore, the possible contribution of oral bacteria in periodontal pockets to bacterial endocarditis has been suggested for decades. But it wasn’t until Offenbacher and co-workers commenced their research in the 1990s, that links between PD and other organ disease were considered possible. The two-way relationship between PD and systemic health has now termed the phrase periodontal medicine (Offenbacher 1996). Recent research has shown a link between PD and cardiovascular disease, as well as pre-term/low birth weight babies in man. Pathways linking PD to systemic diseases: Three pathways linking PD to systemic effects have been proposed. Infection theory: It has been reported that in patients with periodontal inflammation, a Streptococcus sanguis protein associated with platelet aggregation and bacteraemia associated with Porphyromonas gingivalis may contribute to some acute thromboembolic events (Meyer et al. 1998). Distant injury: Distant injury may occur directly from circulating oral microbial toxins or indirectly through the elevation of the acute-phase response, including C-reactive protein, haptoglobin, alpha 1-antitrypsin and fibrinogen. The liver, in response to the systemic challenge of organisms, secretes acute-phase proteins. This acute-phase response is triggered by blood-borne oral lipopolysaccharide, and oral bacteria which elicit the release of the cytokines interleukin-6 and tumour necrosis factor alpha. These mediators act in the liver to induce the acute-phase proteins. Acute phase proteins especially C-reactive protein appear to be associated with increased risk of myocardial infarction in “apparently healthy” individuals. (Ridker et al. 1998, Scannapieco 1998). Distant inflammation: PD can induce changes in immune functions that result in metabolic dysregulation of serum lipid metabolism through the proinflammatory cytokines. Locally produced proinflammatory cytokines and tumour necrosis factor alpha may exert systemic effects by predisposing the patient to a systemic disorder such as atherosclerosis. Periodontitis and Cardiovascular Disease. It has been hypothesized that one or more infectious agents may play a role in atherogenesis (leading to atherosclerosis), either through a direct pro-inflammatory effect on the vessel wall or through a less specific, long-distance pro-inflammatory effect. In this context, it has been suggested that PD may be one such inflammatory foci (Honda et al. 2005). Periopathogens have been considered to be triggers of a systemic inflammatory response. Furthermore, it has been proposed that patients with PD may have elevated circulating levels of some of these inflammatory markers (Page 1998). In addition, low levels of endotoxaemia in apparently healthy subjects might result from chronic infection associated with the breaches of epithelial barrier function such as seen in PD (Rice et al. 2005). In the veterinary literature, a recent report (Tou et al. 2005) showed a possible link between dental prophylaxis and infective endocarditis in a dog with existing mitral regurgitation. The dog became ill and fevisher soon after the dental prophylaxis, and it was suspected that a bacteraemia associated with the dental treatment induced infective endocarditis in this case. Blood cultures in this dog grew a heavy growth of Streptococcus bovis. Preterm/low birth weight babies: PD is currently being investigated as a risk factor for premature and low birth weight babies. Pregnant women who have periodontal disease may be seven times more likely to have a baby that is born too early and too small. It appears that PD triggers increased levels of biological fluids that induce labour. Furthermore, data suggests that women whose periodontal condition worsens during pregnancy have an even higher risk of having a premature baby (Oral health information for the public: Preterm low birth weight babies, 2004). A study by Constanza (2005) and others showed that PD may be a potential independent risk factor for preterm low birth weight (PLBW) after adjusting for several known risk factors. A number of biologically active mediators such as prostat glandin E2 (PGE2) and tumour necrosis factor alpha (TNF alpha) are also involved in normal parturition. These mediators are raised to artificially high levels during infections and thus may foster premature labour (Gibbs et al. 1992). Lipopolysaccharides from gram-negative anaerobes found in periodontal pockets trigger release of PGE2 and TNF alpha, which may, in turn, affect the course of pregnancy. Evidence to support this hypothesis has been obtained in rodent models. In addition, a recent study of mothers of PLBW infants (Offenbacher, 1996), with otherwise low risk, had significantly more PD than a similar group of women with normal weight infants at birth. Diabetes mellitus: People with diabetes mellitus are 15 times more likely to be edentulous than people without the disease. Both type 1 (insulin controlled) and type 2 (non-insulin controlled) diabetes have the same effect. The likelihood of PD increases when diabetes is poorly controlled (Seppala & Ainamo 1994). People with well-controlled diabete, with good oral hygiene and on a regular maintenance schedule have the same chance of developing severe periodontitis as people without diabetes. The mechanism is multi-factorial. The small blood vessels of people with diabete have thickened basement membranes, leading to a reduction in transport across the vessel walls. There is a reduction in collagen production by gingival and periodontal fibroblasts. There is also an acquired neutrophil dysfunction associated with diabetes mellitus, leading to impaired host defence against bacterial assault. In addition, high levels of pro-inflammatory mediators responding to endotoxin from gram-negative bacteria lead to an increase in collagen breakdown (Matthews 2000). There appears to be a relationship between insulin resistance and active inflammatory connective tissue disease and acute infections. Tumour necrosis factor alpha and other inflammatory cytokines found to be associated with periodontitis have been reported to interfere with insulin’s actions and lead to metabolic alterations during infection (Hotarnisligil et al. 1993, Flier 1993). Diabetes mellitus in dogs and cats is often associated with PD. It is common practice that in those animals that show poor glycaemic control of their diabetes, periodontal management is seen as an essential component in restoring control of blood glucose levels and for the reduction in insulin dosage. This would therefore strengthen the recommendation to incorporate a thorough oral examination and appropriate periodontal care in the
manicement of dogs and cats with diabetes mellitus. **Periodontitis and pulmonary disease:** Bacterial respiratory infections are thought to be acquired through aspiration (inhaling) of fine droplets from the mouth and throat into the lungs. These droplets contain organisms that can breed and multiply within the lungs to cause damage. Recent research suggests that bacteria found in the throat, as well as bacteria found in the mouth, can be drawn into the lower respiratory tract. Scientists have found that bacteria that grow in the oral cavity can be aspirated into the lung to cause respiratory diseases such as pneumonia, especially in people with PD. **Periodontitis and systemic disease in dogs:** Numerous studies have shown that a transient bacteraemia occurs in dogs after a dental procedure (Harari et al. 1993, Nieves et al. 1997). It is also accepted that during episodes of active periodontitis, periopathogens and their toxins enter the bloodstream. However, very few studies have been undertaken, looking at the association of PD and organ involvement in dogs and cats. DeBowes et al. (1996) showed an association between PD and morphologic changes in renal glomeruli and interstitium, myocardium and hepatic parenchyma. However, there was no significant association between PD scores and lung histopathology scores. The authors concluded that their results supported the hypothesis that PD can have systemic effects on other organs. A recent study conducted in thirty-eight client owned dogs (Rawlinson et al. 2005) looked at the association between the concentration of systemic inflammatory parameters (including serum C-reactive protein, urine protein:creatinine ratio, blood pressure, microalbuminuria), and severity of PD and then, after appropriate treatment of PD, the changes in these systemic parameters. The study showed that increases in concentrations of systemic inflammatory markers were positively related to the severity of PD. After periodontal therapy, there was a significant decrease in the concentrations of some of these inflammatory markers. The study showed that PD leads to systemic inflammation that is significantly reduced with appropriate periodontal therapy. The authors concluded that further research was required to fully understand the significance of these changes.

**Conclusion:** Proving the link between cause and effect of chronic diseases, such as PD, is not an easy task. As PD is generally slowly progressing, people/animals studied over a long period may be exposed to a multitude of potential causes making determination of a cause–effect link more difficult. However, there seems to be a growing body of evidence to suggest the PD is a true risk factor for other systemic diseases such as cardiovascular disease.


INDEX TERMS: Periodontitis, systemic, disease, animal, dog, cat.

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**Introduction:** A 8-year-old Doberman, male, presented with its four canine teeth fractured and with dentyral abrasion. These teeth were prepared for non-precious metal, full crown restoration, in canine 104 and 204, after endodontic treatment, and for number 304 and 404, which also received crown lengthening after osseotomy. To accomplish oral rehabilitation, one of the solutions is the use of metallic crowns, with cosmetic and functional reestablishment of the mouth. A crown is an extra coronal restoration that covers all or most of the coronal portion, restores the function and structure of a damaged tooth, and protects the remaining structure. Crown retention is dependent upon preparation.

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Design and choice of cement. The most common place for attrition on the crown of a tooth is the distal face of the canine (Brech et al. 1997). Campos et al. (2003) defend that the teeth with endodontic treatment are more prone to break, because the loss of the dental structure, endodontic techniques and surgical instruments choice, as well as the approach to the radicular canal which can decrease the strength. Additionally there is a lower dentinum hydraulicity, with changes in the resilience of the tooth, with increase of the risk of fractures. Human patients, after prosthesis adaptation, learn and restore the signs of proprioception, which result in changes in their mouth. A gradual conditionament of the tooth structures and diet control (soft food) also cause progressive adjustment (Montenegro et al. 2004). A crown is an extracoronal restoration that covers all or most of the coronal portion of a tooth, restores the function and structure of a damaged tooth, and protects the portion of the tooth that remains (Forest & Roeters 1998, Visser 1998, Wiggs & Lobprise, 1993). For the teeth endodontic treated, that need restoration with inra-radicular pins, there are different opinions about of the length of the pins in relation with the remaining crown. There are reported ranges from 100% of the crown height, or of 5mm beyond the crown and still 2/3 to 4/5 of the length of the root (Mori et al. 1997).

Case Report: The crown preparation was done according to the biomechanical technique used for human dentistry and veterinary dentistry (Schillingburg et al. 1987, Visser 1998). After crown preparation, the impression was done with condensing silicone (Perfil Denso Vigodent®, Perfil fluido Vigodent®), with the double phase technique. These materials provide the exact details required for the crown. The teeth were previously alleviated with wax (utility wax Wilson®). The same procedure was applied to the four teeth (104, 204, 304, 404). The bite registrations were necessary for crowns on canine teeth, and the wax is not inexpensive and simple to use. (utility wax Wilson®). Theses teeth were prepared for non-precious metal Nyckel-cromium (FIT CAST-V®, Paladium of Brazil). The choice of cement used to cement the metal crowns on the canine teeth was Zinc Phosphate (SSWhite®). After surgical prepare, the remaining crown of each one of the teeth were to cover with a temporary crown by acrylic (Dencor® number 61) to protect the crown. This temporary crown also is cemented with Zinc Phosphate (SSWhite®). The crown was checked in the mouth to ensure that it seats fully to the marginal line and that the occlusion is correct. The procedures of cementation were taken 15 days, after the crown preparation and impression.

Discussion and Conclusion: The reconstitution of the dental crown is the most difficult and detail job to be done because of the many technical difficulties, due to iatrogenic factors, which can cause permanent damage. There will never be a technique to develop the correct contours. Even, with all the difficulties that knowledge gives us to take immediate and most precise decisions, we conclude that dental metallic rehabilitation is possible, when we use techniques described and consider that there are many concepts for the best methods or the most indicated. The objective of this technique is to protect the remaining crown, even if fractured or not. In most cases the endodontical treated teeth should receive metallic restoration.

ramifications. The pain location is very difficult to find, because they are many afferents pulpar nerves, and afferents terminations coming from orofacial structures, that impair pulpar pain location. When there is severe and fast dentinary abrasion, with pulpar exposure, and there is no fast dentine reaction, pain can be a common report in human patients, in the cases of hot, cold and pressure. When there is sclerosis of the dentine tubules, pain or other sensibilities disappears. (Leon-Roman 2004).

Discussion and Conclusion: The theory of the pain evaluation, by means of dentinary sensibility and by the hydrodynamics theory, or still for by means of dentine overgrowth reaction, which play an important role in dental element defense, seems to be true. Even though it does not explains what comes first: pain leading to abrasion or the abrasion leading to pain. Our patients, dogs and cats, although with pain, maintain their habits of attrition and abrasion that can lead to totals crown destruction with or without dentine reaction.


INDEX TERMS: Tooth pain, dentary abrasion.
size for each clinical case. In the majority, the mini appliances sizes for human lower incisors are the most useful for dogs, mainly with small and medium breeds, as they are the smallest brackets found in the market. Wrong bracket positioning can result in extra time treatment length for a better occlusion finalizing or appliance removal without the best possible result is achieved (Bennett & McLaughlin 1994). A correct bracket positioning reference is the center of clinical teeth crown, in mesiodistal way. The slot or bracket base angulations should follow the teeth long axis. In relation of the others teeth from the same arch, brackets positioning there are methods using medium crown teeth height or the vertical center of each clinical teeth crown (Sinha, & Nanda, 2004). In the treatment end, the brackets debonding can be done with debonding pliers, between enamel-resin or resin-bracket. The bracket is removed, leaving minimal amount of resin on teeth surface, which should be removed with finishing buds or periodontal scalers (Newman & Facq 1971).

**Discussion and Conclusion:** The use of corrective orthodontics fixed appliances in dogs can be an important way to achieve a better dental positioning and alignment, factor that can make buccal hygiene easier and buccal health better. However criterion indicators parameters, well done planning and technique domain by veterinarian physician are clearly needed for fixed orthodontic appliances procedures. If there is a fully planned fixed orthodontic treatment protocol, these resources are efficient mechanics for a better dogs' buccal health.


**INDEX TERMS:** Orthodontics, dogs, dental care, orthodontic appliances.

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**Introduction:** The result of human selection of dog breeds is the major contribution of malocclusions; its severity and frequency have increased in the last years (Harvey & Emily 1993, Beard 1998). The occlusion and the teeth positioning should be the same in all kinds of breeds. However, the correct teeth positioning can be affected in result of a head shape, causing malocclusions (Shipp & Fahrenkrug 1992, Emily & Penman 1994). In consequence, the malocclusions in dogs sometimes can result in oral pain, by interdental contact or by the teeth lesioning soft tissues (Mitchell 2005). They can happen when there is a mal positioned tooth (Class I malocclusion) or when there is not a correct proportion between mandibular and maxillary length (skeletal malocclusions Class II and III) (Gioso 2003). The most common signs observed in animals with malocclusions can be: masticatory difficulties, problems in temporomandibular joint, caries formation, development of periodontal disease, problems on dental facial development, trauma in soft tissues, teeth fractures or abrasion. Each sign can be a reason to initiate an orthodontic treatment, to obtain a harmonious and correct occlusion (Wiggs & Lobprise 1997). Mal positioned teeth can be re-positioned with orthodontic appliances or can be extracted. However, there is no surgical procedure developed or described in literature for animals that allows the repositioning of the mandible and, at the same time, to preserve the vessels and the nerve of the mandibular canal (Carvalho 2004). Skeletal disturbances, in mandible or maxilla, can not be treated with orthodontic appliances exclusively because this kind of treatment acts specifically on the teeth and alveolar bone. The orthognathic surgery is a repair procedure, involving maxilla, mandible, including the alveolar bone (Medeiros 2001). The purpose of this study is to introduce and describe a technique, based on the humans orthognathic surgery techniques and in the paper “A dog instruction model for correction of mandibular prognathism” (Lohse 1977), that can permit mandibular repositioning by bilateral caudal sagittal osteotomy of mandible, to rehabilitate Class II and Class III malocclusions that are causing trauma and pain (according to the ethical considerations), done in cadavers to re-establish the normal occlusion in these patients, analogous to human cases.

**Materials and Methods:** Twenty cadavers of dogs were used in this experimental study to define a proper technique of the orthognathic surgery in dogs. The used materials were the same surgical instrumentations used in major oral surgeries, dental equipment, X-ray (intra-oral and skull), micro-saw and instrumentation to bone fixation, like titanium screws (provided by Tóride Ind. e Com. Ltda). The technique consisted in a sagittal split osteotomy in the region of the last two mandibular molar teeth, bilaterally, that allows the movement of the mandible between the fragments, repositioning it in the correct occlusion and preserving the alveolar nerve and vessels that is present in the mandibular canal. The first step of the proposed technique is the extraction of the third and second lower molar teeth, exactly where the osteotomy is done. The muscosa is incised and the muscles dissected caudally and rostrally to...
the lower first molar tooth, at both sides. First, an osteotomy line is drawn on bone with a very small spherical burr, from the mandibular foramen to the upper angle of mandible and another osteotomy line is done, with the same spherical burr, on the lateral cortical bone, caudal to the first lower molar tooth, parallel to the distal root of this tooth. This osteotomy needs to be extended ventrally, until the medial portion of the mandible. It is not necessary to make an osteotomy from the mandibular foramen to the ventral border of mandible because it is fractured by itself during the corticals separations. The micro saw initiates the split between the vestibular and lingual cortical bones of mandible, dorsal to the mandibular fora-
men, passing by the last two alveoli and finishing caudal to the first molar. The separation of the two cortical bones is done inserting the chisel (1mm in width) it into the retromolar osseous incision, tapping gently with a mallet. Next, the chisel is removed and then placed within the buccal osseous incision in a more horizontal position, and force is applied with a mallet. After separation of the lingual and vestibular bone fragments, the mandible is repositioned in a more horizontal position, and this location, measurement of the mandibular advance and caudal of success of the osteotomy, percentage of mistaken fractures and stability of fixation and efficiency of the material used, percentage orthodontic treatment before surgery, necessity of interdental block, and vestibular bone fragments, the mandible is repositioned in a more horizontal position, and force is applied with a mallet. After separation of the lingual and vestibular bone fragments, the mandible is repositioned in a more horizontal position, and this location, measurement of the mandibular advance and caudal movement and, the most important, the preservation of the vessels and nerve of the mandibular canal.

Discussion and Conclusion: The orthognatic surgery is a new opportunity to treat skeletal malocclusions, for some reasons related in literature like trauma and pain (Gioso 2003, Mitchell 2005). These problems are increasing and affecting more animals nowadays (Shipp & Fahrenkrug 1992, Harvey & Emily 1993, Emily & Penman 1994, Beard 1998) and any definitive treatment are being required for these animals. Each signs of trauma and pain caused by the malocclusion can be a reason to initiate an orthodontic treatment (Wiggs & Lobprise 1997). So, the orthognatic surgery can be a definitive treatment for the skeletal malocclusion (Medeiros 2001). The instruction model published by Lohse (1977) did not evaluate the positive and the negative points of the procedure and the technique described needs to be improved. Many studies about viability of technique and execution need to be done because this procedure is not simple. And more, it is necessary to develop an appropriated technique for dogs because there are some anatomical considerations to study and the surgical procedure needs to be effective with less damage to provide a good reestablishment of normal occlusion.


INDEX TERMS: Skeletal, malocclusion, dog, orthognathic, brachgnathism, prognathis.

Introduction: The high prevalence of periodontal disease in dogs and cats has been widely published. The most serious consequence is the loss of the periodontal support structure, which includes cementum, periodontal ligament, and alveolar bone. The treatment of periodontal disease in veterinary patients today can range from routine periodontal therapy including scaling and root planing, to advanced periodontal surgical procedures aimed at regenerating diseased periodontal tissues. Successful regeneration of periodontal tissues can offer an alternative treatment option to tooth extraction in cases of moderate to advanced periodontitis. The objectives of periodontal regeneration therapy for patients with periodontitis include probing depth reduction, clinical attachment gain, bone fill of the osseous defect, and regeneration of new bone, cementum, and periodontal ligament. Numerous case reports and controlled clinical trials have provided data on achieving the first three objectives. Only histopathology can accurately determine whether any true periodontal regeneration has developed. (Rosenberg & Rose 1998)

Literature Review: There are studies showing that cells of the epithelial root sheath synthesize enamel matrix proteins and that these proteins play a fundamental role in the formation of acellular cementum, the key in the development of a functional periodontium. (Hammarstrom & Heij 1997) It is reasonable to believe that the molecules involved in triggering the development of periodontal tissue are effective in promoting regeneration of periodontal tissues. (Caranza & McClain 2002) One enamel matrix protein derivative obtained from developing porcine teeth has been approved by the FDA for use in human periodontal surgery. Studies have shown that enamel matrix protein derivative enhances regeneration of both hard (Heij & Heden 1997, Boyan & Weensner 1999) and soft periodontal tissues (Mellonig 1999).

Discussion and Conclusion: The authors have successfully used enamel matrix protein derivative alone and in combination
with other graft materials in clinical cases as a treatment of the root surface and periodontal defect in conjunction with periodontal surgery. The most common site of use has been in deep periodontal pockets found on the palatal surface of the maxillary canine teeth in dogs. In this report clinical cases will be used to illustrate the use of enamel matrix protein derivative, alone and in combination with demineralized freeze dried bone\textsuperscript{bc}, and synthetic bone graft particulates\textsuperscript{d}, to illustrate potential outcomes in surgical treatment of periodontal defects.

\textsuperscript{a} Emdogain Gel, Biora Inc., Chicago, IL, USA.
\textsuperscript{b} Grafton Bone Putty, Osteotech Inc., Eatontown, NJ, USA.
\textsuperscript{c} Osteo-Allograft, Veterinary Transplant Services, Kent, WA, USA.
\textsuperscript{d} Osteograft-N, Dentsply International Inc., Lakewood, CO, USA.

**References:**


**INDEX TERMS:** Enamel matrix proteins, periodontal surgery.

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**Introduction:** The periapical x-ray is basic for an accurate diagnosis in Veterinary Dentistry, to identify certain buccal pathologies and to plan treatments. It is true what Gibilisco et al. (1986) say that “the attainment of satisfactory x-rays of teeth and adjacent structures is one of the difficulties and complicated technical problems in radiology”. Cieszynski (1907), according to its "Rule of the Bisecting Angle"or "Cieszynski's Rule", based on an old geometric theorem, which establishes that two triangles are equal when they have two equal angles and a common side, idealized its rule that says: “The angle formed for the long axle of the tooth and the long axle of the film will result in a Bisecting Angle in which the beam of X-rays will have to happen perpendicularly”. Thanks to technique developed by McCormack (1920) and perfected and divulged by Fitzgerald (1947), the technique of parallelism had its acceptance and diffusion in America and Europe. Lima (1953) presented a comparative study of the techniques of the Bisecting Angle and Parallelism, affirming that is a technique easy to learn and concluded that, when investigation of subtle alterations in the periapical and periodontal structures is necessary, the technique of Parallelism is superior to the one of the Bisecting Angle. He analyzes the techniques of intra-oral Bisecting Angle and Parallelism. Knowledge about radiographic techniques is the best and most secure way for a good treatment plan and therapy, and makes the difference between a good professional procedure and a poor one.

**Materials and Methods:** Five 5 Cocker Spaniel dogs of the same origin were selected for the study. After clinical dentistry exam, a radiographic intra-oral exam was performed to choose the best treatment plan and therapy for the case. The animals were submitted to the radiographic examination and the radiographic Periapical of the Intra-Oral Bisecting Angle and the Intra-Oral Parallel technique were used for a comparative study for application in the veterinary dentistry clinic. For the execution of the technique Intra-Oral Bisecting Angle three angles were calculated; the angle A is the long axis of the tooth, the angle B is the angle of the film and the angle C is the angle that bisects angle A and B; the beam is then directed at 90 degrees to angle C. The film was located in the lingual/palatine face of the teeth in a 90-degree arc. For the execution of the technique of the Intra Oral Parallel the film was located at the same way but the beam was angled at 90 degrees to the film and the target. The target tooth/teeth should be in the middle of the film and the surrounding structures included, when important, as for example the ventral border of the mandible. The dental films were processed manually.

**Results:** Regarding the technical procedures, some differences exist between the techniques of Intra Oral Parallel and Intra Oral Bisecting Angle; even so both have the same purpose that is the radiographic examination of the tooth and periapical region. The results with the Intra-Oral Parallel showed that if the angle between the tooth and the film is more than 15 degrees, the use of the Bisecting Angle technique prevents great distortion of the image caused by increasing the Object Film Distance.

**Discussion and Conclusions:** The execution of the radiographic technique of Intra Oral Parallel and Intra Oral Bisecting Angle has its advantage because of its great simplicity, not being necessary to correct positioning of the patient’s head, there are fewer radiographic images, and standardized radiographic examination, with the possibility of getting x-rays in different situations. In accordance with Gosio (2003) “… for maxilla teeth it is impossible to parallel juxtapose the film to the tooth, a good reason to apply the Bisecting Angle technique to get an image with dimensions next to the tooth”, or still in accordance with Roza (2004), “in dogs and cats the technique of Parallelism is easily executable at the premolar and molar teeth”; The Intra-Oral Bisecting Angle is used in areas where the Parallel technique is impossible due to poor access (with an angle between teeth and film more than 15 degrees).

**References:**

Introduction: Among all the described techniques for repair and fracture healing of the maxillary structure and mandibular branches, the ferulization technique (splint) has become an easily and non invasive option, besides promoting a quickly return to its stomatognatic function (Harvey & Emily 1993). The present report describes the case of a eight months old cat which was diagnosed as having a traumatic maxillary fracture with avulsion and a communication between oral and nasal cavities. The patient had the clinical and surgical procedures needed for its case, being the ferulization technique part of the treatment correcting the maxillary fracture and the iatrogenic communication.

Materials and Methods: In the reported case the patient described was a cat (*Felis catus*), mixed breed, male, weighting 3.6 kg and estimated age of 8 months old. It had peri-domiciliary habits, being home just for feeding and resting in some moments of the day, while in absolute freedom to walk on the streets all day long. Till the clinical attendance, the owner denied any basal care to the animal, such as immunizations or antihelmintics. At the patient’s evaluation at the end of the afternoon, the students evolved in the Veterinary Dentistry Lab figured that it had been hitting by a car in the morning. The physical examination revealed blood on the lips and nostril. At the oral inspection it was seen the avulsion of the canine teeth (#104) and the oro-nasal communication with presence of blood. After prescribing Ketoprofen (1.1mg/kg, PO, 24hr) and nebulization for five minutes at that night and the next morning, the animal was recommend to surgical treatment in the next day. At the surgical procedure, induction was made by the use of Propofol (6mg/kg, IV) and Isoflurane for maintenance. Analgesia was achieved with Morphine (0.1mg/kg, IM) and regional block with Lidocaine 2% (0.3ml infiltration on the infra orbital foramen) Both morphine and Lidocaíne were administered after induction (Pinto & Mannarino 2004). Then, under anesthesia, intra oral radiographs in oblique projection were taken, confirming the maxillary fracture clinical diagnosis and the integrity of the teeth with it’s apical root still open, a radiological sign of the presumed patient’s age. After cleaning of the oral and nasal cavities with NaCl 0.9% and Chlorhexidine 0.12% solutions, suture was performed with 3-0 absorbable polyglycolic wire between the borders of the hard palate and the gingival, what it conferred initial aspect of good reduction of the oral-nasal communication. After that, in order to confer stability to the avulsioned element the splint technique by means of acrylic resin application was carried through, using as anchorage points the superior canine teeth (#104 and #204), being prescribed well taken care of postoperative with Cetoprofeno use (1.1mg/Kg, vo, SID, 5 days), Clindamicine (11mg/Kg, vo, SID, 5 days) and Clorexidine 0.12% (topical, BID, 30 days) (Gioso 2004) e the removal of the resin inside of 4 weeks, where, later, the root canal treatment would be carried through (French 2001).

Results: The stabilization of the avulsionated bone and tooth showed very satisfactory from the moment of total polymerization of the resin. The recover of the patient from its anaesthetic plain was calm, without vocalizations. The same it demonstrated small discomfort with the presence of the resin during first the 48 hours, what it disappeared in the sequence of its recovery, also with the alimentary habits of the animal returning spontaneously. Sneezing had not been observed, as well nasal discharge had also not been cited during the revision of the patient. The avulsionated segment remained steady after and without signals of muco-gingival alterations 3 weeks. It had profit of significant weight (180 grams) and compatible with the stage of development of the patient.

Discussion and Conclusions: The ferulization technique was demonstrated an easy option with a short-time surgery time, and it could be applied by academics under the supervision of its professors, and with fast adaptation of the patient after-surgical condition, in accordance with what Harvey & Emily (1993). The general anesthesia procedure, associate with the local block with lidocaina 2% promoted excellent analgesia to the patient, as Pinto & Mannarino (2004). The antibiotic use (clindamicina, vo) during the postoperative one was of great value in the prevention of infection of the superior aerial ways and of alveolite, as well as Gioso (2003). The delayed endodontic procedure indication based on the described procedures per French (2001), aiming at the correction of probable damages to the neural-vascular beam on the root canal of the avulsionated dental element. Being thus, the accomplishment of less invasive techniques must be stimulated and be practiced in the clinical routine, aiming at the good recovery of the patient and preservation of the dental elements and the perfect occlusion.


INDEX TERMS: Bisecting Angle, Parallelism.
013. DeBowes L.D. 2007. Intraoral dental radiography of dogs and cats: positioning and technique. Pesquisa Veterinária Brasileira 27(Supl.). Shoreline Veterinary Dental Clinic, Seattle, WA, USA. E-mail: ldebowes@aol.com

Introduction: Dental radiographs are an important part of the diagnosis, management, and monitoring of a variety of dental and oral disorders. Intraoral dental radiographs have several advantages over standard radiographic techniques including ease of making and better diagnostic quality. Quality intraoral dental radiographs are important for accurate interpretation. Proper positioning and technique are necessary for obtaining the best quality dental radiographs.

Literature Review: The dental film sizes most commonly used in dogs and cats are the size 2 (periapical) film (1 1/4" x 1 5/8", 31 x 41mm) and size 4 (occlusal) film (2 1/4" x 3", 57 x 76mm). The film speed (A,B,C,D,F) refers to the film sensitivity. The sensitivity of the film determines the required exposure time. The faster speed (higher sensitivity) film requires less radiation to expose (blacken) the film. Commonly used film speeds include D speed and F speed (Kodak Insight ©). Film packets come in single film packet (make one radiograph), double film packet (makes two identical radiographs), and duplicating film (to make duplicate radiograph). The film packet packaging includes an exterior nonabsorbent plastic envelope, a black paper light barrier, and a thin sheet of lead foil (stippled embossment pattern). Errors made during film processing affect film quality.

Discussion and Conclusion: Dental films may be developed in one of several ways; chair side developing system using rapid developers and fixers, automatic processor, regular dip-tanks, small containers in the dark-room (rapid developers and fixers), and automatic processor. When positioning for an intraoral dental radiograph the film or sensor (digital radiography) is oriented in the patient’s mouth (intraoral) with the front towards the x-ray tube. The dimple (embossed circle in one corner) in film is positioned away from the area of interest. Mobile dental x-ray machines are recommended. The basic positioning (film and tube-head) techniques include the parallel technique (film is parallel to the axis of the tooth roots) and the bisecting angle technique. The parallel technique is primarily used with the distal mandibular teeth. The bisecting angle technique is used for the other teeth where the film cannot be placed parallel to the tooth. The bisecting angle technique is used to prevent/ minimize image elongation or foreshortening. The film is placed intraoral as close to the tooth as possible and the x-ray beam (tube-head) is positioned perpendicular (right angle) to an imaginary line that bisects the angle formed between the film and the roots of the teeth being radiographed. Shifting the tube head in the third axis while maintaining the bisecting angle in the plane is used to separate structures avoiding superimposition of radiograph. Special considerations are made for the maxillary premolar teeth in the cat where the tube head is positioned ventrally to drop the x-ray beam under the zygomatic arch (results in slight elongation of the roots) and allow for better visualization of the tooth roots.


014. DeBowes L.J. 2007. Use of esophageal feeding tube after oral surgery. Pesquisa Veterinária Brasileira 27(Supl.). Shoreline Veterinary Dental Clinic, Seattle, WA, USA. E-mail: ldebowes@aol.com

Introduction: Esophagostomy tubes (E-tubes) are relatively easy and fast to place and are an excellent method for feeding patients with oral problems that are unable or unwilling to eat. An E-tube may be left in place and used for short or long-term (weeks to months) feeding. Bolus feedings of a blended canned diet is generally acceptable when using a large-bore feeding tube in these patients. The most common complications are infection at the site where the tube exists through the skin and obstruction of the feeding tube.

Literature Review: Indications for placing E-tube are the inability to eat (i.e. jaw fractures, head trauma, painful oral conditions) and inadequate consumption of required calories for maintenance and recovery (i.e. painful oral conditions such as stomatitis, glossitis). Contraindications for placing an E-tube are an esophageal or gastric disorder and the risk of aspiration pneumonia (i.e. comatose patient). Recommended E-tube size for cats are 14 to 18 Fr. and for dogs are 20 to 24 Fr.

Discussion and Conclusion: The steps for esophagostomy feeding tube placement using the curved forceps technique are: 1) general anesthesia with tracheal intubation; 2) position patient in right lateral recumbency; 3) clip hair and aseptically prepare surgery site; 4) prepare the feeding tube (premeasure, mark, enlarge openings); 5) extend the neck, pass curved end of forceps into midcervical esophagus; 6) make incision through skin and tissues to exposed tip of forceps; 7) push the forceps through incision and grasp distal end of the feeding tube; 8) withdraw the forceps from esophagus bringing distal end of tube into the oral cavity; 9) redirect the distal end of the tube into the esophagus; 10) position tube so that it ends in the distal esophagus (premeasured); 11) secure tube to the cervical skin using a Chinese finger-trap friction suture; and 12) cap end of tube and lightly bandage. The basic feeding instructions are: 1) Feed blended canned food (blended with water or Clinicare); 2) Feed a minimum of three bolus feedings daily; 3) Calculate resting energy requirement (RER), Exponential equation RER = RER =
70(BW,kg)0.75 (use for patients 2 to 25 kg), Linear equation RER = 30(BW,kg) + 70 (use for patients <2kg); and 6) Flush tube and cap after each feeding. Selected commercial products suitable for E-tube feeding and calorie content (kcal/ml or g) (taken from Remillard R.L. et al. Small Animal Clinical Nutrition. 4th ed.) are: Hill’s Prescription Diet Canine/Feline a/d (1.3), Iams Eukanuba Maximum Calorie/Canine and Feline (2.1), Select Care Canine Development Formula (0.9), Select Care Feline Development Formula (1), Waltham/Pedigree Concentration Diet/Canine (1.4), Waltham/Whiskas Concentration Diet/Feline (1.2), Abbott ClinicCare Canine (1), Abbott ClinicCare Feline (1), Abbott ClinicCare RF Feline (1). The steps for E-tube care and removal include: 1) Daily clean area around tube site to decrease chance of infection; 2) Remove E-tube when patient eating sufficient quantity to maintain weight; and 3) Release E-tube by cutting sutures and gently remove. The opening will seal rapidly and the site will heal in a few days.


INDEX TERMS: Esopagostomy tubes, E-tubes, enteral feeding.

015, DuPont GA. 2007. Debunking the myth. Pesquisa Veterinária Brasileira 27(Supl.). Shoreline Veterinary Dental Clinic, Seattle, WA, United States. E-mail: GatorGreg@AOL.com

“It is the right and duty of dentists to constantly criticize dogma and investigate the justification for current standards of practice. Therefore, to challenge ...recommendations is a professional obligation. It is also a definite necessity.” Dr. John Hardie

Introduction: The practice of evidence based dentistry includes five steps: 1) Create an answerable question to a clinical problem; 2) Search for and find the best evidence to answer it; 3) critically evaluate the information you have found; 4) apply it to your patient; and 5) evaluate the results. Evidence based veterinary dentistry makes use of scientific research to provide the best solutions and treatments for existing problems. The result is a high (or at least a predictable) procedural success rate. Unfortunately, there is only very poor evidence available for many of the decisions that we make every day. This problem was even more widespread in the past, and many “facts” that have been accepted for years are wrong because they were based on inaccurate information. Sometimes even the most basic and universally accepted concepts are nothing more than unverified and completely false myths. As a result, we must always remember some of the other fundamental tenets of science: 1) Avoid dogma by critically reviewing previously interpreted data; 2) apply consistent reasoning; and 3) question the validity of authoritative pronouncements. Applying these tenets can result in dramatic changes in thinking, and even complete paradigm shifts. Well known examples include Pasteur’s blasphemous insistence that micro-organisms exist and cause infection, and Lister’s equally “ridiculous” claim that scrubbing for surgery might decrease the high rate of surgical infections. In each area within the field of dentistry there are examples of concepts that have changed or that should be questioned.

Literature Review: Following are some examples of facts that contradict currently held beliefs, or areas where the evidence is unclear.

Endodontics
- Causes of treatment failure. Various studies show that coronal leakage of the restoration, inadequate canal obliteration, or inadequate canal cleaning are all equally or more important than apical leakage.
- The best canal flushing materials. Chlorhexidine vs antibiotic solution vs NaOCl. More concentrated bleach is more effective. Warming and agitating the bleach also increases its effectiveness.
- Some people believe that all root canal materials should be strictly controlled completely within the root canal system while others believe the apex should be instrumented and an apical “blush” of sealant should pass through into the periodontal ligament space.
- Surgical endodontic treatment vs conventional retreatment of a failed case.
- The recommendation that root canals be filed and filled to 1mm short of the apex does not transfer from humans to veterinary patients.
- Nickel-titanium files may navigate curves nicely but they also fail without warning compared to stainless steel.
- The root canal is not always in the center of the root.
- A corollary – the canal should not always be instrumented to a circular cross section so the file can clean all walls.
- Clean white dentin shavings do not indicate that filing is complete.
- The step-back technique to enlarge the root canal coronally is inferior to modified crown-down methods.
- The old method of rotating k-files counter-clockwise with balanced force, then ¼ turn clockwise to advance, then counterclockwise again should not be routinely used. In specific instances this is valuable, but it pushes the dentin mud apically.
- The pulp chambers in veterinary patients should not be “uncapped” as has been done in human patients.
- Is the choice of obturating material important? Is the quality of the 3-dimensional obturation important? Is the sealant the most important material in both type used and placement?
- Radiographic evidence of pulp obliteration (calcific metamorphosis) does not indicate that there is no longer pulp tissue present.

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• Vital direct pulp cap with mineral trioxide aggregate (or similar material) seems to be much better that the older Ca(OH)2.
• After vital direct pulp capping, follow-up radiographs that show the presence of a dentin bridge is not radiographic proof of procedural success; it only indicates the pulp survived the procedure.

Periodontal treatment
• Gingivitis is reversible, but so is periodontitis!
• Untreated gingivitis does not cause, and lead to, periodontitis.
• Periodontitis is associated with many systemic diseases including remote lesions, cardiovascular disease, low birth weight babies, and pulmonary disease. However it has yet to be proven to cause them.
• The merits of polishing teeth with each dental cleaning outweigh the resultant enamel loss. The human debate spills over to veterinary dentistry in the minds of some.
• Periodontal pockets should not be treated by gingivectomy unless they are pseudopockets.
• Wide based mucogingival flaps cut across blood vessels. Incisions in the mucosa should be oriented vertically.
• Mucogingival flaps should be coronally repositioned instead of apically repositioned.
• When and how to use systemic antibiotics remains controversial.

Operative dentistry
• Dental caries is not caused by the dreaded tooth worm. Pouring molten metal into the affected tooth may help but not because it killed the worm.
• Newer bonding agents with fewer bottles and fewer steps are not as strong as the older wet-bonding systems.
• Although amalgam is rarely used it remains the strongest material available for direct placement restorations and has the highest long-term success rate.
• Ca(OH)2 should not be used for indirect pulp exposures.
• Composite resins do not move towards the activating light.
• Fast cures are detrimental to the bond.
• Cavity preparations should not be extended for prevention of recurrent disease.
• Unsupported enamel is no longer an important concept with modern restorative materials and techniques.
• Undercuts in cavity preps should not be made with an inverted cone bur.
• Crown preparations do not need a 3 – 5 degree taper with modern cements.
• Dental resorption lesions in humans cause discomfort only when they are intraoral.

“Half of what we know is wrong…but which half?”
“Follow the strongest evidence, wherever it leads”

Discussion: Advances in treatment are only possible by questioning the limits imposed by, and the rationale behind, traditional treatments. Nothing can ever be finally proved to be true. It can only be shown repeatedly that studies (so far) confirm it is not false. Science progresses by constantly challenging existing views and attempting to prove them wrong. Always question. Steven Pinker, an experimental psychologist at Harvard, made the assertion in his essay in the book Curious Minds: “Don’t believe a word of what you just read in this paper. Don’t believe a word of what you read in the other papers either.” Conferences and Proceedings are very low-level evidence. Each author has made an honest effort to share with you the results of their research, and has invested a significant amount of their time to do this for you. It is therefore quite likely that their information is relatively good. Unfortunately, since few of us have the time to properly research and evaluate the available evidence in all areas of practice, we listen to experts and trust them to some extent. As Jamie Whyte shares, “no one can do it all themselves – it is a necessary division of labor”.

Conclusion: Question everything regardless of how well established it is. Evaluate the quality of the supporting evidence. Be willing to change your beliefs when the evidence shows that they were wrong.


INDEX TERMS: Debunk, evidence based dentistry, literature inaccuracy, myth.

Introduction: Adequate numbers of quality radiographs are essential for dental and oral diagnosis, treatment planning, procedural decision making, follow-up evaluation and medical record keeping. The status and health of the dental pulp and roots can only be fully evaluated by adding radiographs to the other observational information acquired on an oral examination. Without this valuable tool we are truly working “in the dark”, missing lesions and disease processes, and only guessing at the quality and success of treatment. Dental radiography is greatly facilitated by having a dedicated dental x-ray unit in the dental operatory, instantly available radiographs, ability for fast re-takes, image enhancement, and enlargement. Conventional radiography falls short in many of these areas.

Literature Review: Digital radiograph units replace the dental film with a sensor. Dental films do not use the intensifying screens that are used in cassettes for standard radiographic film. As a result dental films require much higher doses of radiation to expose them. More sensitive films (E and F speed) require far less radiation than the older films but still use high doses. One of the advantages of digital radiography is the high sensitivity of the sensors. Current sensors of most systems require one tenth the radiation of the commonly used D speed film. Conventional radiographs

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are produced when the radiation that has not been absorbed by tissues travels completely through the subject and acts on the photographic emulsion surface of an acetate film. Digital radiography uses either a charged coupled device (CCD) or a complementary metal oxide semiconductor (CMOS) sensor in place of x-ray film to record the image. The information is transferred to a computer, which then forms an image and displays it on a monitor. Software allows manipulation of the image to enhance viewing. Enhancements might include increasing or diminishing contrast and brightness, adding color, or changing between positive and negative images. The software also provides additional information, such as measured distances, histogram analysis of radiographic density, and magnification of the image on demand. Images are saved on disk for long-term storage, and can be printed for sending with the owner or included in the patient’s chart.

Advantages of digital systems:
- Less radiation needed for radiographs.
- Instant images - the radiographic image takes less than a second to almost three seconds (depending on the system) to appear on the monitor. There is no delay while waiting for film to develop.
- Images can be rejected or retaken immediately - the software allows immediate evaluation and re-take, followed by the ability to select which exposure is preferred.
- Developing fluids are not needed. This results in savings in supplies purchases, but more importantly a savings in time. It also resolves the problem of disposal of silver-contaminated fixing solutions.
- No x-ray film - again, no need to purchase film, plus time related to responsible and legal disposal of lead backings from film packets. Also eliminates film developing artifacts.
- The CCD and CMOS sensors are firm, eliminating image distortion caused by bending the film.
- Allows for image manipulation to improve interpretation accuracy.
  - positive/negative colorization - positive and negative colorization give separate color schemes, which can be customized
  - enlargement
  - histogram
- Ability to measure anatomical structures directly from image or relative to a known distance.
- Print-out of radiographs for clients and for referring veterinarians - film images are automatically oriented and positioned by the software. This produces a “reader-friendly” print out presenting an image of the mouth similar to a panoramic radiograph.
  - Automatic generation of referral letters.
  - Ability to export images for e-mailing to clients or veterinarians.
  - Ability to import images for enlargement or image manipulation.
  - Ability to import digital photographs into the study.

Discussion: There are also some disadvantages to the digital system. The biggest is the initial expense. While the cost of digital systems has dropped over the past few years, most systems in the US cost between $6,000 - $10,000 US. This includes the sensor and the software. The X-ray machine used must have the ability to make fast exposures at 0.01 to 0.05 seconds; the working range for radiographs taken with most digital systems at 60-70 kVp and 7-15 mA. Older X-ray machines can not produce these low exposures, and if a new X-ray machine is needed then an additional $3,000 US must be invested. Another minor disadvantage is the size of the sensor. It is comparable to a size 2 dental film. For very large canine teeth, 2 views are needed to get both the crown and the root apex. Nasal radiographs, which are best viewed on a size 4 film, can be difficult to read on the smaller digital image. Positioning can initially be a little more technique sensitive since gravity acts on the heavier sensor, and the connecting wire can also pull on it. There are also wireless sensors, but we prefer those with a wire to avoid misplacing the sensor.

When we first purchased our system in 1995 there were only a few manufacturers. Now there are many systems available. Image quality is one variable between them. Just as important is the software and user-friendliness; a powerful and versatile software that is difficult to navigate is both unnecessary and a liability, while one that performs all the basic and important functions in an easy-to-use and efficient fashion rates highly with us.

Conclusion: A dedicated dental x-ray unit should be considered basic equipment for any veterinary hospital that performs dental procedures. Digital radiography offers many advantages over use of emulsion film. The only significant disadvantage is the expense.


INDEX TERMS: CCD, CMOS, dental radiograph, digital radiography, x-ray sensor.

017. Fecchio R.S.¹, Gomes M.S.², Kolososki J.³ & Gioso M.A.¹ 2007. Study of the adherence of acrylic resin in fractures of rhinotheca of toucans (Ramphastus toco). Pesquisa Veterinária Brasileira 27(Supl.). ¹Laboratory of Comparative Dentistry (LOC), Faculdade de Medicina Veterinária e Zootecnia (FMVZ), USP, São Paulo, Brazil; ²São Bernardo’s Zoo; ³College of Industrial Engineering, FEI. E-mail: bob_veteto@yahoo.com.br

Introduction: The avian beak is a continuously growing, dynamic structure composed of bone, vascular layers, keratin, dermis, joints and a germinative layer (Rupley 1999). In psittacine birds, the upper and lower jaws are connected to the skull via a kinetic joint (Ritchie et al. 1994). The keratinized sheath covering the upper and lower beaks is called rhhamphotheca and can be divided into the rhinotheca (maxillary keratin) and the gnathotheca (mandibular keratin) (Altman 1997). The median dorsal border
of the rhinotheca is called the culmen, and the median ventral border of the gnaotheca is called the gony. The edges of the rhamphotheca are called the tomaia. The rhinotheca is perforated by the paired nostrils. Aviculturists classify caged birds into hardbills (e.g., most psittacine birds) and softbills (e.g., mynahs, starlings). In ducks and parrots, the tip of the bill contains well developed mechanoreceptor nerve endings (Rupley 1999). The beak is used for prehension, for the physical preparation of food, and in some species such as parrots, for locomotion (Ritchie et al. 1994). The rate of keratin replacement is strongly dependent on the use of the beak. In large parrots, the complete rhinotheca is replaced in about six months, while in toucans the rhinotheca grows approximately 0.5cm over a two-year period. The rate of growth of the gnaotheca is about two to three times faster than that of the rhinotheca. A variety of congenital and acquired defects, including scissor beak and mandibular prognathism, can interfere with normal beak function. Examples of acquired lesions that can lead to malformations or necrosis of the beak include punctures, lacerations, splits and avulsions. Traumatic fractures, especially of the mandible, occur frequently in psittacine birds that get caught in hooks suspended from the ceiling of their enclosures or as a result of fighting (Ritchie et al. 1994). The present work has the aim of studying the forms of fixation of the rhinotheca fractures in toucans, with the use of acrylic resin. In order to simulate the forces that the beak is submitted to during feeding, we opted for the accomplishment of flexing tests essays.

Materials e Methods: Five beaks, removed from dead animals, were used to study the forms of fixation with the use of acrylic resin. The proximal extremity of the beaks was set in a support of epoxy resin while the distal extremity was set with a nylon fastener. This nylon fastener was connected to the movable headstock of a dynamometer through a brace of steel.

Results: The intact beak was fractured in the central portion when submitted to traction of 270.4 N, with displacement of 22.59mm. The location of this fracture served as orientation for the fractures induction in other beaks. The second beak received the resin in the two laterals and it presented resistance up to 69.75 N in 10.35mm. The third beak was submitted to acid conditioning for 60 seconds before the fixation of the resin and it resisted a force of 63.29 N in displacement of 6.73mm. Other two new tests were accomplished with the fourth and fifth beaks, being filled out the whole surface of the rhinotheca, besides the palate. The fourth beak was not submitted to the acid attack and it resisted up to 134.4 N in displacement 17.18mm and, the fifth was submitted to the acid etch and it resisted up to 101.5 N in displacement of 9.79mm.

Discussion and Conclusion: Statistical correlation and, consequently, differences among the procedures (with previous use of acid attack and those without the use of the same) were not observed in this study. Besides, it was noticed that the problem of repairing of the beaks seems to be related to the adherence of the resin to the keratin and not to its resistance. Still, the fixation to the palate provides larger resistance than that when it is used only on the lateral faces of the rhinotheca.


INDEX TERMS: Toucans, rhinotheca, fracture, acid etch, beak.

Introduction: Cancer in small animals is the most common death in dogs in USA. In Brazil, you can see increase the frequency of cancer in pets and owner’s preoccupation with his animal. Chemotherapy has been utilized since 60s decade in Veterinary Medicine in tumors like TVT, after in lymphoma and solid tumors (Chun et al. 2001, Almeida et al. 2005). The aim of chemotherapy treatment is utilized antineoplasic drugs and solid tumors (Chun et al. 2001, Almeida et al. 2005). The important point is, use the correct chemotherapy for type of cancer, and reduce the recurrence. Manny authors no know effective adjuvant chemotherapies for oral cancer, but when correctly used you can improve the survival of dogs. The important point is, use the correct chemotherapy for type of cancer, and study this drug for this patient. There are many preconception for use chemotherapy for the owner and veterinaries, but we will be need change the point of view, because the animal could be tolerate better than humane when used chemotherapy. In conclusion a chemotherapy associate a surgical treatment increases a survival in patients.

INDEX TERMS: Vaccines, cancer, malignant melanoma.

Results, Discussion and Conclusion: The treatment of dogs with oral malignant melanoma showed 9 months of survival, and further research with vaccines could increase the survival time. The results proved to have stabilized the disease, like in human patients who received the same treatment. The vaccine is not toxic, and doesn’t cause effects in the patients like chemotherapies. Melanoma is the most immunogenic solid tumor and, as such, has served as the major model for tumor vaccine investigation in both the laboratory and the clinic. This vaccine is unique for dogs and is a new therapy with good results.


INDEX TERMS: Chemotherapy, oral cancer, dogs.

019. Felizzola C.R. & Barbuto J.A. 2007. Vaccine therapeutics for treatment of malignant melanoma. Pesquisa Veterinária Brasileira 27(Supl.). Rua Antônio Alves Magan 124, São Paulo, SP 01251-150, Brazil. E-mail: cfronca@globo.com

Introduction: Oral cancer is 5.4% of all cancer in domestic animal (canine, feline, equine and bovine), (Dorn & Priester 1976) furthermore in feline oral cancer is 3 % of all cancer (Moore &Olgivie 2001) The most common oral tumor in cats is malignant and they have a poor prognostic (Stebbins et al. 1989, Bertone 2003, Have been reported over 20 types of oral cancer in felines, but only few are observed commonly. Among the more common feline oral cancer are squamous cell carcinoma (SCC), fibrosarcoma (FSA) lymphoma (LSA) and malignant melanoma (MM). Squamous cell carcinoma is account about 70% of all feline oral tumors. Squamous cell carcinoma (SCC) is an aggressive and common oral neoplasm of the domestic

020. Felizzola C.R. & Sousa S.C.M. 2007. Clinical and pathological study of the malignant oral tumor in cats. Pesquisa Veterinária Brasileira 27(Supl.). Departamento de Patologia Bucal, FOB-USP, Rua Antônio Alves Magan 124, São Paulo, SP 01251-150, Brazil. E-mail: cfronca@globo.br

Introduction: Oral cancer is 5.4% of all cancer in domestic animal (canine, feline, equine and bovine), (Dorn & Priester 1976) furthermore in feline oral cancer is 3 % of all cancer (Moore &Olgivie 2001) The most common oral tumor in cats is malignant and they have a poor prognostic (Stebbins et al. 1989, Bertone 2003, Have been reported over 20 types of oral cancer in felines, but only few are observed commonly. Among the more common feline oral cancer are squamous cell carcinoma (SCC), fibrosarcoma (FSA) lymphoma (LSA) and malignant melanoma (MM). Squamous cell carcinoma is account about 70% of all feline oral tumors. Squamous cell carcinoma (SCC) is an aggressive and common oral neoplasm of the domestic


INDEX TERMS: Chemotherapy, oral cancer, dogs.
Introduction: The neoplasias seem to be growing in prevalence in pets and the mouth is one of the places with more occurrence. Diverse types of neoplasias occur in the mouth, malignant or benign, and the most common are: epulides, melanoma, carcinoma, fibrosarcoma, papilloma, and osteosarcoma (Gioso M.A. 2003). The present report mentions two young dogs with oral neoplasia treated in the Laboratory of Comparative Dentistry, School of Veterinary Medicine and Animal Science, University of São Paulo, Brazil.

Case Report 1: An animal of the canine specie (Canis familiaris), female, 5 months, golden retriever was examined in the Laboratory of Comparative Dentistry. The owner reported that referring veterinarian examined the dog 10 days before due to having noticed a tooth with mobility in the left mandible. The tooth was extracted and sent to histopatological examination together with periapical tissues and was prescribed clorzehidine 0.12% for oral hygiene. After 7 days it was prescribed also prednisolone and ceftriaxone. The owner told that it did not have improvements and she noticed the appearance of a lesion in the distal portion of the left mandible. She also reported that the result of the histopatologic examination was suggestive of neoplasia of round cells. It was noticed in physical examination a mass of approximately 3.0cm of diameter, with ulcers and erythema in the distal region to the mandibular left first molar, as well as presence of two teeth in the interior of the mass and dislocated the lingual aspect. An area of osteolisis in distal region to mandibular left first molar was visualized on the x-ray, and no alteration in pulmonary fields in the radiographic evaluation was noted. One week later the animal was submitted to surgical intervention for the total resection of the distal left mandible. Left partial mandibulectomy was carried through. The entire mandible distal to the mandibular left third premolar was removed. The safety margin around the neoplasia was at least 2.0cm and the left palatine tonsil also was excised due to localization in the definitive area as safety margin. The animal was medicated with clorzehidine 2.0mg/kg every 8 hours per 5 days, spiroamcin 75,000 UI/kg + metronidazole 12.5 mg/kg every 24 hours per 10 days, meloxicam 0.1 mg/kg every 24 hours per 4 days and clorzehidine 0.12% every 6 hours per 15 days for oral hygiene. The removed material was sent to histopatological examination. The healing process progressed satisfactorily. The owner reported trauma of the maxillary left canine tooth in the lingual gingiva to the mandibular left canine tooth due to the absence of the distal left mandible. After 15 days of the intervention the animal presented complete healing of the surgical wound, however the histopatologic examination indicated suggestive lymphoma neoplasia with anaplastic gigantic cells and was also noticed mass in mandibular left lymph node of approximately 4.0cm of diameter. The animal was directed to the department of internal medicine where chemotherapy treatment with vincristine and prednisolone
was instituted. The animal answered well to the first session of chemotherapy; however, it was diagnosed metastasis in mediastinoh lymph node and pleural effusion, with about 2 liters removed of liquid every 2 days. One month after the institution of the chemotherapy, drainings of pleural liquid, important loss of weight, and of gradual apathy of the animal, the owner opted for euthanasia, and no necropsy.

Case Report 2: An animal of the canine species (*Canis familiaris*), male, 79 days of age, Schnauzer breed, was examined in the Laboratory of Comparative Dentistry. In the case history the owner informed that at 20 days old it was noticed a mass in the left mandible. He looked for the opinion of a private veterinarian, who did an incisional biopsy and histopathologic examination. The diagnosis was squamous cells carcinoma. It was prescribed prednisolone 1.0mg/kg every 12 hours per 7 days and there was small regression of the tumor. In the physical examination an ulcerated mass, not pigmented through all the extension of the left mandible was seen. In the radiographic examination it was visualized areas of osteolysis and a ventral mass in the left mandible. Explained the prognostic and the absence of safety margin for surgical resection, in agreement with the indication of the referring veterinarian who made the first consultation the owner opted for euthanasia. The animal was sent for necroscopic examination where it was not identified compatible alterations with metastasis and it confirmed the oral neoplasia as squamous cells carcinoma.

Discussion and Conclusion: The lymphomas (malignant lymphoma or lymphosarcoma) are a diverse group of cancers that originate from a type of white blood cell called a lymphocyte. They are one of the most common cancers diagnosed in dogs and cats. This cancer usually arises in lymph tissues such as lymph nodes (lymph glands), spleen, and bone marrow; however, it can arise in almost any tissue in the body including the skin, the brain or spinal cord, bones, heart, or intestines (Verstraete F.J.M., 2005). In the case reported the animal was very young. Squamous cell carcinoma is diagnosed in 20% to 30% of oral tumors in the dog but it is more common in the cat (70% of oral tumors). There is no sex predilection in the dog, but older large-breed dogs are more commonly affected. Squamous cell carcinoma most often originates in the gingiva, especially on the rostral mandible, and infiltrates deeply (Wiggs & Lobprise 1997). In this reported case the neoplasia was in this region and with the same aspect related before but the animal was extremely young. In these cases, the prognosis was poor due to the time of evolution and the local tissue invasion.


INDEX TERMS: Oral neoplasia, young dogs, squamous cells carcinoma, lymphoma.
involvement or not. For the visualization of lamina dura surrounding each particular tooth, it is necessary to do a very well positioned oblique view, on a strictly perpendicular orientation of the x-ray tube towards the suspected tooth to permit the proper angulation. To seek for abnormalities involving one or more dental structures, the best way to approach the major anatomical details in equine odontology is to investigate both sides, no matter which side is the supposedly altered, to permit comparison between left and right hemi-arcades. This reduces misinterpretation of radiographic findings and assures better reports and diagnosis.

Introduction: Preparation and setting of porcelain fused to metal crowns is an alternative treatment for restoration of dental pieces in small species, principally in dogs, Restorative dentistry is based on dental restoration and preparation of teeth for to rehabilitate them, partially or totally. The totally rehabilitation could be with crowns, as well as for fixed prosthesis. Fixed prosthesis is the specialty in which all techniques for preparation of fixed crowns and bridges from diverse material used to partially or totally rehabilitate dental structures lost due to pathological causes (tooth decay, external odontoclastic resorption, enamel hypoplasia, etc.), or traumatic (fractures at different levels of tooth crown), or worn out prosthesis (titanium implants, malocclusion, ectopic teeth, etc.) are studied. When working with any kind of crowns, multidisciplinary support from all odontological areas is required to set a porcelain metal crown. It is necessary to work with a dental laboratory using the ideal techniques and material, since final results depend 50% from laboratory work. Knowledge of dental anatomy, gums and occlusion animal to treat are very important because making a porcelain crown requires the best possible imitation of the tooth shape and its function in occlusion. In dogs and cats it is regularly preferable to prepare supra gingival since they are more hygienic. In the case of anterior teeth (incisive and canines), many owners want aesthetic crowns requiring infra gingival preparations. The technique to prepare porcelain metal crowns has certain basic objectives such as: Removing or eliminating abnormal tissue; preserving as much healthy tissue as possible; rehabilitate the crown portion in case of severely destroyed teeth in order to get an adequate stump and; preparing the most adequate design to keep stability and sealing of the porcelain metal unit. There are 4 main principles to prepare crowns:

I. Preserve dental structure. Not to wear out more than necessary. In the case of porcelain metal crowns, wearing is 1.2 mm from cervical in aesthetic faces.

II. Retention and estability. Retention avoids dislocation of restoration due to oblique or apical direction forces. The basic unit of retention has two opposite dental surfaces of a maximum of 6° conicity.

III. Structural Strength. Dental shaping is projected to a metal porcelain width necessary to resist occlusion forces.

IV. Prefect limits: Supra or infra gingival dental wear must be precise. This allows restoration to have a sealing isolating the tooth from the buccal environment. Limits support occlusion forces too.

There are 5 types of margins or cervical terminals for dental preparation:

1. Knife edge. It is difficult to wax and drain, since it may produce excessive edges for restoration and distort it with occlusion forces. A needle diamond (pencil point) bur should be used. This margin is used only for metal crowning.

2. Champfer. A rounded point conic diamond bur is used to finish metal crowns. It is easy to wax and drain and it does not allow excessive edges on the crown and produces less effort before the occlusion forces.

3. Shoulder. It is used for porcelain crowns. The tooth is prepared with a conic diamond bur with plane tip. It is highly resistant to occlusion forces and minimizes restoration effort.

4. Bevel: Modified shoulder shape with a major 90° corbel. A conic diamond bur with round point is used for preparation. It is resistant to occlusion forces and diminishes restoration effort. It is used for metal porcelain crowns.

5. Shoulder with bevel. It is a 90° shoulder ending with beveling ending between 30° and 45°. The sharp angle gotten with beveling is excellent for metal sealing and it is ideal for metal porcelain crowns. The tooth is prepared with a conic diamond bur with plane tip to preparing the shoulder and then a needle diamond bur is used to preparation with beveling. It is resistant to occlusion forces and minimizes restoration effort.

When a tooth is prepared infra gingival it is necessary to use retraction cord for soft tissues. It may be soaked in epinephrin or aluminum sulfate as a vasoconstrictor so that there is no bleeding when it is withdrawn. The first impression is taken (primary impression) with heavy material of polivinil siloxan with the retraction cord in position.


INDEX TERMS: Horses, radiography, extra-oral.

023. Garrido M.G. 2007. Porcelain fused to metal crowns in dogs. Pesquisa Veterinária Brasileira 27(Supl.). Departamento de cirugía, UNAM, Mexico city. E-mails: docgusgarridodentista@yahoo.com, gusgamen@yahoo.com

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After withdrawing the primary impression the retraction cord is withdrawn from the gingival sulcus and the heavy material impression of silicon is checked with the polyvinil siloxan fluid taking the tray again into the mouth. The fluid or light material is introduced easily into the gingival sulcus allowing getting the negative of the subgingival edge with great precision. The impression is plastered in stone past “velmix” to get the working model. It is necessary to get the patient occlusion with a study model stone. The impression of the antagonist teeth it’s getting with alginate (irreversible hydrocoloid). To get a reliable bite is necessary to get the occlusion impression in the patient’s mouth with low fussion wax registering the teeth marks. With this marks on the wax the plaster models are articulated so the dental laboratory personnel makes a crown adapted to the specific occlusion of the patient.

**Results:** 4 clinical cases are presented with different types of rehabilitation of the tooth crown. In 3 cases dentinny pins were used to form the stump, one was rehabilitated with light cured composite, and the other 2 with a mixture of amalgam with “Duralay” acrylic. In the 4th case, the canine stump was rehabilitated with a metal casting post. All cases got an endodontic treatment since the dental pulp was compromised. All canines were rehabilitated with metal porcelain crowns following the methodology described above.

**Discussion and Conclusion:** Totally aesthetic restorations with infra gingival finishing in pets cause rejection from some veterinaries devoted to odontology since it requires more appointments and a lot of work. Although these factors are considered in deciding whether to place a metal crown, a metal porcelain crown with supra gingival preparation or a metal porcelain crown with infra gingival preparation, It is important to recognize the owners demand better quality and aesthetics in the treatment of their pets. In all clinical cases, the owners were completely convinced of the benefit they got with this type of restoration and the patients have evolved adequately without gingival problems or rejection of the crown.


INDEX TERMS: Porcelain fused to metal crowns, restorative dentistry.

**Introduction and Development:** Self threading dentinny pins are small screws used in odontology as reconstruction material retainers such as amalgam, composite, “duralay” acrylic with amalgam or glass ionomer cement with amalgam filing. There are three kinds of dentinny pins: cemented pins, holding pins by friction and self threading pins. The technique for cemented pins was first reported by Markley in 1958. Research done by Dits and colaborators in 1968, and Moffa and his group in 1969 showed the self threading pin is the most retentive in dentine as well as in the restoration material. Reconstruction is a method to rehabilitate severely destroyed teeth, forming stumps for prothetic purposes or restoring the shape and function of the affected tooth. Pins are placed in dentine, which is the mineralized tissue found along the teeth under the crowning enamel and the cementum. Dentine is formed due to odontoblastos which are cells found in the periphery of dental pulp and in contact with predentine. Dentine is structurally different from bone tissue, but it is very similar from the physical-chemical point of view. When mineralized it has between 15% to 30% organic matter, mineralization cristals are hydroxiapatita and its elasticity and hardness are very similar to bone. Elasticity allows dentinny pins to be placed in dentine without causing tooth fractures due to occlusion. An important problem to consider is that in young teeth pin placing is more difficult since there is a smaller quantity of dentine. Dentine has millions tubes going from pulp to enamel and cement, inside this tubes there are citoplasmatic prolongations from odontoblastos and nerve terminals tath allow the tooth to form repairing esclerotic dentine as well as sensitivity.
respectively. Procedure to place self thread pins requires a one channel drill slightly smaller in diameter to place the pin. Drills have a point to prepare channels for a depth going from 1 to 4 millimeters with a diameter from 0.34 to 0.68 millimeters. The self threading dentinary pins are made of titanium o stainless steel. Their length goes from 3 to 8.2 millimeters and a diameter from 0.38 to 0.78 millimeters. The differences between the drill and the pin go from 0.04 to 0.10 millimeters. There are self section pins, others which may be cut with burs being self section pins the most comfortable. Dentinary pins work better for vital teeth since teeth with endodony treatment lose moisture and organic material and consequently lose elasticity. Choosing the pin´s diameter and the necessary number of pins has to do with the ammount of dentine present in the affected tooth. The pin is placed where there is more dentine, normally in vital teeth in the mesial-buccal, mesial-palatal, distal-palatal and distal-buccal angles, according to tooth destruction. To decide where and what direction the pin must go into the tooth, the morphology of every tooth of the species to treat must be known, otherwise the pulpar tissue or the peridontal ligament with all bone tissue. The canal must be from 1 to 2 mm from the external crowning surface or radicular and with a direction parallel to the longitudinal axis of the root involved, although this may vary occasionally but always trying not to hurt the pulp or the oseo-parodontal tissue. The most common failures may be due to: dentinary or mineralized tissue sostened by tooth decay or any other factor; drilling more than necessary and making a channel a lot wider than the pin; part of the pin being in pulpar or paradontal tissue. The most common accidents are: breaking the pin inside the channel; leaving part of the pin outside the base, causing the pins exit from the receiving tissue and; penetration within the pulpar chamber or the external surface of the tooth (periodontal or bone tissues). In veterinary medicine, dentinary pins are used as in human odontology, but also may be used in other cases such as reduction and ferulization in turtle shell fractures or big birds beaks, or interdentary casting. Other applications are possible using common sense before need. It is important to mention some general aspects about quelonian anatomy. Turtle shells are made of a shell (dorsal region) and a plate (ventral region) connected with bone bridges. The shell is made of about 50 bones coming out of the ribs, vertebrae and skin elements. The bone part of the shell is covered with superficial sheets made of quaretin. These plates are organized in a way they dont overlap at the bone tissue joints under them. Turtles produce new plates every period of growth and change the plates from the previous period. There are 4 clinical cases in this work where self threaded dentinary pins were used, automatic section with plastic base for counter angle with slow speed handpiece. Two of the cases are dental reconstruction from a canine and a 4th upper premolar with light cured composite in two dogs. The other two cases are turtles suffering a shell fracture using 0.010 inch in diameter wire as a ferula and pins. The other turtle was rehabilitated with an acrilic plate fixed to the shell with dentinary pins, 0.010 inch wire, thermo maleable silicon and a covering made of acrylic.

**Discussion and Conclusion:** Self threaded dentinary pins are instruments that provide retention to a great number of elements. Without them, the possibility to reconstruct or ferulize structures which size make it impossible to use screws. With training they are easy to handle and the cost is low for the service they provide. With common sense they can be used for many different treatments and new alternatives. The final decision depends upon the doctor and his/her wish to solve the problems present in their patients. In the clinical case of the acrilic plate place on the turtle's shell, the decision was made principally to observe the healing process in quelonians and to photograph its evolution.


**INDEX TERMS:** Self threading dentinary pins, teeth reconstruction, turtle shell repair.
bird to good health implies frequent exposure to fresh air and sun light, adequate nutrition and rutinary flying exercises. The factors predisposing to respiratory tract diseases include: 1) Nutrition problems, being vitamin A deficiency the most common; it may cause metaplasia of the squamous respiratory epithelium; mechanical obstruction caused by the precense of foreign bodies such as seeds, peelings, dust and feathers; 2) Parasite local problems principally caused by _Cnemidocoptes pilae_ causing obstruction of air flow; 3) Environmental factors as tabacco smoke, low moisture because of air conditioners, boilers, irritation of nasal tissues due to perfumes and sprays; 4) Problems caused by infection agents suchs as bacteria, fungus, _Chlamydia_ spp., _Mycoplasma_ spp., and virus; 5) Local traumatism; and 6) Respiratory epithelium neoplasms of the superior respiratory tract, being the most common fibromas, fibrosarcomas and squamous cell carcinomas. During the examination, the patient must be observed from a distance in order to see if there are changes in normal posture, wing position, respiratory frequency, and respiratory pattern that may indicate abnormalities. A bird uses chest muscles for the respiratory cycle. Any compromise in the input or output effort may affect the bird’s posture. Normal respiratory effort must be observed and the beak must be closed. Respiratory diseases may be present in two levels, the upper respiratory tract (nostril, operculum, nasal shell, infraorbital sinus, glottis and trachea) and the lower respiratory tract (sirynge, bronchus, lungs, and air sacs). The infraorbital sinuses are divided into right and left, in some birds they are connected as in the psittacides and are separated in other species. The infraorbital sinus is the only paranasal sinuses in birds and is located sideways to the nasal cavity and surrenders ventrally to the eyes. It has several compartments (rostral, preorbital, infraorbital, postorbital, preauditory and mandibular) and two chambers (maxilar and suborbital). The left and right infraorbital sinus are connected in their rostral portion with the nasal shell through an opening coming out the preorbital compartmen and, in its caudal portion with the cranial portion of the cervical-face air sacs communicating to the suborbital compartment. It is important to understand that the disease process in the upper respiratory tract could invade internal zones, and may spread into the muscles of the patient’s face and neck. The interconnection of the nasal cavity, the infraorbital sinus and the head, causes a situation in which inflammatory reactions in the sinuses or in the nasal cavities may involve the majority of the head structures. At the same time, the infection may spread to the cervical face air sacs. In severe chronic sinusitis the piling of abscess tissue may cause destruction of the nostril, nasal cavity, operculum and concha nasal. This degree of destruction is very common in amazon and grey African parrots with sinusitis due to aperglossis. The clinical conditions that the professional must consider to diagnose upper respiratory tract illnesses depend upon the presence of clinical signs as open mouth breathing, voice changes, sneeze, face tumors in the sinus zone, nasal granulomas, intolerance to exercise, breathe difficulty, shaking head movements, mucous purulent nasal discharge, neck swelling, blepharospasm, epiphora, periophtalmic swelling, obliterated nostril, anatomic distortion of the nostril, and face deformities. Diagnose protocols may be: Checking the nutricional state through a clinical history (exposure to cigarette smoke, etc.), Gram tint in feces, floatation test in feces to determine parasites, affected areas cytology, Xrays, tomography, magnetic resonance, ultrasound, rhinoscopy, cultures and sensitivity tests to antibiotics, biopsy and histopathology.

**Case Report:** “Gastón”, a 10-year-old male _Amazona autumnalis_ parrot was taken for checking to the Hospital of Small Species of the Veterinary Medicine School, National University in Mexico city. Upon physical examination the animal had a 41.9ºC temperature, cardiac frequency of 140 bits/min, respiratory frequency of 30 respirations/ min, body condition 2/5, weight 450g, slight diminishing in left nostril, mucous secretion in both nostrils, increasing volume in the right side of the face at the jaw angle and infraorbital, increased volume of the left side of the face at infraorbital level, blepharospasm and bilateral epiphora. The patient was sent home administered with enrofloxacin at 5mg/kg every 12 hours. It was appointed for surgery and entered the preparation area of the hospital where anesthesia was induced with isoflurane at 3% plus 100ml/min of oxygen, later a pediatric endotraqueal (catheter of Cole) was placed, fixed to the lower beak with tape. The catheter was connected to a tube for Bain opened system. An esophagic catheter was placed to monitor constantly the changes in cardiac and respiratory frequencies. Two 1cm preorbital incisions were done caudally towards the rostro. The sinus were treated extracting solid abscess material from all compartments and chambers and on the right side a fistula among a muscle aponeurosis, which had invaded all the way to the lower angle of the jaw. The extracted material was sent to the lab for bacteria testing. Tissue samples from the infraorbital sinus were taken for histopathological diagnosis. The wound was sutured with simple separate points of nylon 5-0. It was pressure washed with a physiologic salty solution at 0.9%. The patient was sent home with Enrofloxacin at 5mg/kg administered orally every 12 hours for 7 days, with a multivitamin given orally every 24 hours, and with instructions to keep the wounds clean. The lab results showed a _Pseudomonas aeruginosa_ in high quantities, susceptible to gentamycin, polymixin B and norfloxacin. The pathomorphologic diagnosis was heterophelic sinusitis and multifocal moderate linfoplasmocytic with spread necrosis compatible with an abscess. During the checking appointment the suture was removed, the nostrils were positive pressure washed with salty solution at 0.9% using a syringe, and the Gaston’s head was leaning so that the water running out the coanas was not aspirated. Medication was changed to norfloxacin at 10mg/ kg administered orally every 12 hours.

**Discussion and Conclusion:** Sinusitis diagnosis in pet birds requires clinical experience. Causes originate this type of pathology are many and generally interrelated. Anesthetic handling of pet birds must be carefully done and it is necessary to have knowledge and experience. Sinusotomy is an effective chirurgic technique as long as there is adequate postoperatory handling.


Materials and Methods: Eight 9 to 13-year-old dogs weighing 6 to 38 kg with diagnosed oral melanoma (Stage of growth II and III) were treated in the similar way. Surgery put a greater stress on simply removing the mass than on radical resection. Therefore, the sections had marginal or wide character. In the first place, because the stage allowed for that, and secondly, because the owner did not accept aggressive procedures. Recovery lasted for 10 days and was followed by the postoperative supportive protocol. This protocol consisted of cytotoxic therapy and administration of interferon α. In the case of dogs, the cytotoxic drug was Dacarbazin which was given intravenously at the dose 200mg/m2 at 3 weeks intervals. In the case of cats, Cyclophosphamid was given orally at the dose 50mg once per week. Additionally, dogs and cats received p.o. saline containing interferon α in a dose of 10 IU/kg for 7 consecutive days with 10 days break between the cycles. Each animal had preoperative blood profile, good blood test results that allowed them to undergo the cytotoxic protocol. After first intravenous administration of Dacarbazin, 6 dogs had temporary (24 hrs) problems with appetite and significant drop of activity. In the case of 2 dogs, no side effects were observed. Orally administered interferon did not cause any inconveniences. The cats also accepted the drugs very well. All dogs were under control for maximum 18 months and in all cases a monthly control was done. In each case, postoperatively and after cytotoxic treatment, complete remission was observed. The recurrence of tumor took place in 6 dogs and was observed after 3-10 months after surgery. All of them were euthanized when the obvious discomfort of life occurred. Two dogs died because of other than neoplastic reasons without signs of MM after 10 and 11 months after surgery. Survival time in those dogs which had recurrence was 4-18 months. Average survival time in this group was 11.1 months. One cat survived 12 months after surgery, however the tumor reappeared 3 months after its removal in the same place (mandible) The other cat was euthanized 2 months after surgery because of local rapid recurrence of palatal mass which disturbed the cat eating and drinking.

Discussion and Conclusions: Numerous studies showed the results of treatment oral MM tumors as unsatisfactory. The reported survival time in dogs was in the range of 9-19 months. (Kosovsky et al. 1991, Withrow & MacEwen 1996, Horsting 1998, Gawor 2002). In humans, the average survival time in oral MM is 1.8 years. 10% of patients live more than 5 years, and the longest survival time was 19 years. (Shklar 1984, Hoyt et al. 1989, Conley 1991, Orr et al. 1993). Insufficient resection is considered the most common reason of failure of the treatment of MM. In this particular tumor, the section margins are very often "dirty" with presence of neoplastic cells, moreover the risk of metastasis in melanoma is very high. (Patton et al. 1994) It is the reason of continuous studies on improving MM treatment. When commenting the mentioned average survival time in dogs, one has to note that different stages and methods of treatment were evaluated. Perhaps an important difference is that all dogs and cats in the presented studies had no radical surgery but only palliative one. In supportive protocol, the choice of dacarbazin was based on relatively low level of side effects and requirements for administration and use. (Lewicki 2002) MM is recognized...
as the problem where the immune system may play a serious role in the treatment. (Holzle 1993) The use of Corynebacterium parvum, interferon alpha, and other immunostimulants were reported and significant improvement in evaluating parameters was observed (MacEwen 1986, Carson 1998, Soergel et al. 1999). It was the reason for adding interferon alpha in low doses which is found beneficial to patients in inflammatory, neoplastic and some immune mediated conditions. The goal of the presented studies was to evaluate another modification of postoperative protocol in the cases where the margins of section did not remain clear. The measurement of achieved results was mainly the survival time which ended with the obvious lack of life comfort. The author’s previous postoperative protocol in such cases consisted of melphalan 2mg/m2 daily with a 10 days intervals every week, given together with prednisone 1mg/kg daily and the average survival time in the group of 25 dogs was 8,23 months (range 2-14). The new protocol with different cytotoxic substance and interferon provided longer median survival time of 18 months. Based on the obtained results, the used protocol seems to be promising, as we take into consideration the prolonged survival time. Regarding cats, there were too few cases to make an honest judgment on the benefits of this treatment. Still, the number of treated patients is not sufficient to claim spectacular improvement. Further studies are required to evaluate whether this protocol may be an option for palliative treatment of oral MM in small animals.

References

Index Terms: Dogs and cats, oral melanoma, interferon alpha, dacarbazin.

Materials and Methods: Among 92 mandibles of Myotis bechsteinii found in Jaskinia Malotowa (the cave in southern Part of Poland near Krakow), a part had visible damages of hard tissues. The age of the mandibles was evaluated with the use radiocarbon dating (AMS 14C). The mandibles were numbered and photographed. Each mandible was clinically evaluated with 7,5x magnification. All of them were X-rayed too. Two groups of defects were distinguished: dental and mandibular. One of the most representative mandible for each group was X-rayed. In the second step, the measurement of clinical pathologic changes in this species. Was the dental disease the reason of significant reduction of this population? The preliminary analysis of clinical, radiologic, and histologic evaluation is presented in this brief.
Results: All mandibles belonged to one species: Myotis bechsteinii. The estimated age was evaluated with the use of 14C and estimated as 3905 yrs ±35. 37 of 92 mandibles (40%) had visible lesions in dentition and/or in mandibular bone. Based on a preliminary evaluation, the external cause seemed to be very unlikely. 18 were left, and 19 right mandibles. In clinical evaluation of 37 selected mandibles with 7,5x magnification, all the lesions that were found were described (Table 1). Location of defects was précised as it exists in anatomy of mandible (Fig. 1). The defects were divided into 2 groups: dental and mandibular. First group referred to the dental crown and its neck area, the second group contained those which had the lesions in different parts of mandibular bone. All 37 selected mandibles had mandibular lesions (Group 1), and 8 of them had dental defects (Group 2). In Group 1 there were affected: one fourth premolar tooth, five first molars, five second molars and three third molar teeth. Dental lesions had sharp edges, hard bottom and an appearance similar to resorptive lesions. Radiographs made with different techniques did not allow for detailed evaluation of dentition. Scanning microscope visualization confirmed the cavital shape of the lesions and the sharp edges of defects. In some places, openings of dentinal tubules were seen. Histology made possible evaluation of the entire tooth including its roots. Microscopic evaluation showed the more intensive stain of hematoxylin in the affected areas. In root, the lesions looked as root replacement with variable density of hard substance, irregular shape and empty spaces were found. All of the lesions were considered as intravital ones. In Group 2, localization of defects is presented in Table 2. In macroscopic examination the lesions had focal character and had different stages of bone damage: from the discolorations of the bone through erosion into complete lack of cortical bone and perforation into mandibular canal and/or into alveolus. Most of bone lesions were located at processus alveolaris of the mandible. Radiographically, no further details could be obtained as the resolution of picture was not satisfying. In scanning microscopy, the lesions had certain margins, did not look as infiltrative. Microscopic evaluation of histological slide showed the areas of affected bones with numerous empty spaces which were intrabony and had regular round and oval shape. Trabecular character of bony structure was partially lost in those areas. More intensive hematoxylin stain was observed in most external parts of the affected bone.

Discussion and Conclusion: Preliminary analysis of the obtained results allows for the fundamental conclusion: the defects presented in mandibles were intravital and not caused by external conditions as climate, humidity, acidity of environment etc. Among evaluating methods, the most reliable results were obtained in microscopic evaluation of histological slides. Obviously, in non-fixed material all vital cellular soft structures disappeared. However the remaining empty spaces looked exactly like vascularisation, root replacement and cavities. The localization of those empty spaces was not casual. All of them were located next to erosions and/or dental defects. The more intensive stain of hematoxylin used to be the consequence of less mineralized, softer substance in material. This area was present only in defects, not circumferential in the entire tooth surface. Such an appearance of the described above lesions is typical for inflammatory or resorptive process often observed in periodontal disease, dental resorative lesions or caries in mammals. In radiographic evaluation, an important limitation was the resolution of image. Small size of the mandibles (10mm length) and even smaller dentition made the classic and digital methods of radiographic imaging useless. In fact, this part of examination did not give an important input to the results. Still, the method of an accurate radiographic evaluation of that small object is being tested as radiolucency of the affected places is one of missing aspects of examination.

The location of defects excluded possibility of attrition and abrasion as their possible origin. Dentition of bats was the subject of interest and studies. Alveolar resorption was described in different species of bats living in Europe and North America (Phillips & Jones 1970). In studies made on the sculls of currently existing European species of bats, 1/5 of the examined sculls had signs of periodontitis (Vierhaus 1980). In all studies, the endogenic reason was seriously considered (Phillips 1970, Vierhaus 1980). There are no reports about oral problems in bats from that old times. The presented material gives the preliminary ideas about possible clinical problems in the nature that occurred in the past and had a serious influence on the existing species:

1. The real clinical character of periodontal and dental lesions found in mandibles of Myotis bechsteinii living over 3900 14C yrs BP is very likely.
2. Possible inflammatory character of lesions typical for periodontal disease, caries and dental resorption is considered.
3. Prevalence of oral problems might affect the size of population of Myotis bechsteinii and cause its reduction.

References: Phillips C.J., Grimes G.W., Forman G.L. 1977. Oral...

028. Hall B.P. 2007. Endodontic and prostodontic repair of maxillary cusps in a working dog. Pesquisa Veterinária Brasileira 27(Supl.). The Animal Dental Clinic, Vienna, VA. United States. E-mail: K92thBarron@aol.com

Introduction: Signalment: 2-year-old, male, German shepherd dog. The patient is an actively working police dog. The handler/owner noticed him “backing off the sleeve” during his training sessions. The RDVM saw the patient and referred him for assessment of a fractured canine tooth with possible endodontic and prostodontic therapy to preserve his career. Upon presentation the oral exam revealed bilateral Class VI, Stage IV mesiodistal fractures of the maxillary canine teeth (104, 204). There was a vertical fracture of the distal third of 104 that extended subgingivally.

Case Report: Once anesthetized a complete oral exam was done: attrition was noted along with the maxillary canine tooth fractures. Infraorbital nerve blocks were done bilaterally using Marcaine with epinephrine. Intraoral radiographs revealed the vertical fracture of 104 did not extend into the root canal. Using a 12-fluted bur on a water cooled high-speed handpiece, a Type II crown lengthening procedure was done for 104 and a Type I crown lengthening was done for 204. Standard root canal therapy was performed on both teeth using CRCS and gutta percha for obturation. The handler/owner noticed him “backing off the sleeve” during his training sessions. The RDVM saw the patient and referred him for assessment of a fractured canine tooth with possible endodontic and prostodontic therapy to preserve his career. Upon presentation the oral exam revealed bilateral Class VI, Stage IV mesiodistal fractures of the maxillary canine teeth (104, 204). There was a vertical fracture of the distal third of 104 that extended subgingivally.

Discussion and Conclusion: Three days later the crowns were cemented on using Panavia. There was to be no bite work for 72 hours, then he could resume normal activity. The patient presented for an oral exam 8 months post-opt. The crowns were holding up well and the patient was actively working again “like nothing had happened.” The kids on his beat call him “blingbling”.


INDEX TERMS: Endodontic, prostodontic, maxillary, cusps.

029. Hall B.P. 2007. Labial advancement flap after excisional biopsy of a labial mast cell tumor (MCT). Pesquisa Veterinária Brasileira 27(Supl.). The Animal Dental Clinic, Vienna, VA. United States. E-mail: K92thBarron@aol.com

Introduction: Signalment: 9-year-old, FN, Husky. Patient presented for surgical consultation after 2.5 months of chemotherapy to treat a Grade 3 (poorly differentiated) mast cell tumor (MCT) located on the buccal mucosa of the rostral right lip. Preoperatively, two types of skin flaps were considered to close the defect left after the mass was excised: Y-plasty and advancement flap. Due to the more rostral location, the advancement flap was selected.

Case Report: Once anesthetized a complete oral exam was done: Class III malocclusion, level bite with secondary attrition, and a Class VI, Stage II fracture of the maxillary left intermediate incisor (202). The margins of the mass were delineated. An alveolar infusion block using Marcaine with epinephrine was placed in the oral mucosa around 202, the region around the mass, and along the projected incision line for the advancement flap. An intraoral T-shaped incision was made using the same local anesthesia. After clipping and surgically scrubbing the right side of the face and extracting 202, a 2cm area around the mass was delineated. A full thickness skin incision was made along these margins to remove the neoplasm, leaving a rectangular defect. The dorsal extent of the excision was horizontally extended caudally about 3cm ventral to the right lateral canthus. The infraorbital neurovascular group was ligated. A small wedge-shaped segment was excised from the rostro-dorsal border of the flap to allow for the slight curve along the lip margin. The flap was advanced and closed intraorally and cutaneously without tension. The patient recovered uneventfully.

Discussion and Conclusion: Mast cell tumors (MCT) are...
of the most common skin tumors in the dog comprising 20-25% of the cutaneous and subcutaneous tumors and 11-27% of all malignant tumors. While there is no sex predilection, MCT’s are normally found in middle to older aged (mean age ~8.5 years) brachycephalic breeds. They are located 50% over the trunk and perineum, 40% on the extremities, and 10% on head and neck regions. They are classified by Patnaik into three categories: well differentiated (Grade 1), moderately differentiated (Grade 2), and poorly differentiated (Grade 3). The more differentiated they are the more likely they are to metastasize, although pulmonary metastasis is very rare. MCT’s cannot be diagnosed definitively without cytology or histopathology. They are best described by their biologic behavior as unpredictable, as they may become systemic and behave similar to a hematopoietic malignancy. The KIT immunophenotype uses immunohistochemistry to help give a more detailed prognostic evaluation for MCT’s based on their cytoplasmic staining. Based on a study of 100 dogs with MCT’s from the College of Veterinary Medicine, Michigan State University, an increased cytoplasmic KIT staining has been shown to occur in patients with a higher rate of local recurrence and decreased survival intervals. Based on these results, the authors feel a new prognostic classification for MCT’s should be used based on their cytoplasmic KIT staining. Dogs with MCT’s can be treated with surgery, chemotherapy, and/or radiation therapy. Surgery, ideally 2-3cm margins based on the Grade of MCT, and radiation therapy have the potential to be curative and are the most successful treatment options to date, while chemotherapy is only palliative. If excisional biopsy is incomplete, then re-excision with 3cm margins and/or radiation are the recommended treatment options. Once metastasis has occurred treatment is usually chemotherapy and supportive therapy. The wedge and rectangular resections were individually considered for the excisional biopsy; however due to the size and rostral location of the mass, and the owners concern with cosmesis the full-thickness labial advancement technique was selected. Although the infraorbital neurovascular bundle was ligated the collateral circulation to the lip and muzzle will be supplied by the facial artery and the contralateral infraorbital artery. The final histopathology report showed a Grade of II MCT with adequate surgical margins. Since muzzle MCT’s are biologically more aggressive, continued monitoring of this area is recommended. The complete excision combined with chemotherapy should allow this dog a good quality of life through her senior years. The owners were very satisfied with the outcome, medically and cosmetically.


INDEX TERMS: Labial, flap, biopsy, excisional, MCT.
plaque biochemical environment becomes richer, allowing anaerobic periodontopathogens, including spirochetes, to thrive. To prove the infectious nature of periodontal disease by applying Koch’s postulates is not possible because of the complexity of the microflora in dental plaque. Periodontopathogens are defined by Sokransky’s Postulates:

Association: The causative agent must be found in active ‘sites’ in higher numbers than in non-active sites.

Elimination: The elimination of the agent must stop the progression of disease.

Host response: The cellular or humoral immune response must validate the specific role of the agent in the disease.

Virulence factors: The agent must possess virulence factors that are relevant for the initiation and progression of the disease.

Animal models: The pathogenicity of the agent in an animal model must provide conclusive evidence that it can cause periodontitis.

A change from primarily periodontopathogens - predominantly anaerobes of the black-pigmented Bacteroides group (including Porphyromonas and Prevotella spp.) - to a wider variety of organisms, particularly aerobic Staphs and Streps, is considered indicative of reversion from periodontal disease to oral health. However, qualitative and quantitative assessment of the bacteria in direct contact with infected periodontal tissues is challenging, and inconsistent culture results are often found in microbiological studies of periodontal disease. The ability of an individual animal to resist a given gingival bacterial load varies greatly, depending on immunological competence, differences in protective constituents of oral fluids, and other factors such as age, stress, nutritional status, concurrent infections, distant-organ health status and probably additional factors that are incompletely understood or not yet known. What is the purpose of an antibacterial drug when an infection is located in a tissue that is always exposed to a rich bacteriological flora? Is re-infection the inevitable result of contamination following antibacterial treatment?

Antibacterial Drug Treatment - Role in Management of Oral Diseases: In a healthy mouth, the well vascularized oral tissues are adapted to existing in a contaminated environment. Use of an antibiotic drug is indicated in patients with oral diseases to treat either local infection or to prevent settlement and growth of bacteremic organisms in distant sites in at-risk patients.

Considerations of the patient’s general health aside, patients with contaminated oral sites that are already open for drainage (i.e., periodontal pockets) or that will be open for drainage following a procedure such as scaling or extraction generally do not require antibiotic treatment. Thus, treatment of extensive periodontal disease by a combination of scaling and extraction is, of itself, not an indication for treatment with an antibacterial drug. Periodontal infection is treated by removing the cause (plaque and calculus) so that the tissues can revert to health; antibiotic administration is an auxiliary treatment.

Indications for Use of Antimicrobial Drug in Patients with Oral Infection:

Treatment of Local Infection. An antibiotic can shift the plaque flora from a pathogenic to a commensal mix. Combining this effect with the mechanical removal of calculus and plaque will enhance the likelihood of stabilization of healthy flora in the healing tissues.

1. Local tissues are severely infected and treatment including retention of teeth would require periodontal surgery that will expose infected bone, or teeth surrounded by severely infected bone are to be extracted. The local tissues will withstand the effects of surgery better and healing will be more rapid if local periodontal infection is controlled at the time of the dental procedure. In this circumstance, antimicrobial treatment is commenced several days prior to surgery and is continued for several days following surgery.

2. When the periodontal infection has progressed to wide-spread osteomyelitis (i.e. is affecting the trabecular bone and outer cortical bone of the involved jaw) and infected bone will be left in place following extraction or deep scaling. Antimicrobial treatment is best started several days prior to the procedure, and continued for several weeks following the dental procedure.

3. When mucosal immunopathy has resulted in oral ulceration that is exacerbated by contact with even small amounts of dental plaque accumulation, such as in ulcerative stomatitis in dogs and possibly stomatitis in cats.

Prevention of Bacteremia. Bacteremia is frequent in patients with gingivitis and active periodontitis, and is rapidly cleared by the reticulo-endothelial system in otherwise healthy patients. However, there is an association between severity of periodontal disease and distant organ abnormalities. Anaerobic culture methods were not used in most studies reporting the prevalence of bacteremia associated with dental treatment; more recent studies have shown that the full range of aerobic and anaerobic bacteria found in local periodontal infection also can cause bacteremia. Treatment with an antibiotic drug is indicated when the patient’s distant tissues are at risk as a result of bacteremia during a dental procedure.

Examples of Indications for Prevention of Bacteremia

1. Patients with clinically evident cardiac disease. Although a cause-and-effect relationship between periodontal infection and endocarditis has not been proven, turbulent flow in an abnormally functioning heart may enhance the attachment of bacteremic organisms to the heart valves.

2. Patients with clinically-evident renal or hepatic disease, or with uncontrolled hormonal disorders such as diabetes mellitus or hyperadrenocorticism. When cellular metabolism is depressed by systemic disease, the oral tissues are less able to respond normally to the trauma of the procedure, and the kidney and liver may be at risk of infection from bacteria that become lodged in sludged blood vessels.

3. Patients with prostheses, such as ocular prosthesis, total hip replacement or cruciate ligament repair using a non-absorbable material, or patients whose spleen has been resected (the spleen is a primary site of the reticulo-endothelial filter that eliminates bacteremia within several minutes in healthy patients).
Materials and Methods: Microbiological techniques used included dark-field morphometric examination, immunofluorescence testing for presence of standard human periodontopathogens, aerobic and anaerobic culture, and microdilution and E-test strip susceptibility testing of four antimicrobial drugs (amoxicillin-clavulanic acid, clindamycin, metronidazole, and pradofloxacin). The cats were treated with either amoxicillin-clavulanic acid or pradofloxacin for 14 days and sample collection was repeated.

Results: On morphometric examination, both the number and proportion of motile rods and spirochetes decreased following treatment, and the number and proportion were both lower when comparing stomatitis lesions with periodontal pocket samples. On immunofluorescence testing for Porphyromonas gingivalis, Tannerella forsythensis and Campylobacter rectus, P. gingivalis was the most common periodontopathogen identified. P. gingivalis was found less commonly in stomatitis lesions than in periodontal pocket samples. It was reduced in frequency and proportion for treatment period, and the number and proportion were both lower when comparing stomatitis lesions with periodontal pocket samples. It was reduced in frequency and proportion for treatment period, and the various sub-types of local indication and systemic risk also have different recommended treatment periods.

INDEX TERMS: Periodontal disease, oral infection, antimicrobials, dogs, cats.

Introduction: Periodontal pocket and stomatitis lesion samples were obtained using paper points from thirty eight cats with clinical stomatitis. The most prevalent species were identified and antibiotic susceptibility testing was performed.

Discussion and Conclusion: A patient under consideration for treatment of oral infection may have no, one or two indications (local disease, distant organ prophylaxis) for use of an antibacterial drug as part of his/her dental treatment. Each of these indications may have a different recommended treatment period, and the various sub-types of local indication and systemic risk also have different recommended treatment periods.

031, Harvey C.E. & Lai C.-H. 2007. Bacterial isolation results in cats with stomatitis: Comparison of periodontal pocket and non-gingival stomatitis lesion samples. Pesquisa Veterinária Brasileira 27(Supl.). Department of Clinical Studies, School of Veterinary Medicine and Department of Periodontics, School of Dental Medicine, University of Pennsylvania, Ryan-VHUP 3113, 3900 Delancey Street, Philadelphia, PA 19104, USA. E-mail: ceh@vet.upenn.edu

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acid and pradofloxacin; resistance to clindamycin and metronidazole was more common, particularly to metronidazole in aerobic bacteria. Susceptibility testing results were similar when comparing pre- and post-treatment samples. There was good correlation in the results of the two susceptibility testing methods used.

Discussion and Conclusion: In this short-term study, bacteria found in periodontal pockets and on the surface of stomatitis lesions in cats are affected by treatment with a broad-spectrum antimicrobial drug.

INDEX TERMS: Microbiology, periodontal disease, stomatitis, cats, amoxicillin-clavulanic acid, pradofloxacin.

Introduction: Orcinus orca, commonly called killer whale or orca, is a member of the Cetacea (dolphin group). It has monophyodont tooth development, thecodont tooth anchorage, brachyodont crowns, and homodont dentition. An orca has 40-56 teeth (Wiggs & Lobprise 1997). The mandible of cetaceans acts as an integral part of the auditory system. The caudal 2/3 of the mandible is used as an acoustic horn in dolphin and whale hearing. For this reason, only the anterior 1/3 of the mandibles are solid - the caudal 2/3 are hollow (St Leger 2004). Dental disease involving the pulp is not uncommon in captive orcas and is also present in wild orcas. One trainer, having worked with upwards of fifteen orcas over seventeen years, estimates that 30% of orcas he worked with in captivity had dental problems. These whales have lived in France, California, Texas, New York, Ohio, and Florida (Delgross 2004). Some were bred in captivity and some were captured from the wild. As part of this study, several orca skulls (both captive and wild) in museum collections were studied. In all of the orca specimens examined, the teeth had open apices, with the following exceptions: some of the smallest most mesial and distal teeth in specimens having more than 40 teeth and one tooth having pulp obliteration.

Cases Report: Tooth fractures in wild orcas lead to pulp exposures. Malocclusions have also been observed in some orcas, which may lead to abnormal forces and dental trauma. In captivity, some orcas rub their mandibular teeth on the pool walls repeatedly, causing abrasion of these teeth and eventual pulp exposures. The reason for the tooth rubbing behavior is unknown but has been speculated to be an obsessive compulsive behavior or boredom. Dental trauma and pulp exposures have been noted in orcas as young as 5-6 years of age. In captive orcas, once the tooth has been damaged and the pulp is exposed, the management option that has become customary is to “drill” the pulp cavity open further to allow drainage and flushing of the exposed pulp. The exposed pulp cavities become contaminated with food and other debris from the pool water. The trainers flush the exposed pulp cavities multiple times per day with various solutions. The drainage from the open pulp cavity resolves once granulation tissue fills the cavity (St Leger 2004). In one case involving a female orca in captivity, a dentin bonding agent was applied monthly to teeth with near pulp exposures. Thermostory was unsuccessfully attempted in this patient to locate heat in teeth that may have pulpitis. In another case involving an eleven year old female orca in captivity, there was bleeding reported from the teeth that had been “drilled” on the left mandible. Four adjacent teeth (teeth 3-6 on the left side) had open pulp cavities. The teeth had been “drilled” several months previously and had a history of intermittent bleeding. On the day of examination, the pulp cavities that were bleeding were probed with cotton swabs. The depths of the cavities measured 4.9cm, 5.4cm, 5.2cm, and 5.3cm from mesial to distal. (The depth of the left seventh alveolus measured in a museum specimen was 7.5cm.) There was a visible diffuse firm swelling on the lingual side on the mandible in the area of the drilled teeth. The depths of the pulp cavities of the teeth that had been drilled on the right mandible were 1.2cm, 1.5cm, and 1.4cm (teeth 2-4). There was no bleeding from the right mandibular teeth and what appeared to be firm soft tissue was grossly visible within the pulp cavities of these teeth. The open pulp cavities were being flushed 2-4 times/day with a dilute iodine solution using a waterpick. The trainer had noticed an odor from the left mandibular teeth, particularly at the time of the early morning flush and assumed it was from food and other debris in the pulp cavities. A recommendation was made to flush with 0.12% chlorhexidine solution, at least once daily, because of its substantivity and antimicrobial benefits (Robinson 1995). The trainer reported a resolution of the odor from the teeth and bleeding had stopped after a few days of flushing with the chlorhexidine solution. Within the next two months, this orca was relocated to another state and there has been no further follow-up. Other management options for the exposed pulps, some of which are vital and some non-vital have been tried. Root canal therapy is not an option due to the open apices in captive orca teeth. Apparently, this option has been tried in spite of the apical anatomy, without success due to the inability to control hemorrhage. Local anesthesia nerve blocks have not been perfected and lengthy procedures are not preferred. An ideal solution for treatment of these endodontically involved teeth might include an implant that could be placed quickly, did not shrink or swell, is biocompatible, can withstand further abrasive dental trauma, and be color matched to the adjacent teeth. This would need to be placed in the tooth of the orca without general anesthesia. Dental chemical erosion has recently been identified in a Pseudorca crassidens (false killer whale). The whale is a sixteen year old, 507 kg male living in captivity in a marine park in the Philippines. He has been in captivity for eleven years and currently resides in an ocean water, plastic mesh fence enclosure with several female Pseudorcas. He has a history of gradual generalized dental erosion on the lingual, incisal and occlusal surfaces over four months with rapid progression more recently. This Pseudorca has a chronic history of frequent regurgitation (much more frequent than the females in the enclosure). The pattern of erosion of the maxillary and mandibular teeth is consistent with the pattern seen in people

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a Optibond, Kerr Corp, Orange, CA.
b Nolvadent, Fort Dodge Animal Health, Fort Dodge, IA.
having progressive chemical dental erosion from gastric fluids in those with bulimia or gastroesophageal reflux (Sturdevant 2002). Recommendations for treatment included: 1) topical fluoride treatments (gel, foam, or sealants) to decrease the acid solubility of the dental enamel, influence its hardness, decrease the rate of demineralization, enhance the rate of remineralization and increase resistance to dental caries (Shugars 2002), 2) identify the etiology of the excessive regurgitation and control of this behavior, and 3) intraoral radiographs to identify endodontic disease. Follow-up is pending.

**Discussion and Conclusions:** Dental disease in captive orcas is present worldwide. To the author’s knowledge, there are no published references documenting diagnostics, treatment planning or outcome of dental disease treatment in this species. Our ability to treat orcas requires: 1) knowledge of orca dental and oral anatomy, 2) knowledge of etiology and progression of dental disease, 3) restraint and anesthesia expertise, 4) an understanding of orca behavior, and 5) application of dental procedures and materials appropriate in this species. This requires a team of professionals including trainers, aquatic animal veterinarians, anesthesiologists, and dentists working together to address dental disease in captive orca.

**Acknowledgements:** To the Museums which provided access to their collection of *Orcinus orca* specimens for this study: 1) University of Michigan Museum of Zoology - Mammal Division, Ann Arbor, MI www.umz.isa.umich.edu/mammals; 2) Skulls Unlimited Museum of Osteology, Oklahoma City, OK (Orca skulls donated by Sea World from several locations), www.education@skullsunlimited.com; 3) National Museum of Natural History, Smithsonian, Washington, DC.


INDEX TERMS: Orcinus orca, captive orcas, dental disease.

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**033. Hofmann-Apollo F. 2007. Secondary hyperparathyroidism in chronic renal disease in dogs, rubber jaw. Pesquisa Veterinária Brasileira 27(Supl.). Mestranda no Departamento de Cirurgia, FMVZ-USP, São Paulo, SP, Brazil 05508-270. E-mail: fehofmann@usp.br**

**Introduction:** The parathyroid hormone (PTH) is a polypeptidic hormone that increases the osteoclastic activity, resulting in calcio and phosphorus resorption of bone. Decreasing glomerular filtration causes retention of phosphate, and the resulting hyperphosphatemia then causes hypocalcemia, wich is the stimulus for the increase of parathormone secretion. The vitamin D has great effect on high calcium absorption on intestine. However, it needs to be converted on liver and kidney to its final active product, 1,25-dihydroxycholecalciferol (1,25-(OH)2-D3). The kidneys have the main role in this process because they are the greatest source of 1-á-hydroxilase, that transform 5- hydroxycholecalciferol in the active form of vitamin D3. At chronic kidney failure, the 1,25-didroxicolecalciferol production by the kidney is impaired, decreasing the intestinal transport of calcium that causes hypocalcemia. The result is calcium resorption of bone to maintain homeostasia. Resorbed bone tissue is replaced by connective tissue. The osteopenia that results is generalized but does not affect the bones uniformly. With secondary hyperparathyroidism, both renal and nutritional, there is a hierarchy of bone loss in decreasing order: the jaw bones, ribs, vertebrae and, finally, long bones. The cribiform plate of alveolar bone, recognized by Lamina dura in radiographs and the narrow bone of jaws are more susceptible to demineralization than others, and are affected earlier. Clinically, there can be noted jaw flexibility and teeth mobility. These signs are compatible with rubber jaw. The bone decalcification and pathologic fractures are the most advanced degree of chronic renal disease, but occur only in chronic cases whereas most of them die before, because of renal complications. The young dogs with few months can present swell and flexibility of the jaw bones and ulcerative gingivo-stomatitis. The clinical signs of renal disease can or can not be present like emesis, dehydration, poliuria and polidipsia. The diagnostic consists in clinical, radiographic and laboratorial findings. High concentrations of PTH, hyperphosphatemia and normal or reduced calcium concentrations are common findings.

**Case Report:** We examined at Laboratório de Odontologia Comparada (LOC) from Departamento de Cirurgia, Faculdade de Medicina Veterinária e Zootecnia, Universidade de São Paulo, a mixed breed dog, five years old, with supposed jaw fracture and it had been referred to emergency treatment. The animal was submitted to general inhalatory anesthesia to intra oral radiographic examination and fracture treatment. At this moment, a general flexibility of jaws was detected. The radiography showed severe osteopenia. The anesthesia procedure was interrupted and the dog conducted to the internal medicine department for laboratory exams and support therapy. The abnormal laboratorial findings were: Urea 329.7 mg/dl (normal until 40mg/dl), Creatinine 5.8mg/dl (until 1.5mg/dl), Phosphorus 13.9mg/dl (until 6.2mg/dl), Calcium 11.1mg/dl (until 11.3mg/dl), Pancitopenia, Trombocitopenia. The therapy started at the same day but the owner decided not to continue it. The animal died at home 30 days after diagnoses with the same symptoms.

**Conclusion:** Although we do not have updated references about the rubber jaw treatment, it is not common in our routine. Unfortunately, when diagnosed, the animal already had a severe degree of renal disease, and few chances of survival.


INDEX TERMS: Secondary hyperparathyroidism, rubber jaw, renal disease, dog.

034. Kressin D.J. 2007. Pain management for the veterinary patient. Pesquisa Veterinária Brasileira 27(Supl.). Animal Dental Centers, Oshkosh/Milwaukee Wisconsin-Animal Emergency Center, United States. E-mail: dalekressin@ntd.net

Introduction: Pain management for the veterinary patient has developed tremendous interest in the last decade. In human medicine, pain management has been described as the “fifth vital sign” (Wolf 2006). Pain is a crucial vital sign for patient assessment as are temperature, pulse, respiration and blood pressure. Pathways of nociception have been well defined in all mammals including humans and companion animals, canines and felines commonly treated by veterinarians (Gaynor et al. 2006). Since these pathways are similar, any stimulus or injury that would be painful for people are highly likely to be painful for animals and therefore should either be pre-empted or managed.

Materials and Methods: There are several critical considerations for veterinary patient pain management. The clinician must understand that veterinary patients experience pain. Pain is an “unpleasant sensory and emotional experience associated with actual or potential tissue damage” (International Association for the Study of Pain 1979). An accurate patient history is the starting point. If the patient has an oral disease, the duration of the problem is important. Acute pain has been described as the result of the stimulation (recent dental fracture or oral surgery) of a normally functioning nervous system. It allows avoidance or the minimization of tissue damage. Chronic pain (stomatitis in feline patients) is typically experienced over a longer time period often arbitrarily set at 3-6 months (Woessner 2006). Clinicians must consider the potential sources of pain (nocioceptive, inflammatory or neuropathic). To manage pain, it is useful to understand the classic pathways of transduction, transmission, modulation and pain perception. With this fundamental understanding, we can develop balanced anesthesia protocols and multimodal approaches to pain management. Additionally, we can apply complementary and alternative therapies.

Discussion and Conclusions: Pain management can effectively improve patient well being. Preempting and treating acute pain can help prevent the development of chronic pathologic pain. Pain management can effectively prevent pain amplification (allodynia, hyperalgesia and hyperesthesia), avoid depression, reduce infection and improve tissue healing. This allows for improved patient function and quality of life.


INDEX TERMS: Veterinary pain management.

035. Kressin D.J. 2007. The Importance of veterinary dental radiography. Pesquisa Veterinária Brasileira 27(Supl.). Animal Dental Centers, Oshkosh/Milwaukee Wisconsin-Animal Emergency Center, United States. E-mail: dalekressin@ntd.net

Introduction: Intraoral dental radiography is fundamental to the practice of veterinary dentistry (DeForge & Colmery III 2000). As in other disciplines of veterinary medicine, it is important to establish a diagnosis, prognosis and treatment plan prior to treating dental patients.

Materials and Methods: A dental radiograph machine is useful in veterinary dental practice. Images can be produced using dental radiograph film or digital sensors. There are advantages and disadvantages in using either radiograph film or digital sensors.

Results: Dental radiograph images can help the veterinarian in identifying tooth, bone or soft tissue pathology. They help establish diagnosis, in treatment planing and in performing dental procedures. These images allow the veterinarian to verify that procedures have been accurately performed and for documentation in the medical record (Mulligan et al. 1998).

Discussion and Conclusions: Veterinary dental radiography is highly valuable for veterinarians in performing dental procedures. The author has a tremendous passion for veterinary dentistry and interest in veterinary radiology. A 40 to 45 minute powerpoint presentation will be provided that will emphasize the importance of intraoral veterinary dental radiography. A brief question period will follow the presentation. In canine and feline patients, 2/3 of the tooth lies below the gingival sulcus and are not viewable on oral examination. In other species such as lagamorphs and rodents, a greater amount of tooth structure is located subgingivally. Intraoral radiography helps in the evaluation of the subgingival tooth as well as adjacent structures. The presentation will describe when and why intraoral radiography is beneficial and it will emphasize the value of these images. Intraoral
radiography is very useful in evaluating normal teeth and oral structures (bones of the skull and periodontal tissues). These images allow for the identification of abnormal teeth, abnormal skull anatomy, oral/dental fractures, dental caries, foreign bodies (objects) and periodontal disease. Periodontal disease is the most prevalent disease in domestic species (such as canine and feline) and intraoral radiography is essential in the diagnosis, staging, treatment planing as well in the treatment. Intraoral radiography helps in performing and the documentation of most dental procedures. Specific clinical case examples will be discussed.


INDEX TERMS: Veterinary, dental, radiology.

Introduction: The periodontal disease occupies a prominent place reaching about 80% of the dogs over 4 years old (Harvey & Emily 1993). In the periodontal disease the exposure of the cementum to the buccal environment occurs (Borghetti et al. 1987, Nisengard & Bascones 1987), favoring the penetration of microorganisms (Olgart et al. 1974, Mjor 1983, Adriaens et al. 1987). Langeland et al. (1974), Wirthlin (1981) and Eide et al. (1983), showed histologically the penetration of microorganisms into the cement exposed to the periodontal bag. Teeth abrasion (Borghetti et al. 1987) does not avoid the installation of bacteria in the dentinal tubules exposed after the periodontal treatment (Gantes et al. 1992). The anaerobic Gram-negative microbota as Bacteroides (Phyllopyrornonas) asaccharolyticus and Fusobacterium nucleatum is found mainly on the radicular subgingival surface (Sarkiala et al. 1993). The most common pathogens in clinical periodontics are anaerobic Gram-negative rods, especially the pigmented group, and certain Gram-positive coccis (Sarkiala et al. 1993). The treatment of the periodontal disease and the maintenance of the periodontal health involve the elimination of the dental plaque and dental calculi, and also the establishment of dental plaque control. To achieve this objective, it is necessary to treat the surface of the teeth with abrasion procedures, planning and polishing with proper instruments for such purpose. Among the operative procedures, the abrasion has gotten great impulse with the development of the manual instruments, which came to be widely used (Rabbani et al. 1981, Khatiblou & Ghodssi 1983, O’leary 1986). Other means of abrasion were tried through the development of new methodologies. The methodology used nowadays in higher evidence is the ultrasonic method, through the pioneer work of Zinner (1955). The ultrasonic apparatus are extensively used by the Human and Veterinary Dentistry for their effectiveness in the removal of dental calculi of crowns and roots, and by their comfortable usage (Fragueta et al. 2000). They are also used for curettage of soft tissues of the wall of the periodontal (Brine et al. 2000). The objective of the present study was to accomplish histobacteriologic and ultrastructural evaluations of the teeth of dogs involved with the periodontal disease, looking for checking the bacterial contamination of the cement, dentinal tubules, percentage of raw dentin in abraded faces compared to the non-abraded ones.

Materials and Methods: The sample used is constituted of 40 inferior and superior incisor teeth with periodontal advanced involvement (mobility level III) of dogs with or without defined race, adults from 3 to 10 years old, weight varying from 1.9 to 13.0 kg, males or females, coming from the Veterinary Hospital of the Federal University of Uberlândia, the College of Agrarian and Veterinarian Sciences, Jaboticabal Campus of Unesp, and the Veterinary Dentistry Center (Odontovet), and distributed at random in two groups of equal number. The teeth of Group I were abraded with curette and the ones from Group II with ultrasonic dentistry, being the mesial face of the root destined to verify the action of the instrument (treated surface) and the distal was considered as control (non treated surface). For the abrasion of the radicular surface of the teeth from Group I a sharpened periodontal curette kind Gracey Hu-Friedy nr. 5/6 was used for each tooth. For Group II it was used a point coupled to the dentistry ultrasonic equipment piezo-electric of variable frequency from 30-40 cycles per second (KHz). With the tooth already fixed in formaldehyde, the tooth plaque was stained by an evinced solution of basic fuchsin. The dental surface was abraded until it was considered clinically clean by visual check-up. To make the histological processing procedures easy, the specimen were sectioned transversally with 6 micrometers of thickness. The presence or absence of the dental plaque in the residual radicular structure was studied. The percentage of raw dentine considering the total area treated of the histological sections. Two samples of the material of each Group were drawn for scanning electronic microscopy check-up.

Results: In the optical microscopy the distal face presented alteration where the cementum, beyond the irregularities, had continuity solution and the penetration of microorganisms into its structure in several degrees of depth. Beyond the cementum, the dentine in some dental elements was contaminated in several levels of depth. In the mesial face, 16 teeth had no plaques in Group I and II. The areas undergone to the abrasion procedures presented variable thickness and extension of the residual cementum, remaining frequently amounts of raw dentine, which varied from 25% to 100% of the area treated. The residual cementum was contaminated. In the area treated by the curette and ultrasonic procedure there could be observed the presence of solution areas of continuity of the cement exposing the dentine. Despite the superficial dentine was free of microorganisms, there existed dental tubules contaminated in the depth. The analysis by scanning electronic microscopy of the samples of teeth from Group I and II confirmed the optical microscopy. The presence of dental plaques and dental calculus...
in the control face of the teeth from both Groups was observed, as well as the interface of the dental calculus and cementum. In both treatments it could be seen that the cementum obstructed the dental tubules and there were some areas with open dental tubules after the abrasion.

**Discussion:** In the optical microscopic check-up of the sample from Groups I and II demineralization of cementum and loss of radicular substance was observed (Mjor 1983). The analysis of the samples in scanning electronic microscopy allowed to accomplish an evaluation of the controlled and treated surfaces of the teeth and presence of dental plaques, the efficiency of the instruments used, the exposure to the dental tubules after treatment, and made it also possible to observe the calculus interface and the treated area and the penetration of dental tubules by bacteria (Adriaens et al. 1987, Gantes et al. 1992, Bergenholz & Babay 1998). For each treatment a curette and an ultrasonic point was used. This procedure was applied for not having other variables (sharpening, cut effective area) during the abrasion process. Contamination by microorganisms of variable depths in Group I and II were observed, from a simple existence of superficially deposited plaques on the radicular surface to the total destruction of the cementum or dentine with consequent exposure of the dental tubules (Langeland et al. 1974, Wirthlin 1981, Eide et al. 1983, Adriaens et al. 1987). The observation of the treated surfaces showed alterations which occurred from histologically clean areas, protected or not by cementum, and others with raw dentine contaminated or not and frequently in depth of difficult clinical access. The treated faces which were histologically free of plaques or microorganisms represented 80% of Groups I and II. The presence of residual plaques on the treated surface (20% for both groups) can be explained by the little pressure during the use of the instrument, anatomic irregularities and that, by the clinical observation of the surface clinically clean, some plaque can still remain, which only could be observed histologically. There occurs less raw dentine with the use if the ultrasonic procedure, as proved by the histological analysis of the cementum for this group, which shows a decrease of its thickness and which remains residual in counter position with the use of the curette, which results in more raw dentine. The greatest amount of residual cementum in the treated area of Group II can also be due to the time of action of the ultrasonic procedure at the radicular structure. There was contamination of the dental tubules of the control and the treated faces of both groups. Even if the instruments used draw all the cementum and smooth the dentine, there still is the contamination in different levels in the dentine in variable depth not allowing the action of the curette and the ultrasonic (Adriaens et al. 1987, Borghetti et al. 1987). Probably the mechanical action itself is not able to remove bacteria present in the radicular dentine (Borghetti et al. 1987). It is suggested that all the cementum affected by the periodontal disease should be removed, because it is possible that a mechanical removal of the endotoxin may also occur.

**Conclusion:** The usage of the periodontal curette according to Gracey has shown to be more effective for the periodontal treatment than the treatment by ultrasonic piezo-electric dentistry. Both treatments do not dislodge bacteria from the residual contaminated cementum or deeper levels of dentine, especially from the dental tubules. Examining clinically smooth and hard surfaces of teeth, the microscopic check-ups showed that those can be composed of dentine, cementum or a combination of both, and its clinical differentiation is not accurate.


INDEX TERMS: Dog, disease periodontal, scaling.

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**Introduction:** This lecture investigates the dynamics of periodontal disease and the impact this chronic infection can have on systemic health. Research now focuses on inflammatory markers and their significance in disease prevalence and treatment response. Aspects of prevention, from home care to early intervention to innovative preventative means, will be discussed.

**Literature Review:** Periodontal Medicine is described as

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a discipline that focuses on validating the association between oral infection and systemic disease and its biological plausibility in human populations and animal model (Offenbacher 1996). Impact of Periodontal Disease (PD) on Systemic Health (Human data); mouth as the focus of infection (Miller 1891); rebuttal: patients not relieved of symptoms (JAMA Editorial 1952). Bacterial Link: Inflammatory Bowel disease and periodontal microorganisms (VanDyke et al. 1986); relationship between PD and cardiovascular disease (Matilla 1989); identification of periodontal pathogens in atheromatous plaques (Zambon et al. 1997). ARIC Study - Atherosclerosis Risk in Communities - periodontal disease associated with: coronary artery calcification (Nakib et al. 2004), renal insufficiency (Kshiragar et al. 2005), stroke/ TIA (Elter et al. 2003), carotid Artery Intima-Media Wall Thickness (Beck et al. 2001). Inflammatory Link: IgG antibody of oral organisms association to carotid intima-media thickness (ARIC - Beck et al. 2005), PD measures and association with clinical markers (Beck & Offenbacher 2002), PD relationship with C-Reactive Protein (Slade et al. 2003), risk factors for cardiovascular disease in patients with periodontitis (Buhlin et al. 2003), PD and biomarkers related to cardiovascular disease (Joshipura et al. 2003), C-Reactive Protein used as indicator of risk for diabetes, heart diseases, etc. Response to Therapy - significant decrease in C-RP in treated periodontitis patients at 6 months (D’Autio et al. 2003). Theories (Xiaojing et al. 2000), direct bacterial infection - 'metastatic infection', bacterial toxins - 'metastatic injury', immunocomplexes - antigen - 'metastatic inflammation'. Complicated factors of other diseases, risk factors, veterinary data, association of PD and histological lesions in multiple organs (DeBowes et al. 1996), systemic effects of chronically infected wound in oral cavity of dogs (Pavlica & Petelin 2005), echocardiographic alterations and PD in dogs: a clinical study (Boutouille et al. 2006), mitral value endocarditis after dental prophylaxis in a dog. (Tou et al. 2005), tracking systemic parameters pre- and post-treatment for PD (Rawlinson et al. - publication pending).

Discussion: Periodontal Management: Future studies may continue to look at the association of inflammatory markers, in particular with response to therapy. Dealing with the inflammation, as well as the infection, may help stabilize periodontal conditions by reducing the rate of alveolar bone resorption and discomfort associated with the disease (Tschappe & Kielbassa 2006). As with any disease, the best management is one of prevention whenever possible, instead of treating it once it has happened. Development of the Porphyromonas Denticanis-Gulae-Salivosa Bacterin: Periodontitis is a bacterial infection of the oral cavity primarily caused by Gram-negative black-pigmented anaerobic bacteria (BPAB) (Boyece et al. 1995). Twenty-four of these BPAB that cause periodontal disease are collectively known as periodontopathogens. In a recent study, the most commonly isolated BPAB in dogs with periodontitis were Porphyromonas gulae, Porphyromonas salivosa and Porphyromonas denticanis (Hardham et al. 2005 - Vet Microbiology). Once the microbiological study was completed and a Porphyromonas Vaccine was developed, studies were performed to establish that the Porphyromonas gulae used in the Porphyromonas Vaccine was pathologic (Hardham et al. 2005, Vet Microbiology). Then a study was conducted to determine if a P. gulae vaccine would prevent the pathologic changes demonstrated (Hardham et al. 2005, Vaccine). Mice vaccinated with the P. gulae strain B43 bacterin demonstrated a 83.9% reduction in alveolar bone lysis when compared to the control mice following a homologous P. gulae challenge. In addition, vaccinated mice showed a 40.7% and 64.6% reduction in alveolar bone lysis following challenge with a heterologous P. gulae strain or P. salivosa, respectively, when compared to the saline vaccinated and challenged mice. A dog model was then developed by Pfizer investigators to determine if the Porphyromonas Vaccine’s protective effects would be seen in canines. This study provided data which were used to meet the USDA’s reasonable expectation of efficacy requirement for conditional licensure of the Porphyromonas Vaccine (Pfizer Inc., Data on file 3860R-03-198). The canine apical periodontitis challenge model induces alveolar bone changes (osteolysis / osteosclerosis). The canine apical periodontitis challenge model is an acute model that may not reflect the chronic nature of canine periodontitis. The study demonstrated that the trivalent Porphyromonas Vaccine containing P. gulae (strain B43), P. salivosa (strain B104) and P. denticanis (strain B106) significantly reduced bone changes (osteolysis / osteosclerosis) following challenge with heterologous Porphyromonas gulae strain B69 when the challenge strain was administered at a high concentration (approx. 1x109 organisms/mL). In addition to a laboratory safety study, a clinical field study demonstrated the safety of the Porphyromonas Vaccine when administered in client-owned animals as young as 7 weeks old under field conditions (Pfizer Inc., Data on File, study 3467R-60-040218). Immediate post-vaccination pain was characterized as vocalization, scratching or biting at the injection site, aggression/attempt to escape from restraint or an abnormal attitude (5.9%). Sixty-two adverse events (4.6%) considered by the investigators to be related to vaccination were reported over the course of the trial. The types of events reported included generalized pain, injection site swelling, lethargy, and pain at the injection site. No significant adverse events were observed in any animal during the study period. Most of these reported events were mild and self-limiting, requiring no treatment. The USDA has granted a conditional license to Pfizer Animal Health for a new product to be used as an aid in the prevention of periodontitis in dogs, as evidenced by a reduction in bone changes (osteolysis/osteosclerosis). This product is a Porphyromonas Denticanis-Gulae-Salivosa Bacterin, which can be administered to healthy dogs with two initial doses 3 weeks apart. A field safety study was conducted in over 600 dogs of multiple sizes and breeds, and safety was demonstrated in dogs as young as 7 weeks of age when vaccinated according to the label directions. A reasonable expectation of efficacy has been demonstrated in 8-month-old dogs. Duration of immunity for this product has not been evaluated; and 6 and 12-month revaccination intervals are currently under evaluation in a field efficacy study. Consultation with a veterinarian is recommended. Additional efficacy and potency studies are in progress.
Conclusion: While there are studies and data that look to correlate the presence of periodontal disease with systemic disease, a definitive causal relationship has yet to be proven. Continued research to show this relationship, and the impact of therapy will provide additional data. With the general consensus that these are related, the options of preventing periodontitis should continue to be encouraged.


INDEX TERMS: Periodontal disease, systemic health, inflammatory markers.

038. Lobprise H.B. 2007. Systemic impact of periodontal therapy - do no harm! Pesquisa Veterinária Brasileira 27(Supl.). Senior veterinary specialist, veterinary specialty team Pfizer Animal Health. E-mail: Heidi.Lobprise@pfizer.com

Introduction: While ongoing studies strive to tie the impact of periodontal disease to systemic health, there must also be a strong effort to assure that our means of therapy cause no further damage to the patient as a whole. The entire peri-operative effort should be directed at resolving the patients’ oral and dental problems and infections while implementing a complete body focus on pain management, patient monitoring and avoiding problems, or handling them adequately should they occur.

Literature Review: Appropriate literature references are used throughout the notes and catalogued at the end of the paper

Discussion: A comprehensive patient focus will be discussed, from pre-operative evaluation to peri-operative management and recovery. Pre-operative Patient Evaluation: A thorough evaluation prior to the day of the procedure allows for complete physical examination, taking a complete history and assessing any individual considerations such as breed-related concerns (brachycephalic, sight hounds, etc.). Routine examination on apparently healthy patients may miss subtle warning signs, so be thorough. There is a higher death rate in “routine procedures” than in emergency procedures, possibly due to the decreased intensity of evaluations in those ‘routine’ patients that might miss an underlying problem, as compared to the detailed evaluation an emergency patient might get (Matthews 2001). The initial dental examination may alert you to specific problems. Be sure to let the owner know that ‘hidden’ issues may be found once the patient is under anesthesia, and this may change the anticipated anesthetic time, or open up the consideration for a staged procedure. Laboratory screening protocols are set in each hospital and should be recommended based on the relative anesthetic risk of the patient. While the patient history and physical examination may be of great importance in human anesthesia (Ross & Tinker 1990), often the details we can obtain about our patients may be limited (Smith 1997). - Pre-operative Patient Management and Triage: Two important considerations in the pre-operative phase, based on the physical examination (repeated) and laboratory screening, include evaluating the patient for antimicrobial therapy and pain management considerations. Be sure to review any individual concerns (or breed concerns) and review all medication the patient is being given (Muir 2000). This pre-operative time can cause undue stress to the animal and in aggressive or anxious patients; this may not allow the practitioner to perform a complete physical examination, which may limit complete assessment. In addition, the stress can affect the anesthetic needs and immune function of the patient. Anxiety produced by not sedating a patient and using gas inhalants for induction only may be detrimental. A complete pain management protocol, including appropriate sedation, will not only reduce the stress on the patient (and you!), but most importantly can allow you to use the minimum amount of general anesthesia during the
procedure. Give appropriate medications (multi-modal when possible) for the best synergistic effects prior to starting the procedure. Local and regional blocks intra-operatively, when performed by trained personnel, can help reduce intra-operative pain and even post-operative, stress-induced immunosuppression (Koun-Boun et al. 2005). - Patient Classification (Smith 1997): I.) Excellent: Apparently healthy: no obvious signs of disease, elective procedures - OHE, neuter, screening radiographs; II.) Good: Mild systemic disease: pregnancy, obesity, dental disease, compensated cardiac disease, localized infection, neonatal (<8 weeks); geriatric (>10 yrs), procedures: skin tumor; uncomplicated ocular surgery; simple fracture repair or hernia; III.) Fair: Moderate systemic disease - activity limited: low or moderate fever; moderate dehydration or hypovolemia; anorexia, cachexia, anemia; chronic heart disease, procedures: complicated fracture, C-section, diaphragmatic hernia; IV.) Poor: Severe systemic disease, constant threat to life, shock, high fever, uremia, toxemia; severe dehydration or hypovolemia; severe anemia, emaciation; decompensated cardiac or renal failure; severe pulmonary disease, diabetes; V.) Guarded: Moribund patient not expected to survive 24 hours: advanced multiple system failure; profound shock; severe head injury, major trauma, DIC. - Induction: Many protocols are available for anesthetic induction, depending on the patient status, pre-medication used and the extent of the procedure. Once induced, intubation should include proper selection, placement and securing the tube. Take care with older tubes and cat intubation to avoid tracheal rupture (Hardie et al. 1999, Mitchell et al. 2000). - Patient Care and Maintenance: Maintain perfusion, IV catheter and fluids, 5-10ml/kg/hr or bolus, additional as needed (Seeler 1996, maintain body temperature, wet procedures, long, less than 99°F (37°C) (Armstrong et al. 2005); small, pediatric, geriatric (Koun-Boun et al. 2005), hypothermia may alter mentation, immunity, cardiac function and wound healing (Moon 1996), passive and active surface re-warming, active core re-warming. - Patient Monitoring: The best monitoring tool in a practice is a good technician! General assessment of CNS function to check muscle tone of the jaw and the palpebral reflex give an initial reference, but should be supplemented with monitoring devices (Benarsi 2001). Remember, anesthesia depresses many systems, not just during the procedure. This may extend into the post-operative period, where most unexpected deaths occur (Ko 2001). The respiratory system can be impacted significantly during anesthetic events, and hypoventilation is one of the most common complications during anesthesia (Evans 1996), including death during recovery. The respiratory rate should be similar to that during sleep, from 6 bpm in a large dog to 10-15 bpm in a small dog or cat. The ease of using a pulse oximeter, to maintain saturation above 97% optimally (92% minimum), can be offset by complications in attaining an accurate reading (Haskins 1996). Capnography (EtCO2, to measure end tidal CO2 at 35-55mg Hg) is more expensive and labor intensive, but gives a truer indication of ventilation. Primary treatment of hypoventilation is reduction of general anesthetic, but positioning, and maintaining an unobstructed airway are essential. Some patients (geriatric, obese, ill) may require ventilation assistance. Hypotension and hypoperfusion are also common anesthetic complications, as anesthetic levels can decrease cardiac contractility and cause vasodilation that can impact the circulating volume which may already be compromised due to hydration, age and disease. While assessment of membrane color, pulse strength and capillary refill time will provide an initial level of evaluation, the gold standard is monitoring the blood pressure. Unrecognized hypotension with a reduction in peripheral perfusion may lead to hypoxic damage to organs, including the kidneys and heart. While the indirect Doppler units may require some practice, they are fairly easy to use and produce an audible indicator of blood flow. If hypotension is encountered, again, decreasing the anesthetic depth is the first step of treatment. From there, increasing fluid flow for preload and cardiac output is essential. Additional supplementation with a colloidal material may be necessary. Keep the patient and fluids warm. The use of positive inotropes may be necessary to improve contractility and heart rate (Evans 1996). Electrocardiography can be an important tool to monitor the electrical activity of the heart, but should be used in conjunction with other monitoring, as the true mechanical activity of the heart is not assessed with the ECG. The most common arrhythmias encountered during anesthesia include bradycardia (<40-50 bpm for large dogs, <80-100 bpm for cats and toy dogs), tachycardia (>140 bpm for large dogs, >240 bpm for cats) and ventricular arrhythmias. Anticholinergics may be used to treat the bradycardia (Evans 1996), keep the patient warm, oxygenated and evaluate electrolytes. If the patient experiences tachycardia, first assess the anesthetic depth, which may be too light (painful) or too deep, as well as checking for hypoxia or use of anticholinergics, and adjust accordingly. Recovery: Often the patient leaves the operative time period and gets minimal attention, especially once the endotracheal tube is removed. In fact, this is the time when complications can occur unnoticed, so patient management is very important (Ko 2001). Continue with appropriate hydration, temperature monitoring and particularly ventilation, especially in brachycephalic patients. With debris or fluids in the oral cavity, elongated soft palates and potential swelling of the pharyngeal or tracheal tissues, the endotracheal tube should be maintained as long as possible, and the patient should be monitored closely once it is removed. Patients with a history of tracheal problems may benefit from the anti-tussive effect of certain opioids, as well as their sedative and analgesic properties. The period of emergent delirium may cause the patient to injury itself and can increase stress, so close attention to pain management during this time period is crucial. Provide additional analgesia, such as an opioid to smooth this recovery period, and consider an ‘escape’ dose of an alpha 2 agonist, such as medetomidine (1-2 micrograms/kg) to reduce the delirium. Conclusion: With appropriate patient assessment, management and monitoring, treatment of oral and dental
Both canine teeth remained in the new position after 4 months since the last reported verbal examination, no dislodgment or breakage of the appliance, and vestibular disease can have the most positive impact on our patients, while minimizing the complications.


INDEX TERMS: Periodontal, therapy, systemic, health.

039. Lopes F.M. 2007. Orthodontic treatment in a Labrador retriever dog with mandibular brachynathism and base narrow canine teeth. Pesquisa Veterinária Brasileira 27(Supl.). Mestranda do Departamento de Cirurgia, FMVZ-USP, São Paulo, SP 05508-270. E-mail: lopesfm@usp.br

Introduction: Malocclusion is a common dental problem in domestic dogs. Etiology includes dentofacial deformities, heredity, systemic and local factors, such as trauma and chewing habits. Several treatment options are available for occlusion correction, as teeth extraction, crown-height reduction, and orthodontics. This category of treatment includes several techniques, two of them are presented in this report.

Case Report: A 5-month-old, female, Labrador Retriever dog was presented to the Comparative Dentistry Laboratory of the Veterinary Hospital of São Paulo University with malocclusion. The owner reported oral bleeding after biting or chewing. Oral examination revealed mandibular brachynathism (Angle’s class 2 occlusion), base narrow canine teeth (degree 4) and retained primary tooth (604). Under general anesthesia, it was performed retained tooth extraction, dental alginate impression and gypsum model and a direct acrylic inclined plane was applied between maxillary canines and second premolars. The patient returned 6 weeks later for appliance removal, since the lower canine teeth movement was acquired and no homecare complications were reported by the owner during postoperative period. After 3 months the owner reported lingually displacement of the canine teeth. Dental impression and models were performed and a second direct acrylic inclined plane was applied over maxillary incisors until first premolars in the anesthetized patient. During postoperative examination after 2 and 6 weeks the owner reported oral bleeding, halitosis and prostration. The appliance was removed 2 months later, revealing extensive palatitus, with bleeding and palatal necrosis. At the same procedure, a “W” wire was positioned on the mandibular canine teeth in order to prevent lingually displacement of both teeth. The appliance was bonded with light-cured acrylic resin and acrylic. Postoperative examination after 2 weeks, 3 and 6 months revealed palatitus regression, absence of halitosis, no dislodgment or breakage of appliance and vestibular movement of mandibular canine teeth. At the 6-month recheck examination the appliance was removed and prophlaxis performed. Both canine teeth remained in the new position after 4 months since appliance removal.

Discussion and Conclusions: Orthodontic treatment is the best option of malocclusion treatment, if possible, since teeth are preserved and complications risks are minimized if orthodontic fundamentals are followed. Lingually displacement of mandibular canine teeth is a common malocclusion in dogs, sometimes related with pain and inability to close the mouth, since it may cause damage to oral tissues, as palate, resulting, in some cases, in oronasal communication. The direct acrylic inclined plane is, usually, the treatment of choice. The advantages of this technique include easy placement, low cost, rapid correction and it rarely needs adjustments after appliance. The disadvantages are its restriction to maxillary growth and gingival and palatal inflammation. At the reported case, the direct inclined plane was able to correct the malocclusion, but the mandibular canine teeth returned to the previous position and another intervention was necessary. Palatal inflammation presented by the patient was severe at the second time, and tissue necrosis occurred. A “W” wire was performed and applied on the mandibular canine teeth in order to maintain both teeth in position. This technique could be considered a good option, since the patient presented satisfactory adaptation, easy home care cleaning, and no breakage of the equipment. The final result was not a perfect occlusion, but a healthy and functional one. The combination of both orthodontic techniques presented a good option of treatment for correction and maintenance of the teeth at the correct position.


INDEX TERMS: Veterinary dentistry, orthodontics, malocclusion, dogs.
Introduction: This paper has the intention to show details that most of the times the veterinarian specialized in Veterinary Dentistry or either the ones who got interest to have this service in their clinics or hospitals have to consider when they make a project for a surgical room ready for odontologic services (Gioso 1994). After knowing this subject, the professional will have conditions to make a project that contains many kinds of equipments, furniture, surgical materials and respective prices, researched in many stores of Brazilian’s market. Here we won’t consider expenses as values of property, monthly expenses (servants, accounts of light, water and telephone) or values of materials for basic consumption (as gauze, adhesive tape and anaesthetics).

Materials and Methods: We have four surgical centers are practicing veterinary dentistry, situated in Grande São Paulo, Brazil: 1) the USP Surgical Center, called LOC (Laboratory of Comparative Dentistry); 2) a surgical center at UnG (University of Guarulhos); 3) the Odontovet Surgical Center, that is the second clinic opened in the world only to take care of veterinary dentistry, and 4) the surgical center of the Veterinary Polyclinic São Francisco, where are realized dental surgeries and dental treatments of routine, and that also has all the necessary equipment and materials for practices of veterinary dentistry. In the following, we have opportunity to present two human odontologic centers: one of them is a center of excellence situated at Unesp-Bauru, that serves as reference for the human dentistry in Brazil, and the other is a dental centre that respects the standard of Brazilian human dentistry. The reason for the inclusion of these six centers in this presentation was just to compare the kind of work in each one, including all sorts of equipment used in both the human and veterinary dentistry.

Results: After a long lasting study with the intention to compare all the infrastructure, equipments and surgical materials, we can conclude that the veterinary dentistry is practiced at a great technical and scientific level which approaches very much to human dentistry (Venturini et al. 1998). We showed the most diverse equipments, since a simple however important millimetric probe (Roza 2004) until the future of veterinary dentistry, that will use magnetic resonance (reality in human dentistry) and lasers ray for many odontological procedures. After all of this, we can claim that the two principal points that differentiate human and veterinary dentistry are first the patients and second the place where they will be treated (Gioso 2003, Roza 2004).

Discussion and Conclusions: Today, most of Brazilian dental veterinarians present excellent scientific and technical level they acquired mainly by specialization courses (500 hours lesson) developed by Ancílivepa (National Association of Small Animal Veterinary Clinics) and through complementary courses, developed by ABOV (Brazilian Association of Veterinary Dentistry). With all this technical knowledge (Harvey & Emily 1993) we can establish a point of union and balance with human dentistry and look forward to find and use the best equipment and consumption material, so that we are able to develop veterinary dentistry with technology of the last generation.


INDEX TERMS: Dental equipments, prices, equipments, Surgical Centers.

040. Miranda R.A.1 & Nakamura A.A.2 2007. What a veterinarian that acts in Veterinary Dentistry needs to know about instruments and equipments to open a dental clinic. Pesquisa Veterinária Brasileira 27(Supl.). 1Veterinary Polyclinic São Francisco, Veterinary Dentistry, University of Guarulhos (UnG), São Paulo, Brazil; 2 Master’s degree course at VPS, FMVZ, University of São Paulo (USP), São Paulo, Brazil. E-mail: r.a.miranda@estadao.com.br

Introduction: Nitric oxida NO• is considered an important intra- and inter-cellular messenger molecule and small amounts of nitric oxide (NO•) are found in tissues due to constitutive NO• production (Thippeswamy et al. 2006). Larger (toxic) amounts are produced locally and systemically by inducible nitric oxide synthase (iNOS) after exposure to bacterial lipopolysaccharides (LPS) (Berliner & Fujii 2004). Excess NO• production is detrimental, leading to oxidative tissue damage (Miller & Britigan 1997). The local pathogenesis of periodontal disease involves excessive NO• production (Ugar-Cankal & Ozmeric 2006). The systemic effects of periodontitis may also be related to NO• production, but systemic NO• production after oral exposure to gram negative pathogens has not so far been reported.

Materials and Methods: The organ levels of NO• in normal mice were compared with levels found in mice inoculated perorally with 10⁶ CFU E. coli ATCC 25922 or P. gingivalis ATCC 33277, with or without concurrent use of iNOS-specific (1400W) or non-specific (L-NAME) NOS inhibitors. Electron paramagnetic resonance (EPR) detection of NO• was performed using a diethyldithiocarbamate (DTC), Fe-sulfate and Na-citrate ‘spin-trap’. (Berliner & Fujii 2004).
Specific pathogen free balb/c mice 3 to 4 months old were randomly divided into eight groups: I) untreated, II) spin trap, III) sterile broth inoculation + spin-trap, IV) E.coli inoculated, V) E.coli + spin trap, VI) E.coli + L-NAME + spin-trap, VII) E.coli + 1400W + spin-trap, VIII) P.gingivalis + spin trap. Additionally, the effects of NOS inhibitors alone or with administration of spin trap were tested in ten mice. Mice were euthanised at intervals - 2.5, 7, 13, 25 hours after infection, (spin trap being administered one hour before sacrifice in the relevant groups) and the internal organs immediately harvested and frozen in liquid nitrogen. The EPR spectra of the organs were measured on an X-band EPR spectrometer (Bruker ESP 300) at 130 K and searched for the EPR spectrum of FeNO(DETC)₂, which is formed when NO• reacts with the spin trap (Yanin et al. 2002). The signal intensity is proportional to the amount of NO• present in the tissue (Venkataraman et al. 2002, Kleshchev et al. 2003). The intensity of the signals was normalized to the mass of each sample and recorded as adjusted units (AU) to enable statistical comparison between the measurements (nonparametric Wilcoxon’s rank sum two-sided two-samples test).

**Results:** A typical FeNO(DETC)₂ signal was detected in all organs and in all the mice infected with E.coli and levels were at a maximum 25 hours after infection. (Fig.1)

A response was already present at 2.5 hours, but the level varied between animals and organs. At intermediate times between 2.5 and 25 hours the signal decreased before increasing again. The organ with the highest post infection signal was the liver, followed by thoracic aorta and lungs. The intensity of the signal was statistically significantly higher at 2.5 hours after infection in liver and at 25 hours in liver, lungs, spleen, kidneys and brain in E.coli infected mice compared to non-infected mice. In P.gingivalis treated mice there was a consistently detectable NO• response in lungs and liver while in other organs the response varied over time. The highest response was in thoracic aorta followed by lungs, both at 13 hours after infection. The maximal signal intensity for liver, kidneys and brain was nearly the same, but at different times, 7 hours, 2.5 hours and 13 hours respectively. Apart from the aorta, the maximal intensity of the signal was lower than that observed with E.coli inoculation. L-NAME and 1400W used in E.coli infected mice inhibited FeNO(DETC)₂ signal at 2.5 hours proving that at least some of the NO• radicals detected after infection arises from iNOS. However, at 7 hours a more intense FeNO(DETC)₂ signal was observed in the mice treated with 1400W, than in animals not receiving NOS inhibitors.

**Discussion and Conclusions:** In septic shock studies the likelihood of organs showing a NO• response to E.coli infection varies (Suzuki et al. 1998, Dambrova et al. 2003, Kozlov et al. 2003, Plonka et al. 2003, Hayashi et al. 2005). P.gingivalis LPS is reported not to stimulate isolated murine splenic cells to produce NO• (Sosrono 2000), but it induces production of NO• in macrophages, central nervous system glial cells and cultured gingival fibroblasts (Frolov et al. 1998, Kendall et al. 2000, Shapira et al. 2002, Kim et al. 2006). Our study, however, has shown that a single peroral infection of mice with either E. coli or P. gingivalis stimulates the whole organism to produce NO•, though the principally involved organs were different in E.coli and P.gingivalis infected mice. The intensity of stimulation was much lower with P.gingivalis infection. This fits with the findings of Reife et al. (1995) who showed that P.gingivalis has a less biologically reactive LPS compared with E.coli. Reduced production of bactericidal NO• as detected after P.gingivalis infection, compared to E.coli infection, suggests that P.gingivalis can avoid innate host defense mechanisms. Moreover, it appears that LPS from E.coli and P.gingivalis activate different types of adaptive immunity in vivo (Pullendran et al. 2001). Therefore infection with P.gingivalis may result in greater colonization and more chronic disease than occurs with E.coli infection. As NO• from iNOS is reported to be an important element of the host defense against P. gingivalis (Alayan et al. 2006) its inhibition is not always appropriate, so the proposed therapeutic use of iNOS inhibitors may not be appropriate. What is more, NOS inhibitors are known to have side effects (Pechanova et al. 1999, Inada et al. 2002). In our study, after an initial short period of inhibition, the use of inhibitors resulted in greater NO• production associated with E.coli infection: this effect may be responsible for worsening the symptoms seen in some studies. The response of the organism to the treatment with NOS inhibitors in P. gingivalis infection remains to be elucidated.

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Introduction: Whole mouth impressions are a very common occurrence in veterinary dentistry. Typical indications include orthodontic therapy and crown fabrication (Holmstrom, Frost & Eisner 1998). They are a straightforward procedure and can be accomplished by anyone. However, to get high quality models, all steps need to be performed quickly and adroitly.

Literature Review: A type I alginate is generally selected for the full mouth impressions (Wiggs & Lobprise 1997). Impression trays should be selected from the practice assortment that most closely fit the patient’s jaw. The selected trays should provide complete coverage of the arch with approximately ¼ inch clearance around all areas of the mouth with a minimum of dead space. It is best to trail fit the trays prior to mixing the alginate. The alginate is first aerated by gently tumbling the container. It should be poured as soon as the patient had recovered from anesthesia. This was done to decrease the distortion of the model due to the low dimensional stability of alginate. In addition, the alginate should be placed in the mouth on the wax and held in position for 1 minute following ventral recumbancy for the maxilla. The tray is then applied to the portion and forcing it firmly into the tray to avoid trapping voids. Place the patient in dorsal recumbency for the mandible and ventral recumbency for the maxilla. The tray is then applied to the target arcade, and held in position for 1 minute following the loss of tackiness of the impression material, which indicates complete setting. The impression is then removed from the teeth in a rapid motion to decrease the chance of tearing the impression. This is done because alginate has a higher compression and tear strength with increased rates of deformation (Craig et al. 2000). The strength of alginate will normally be accomplished with a commercially manufactured bite registration. This step can either be accomplished with a commercially manufactured bite wax, or the putty from a 2-step crown impression material. The wax strip is immersed in warm water to soften according to package directions. The patient is extubated, and the bite impression taken by closing the mouth on the wax and holding for a few seconds until the wax had hardened. Then the mouth was carefully opened, the wax strip removed, and the patient re-intubated. The impressions and bite registration were carefully inspected for defects, and the patient recovered from anesthesia normally. If using the crown impression material, mix according to package directions and follow the steps above for wax. This will give a more accurate impression, however it will take much longer to set up. This is a concern due to the fact that the pet is extubated at this time. Let the veterinarian make the decision as to material used. Preparing stone models: The stone models should be poured as soon as the patient had recovered from anesthetic. This was done to decrease the distortion of the model due to the low dimensional stability of alginate. In addition, it is accomplished quickly to avoid the alginate drying out, which...
Introduction: There are several indications for surgical root canal therapy (Wiggs & Lobprise 1997). 1) Failed standard root canal therapy, but only if you feel that you cannot perform a better conventional RCT. Poor standard root canal therapy is no reason for a surgical root canal. 2) Procedural blockage from a pulp stone, file separation, or stenotic canal (try RC prep and watch-winding first!). 3) Incomplete apex in a young patient, however we prefer to attempt apexogenesis or apicification first. 4) Apical perforation or apical disease/resorption, however only if severe, as these can often do very well with standard root canal therapy.

Literature Review: There are several critical pieces of equipment that are required to perform this type of therapy (Holmstrom et al. 1998). These include: a dental x-ray unit, high speed air driven unit preferably with a pediatric (mini) hand piece, a sterile surgical pack (scalpel, periosteal elevator, needle holder, burs (701, 330, 1/4), and root end filling material (MTA, IRM, amalgam). Optionally, an ultrasonic root end preparation tool may facilitate the procedure. Pre-operative testing: A minimum database should be obtained consisting of a CBC and chemistry panel including thyroid level in older patients as well as a urinalysis. In addition, this author recommends that patients over 6 years of age have 3-view chest radiographs exposed. Finally, a coagulation profile and Crossmatch should be considered. Since this is a very invasive procedure, IV Fluid therapy, balanced anesthesia, and proper pain control (NSAIDS, Opioids, regional anesthetic) and antibiotic coverage, along with monitoring should be performed in all cases. Surgical procedure: approach: The incision should be placed utilizing your knowledge of dental anatomy and palpating the juga (if possible) to approximate the apex. Make a curved incision to expose the apex by a wide margin avoiding the attached gingiva. The incision should be made full thickness in one deft motion to enhance healing. Following the incision, the mucosa should be elevated full thickness to reveal the bone over the apex. If there is any question as to the location of the apex, the practitioner should consider placing a radiopaque marker over the apex and exposing a radiograph to ensure that the trephination is in the correct position. Using a dental bur, the bone is carefully removed to expose the apex. This should be done in a paint brush fashion. Once the apex is identified, it is further exposed for the surgical approach. Enough of the root must be exposed to reveal 6-8mm of the apex plus a little beyond. This bone removal must be done very carefully to avoid damaging the root or entering vital tissues (nose, mandibular canal). Apicoectomy: Once the apex is exposed; using a high speed bur (699 normally) resect the apex. It is important to remove a minimum of 4mm of apex in order to minimize the possibility of lateral or accessory canals. If you are performing the retrograde preparation with a bur, the apicoectomy should be done at a 45 degree angle to help visualization. If utilizing an ultrasonic retrofitting tool, this can also be performed at a 90 degree angle. In fact, the 90 degree angle provides superior seal to the traditional 45 degree angle when ultrasonic units are used to

Discussion and Conclusions: Full mouth dental impressions are straightforward procedure, but since there are numerous steps, there are numerous chances for failure. Many people can make impressions, however to create truly excellent models, each step must be performed expertly. The first step is to obtain the proper equipment. This may be difficult due to the lack of availability of proper sizes for veterinary patients however, over time, customization can be performed. By working through the procedure quickly yet fastidiously, high quality models can be made on a regular basis.


INDEX TERMS: Impressions, stone models, orthodontics.
prepare the cavity (Gagliani et al. 1998). The granuloma should be debrided with a curette and a sample submitted to the lab for histopathologic analysis. Following this, the defect is rinsed and packed with cotton pellets to help catch scatter. Apical preparation: The apical portion of the root canal system is then prepared to a minimum depth of 3mm. However, the deeper the preparation, the better the retrofill and therefore prognosis. This is classically accomplished with a small round bur. However numerous recent studies currently support the use of an ultrasonic scaler. For the studies supporting the rationale and benefits of this method see the article in the AVDC advanced section of the 2005 AVDF proceedings. Retrograde filling: Following the retrograde preparation, a dental radiograph should be exposed to ensure complete removal of the obtrusion material to the minimum depth. In addition, the depth should be evaluated with a periodontal probe. Providing that the radiographic and physical evidence of proper preparation exists, the apical portion of the root canal is filled. Amalgam, IRM, and EBA have been used historically; however MTA is the current treatment of choice. If there is severe inflammation and seepage, MTA use may be a concern due to the moisture. The selected material is placed with a retrograde filling instrument and packed into the canal to fully and densely fill the canal. The canal should be completely to slightly overfilled with a minimum of splash. If there is any concern of proper fill, a radiograph should be exposed at this time. Closure: The cotton pellets are removed and the area thoroughly cleaned and debrided. The defect is packed with an osseopromotive substance and the incision closed normally. If a post-operative radiograph has not been exposed, one should be at this point. Post-operative care: Proper pain medications and antibiotics are prescribed and the clients instructed to feed only soft food for 2 weeks. Recheck radiographs in six months are critical to ensure success of the procedure.

Discussion and Conclusions: There are several indications for surgical endodontic therapy. However, for many of these indications, standard root canal therapy may be preferable. In addition, debilitated patients should be treated with exodontic therapy due to the markedly decreased anesthetic time. In cases where it is indicated, however, this procedure does carry a very good prognosis if performed skillfully. Ultrasonic retro-preparation tools are commercially available and improve the prognosis in these cases. If a practitioner is performing endodontic therapy on a routine basis, this would be a wise investment. Regardless of the apparent clinical success of the procedure, recheck dental radiographs in 6-9 months are mandated to ensure that the infection has been cured.


INDEX TERMS: Surgical endodontics, retrograde, root canal therapy.

044. Okuda A.1,2, Ichihara N.2 & Asari M.2 2007. Clinical concern of impacted teeth in dogs. Pesquisa Veterinária Brasileira 27(Supl.):00-00. 1 Vettec Dentistry: 3-20-7 2B Higashimukojima, Sumida-ku, Tokyo 131-0032, Japan; 2 Dept of Anatomy, Faculty of Veterinary Medicine, Azabu University : 1-17-71 Fuchinobe, Sagamihara 229-8501, Japan. E-mail: aykvtd@sepia.ocn.ne.jp

Introduction: Impacted teeth are not completely erupted, may cease to erupt before emergence to the oral cavity fully or partially are covered by gingival and/or bone (Shafer et al. 1983, Ishikawa & Akiyoshi 1989). Impaction is an abnormality of time and/or space of eruption. Pathologically conditions of clinically unerupted teeth are often subdivided into impacted and embedded teeth; the former is obstructed by physical barriers and the latter cannot be exhibit by lack of eruptive force (Neville et al. 2002). It is not always easy for impacted and embedded teeth to be diagnosed differentially each clinical situation. Clinically impacted teeth are recognized as missing teeth. Thus, they are not always recognized until the signs of cysts or tumor are appeared or a chance is taken any examination or treatment under general anesthesia. The early clinical signs of cysts or tumor with impacted teeth are very subtle or none. In veterinary dentistry there are a few descriptions of unerupted teeth (Wiggs & Loprise 1997). The author reviewed 46 dog cases with single or multiple impacted teeth with comparing data from human literatures.

Materials and Methods: Clinically diagnosed impacted teeth were found radiological examinations with or without clinical signs. Only impacted teeth with tumors or advanced dentigerous cysts were referred us because of obvious clinical signs, such gingival swellings or jaw swellings, recognized by clinicians or owners. Most of impacted teeth were accidentally found at routine dental prophylaxis, extraction of deciduous teeth, or non-dental conditions. Ninety eight permanent teeth and 19 deciduous teeth were impacted in 46 dogs; 5 dolicocephalic breeds (Borzoi, miniature Dachshund, Wippet,), 14 mesiocephalic breeds (Cairn terrier, Golden retriever, Labrador retriever, miniature schnauzer, Shiba-inu, Yorkshire terrier, mixed breeds) and 27 brachycephalic breeds (Boxer, Boston terrier, Chihuahua, Pomeranian, Pug, Shih-Tzu), in which 25 cases were small brachycephalic breeds. Ages of dogs were 4months to 12yrs. Dogs with impacted teeth were 19 males and 27 females.

Results: Impacted teeth were more frequently found in brachycephalic breeds, rather than dolicocephalic and mesiocephalic breeds. Factors associated with impacted teeth were abnormal eruptive direction, thickness gingival or bone, dentigerous cysts/tumors or enamel/dentin hypoplastic conditions. Multiple unerupted teeth were found in 11 cases of 18 in dolicocephalic and mesiocephalic breeds, associated with enamel and/or dentin hypoplastic conditions. Most frequently impacted teeth in hypoplastic conditions were lower second, third and forth premolars. No permanent teeth (25 teeth) were erupted in one case with regional odotohypoplasia at 10 months-old. Impacted enamel hypoplastic teeth were resorbed

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externally at crown or cervical area. Dentigerous cysts, including 2 cases of eruption cysts were most frequently found with impacted lower canines, and upper canines and lower first premolars in 21 dogs that were found in 16 cases of brachycephalic breeds. Most severe pathological dentigerous cysts were associated with lower canines. Deciduous impaction was found in 4 to 5 months-old puppies, that is so-called eruption cysts. Anterior deciduous teeth, 12 incisors and 7 canines, were covered by thickened gingiva with root resorption. Ameloblastoma was associated with impacted lower canine in one case and compound odontoma was found with impacted upper deciduous canine.

Discussion and Conclusion: In human dental textbooks (Shafer et al. 1983, Ishikawa & Akiyoshi 1989, Neville et al. 2002) the causes of unerupted conditions are explained: 1) abnormal location and eruptive direction of tooth germs, 2) lack of space to erupt, 3) abnormal shape and size of teeth, 4) overlying cysts and tumors, 5) thickened bone or soft tissue, 6) abnormal development of tooth, 7) idiopathic. Cysts or tumors may also be result by impacted teeth. Upper and lower 3rd molars and upper canines are the most often impacted in human, followed premolars and supernumerary teeth. Most of 3rd molars and supernumerary teeth in human have lack of space to erupt mostly. Frequency of impacted teeth in small brachycephalic breeds may be caused by abnormal direction of tooth germs or lack of space to erupt. Small brachycephalic breeds have narrow rostral jaw not enough to align canines and incisors properly as well as dental alignment of premolars and molars are also crowding. Lower canines, incisors and first premolars in small brachycephalic breeds frequently are located horizontally and rost-loingly, make a high risk to be impacted with pushing lower incisors rostrally and forming dentigerous cyst around crown of impacted canines. Lower first premolars are often covered with thickened gingival, but not always form cyst. And developmental abnormalities, such enamel/dentin hypoplasia, make abnormal shape and size of teeth with lack of eruptive force themselves. The impacted hypoplastic teeth were submerged in the middle of mandible without any physical disturbances. Crown of impacted teeth with hypoplasia were resorbed in the jaws. Preferential teeth to be impacted are canines, premolars, and rarely incisors. Clinical concern of impacted teeth in human are mostly 1) dislocation of proximal teeth, 2) root resorption of proximal teeth, 3) sensory loss or trismus, 4) TMJ injury, 5) alveolitis, 6) infection, 7) cysts and tumor formation (Ishikawa & Akiyoshi 1989, Neville et al. 2002). Impacted lower third molars make severe clinical conditions mostly (Shafer et al 1983, Ishikawa & Akiyoshi 1989, Neville et al. 2002). And also impacted teeth self may be resorbed in alveolar bone (Shafer et al 1983, Ishikawa & Akiyoshi 1989, Neville et al. 2002). Stafne and Austin (1945) reported that resorption started on enamel or enamel-cement junction but not on root and upper canines were the most often resorbed. Impacted teeth associated with enamel/dentin hypoplasia in dogs had enamel resorption with time, finally disappeared. The roots of the teeth were left in bone often. But abnormal shape of roots was also resorbed as well as crown and replaced by bone. Clinically concern of impacted teeth left in submerged condition, lower permanent canines may have a risk of severe pathological condition to form dentigerous cysts. Lower first premolars may also have a risk of dentigerous cyst formation. Impacted teeth with enamel or dentin hypoplasia may have a less risk to form cysts.


INDEX TERMS: Impacted teeth, dentigerous, cysts, enamel/dentin hypoplasia, coronal resorption.

045. Okuda A.1, Ehara T.2, Makino H.3 & Morozumi M.3 2007. Clinical trial of a direct capping technique for extensive palatal defect with using silicon denture liner material. Pesquisa Veterinária Brasileira 27(Supl.), 3-20-728 Higashimukojima, Sumida-ku, Tokyo 131-0032, Japan; 2Tempo Animal Clinic. 3-11-34 Tenjinbashi, Kita-ku, Osaka, Osaka 530-0041, Japan; 3Togasaki Animal Clinic. 2-160-4 Togasaki, Misato, Saitama 341-0044, Japan. E-mail: aykvtd@sepia.ocn.ne.jp

Introduction: Clinically we have encountered cases of healed extensive palatal defect caused by extensive injuries, tumor removal or radiation therapy. To close such extensive palatal defect, either surgical techniques or making a cap may use. To make a palatal cap requires two episodes of anesthesia; taking impression and setting a cap in a veterinary literature (Harvey & Emily 1993). Using human silicon-based denture liner, a palatal cap can be made directly in a mouth at one episode of anesthesia. This silicon cap stays for 3-6 months without any care in a mouth. This technique can be also available for closing surgically unclosed nasal cavity after late radiation effect.

Materials and Methods: Under general anesthesia epithelialized palatal or nasal defects are cleaned. Silicon-based denture liner material (Tokuso, human silicon denture liner, Japan) are placed on a flat silicon flat board. The amount of the material should be enough to cover the defects and overflow to make overhung inside of oral or nasal cavity. Usually it takes 4min to be hardened. Once material was hardened, it is trimmed by scissors in the cavity or outside of the cavity to be shaped.
Results: 1) A 6yrs-old, spayed miniature Pinscher had extensive palatal defect with very thin and rippable oral membrane. The silicon cap made to cover for unhealed defect. Once this silicon cap was placed on the palatal defect, it stayed for 4 to 6 months. 2) A 12yrs-old, spayed Shetland sheepdog had necrotic bone and connective tissues after surgery and radiation therapy for removal nasal tumor on the nose. The defect after removed necrotic bone and tissues was covered by this silicon denture liner material. The nasal membrane healed well and frequent sneezing was less.

Discussion and Conclusion: To cover extensive palatal defect surgeries with using larger gingiva and labial membranous flap after all teeth extraction or with using tongue are described in text (Harvey & Emily 1993). Another way to cover a defect is to make a palatal cap, which needs two episodes of anesthesia; taking impression and setting a cap in a veterinary literature (Harvey & Emily 1993). This direct technique is easy to make at one episode of anesthesia. Silicon material has not been resolved or shrunk to change the shape for a year, but generally frequent putting-on & off makes the size of defects larger and need to make much larger cap. As this silicon is much softer than general silicon impression materials, this can be placed at the area that is thin-epithelial linings.


INDEX TERMS: Extensive palatal defect, silicon-based human denture liner material and direct capping method.

Introduction: This paper reports the results of the association of a combination of tiletamine and zolazepam to alpha-2 adrenoceptor agonists (xylazine or romifidine) and atropine in the dissociative anesthesia of domestic and wild carnivores submitted to dental procedures. The objective of this study was to evaluate both the efficacy of the drug combinations and the allometric scaling method of dosage calculation. The combination of tiletamine-zolazepam to alpha-2 adrenoceptor agonists in the chemical restraint of domestic and wild carnivores have yielded encouraging results (Pachaly 2001, 2002, Pachaly et al. 2001, 2004ab, 2006, Azzolini et al. 2005, Giacometti et al. 2006). The method of allometric scaling was recently reviewed (Pachaly & Brito 2001) and it allows extrapolation of drug doses between animals of different sizes and/or taxa, facilitating the use of data obtained in a “model animal” (animal for which the drug was developed) for the treatment of a “target animal” (wild or domestic patient).

Materials and Methods: From June 1999 to June 2006 the staffs of the Services of Dentistry and Wildlife Medicine of the Universidade Paranaense (Umuarama, PR, Brazil) anesthetized 223 domestic dogs (Canis familiaris), 43 domestic cats (Felis catus), 18 African lions (Panthera leo), 12 jaguars (Panthera onca), five pumas (Puma concolor), two maned wolves (Chrysocyon brachyurus), two brown bears (Ursus arctos), and one spectacled bear (Tremarctos ornatus) for dental procedures. The animals were anesthetized in the Veterinary School Hospital of the Universidade Paranaense and several pet clinics, zoos, and circuses. Dogs, cats, bears and wolves were anesthetized with a combination of tiletamine, zolazepam, xylazine, and atropine (TZXA), while jaguars, pumas, and lions were anesthetized with a combination of tiletamine, zolazepam, romifidine, and atropine (TZRA). All doses were established by allometric scaling, using a 10 kg dog and a 500 kg horse as models. Using the dog model, the following doses were used: tiletamine plus zolazepam at 5.0 mg/kg; xylazine at 1.0 mg/kg; and atropine at 0.05 mg/kg. For the horse model, the used dose of romifidine was 0.08 mg/kg. In all cases the drugs were mixed and administered intramuscularly by direct injection or by darts delivered by a blowgun. All patients were carefully monitored, starting immediately after losing the righting reflex until they were fully recovered by exhibiting normal ambulation. The following physiological parameters: heart frequency, respiratory frequency, rectal temperature, and SpO2, as well as response to painful stimuli were monitored every 10 minutes, during anesthesia.

Results: Animals anesthetized with both combinations lost the righting reflex (RR) within 2 to 11 min post-injection (MPI), and deep anesthesia occurred in all cases, beginning between 5 to 14 MPI. All patients showed excellent myorelaxation, and remained safely anesthetized under a proper anesthetic plan for 57 to 113 MPI. Conscious reactions were noted between 89 and 162 MPI, and return of RR between 120 and 225 MPI. The proposed anesthetic protocols proved to be safe and effective in all kinds of dental procedures, including periodontics, exodontics, endodontics, and restorative dentistry, as well as many other concomitant procedures as transponder placement, biological sample collection, and physical radiographic and ultrasonographic examination.

Discussion and Conclusions: The results lead to conclude that the use of the association TZXA is a good option in field anesthesia for dental procedures in domestic dogs, domestic cats, maned wolves, and bears, as well as the association TZRA is equally useful in African lions, jaguars, and pumas. Furthermore, allometric scaling proved to be a useful tool for determining a safe initial dose of the anesthetic agents in the wild felids in this study.
**Introduction:** The radiographic evaluation of the horse's skull is extremely important, for the reason that this anatomical region is easily investigated by radiographic examination. The standard radiographs provide an excellent contrast between mineralized tissues, such as bone structures and the dental enamel, as well as the gas inside the hollow structures of the skull. By the way, it’s worth mentioning that dental enamel is the most radiopaque organic substance known in the mammal's organisms. Although having the horse’s skull large dimensions, portable x-ray machines are quite efficient for making such radiographs, even in the field. The use of intra-oral radiographic techniques, improve the images quality in terms of detail and resolution, avoiding the undesired superimposition over the opposite hemi-arcade, what makes this method, one of the most important auxiliary diagnostic techniques for the odontology.

**Materials and Methods:** For the procedure of dental intra-oral radiographic examination, either portable or stationary x-ray units can be useful, requiring a minimum output of 70 kVp, nevertheless, stationary units with output between 100 and 150 kVp produce better radiographic details. The good results in making intra-oral images depends on several radiographic accessories, made on adapted sizes, such as rigid wooden tunnel, to prevent the cassette from horse’s bite; nylon water resistant flexible cassette, with reduced width, measuring 12x30 cm, to be adapted on the tongue’s face of the teeth, to obtain the best radiographic images for molars and premolars teeth. Rigid cassettes, with approximately 15 cm width, are also helpful to be placed more caudally than ordinary cassettes, to achieve the best images of incisors and canine teeth. When the radiographic incidence investigates the upper dental arcade, we can see better details of the palate. The same adaptations should be done on the intensifying screens and film sizes. For the intra-oral radiographic techniques, we use compatible radiographic screens and films. The screens used in the study are regular ones (high speed). For the incisors and canine teeth, the conventional cassettes can be used, measuring 13x18cm or 18x24cm and the patient must be sedated and step square. In this case, the radiographic techniques are less penetrated because of the fragile thickness of the rostral dental and bone structures. The incidence should be dorsoventral for the upper arcade and ventrodorsal for the lower arcade. However, for molars and premolars, flexible cassettes should be used, with the patient in deep sedation or even general anesthesia, many times for surgical assistance. The best incidence to obtain a good image is the oblique view, in an angle of approximately 60° to 70° from the dorsoventral line of the skull. To avoid blood and saliva contact with the screen and film it’s interesting using plastic film packed cassettes and to avoid the film chewing as well as to keep the horse’s mouth open is always necessary the help of M4 Pherson’s speculum. The other way to accomplish an accurate radiographic positioning is to do a lesion guided incidence of the x-rays. The external anatomical references for positioning the cassettes and shot the x-ray beams are: the second upper premolar is located just below the nasomaxillary notch; the first upper molar as well as the bony septum of the maxillary sinuses are located just below the rostral part of the facial crest of the maxillary bone; the third upper molar is located just below the median angle of the eye, on the facial crest of the zigomatic bone. For the lower arcade, the second premolar is located below the nasomaxillary notch and the first molar, below the facial crest, both on the horizontal ramus of the mandible and finally the third molar is located on the vascular groove on the angle of the mandible.

**Results:** The most common intraoral radiographic findings seeing on the horses are principally the dental architectural, dental number and positioning, dental fractures, abnormalities of the lamina dura, root destruction.

**Discussion and Conclusions:** The intraoral dental radiographic approach in the horse is a remarkable diagnostic, assistance, prophylaxis and guiding device for veterinary odontologists in several dental disorders, providing excellent details of image and safeness in his procedures.


INDEX TERMS: Horses, radiography, intra-oral.
Introduction: After years of little progress, the increased interest in equine dentistry in recent years has stimulated an increased desire to develop new techniques to treat dental disease (Dixon 1993). One technique is oral extraction of diseased equine teeth. This procedure has distinct advantages as avoidance of general anesthesia, potential complications and better cosmetic results, it also has its limitations (Lowder 1999). Oral extraction techniques originally described by Merillat (1906) have been reviewed and found to be successful in both conscious sedated an anaesthetized horses. Because equine cheek teeth are hypsodont, their extraction by any techniques can be difficult (Dacre & Dixon 2004).

Materials and Methods: 1) Examination procedures; a thorough clinical examination which must include a detail intra-oral examination using a full mouth speculum should be performed in all cases, using a good light source and a dental mirror, along with digital palpation of the suspect tooth. If the horse is uncooperative, sedation must be used for this examination. If dental disorders are suspect to affect the deeper intra-alveolar aspects of the teeth (e.g., apical infections), radiographic evaluation of teeth should always be undertaken, to absolutely confirm that a tooth needs to be extracted and also to identify which tooth is diseased. Indications for radiology include impacted premolars, fractures of teeth or skull, draining tracts, painful areas in and around the mouth, abscesses, aberrant teeth, foreign objects, abnormal behavior (biting, riding or head carriage problems) and missing, malformed or supernumerary teeth. If any doubt remains concerning whether a tooth is apically infected or not, conservative treatment and not extraction should be undertaken (Lowder 1999, Dacre & Dixon 2004). 2) Restrain; most of horses tolerate the extraction per os under standing chemical restraint, although general anesthesia is necessary in a small proportion of nervous or fractious horses. (Tremaine 2005). Deep sedation and analgesia is achieved with i.v. Rofimidine (Sedivetä) (80-120µg/kg bwt) combined with Burtofanol (TorbugesicÔ) (25µg/kg bwt) and in same cases morphine (0.15mg/kg bwt). Further increments of sedatives and analgesics are administered as required. (Dixon et al. 2005). Local nerves blocks can also give good analgesia and, can be used in these cases. (Viegas Jr 2006). 3) Extraction Techniques; 3.A-Incisors: in a standing horse with minimal restraint, retained incisors can usually be loosen with dental elevators and the extracted by means of small animal forces. Occasionally, it is necessary to make a incision in labial aspect of the gum overlying the retained incisor to allow the incisor to be loosened with a dental elevator before it can be extracted (Dixon 1997). Supernumerary incisors occur sporadically, and more than one may be present. The occlusal surfaces of the teeth appear similar to normal incisors and they have reserve crowns, which are often equal in length and shape to normal incisors. Radiographs are useful to test non erupted permanent incisor and discriminate between retained primary teeth and supernumerary incisors. However, despite careful examination and radiographs it can be difficult to distinguish the supernumerary teeth from the normal teeth (Tremaine & Lane 2005). The extraction of supernumerary teeth thus requires extensive surgery and also risks damaging the adjacent normal teeth. Because these supernumerary teeth are generically innocuous, they are best left alone, except perhaps in show horses (Dixon 1997). Extraction of permanent incisor may be performed under sedation with alpha-2 agonist and opiate analgesic and regional desensitization. Incisors can be removed by freeing the periodontal attachments around the whole circumference of the tooth gradually until it is sufficiently loose to remove. Teeth which cannot be sufficiently loosened can be sometimes extracted after making a gingival incision and removing part of the labial alveolar plate, using a narrow (1cm) osteotomy. Incisors which have become totally separated from their gingival attachments as a result of trauma or avulsion of the corner of incisive bone or rostral mandible should be removed. However, incisors that retain some gingival attachments may remain viable and can often be salvaged after reduction and immobilization of the fracture using stainless steel wire (Tremaine & Lane 2005). - After the teeth be removed, the alveolar space can be protected by packing it with gel foam, this promote good cicatrization and avoid the accumulation of food (Pimentel, personal communication). 3.B- First Premolars (Wolf Teeth): the vestigial and inconsistent first upper premolar teeth (Triadan 105 and 205 “Wolf Teeth”) are frequently alleged by owners and trainers to cause biting and behavioral problems. Most wolf teeth never cause a biting problem, but sharp, grossly enlarged or buccally displaced teeth often do (Dixon 1997, Easley 2004).Wolf teeth are easily extracted in the young horse. Sedatives/analgesics or local anesthesia is recommended before extraction. The gingival margins of Wolf tooth is cut free using the cylinder of the Burgess instrument. The dental root elevator is then introduced deep into the alveolus to loosen the tooth from its periodontal and alveolar attachments. If during the extraction, progress is not made loosing a tooth, radiography may be indicated. Madibular Wolf teeth can be extracted in similar manner as maxillary Wolf teeth (Easley 2004). Non erupted or blind Wolf teeth, if present, are usually detected by palpation of hard nodule in the interdental space. The technique used for removal this teeth follows the same basic principles as that for removing erupted Wolf teeth (Easley 2004). 3.C- Canine Teeth: unless the canine are positioned abnormally, they should not interfere with the bit. Rarely, it is necessary for a mal positioned canine tooth to be extracted. Extensive lateral resection of the supporting bone and alveolus is required to remove such teeth; this usually necessitates general anesthesia (Dixon 1997). 3.D-Deciduous Cheek Teeth: retained deciduous premolars (caps) are often detected after owner notices of abnormal eating habits, head carriage, facial swelling or blood in the mouth. A medium sized (16-in) pair of molar forceps should be used to grasp the retained deciduous premolar and elevate it in a buccal to lingual direction. In some cases, the tooth caudal to the retained deciduous tooth might impede shedding of the deciduous teeth, and strong force will be needed to remove the deciduous tooth. Excessive force is rarely indicated; if it became necessary to use excessive force, the situation should be again evaluated and a radiograph of the area is indicated (Lowder 1999). 3.E- Permanent Cheek Teeth: this technique has the great advantage of being capable of being performed in standing horse in most cases and, thus, remove the expense of general anesthesia. A prerequisite for oral extraction of equine cheek teeth is excellent chemical restraint of the horse, which should achieved by combinations of drugs previously mentioned and blocking the mandibular alveolar nerve (Dacre & Dixon 2004). Following the placement of a full mouth speculum, the gingival on medial and lateral aspects of affected cheek teeth are separated from the affected cheek teeth to the level of alveolar crest using a dental pick. The blades of molar spreader are pushed slowly into the interdental space, just above the gingival

048. Pimentel L.F.R.O. 2007. Intraoral extraction techniques in standing horse. Pesquisa Veterinária Brasileira 27(Supl.), M.V., mestrando, Departamento de Cirurgia de Grandes Animais, FMVZ-USP, São Paulo, Brazil. E-mail: luizrapp@unisys.com.br

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is put into the sinus twice a day for approximately 6 weeks or until lukewarm povidine-iodine, a solution of 100ml of D.M.S.O., 100ml maxillary sinuses is intact). After sinus irrigation with 5 liters of dilute, more rostral cheek tooth was extracted and the septum between of caudal maxillary sinus) or into the rostral maxillary sinus (if a usually occurs and requires nasal packing. A catheter is sutured into external sinus tract or secondary paranasal sinusitis may require in frontal or rostral sinus a window is make in the less-vascular margin, rostral to and then caudal to the affected tooth, and left in this position for 3-5 minutes. When extracting a Triadan 07 cheek teeth, the molar spreaders are used with caution rostral to this tooth, to prevent the adjacent, normal 06 from being displaced rostrally (Dixon et al. 2005). The molar extractors then can be placed on the tooth. Molar extractors come in different sizes and no single instrument is perfect to every tooth. Mandibular cheek teeth are nower than the maxillary counterparts and therefore require an instrument with nower space between the jaws when the hands are closed. Maxillary teeth usually require a wider instrument. Good instrument-tooth contact is essential, and instruments with toothed or knurled jaws are preferable. (Tremaine 2004). The molar extractor is then firmly attached to the crown of diseased tooth. The initial movements should be a gentle movement in latero-medial plane. The operator should continually cheek that the jaws of the extractor remain tightly fixed on the crown of affected tooth. If the forceps become loose, they may wear away the crown of the diseased tooth to a small, rounded structure and then there may not be enough occlusal left to allow the tooth to be orally extracted. The molar spreader must be intermittently used during the extraction procedure to cause a progressively degree of caudo-rostral movement of affected tooth (Dare & Dixon 2004). When the periodontal attachments are loosened, a distinctive “squealing” sound can be heard, and the resistance to oscillation of the extractor decreases. This is frequently accompanied by fresh foamy hemorrhage around the gingival margins (Tremaine 2004). In a personal communication, J.Easley, said that, “in addition to disrupting the periodontal membrane, it has been suggested that this loosing contributes to stretching the alveolus, facilitating extraction”. According to J.Easley, in another personal communication, some authors recommend postponing the extraction until the following day, when alveolar hemorrhage may have contributed to further loosening of the tooth. At this stage, a fulcrum is placed on the occlusal surface of the tooth rostral to the infected tooth. If the first cheek teeth (06s) are being extracted, a 5cm deep wooden block can be placed in interdental space (“bars of mouth”) to act as a increasing vertical pressure is now exerted on the forceps, drawing the intact affected tooth from the alveolus into the cavity (Dare & Dixon 2004). In case of doubt post operative radiographs must be taken to confirm that diseased tooth has been extracted completely. After curettage, the the alveolar space is washed with 0.5 % chlorhexidine solution using a Water-Pick® with 7 bar of pressure. The alveolar space is dry up. A 37.5 % orthophosphoric acid paste is applied over mesial proximal and mesial distal borders of teeth surrounding the alveolar space. After 2 minutes the alveolar space is cleaned. In the bottom of alveolar space gel foam impregnated with metronidazole antibiotic is applied to promote increased cicatrization. Over the gel foam and 2cm above the occlusal surface the alveolar space is packed with methylmethacrylate plug. If dental disease associated with an external sinus tract or secondary parasinal sinistus may require drainage from maxillary sinus into nasal cavity. Through a drill hole in frontal or rostral sinus a window is make in the less -vascular dorsal aspect of ventral concha. Even at site, severe hemorrhage usually occurs and requires nasal packing. A catheter is sutured into the frontal sinus through the hole (to allow post operative irrigation of caudal maxillary sinus) or into the rostral maxillary sinus (if a more rostral cheek tooth was extracted and the septum between maxillary sinuses is intact). After sinus irrigation with 5 liters of dilute, lukewarm povidine-iodine, a solution of 100ml of D.M.S.O., 100ml of Neomycin (40mg/ml) and 800ml of Ringer’s solution is used make the irrigation of the sinus. 100ml this solution through the catheter i s put into the sinus twice a day for approximately 6 weeks or until the malodorous nasal discharges ceases.

**Results:** a 100% of the intra-oral extractions of Incisors, First Premolars and Deciduous Cheek Teeth were successful. The success rate of intra-oral extractions of Permanent Cheek Teeth is 70%.

**Discussion and Conclusions:** Tooth removal should be considered after other more conservative treatments have failed or offer poor prognosis. Advantages of extraction *per os* has been technique as avoidance of general anesthesia, lower costs, potential complications and better cosmetic results, it also has its limitations (Lowder 1999, Dixon et al. 2005). The most common reasons for dental exodontia include: retained deciduous incisors or premolars, teeth affected by severe periodontal disease, loose teeth, fractured teeth, displaced or malignant teeth, supernumerary teeth, dental impaction, teeth with apical abscesses, teeth devitalized as a consequence of mandibular or maxillary fracture, dental overgrowths resulting of soft-tissue trauma, sinusitis caused by diseased teeth (Lowder 1999, Tremaine & Lane 2005). Potential disadvantages associated with this procedure include the potential for fracturing the diseased tooth, inability to remove the affected tooth and laceration or bruising the oral cavity (Lowder 1999). The actual oral extraction technique and instrumentation as described by Merillat (1906) and O’Connor (1942) have largely unchanged, but the advent of safe and effective alpha-agonist tranquilizers (in combination with i.v. Analgesics) has facilitated the reintroduction of this technique for use in the standing horse (Dixon et al. 2005). In according to related by Tremaine (2004), extraction *per os* has been technique of my choice for dental removal and has been associated with a considerably reduced incidence of complications than that associated with repulsion. The costs and risks associated with equine general anesthesia mean that the ability to extract cheek teeth in conscious sedated horses offers considerable advantages. Even if attempted exodontia in sedated horses is unsuccessful, extraction *per os* performed under anesthesia general has advantages over other techniques in view of reduced incidence of complications and post operative care. In those horses where the initial attempt at extraction *per os* is unsuccessful, subsequent repulsion is greatly facilitate by weakening of some of periodontal attachments, thereby reducing the enormous forces needed to repulse a tooth with intact periodontal attachments (Tremaine 2005).


**INDEX TERMS:** Intraoral extraction, oral exodontia.
**Introduction:** Periodontal disease is clinical and histological characterized by the degradation of extracellular matrix components associated with a gingival infiltration of inflammatory cell populations. The purpose of the present study was to characterize the inflammatory stages in gingival epithelium of the first upper molar according to the number of cells (mono and polymorfo-nuclear), concentration of collagen fibers, vascularization and gingival thickness (Payne 1975, Schroeder 1975, Page 1997, Lindhe 1999).

**Materials and Methods:** Samples of free buccal gingiva of 21 dogs with different degrees of periodontal disease were collected. One fragment for each animal was compared in order to characterize the different stages of each sample through histological analysis of biopsy from the marginal gingival epithelium. For a precise study and to compare each fragment and each portion of the fragment they were subdivided into three portions: I - coronal, II - medium, III - apical. The cuts were evaluated histologically by hematoxylin and eosin staining and Gomori’s trichromic. We took as reference the thickness of the gingival epithelium and the distance between basal layer and the epithelial surface to measure the degree of destruction. These measures were expressed in millimeters. The counting of the blood vases, mononuclear and polymorphonuclear cells was carried out choosing three random areas of each segment with the objective of 100x.

**Results:** Our results showed significant differences in the number of inflammatory cells of Groups I, II and III in the same sample according to severity of periodontal disease and suggest that its progression can be directly related with loss of collagen fibers and decrease in epithelium thickness, observed in different stages of the disease. Finally quantitative evaluation of the fraction containing gingival collagen fibers may reflect severity in periodontal clinical disease.

**Discussion and Conclusions:** Although part of the animals presented clinically signals of initial gingivitis, histological results showed that there was an invasion of inflammatory cells in the connective tissue characterizing advanced disease, according to Page (1997); he affirms that clinical alterations may seem subtle in the initial periods of gingivitis, however the underlying histopathological alterations are already sufficiently accented. One of the most important events in the pathogenesis of periodontal disease is the alteration of the constituents in the connective tissue in relation to the gingival epithelium. Examining the connective tissue area it’s important to evaluate the development of cellular infiltration and the structural and cellular composition of the tissues which suffered alterations (Schroeder 1975, Lindhe 1999). Two types of established injury seem to exist. In the first one, the injury remains steady and does not progress for months or years (Harvey 1975, Payne et al. 1975); the second one can become more active and result into gradual destructive injury. This could be observed in our study in different segments of one same sample. Therefore, we look for correlations of the variable of the three segments (I, II and III) of the collected gingival sample, trying to establish inter-relationships of the progressive inflammatory process. The objective was to promote early diagnosis or to give individually a prognostic for the progression of the injury in each segment of each sample. We know that the periodontal disease can persist for much time as initial injury and the variability of time necessary to produce an established inflammation can reflect in the variation of the individual susceptibility and between different individuals. This study reflects the importance of implementing the histopathological diagnosis as an additional tool in the early diagnosis of perio-dental disease in dogs.


**INDEX TERMS:** Veterinary dentistry, gingiva, periodontophaty, dogs.

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**050. Reiter A.M. 2007. Masticatory muscle myositis (MMM) in dogs: etiology, pathogenesis, diagnosis and treatment. Pesquisa Veterinária Brasileira 27(Supl.).** Department of Clinical Studies, School of Veterinary Medicine, University of Pennsylvania, Philadelphia, PA 19104, USA. E-mail: reiter@vet.upenn.edu

**Introduction:** Masticatory muscle myositis (MMM) is an autoimmune disease affecting the muscles of mastication in dogs (temporal, medial and lateral pterygoid, and masseter muscles). Eosinophilic myositis and atrophic myositis have been described in the past as two separate disorders, but it is likely that they are the acute and chronic stages of MMM (Shelton et al. 1987, Gilmour et al. 1992). MMM most commonly affects young adult, large breed dogs (Gilmour et al. 1992). History and clinical signs of acute MMM include lethargy, fever, reluctance to eat, masticatory muscle swelling, exophthalmos (from enlarged pterygoid muscles), mandibular lymphadenopathy, pain on yawning or palpation of masticatory muscles, and difficulty to open the mouth. In chronic MMM, dogs may appear to be systemically normal, but there is progressive atrophy of masticatory muscles (Gilmour et al. 1992). Hematological and serum chemistry findings of dogs with MMM may include elevations in total protein, creatine kinase, and liver enzymes, but eosinophilia is not considered to be a consistent hematological finding (Gilmour et al. 1992). Antibodies against type 2M fibers may be detected in serum of over 80% of dogs with MMM (Shelton et al. 1987). Dogs diagnosed with MMM should be treated with immunosuppressive doses of prednisone (1-2 mg/kg PO BID) (Gilmour et al. 1992). The dose can be decreased after 2-4 weeks and is then slowly tapered to the lowest possible alternate-day effective dosage over...
Introduction: The treatment of choice for most oral and maxillofacial tumors is wide surgical excision. Large portions of upper and lower jaws and associated soft tissues can be removed without compromise of quality of life. Preoperative workup includes routine blood tests, blood type determination and cross-matching, coagulation profiles, buccal mucosa bleeding time, regional lymph node aspirates, and diagnostic imaging (thoracic radiographs, abdominal ultrasound, head computed tomography). The client must be informed about intra- and postoperative complications, follow-up care, long-term function and quality of life, and prognosis. A biopsy should always be taken in a location that can be incorporated in the definitive resection. Histopathological examination allows the clinician to establish a diagnosis, formulate a treatment regimen, and give the owner a better prognosis. If the biopsy result does not correlate with the clinical findings, a second biopsy specimen is obtained. Surgical biopsy under general anesthesia and microscopic examination of a formalin-fixed specimen are more accurate than cytological techniques. Parotid, mandibular, and other neuromuscular conditions such as trigeminal neuropathy, polymyositis, extraocular muscle myositis, dermatomyositis, laryngeal myositis and myositis ossificans. MMM should be suspected if clinical and histological signs of myositis are restricted to masticatory muscles. Electromyography (EMG) is of help to differentiate MMM from polymyositis in that electrical activity in MMM occurs only in masticatory muscles, while other skeletal muscles remain electrically silent (Shelton & Cardinet 1989). Advanced imaging procedures (magnetic resonance imaging and computed tomography) can detect edema and inflammation in muscle tissue, with contrast enhancement being limited to masticatory muscles in MMM, and permit ruling out most differential diagnoses (Reiter 2001).

Conclusion: A confirmative diagnosis of MMM can be made if antibodies against 2M fibers in serum or immune complexes in masticatory muscles can be identified (Gilmour et al. 1992, Melmed et al. 2004).


INDEX TERMS: Masticatory, myositis, 2M fiber, canine.

Radical resection of oral and maxillofacial tumors – are there any limits? Pesquisa Veterinária Brasileira 27(Supl.). Department of Clinical Studies, School of Veterinary Medicine, University of Pennsylvania, Philadelphia, PA 19104, USA. E-mail: reiter@vet.upenn.edu

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small size of the skull and the short, tighter upper lip compared with that of dogs make radical maxillectomy far more challenging. The practical limits for resection of the lower jaw range from partial resection of the mandible on one or both sides (unilateral or bilateral rostral mandibulectomy and partial mandibular body resection), one entire mandible (total mandibulectomy) to one entire mandible and a portion of the mandible on the other side. For caudally located lesions the mandibular ramus or a portion of it can be resected by means of a dorsolateral approach through the zygomatic arch and the masseter and temporal muscles. Bilateral rostral mandibulectomy to the level of the first premolars provides good function and esthetics. Bilateral resection caudal to this level results in progressively greater problems with tongue retention, eating and grooming. Resection of the symphysis causes the two remaining mandibular sections to ‘float’, which is functionally and esthetically acceptable. Resection should include at least 1-2cm of apparently healthy tissue surrounding the tumor. The use of electrocoagulation along the incised mucosal edges that will be sutured is to be avoided. Bone is cut with power instruments (rotating burs; sagittal and oscillating saws) or with an osteotome and mallet. It is often safer to ‘break out’ the piece to be resected than to bur or saw through any remaining bony attachments. The wound is closed with a buccal flap that is undermined until it can cover the defect without tension. In the case of maxillectomies, a two-layer closure is performed after complete healing of surrounding soft tissues has occurred. Postoperative pain control is achieved with a combination of intraoperatively given longer-acting local anesthetics, centrally acting opioids, and NSAIDs. Patients undergoing radical resective surgery invariably benefit from placement of a transdermal fentanyl patch plus injectable opioid supplementation until the patch achieves adequate blood levels. Antibiotic treatment is not required after oral and maxillofacial surgeries in the otherwise healthy patient. Broad-spectrum antibiotics are given perioperatively in debilitated and immunosuppressed patients and those suffering from organ disease, endocrine disorders, cardiovascular disease, severely contaminated wounds and systemic infections. Water is offered once the animal has recovered from anesthesia. Soft food is offered 12-24 hours after surgery and maintained for about 2 weeks. Dogs usually eat the same or following day; cats may take several days to adapt. Cats may benefit from placement of an esophagostomy tube to ensure proper nutrition and medication during the immediate postoperative period. Chlorhexidine digluconate solution or gel (0.1-0.2%) is administered into the mouth for 2 weeks. Elizabethan collars, tape and nylon muzzles, or other restraining devices may be used in some animals to prevent disruption of the surgical sites. Displacement of a ligature is the most common cause of bleeding in the immediate postoperative period. Hemoclips should not be used to ligate significant vessels due to their tendency to fall off or tear the vessel. Reexaminations are scheduled at 2 weeks (removal of skin sutures) and at 2, 6 and 12, 18, and 24 months postoperatively. Collaboration with an oncologist is helpful after histopathological results return to discuss the need for further treatment (surgery, radiation therapy and/or chemotherapy). Palpation of nonresected lymph nodes (with cytological or histopathological examination of enlarged nodes) and thoracic radiographs should be performed to monitor for regional and distant metastasis.

**Conclusion:** Radical resective surgery often provides a cure in patients with oral and maxillofacial malignancy and is tolerated surprisingly well by dogs and cats. The quality of life provided by maxillectomy and mandibulectomy procedures is excellent. The multiple anesthesia episodes required for radiation therapy and the systemic sickness and multiple office visits required for chemotherapy are avoided. Combined therapy may be indicated, particularly for lesions with regional or distant metastasis.


INDEX TERMS: Oral, maxillofacial, tumor, mandibulectomy, maxillectomy.
Introduction: Feline odontoclastic resorptive lesions (FORL) represent the most common dental disease in domestic cats, affecting multiple if not all teeth.

Literature Review: The prevalence of FORL ranges from 25 to 75%, dependent on the diagnostic procedures applied. Disease below the gum line and along the root surface cannot be detected without the use of dental radiography or histological examination. There is no gender or breed predisposition, but prevalence increases with age (Reiter & Mendoza 2002). If resorption progresses into crown dentin, enamel may get undermined, and a pink discoloration is observed at the crown surface. FORL that emerge at the gingival margin were originally referred to as neck lesions. Exposure to the oral environment results in formation of inflamed granulation tissue. Such defects often are painful and bleed easily when probed with a dental instrument. Some cats show repetitive lower jaw movements, spontaneously or upon propping of the defects. Alveolar bone adjacent to inflammatory root resorption is also resorbed. The crowns of teeth with dentoalveolar ankylosis and root replacement resorption often break off, leaving resolving root tissue behind (Reiter & Mendoza 2002). FORL develop anywhere on the root surface and not just close to the cementoenamel junction. Resorption often starts on the same tooth at various root surfaces simultaneously; progressing from cementum apically into root dentin, as well as coronally into crown dentin. Inflammatory root resorption has radiographically been categorized as type 1 root lesion, with unaffected root areas surrounded by a detectable periodontal space. Root ankylosis and replacement has been categorized radiographically as type 2 root lesion, with no or an inconsistently detectable periodontal space present (DuPont & DeBowes 2002). Attempts at repair include production of bone- or cementum-like material, but resorption usually continues until the roots are completely resorbed or the crown breaks off, leaving resolving root tissue behind (Reiter & Mendoza 2002). A recent histological study of clinically and radiographically normal teeth from cats with FORL on other teeth revealed that the early FORL is non-inflammatory in nature. These teeth showed hyperemia, edema and degeneration of the periodontal ligament with marked fiber disorientation, increased osteoid formation along alveolar bone surfaces (hyperostoidosis), increased cementum formation along cervical and apical root surfaces (hypercementosis), a narrowing of the periodontal space and areas of fusion between the tooth and alveolar bone (Gorrel & Larsson 2002). Because bone is in a constant state of remodeling, ankylosed teeth are at risk to be resorbed and replaced by bone. Many cats also show abnormal tooth extrusion and alveolar bone expansion. Both conditions are commonly observed in canine teeth and may occur together. Abnormal tooth extrusion leads to exposure of the root surface. Alveolar bone expansion causes a thickening of bone along the alveolar margin or the surfaces of alveolar plates (Reiter et al. 2005a).

Discussion: Tooth resorption is caused by odontoclasts, whose precursors derive from hematopoietic stem cells and migrate from blood vessels toward the external root surface. Mononuclear odontoclasts then fuse with other cells to become multinucleated mature odontoclasts, which are capable of resorbing tooth tissue. The vitamin D metabolite 1,25-dihydroxyvitamin D$_3$ [1,25(OH)$_2$D$_3$] is important in recruiting hematopoietic stem cells to become resorbing clastic cells (Reiter et al. 2005a). The etiology of FORL is unknown. The increased prevalence of FORL since the 1960s may not be due to increased awareness and improved diagnostic procedures, but could be associated with aspects of domestication, such as altered feeding practices. The diet represents the only source of vitamin D in cats which are unable to produce vitamin D in skin. About one third of commercial cat foods contain vitamin D in excess of maximal allowances, and a direct linear relationship exists between 25-hydroxyvitamin D (25OHD) concentrations in serum and dietary intake of vitamin D (Morris, 1996; Morris et al. 1999). Cats have also been reported with vitamin D toxicosis following consumption of commercial foods (Morita et al. 1995), showing decreased urine specific gravity and mineralization of various soft tissues, particularly kidneys and walls of large blood vessels. Cats with FORL were also reported to have significantly lower urine specific gravity and significantly higher serum concentration of 25OHD, compared to cats without FORL, though the means of both parameters remained within physiological range (Reiter et al. 2005b). The possibility of gradual impairment of renal function suggests that FORL might not have a local cause but could be manifestation of a systemic insult. Daily masticatory stress may be the reason why chronic increased vitamin D intake manifests sooner and is more pronounced in periodontal tissues compared to other soft tissues, and FORL may therefore occur prior to the development of obvious signs of vitamin D-induced systemic disease. Evidence for a possible role of vitamin D in the development of FORL comes from studies that evaluated the effect of administration of excess vitamin D or its metabolites in experimental animals. Changes of dental and periodontal tissues in these animals include periodontal ligament degeneration, hypercementosis, hyperosteoidosis, narrowing of the periodontal space, dentoalveolar ankylosis, and root resorption (Becks et al. 1946a,b, Moskov & Baden 1964, Ratcliff & Itokazu 1964, Bernick et al. 1971). Vitamin D-induced periodontal degeneration and alveolar bone expansion could result in coronal displacement of the gingival fiber apparatus and subsequent reduction of the biologic width (the dimension of space occupied by junctional epithelium and gingival connective tissue). Abnormal extrusion of teeth in cats with increased vitamin D activity may be a failed attempt at maintaining biologic width (Reiter et al. 2005a).

Conclusion: Extraction of affected teeth is the treatment for FORL.
of choice. Crown amputation with intentional root retention may be utilized for ankylosed teeth and those with root replacement resorption. ‘Pulverizing’ roots with a round bur on a water-cooled, high-speed handpiece should be avoided, as serious complications can occur with this technique (Reiter & Mendoza 2002). If increased vitamin D activity proves to be the causative factor of FORL, feeding a diet less rich in vitamin D would be recommended.


Introduction: Traditional root channel treatment is an alternative for teeth whose endodontic system is endangered due to pulpitis or fractures with or without pulp exposure (Gioso 2001, Leon-Roman et al. 2002). Extensive coronary destruction after endodontic treatment usually need intra radicular preparation prior to the setting of pins or cast nuclei that will serve as a support base for retention and fixation of coronary prostheses (Gomes et al. 1999, Leon-Roman et al. 2002, Leiria et al. 2003, Wanderley 2003). Both teeth that have undergone endodontical treatment and teeth prepared for nuclei formation may remain in the mouth cavity for varied periods until they are prosthetically restored, being their post-restoration durability long and effective (Gomes et al. 1999, Ribeiro et al. 2000). This report aims to assess the workability of an intra radicular nucleus and dental crown built on a Boxer bitch, making use of acrylic resins reinforced by heavy-duty interwoven polyethylene fibers.

Material and Methods: The experiment was made on an adult Boxer bitch that had suffered total fracture of the left lower canine tooth due to biting trauma. The fracture being located in the cervical region of the dental crown, with the presence of intense painless scarring reaction of clinic assessment and record, chronicity of a dental lesion was found.

Results: In virtue of a worsening clinic situation, endodontic treatment was carried out. The animal was laid in right lateral decubitus and the region of the fracture was exposed through gengivectomy. The remaining root was endodontically treated. Twenty days after the treatment, the animal was sent back to surgery to get an intra radicular pin, a nucleus with autopolymerizable acrylic material, methylmethachrylate, chemically activated acrylic resin and a dental crown with photopolymerizable acrylic. Inlay material of the radicular pin was removed up to the depth necessary to the making of the intra radicular pin and removal of angles at the opening of the canal. Soon afterwards, a cut of the Ribbond® was made, longer than the depth of the canal and as high as the nucleus to be restored and acid conditioning of the canal walls with its rinsing and drying. After drying, autopolymerizable acrylic resin was injected into the canal. The Ribbond® tape was applied on it for compression to assure dense concentration. The animal was examined on a weekly basis for one month after 12 months from surgery. The prosthesis had been preserved with proper dental occlusion, to demonstrate the effectiveness of the technique.

Discussion and Conclusion: Among different alternatives to endodontic therapy and the choice for the most proper procedure, the peculiarities of the patient, duration of affection and clinical signs should be taken into consideration (Gomes et al. 1999, Ribeiro et al. 2000, Leon-Roman et al. 2002, Valle et al. 2003). In the above case a disinfectant penetration treatment or conventional canal treatment was used. This procedure is often employed to treat irreversible injury to the endodontic system in case of pulpar necrosis, usually together with endangerment of the periapical part of permanent teeth (Vasconcelos et al. 2001, Leon-Roman et al. 2002). The Ribbond® tape is produced from high molecular weight polyethylene and has as its main features inertia and biocompatibility (Simamoto et al. 2003, Ribbond® THM 2004). The combination of fiber and weave makes this tape ductile, no memory, and very useful in dental treatment on human beings (Gomes et al. 1999, Ribbond® THM 2004). The tips of the Ribbond® tape that were left out of the radicular canal on purpose were used with the help of the photopolymerizable acrylic resin for reconstruction of both the nucleus and a small dental crown to make better tape adherence to the resin after fixation in order to avoid its weakening. Aiming to reduce
prosthesis fracture and prolong its maintenance a dental crown smaller than the original one was made. Results from experimental conditions described above have led to the conclusion that the use of endodontic prosthesis through the technique of making intra radicular nuclei and dental crown is effective and feasible in veterinary dental treatment.


INDEX TERMS: Odontology, ribbond®, root canal therapy.

Introduction: Dental diseases in equines, especially those that affect the cheek teeth, are usually not diagnosed in time to avoid weight loss, decreased performance and sub-clinical diseases. As well as that, it is important to mention that dental abnormalities may also cause parasanal infections of the sinus, increased volume of the mandible and the maxilla, abscess formation, esophagi obstruction, colic and eventually the death of the animal. The most significant dental diseases in equines are infundibular necrosis and periapical lesions. Generally, these diseases have more severe consequences in equines than in men, and are more difficult to be treated when compared with similar conditions on domestic carnivores. In some cases endodontic therapy is possible, but usually extraction of the affected teeth is the norm. Extraction, however, when not carried out adequately, may bring some problems such as: alveolar infection, presence of bone fragments in the alveolus and bone sequestrum. These are just some examples of cases that may cause the formation of fistula, which may remain for many weeks or even many months on end (Baker 1982, Mueller 1991, Kirkland 1994, Gorrel 1997, Mueller & Lowder 1998).

Literature Review: Historically, equine cheek tooth removal has been thought of and referred to by many professionals in the area as unsophisticated surgery, leaving the impression among many in the profession that this work is beneath their level of expertise. This may, in part, account for the lack of progress in equine dental extraction techniques and the disgusting rate of postoperative complications reported in the literature. At any rate, dental exodontia via buccotomy with the cheek’s lateral incision followed by alveolus lateral wall osteotomy with the exposure of the affected tooth is the technique of choice to gain access to the maxillary third premolar tooth or the mandibular premolar teeth. In the normal course, after the extraction, the vacant alveolus fills with a sterile hematoma. This blood clot, protected from oral contamination, is the framework for a vascularized bed of granulation tissue that migrates inward from the outside margins of the wound, filling the void left by the removal of the dental crown and roots. The mucosa of the oral cavity, paranasal sinus, nasal passages or skin adjacent to the wound migrates over the bed of granulation tissue and, along with wound contraction, covers the alveolus with a layer of epithelium to complete socket healing. Many factors, however, can delay or completely interrupt this healing process, causing long-term problems for the horse and in some cases the need for further corrective surgery. Therefore, for a long time, the necessity of more efficient bone defect reparation has motivated researchers interest in developing materials that present acceptable biological characteristics to be used as a surrogate to bone tissue. To be considered a bone replacement, a material must be compatible, non-antigenic, non-carcinogenic, of low cost, promote its slow replacement for bone tissue, and possess osteoconductor and osteoinductor properties. Compatibility is mainly related to the material’s inertness, in other words, it must not produce or maintain inflammatory reaction for a extended period of time (Evans et al.1981, Baker & Easler 1999). Extraction by oral cavity: The first method of equines dental extraction was executed by oral cavity, having been practiced per centuries in animals with dental affection. For its accomplishment it was needed appropriate instrument, like oral speculum and forceps. The oral extraction is indicated in cases that need economic advantages, because it is not necessary general anesthesia, being able to be used for extraction of molar teeth, premolars, but especially for the incisors. This technique is more indicated in patient that presents teeth of supernumerary deciduous or aged due the small fang, being particularly recommended when there is indication of extraction of multiple teeth. The technique is...
contraindicated in cases of evidence of serious dental caries or fracture, especially in aged patients, when the extraction can cause the break of the tooth and, consequently, the incomplete retreat. The oral extraction is less appropriate in cases that is present fistula between the tooth and the sinus, in sinusitis secondary to dental abnormalities where is indicated to realize a curettage of the alveolar, in cases of periapical infection of new animals and patients where there are the possibility of having more than 30 minutes of considerable work to extract the tooth. Extraction by repress: Repression or repulsion is the most used technique to dental extraction when there is compromising in the molar and premolar teeth. It can be used to the removal of the forth premolar tooth, first, second and third molars of the superior arched, all the premolars of the inferior arched and the second and third molars of the inferior arched, especially in cases of advanced caries and dental fractures, when the oral extraction is not possible. The main problem of the repulsion, the alveolar infection, that is associate to fragments leaved in the alveolar bone, and happens in 47% of the cases of superior tooth repression and 35% in others teeth. It is necessary a lot of careful in this procedure (Evans et al. 1981, Baker & Easler 1999). Extraction by buccotomy: The technique of dental extraction involving the removal of the lateral alveolus, described for the first time by Merillat (1906), was modified by Evans, that incorporated buccotomy in order to obtain better exposition of the affected tooth, it was modified again by Ribeiro (2003), that realized a osseous window minimizing some undesirable effects of the traditional buccotomy, With the evolution of the sedatives and anesthetics, the surgeries procedures with general anesthesia have became more popular. The buccotomy is indicated to the extraction of the molars and premolars teeth of both arched (Evans et al. 1981, Dixon 1997, Gaughan 1998, Auer & Stick 1999, Baker & Easler 1999, Lowder 1999). Advances technician in the recovery after exodontia: Castor bean oil polyurethane is a bioactive non-toxic polymer with elasticity similar to the human bone. It is the result of the addition of two basic components: poliol and pre-polymer. Special techniques of urethane activation are used for the extraction of these two elements, both obtained by a modification of the castor oil, which is extracted from castor beans (Ricinus communis, dicotyledonous class, geraniaceous order, euphorbiaceous family). It has been recommended for the fixation of prostheses, and the reconstitution and filling of bone and alveolar spaces. Castor oil resin implants of different forms and sizes have already shown to be biocompatible in different experimental conditions: intra-bone and intra-articulations in rabbits, in the alveolus of rabbits, in the alveolus of rats, in the anterior chamber of mice, in subcutaneous dorsal implants in rats, in the cornea of rabbits, as partial replacement for the common calcaneum tendon in rabbits, in in-vitro biocompatibility, in the reconstruction of bone defects in humans, and in bone defects in dogs, and in alveolus of equines after extraction of the mandibular third premolar tooth. Other studies have also stated that the polyurethane derived from castor oil is a new biomaterial for the filling of bone defects or bone loss, as there is a gradual replacement of this polymer by neofomed bone. Azevedo et al. (1997) in three cases of use of castor oil polymer membrane in guided bone regeneration in defects around osteointegrated implants in humans, concluded that the castor oil polymer contributed to bone healing. In addition to that, castor oil polyurethane used in the reconstitution of bone defects has been demonstrated to be biocompatible and have osteointegrating action. In a histological study, after exodontia and poliuretana of castor bean implanted in the alveoli of the third inferior premolar of 8 equines and biopsy after 120 days, the author discloses that histological analysis of the material that filled the alveoli showed that it is constituted, in its larger part, of compact or trabecular osseous or mature fibrous connective tissue. In none of the animals, inflammatory reaction was proven directly in the presence of the poliuretana remaining portions. The author concludes that poliuretana of the castor bean is inert, biocompativel, and when implanted in the alveolar socket, it results in osteointegration and assists the fulfilling of the osseous alveolar socket tissue (Ribeiro 2003). Use of Methyl-methacrylate and Acid Conditioning: The technology of the adhesives progressed a lot in the last 25 years, due the use on a large scale and stimulated by ample application in the aerospace and automotive industries. These investigations contributed notably to the development of studies in the odontological area. In 1955, Buonocore developed a simple technique to unite acrylic resin on the surface of the human enamel. The acid attack and the simple and composed resins initially were proposed to seal fissures. Currently they are used for estoration of cavities, topic fluorine application and cementation. The acid attack is made with an acid phosphoric solution on the enamel, in order to create micro-porosities for the penetration of fluid resins which, after polymerization, propitiate retention and marginal sealing. Basically, the technique of acid conditioning consists in the application of ortho-phosphoric acid at the concentration of 30-50%, during 1 or 2 minutes, on the enamel external surface. The acid acts in selective way on the prismatic structure of the enamel, promoting a preferential dissolution of the prisms head center or the periphery, when originates a surface rich in micro-porosities. The product of the enamel dissolution by the acid is a soluble salt that must be removed with water or air, in order to let the resins penetrate in the micro-porosities and polymerize this site. This procedure make possible that the polymerized resins stay mechanically restrained in the enamel. The factors that determinate the quality of the acid conditioning of the enamel are characteristics of the enamel surface; enamel type, acid type used, acid concentration, duration of application, and way of acid application. Resuming, the enamel should as clean as possible, the phosphoric acid must be used in a concentration of 30-50%, and must remain at least per one minute. It is also indicated that the ortho-phosphoric acid at 36%, remaining generally about 15 seconds in dogs, must be increased in aged animals. In the end of the acid attack technique the tooth must be washed abundantly per 20 seconds and dried with compressed air. The acrylic resins of methyl-methacrylate, in
the veterinary medicine, are used especially in reconstructed and orthopedic surgery, for orbital prosthesis in dogs, for reparation of the mandibular and maxilla fractures of dogs and cats; in oro-nasal fistulas in dogs, for facial reconstitution and reparation of the lumbar vertebra fracture in dogs. These resins are classified as resins of type I, they are found in powdered (polymer) and liquid (monomer) form and its mixture forms the methacrylate of the methyl product or methyl-methacrylate. The mixture of the two materials forms an exothermic reaction that polymerizes the product and “hardens” the material. In horses, the methyl-methacrylate is very much used in the reconstitution of cranium, maxilla and mandibular fractures. The resins must be used intra-orally. To minimize the effects of the temperature produced in the moment of drying of the acrylic methyl-methacrylate resins due to the exothermic reaction, a surgery compress soaked in physiologic solution must be used. By this way tissue alteration is not observed adjacent to the acrylic resins, in physiologic solution must be used. By this way tissue alteration is not observed adjacent to the acrylic resins, besides the one that results from accumulation of alimentary residues (Gioio 2003, Ribeiro 2003)

Discussion and Conclusions: The oral cavity of equines must be always examined in the search of some dental affection. When one chooses to extract the affected tooth, it should be done with care, because there are several complications after an inadequate dental extraction as hemorrhage, wrong removal of the tooth, damage to adjacent structures as para-nasal sinus, alveolar bone, adjacent tooth, naso-lachrymal duct, salivary parotitic duct and facial nerve. Complications associated with the surgical wound include wound dehiscence, permanent formation of a fistula following incomplete removal of the tooth, osseous sequester, infection of the gingiva and presence of a range body.


INDEX TERMS: Techniques of exodontias, equine, dentistry.

055. Rocha L. 2007. What can be done, using marketing techniques, to increase the acceptance of your recommendation to your clients. Pesquisa Veterinária Brasileira 27(Supl.). Dental Pet Mobile Services. 5241 SW 132 Avenue Miramar, FL 33027 USA 33027. E-mail: DentalPet@aol.com

Introduction: Many veterinarians are able to perform different procedures in the area of veterinary dentistry. This lecture shows you how different techniques can increase the acceptance of your recommendations, such as digital photography, videos, brochures, telephone conversation, report preparation and others.

Literature Review: Marketing in the veterinary dentistry, is an area that has been growing fast in the last several years. There are many published papers in the Veterinary community, Veterinary dental Community, as well as in the general marketing. The author used the literature from the Veterinary Dental Forums and North American Veterinary Conferences.

Discussion: The first contact with your client, either a referral or your regular client, is usually by a phone call through the receptionist. It is imperative that this experience goes smoothly. If the receptionist is not well trained to answer these calls, the client should be transferred to someone well trained, so your clients can receive the proper information. Most owners have similar questions:

• How much is it going to cost?

• Do you have to put my pet under general anesthesia? I heard general anesthesia is very risky.

• Will my pet be able to go home the same day?

• Will my pet be able to eat after the procedure?

If this first call doesn’t go well the client may not come for a consultation. Efforts are made to bring the patient for an office visit. The most common mistake at this point is to give the owners more information than they need, such as creating different scenarios of possible diagnosis and treatment. Some clients are very concerned with the cost of the treatment. The answer for the concern is always, “we don’t know, but we will be more than happy to fax or e-mail our fee list”, the office visit is US$ x.xx and we need anesthesia, blood work, oral x-ray, etc. As clients enter in the clinic for the first time, they should have a positive customer experience:

• Clean parking lot, free of dog excrements.

• Well-trained and friendly staff.

• A TV playing Animal Channel (or something similar), if not, a soft music.

• Poster/photos should be framed.

• Water and coffee available.

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After the check-in by the receptionist, a technician gets the basic information (history, weight, temperature, etc.); play a video, if you have one regarding the problem they came for. The veterinarian introduces him or herself saying the first and last name and shake hands. Say Hello to the client and pet. Get more history if necessary. Oral examination is done. Use magnifiers to get a better view of the problems. Take digital pictures, or use a Polaroid camera. Show them to the client by putting them on the screen of the computer in the room (if you don’t have a computer in the room use a laptop). Give the picture to the client to take home or e-mail them. Show brochures, literature (books, magazines, and articles). Show different cases, either in the computer or photo paper. In addition, a complete physical examination should be done. Plan to expend at least 20-30 minutes with this client; usually it takes twice the amount of time or more in a regular general practice consultation. - Clients need to sign permission for the procedure, which itemizes everything that is going to be done. Some of the procedures should have a canned estimate, for example a root canal, crown, orthodontic care etc. Give the client a rough estimate in the room, so the client doesn’t have a surprise when the receptionist handles the estimate. Treatment plan for periodontal disease can only be given after oral x-rays and examination under anesthesia. If there are any issues regarding payment for the initial workup, arrangements are done with someone in the front desk. Payment plans such as Carecredit helps clients that can’t afford treatment. - Call the client when the treatment plan is ready. The best person to call is the veterinarian who can medically explain the problems, the focus should be on what is best for the patient, don’t let yourself to be intimidated by the bill. You have to offer what is best for your patient. Give all your recommendations and at the end tell how much it will cost. Get pictures before, during and after, be careful with pictures that may be too graphic. Some clients may not handle it well. - After the animal is awake, is time to do a “go home report”, which should include several pictures with a brief description of what was done. Make sure the patient is well awake, as the owner does not want to take home a pet that is half asleep. Dry and brush the patient’s face. - When the owners come to get the patient, give them the “go home report” while they are in the receptionist area. It’s always good if other clients see the report as well. Talk to the owners without the patient, explain any questions that they may have and give written instructions. - To finalize the day call the client before 9:30PM to make sure everything is going well.

Conclusions: Those techniques described work in different clinics as well as in mobile dental services. Proper equipment and training is a must. Remember an excellent stuff and a team spirit is fundamental.


INDEX TERMS: Marketing, veterinary dentistry.

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Introduction: The domestication of the horse changed its feeding habits and diet, having an influence in the increasing frequency of abnormal dental wear. The oral and dental physical health is a vital condition to the horse vitality, performance and longevity (Pagliosa et al. 2006). To perform dental exams and treatments, the efficient chemical restrain of the horse is an essential need. During the sedation the horse must remain standing and, although slight ataxia is acceptable, a motionless horse is the ideal (Taylor 1985). The association of opioids and sedatives is a routine practice. Muir (1991) defined the primary reasons for association of two or three drugs together to produce standing chemical restraint in horses as to increase sedation or enhance analgesia, increase muscle relaxation and prolonged duration of action can also occur.

Materials and Methods: Five geldings were sedated in random order on separate occasions at least seven days apart. The animals were restrained in stocks and were administered: medetomidine (MD) (0.01mg/kg iv), xylazine (X) (1.0mg/kg iv) alone or xylazine (1.0mg/kg iv) followed immediately by butorfanol (XB) (0.01mg/kg iv) or pethidine (XP) (1.1mg/kg im) or tramadol (1.0mg/kg im) (XT) or fentanil (XF) (0.01mg/kg iv). The variables studied were: restlessness score, ataxia score, head position, respiratory rate; heart rate (HR), mucous membranes color, refill time; mouth speculum reaction, tongue tonus, pain sensibility of the periodontum, water stimuli, power dental float auditory stimuli (before introducing in to the mouth) and e power dental floating the tooth tissues. Ataxia was also measured by time in minutes. The inspection and physical examination variables were measured ten minutes before (T0) and every ten minutes (T1 to T5) after the drugs administration, with total time of 50 minutes. The dental procedures variables were measured every ten minutes after the drugs administration until the mouth speculum was removed (T1 to T4), with total time of 30 minutes. The Friedman and Tukey tests were used to compare treatments statistically (P <0.05).

Results: The ataxia began 2.00 ± 0.53 minutes after the drugs administration. In the X, XB and XP treatments T0 and T1 had different ataxia scores. The mean ataxia time was 36.10 ± 3.35 minutes. The treatments XP and MD produced different times of ataxia, being the XP the longest (43.40 ± 11.84) and MD the shortest (23.80 ± 15.51). The treatments X and XP induced lower respiratory rate at T1, compared to the XB treatment. The smallest respiratory rate was found in T1 of
Discussion and Conclusions: Was concluded that all the sedation protocols used in this study were effective to promote sedation and analgesia in horses necessary to dentistry procedures in standing position, for about 30 minutes. The collateral excitatory effect caused by the administration of iv pethidine in horses reported by Clark & Paton (1988), Clutton (1987) and Alexander & Collett (1974) were not observed, probably due previous administration of xylazine and the use of im route, slowing down the absorption of the pethidine and affording more time to the sedative take action. Compared to all the protocols studied, XP produced more ataxia time compared to the MD, although this effect did not hinder the dental procedures and the duration of the ataxia was clinically proportional to the other sedative effects. None of the protocols caused danger cardio-circulatory effects. The X and XP protocols caused more respiratory depression compared to the other treatments. The tramadol (1.0mg/kg im) can be used after xilazine (1.0mg/kg iv) to produce neroleptanagesia in horses, but its antagonist α2-adrenoreceptor effect described by Faron-Gorecka et al. (2004) and Berrocoso et al. (2006) in rats, can reduce the sedative effects of xylazine when administered together.


INDEX TERMS: Horse, sedation, dentistry.

057. Rossi Jr J.L. 2007. Main oral illnesses in great neotropical felids in captivity and free ranging in Brazil, Pesquisa Veterinária Brasileira 27(Supl.). Laboratory of Comparative Dentistry, Surgery Department, FMVZ-USP, São Paulo, Brazil. E-mail: vetjrossi@gmail.com

Introduction: Species as the jaguar (Panthera onca) and puma (Puma concolor) have an accentuated decrease in their populations due to the indiscriminate hunt associated with the loss of the main ecosystems where they are inhabitate. One of the aspects of this problem that has frequently been accentuated is the constant attacks of these species to domestic animals of economic importance as cattle, sheep, and horses. It happens because, with the expressive reduction of the wild populations, these predators have to satisfy their nutritional needs attacking domestic stocks. It is aimed to compare the conditions of the stomatognathic system of free ranging Panthera onca and Puma concolor originating from areas of Pantanal, Amazon Forest, and Brazilian Atlantic Forest.

Materials and Methods: A total of 42 jaguars (Panthera onca) and 36 pumas (Puma concolor) belonging to Zoos and Forests of the State of São Paulo, with ages varying from six months to 25 years of age, born or not in captivity were studied. They ranged in age from 6 months to 25 years. We studied also 4 individuals of Panthera onca and 4 of Puma concolor, with estimated age varying between 6 months to 8 years, that were captured in Fazenda Sete, city of Miranda, State of Mato Grosso do Sul, in the South Pantanal, which were free-wild animals. One animal was captured in Atlantic Forest, city of Viçosa, State of Minas Gerais, and one jaguar captured in the Amazon Forest, city of Jacareacanga, State of Pará. The methodology used for all the animals, whether kept in captivity or not, was to administer an injectable general anesthesia, perform a physical examination and an oral examination, document the clinical findings in dental charts, and photograph and film all the studied animals.

Results: All animals kept in captivity presented some type of oral disease, varying from light to severe, that might have resulted in varying degrees of injury to the stomatognathic system. Abnormalities included: failure in dental eruption, anatomical defects of teeth, dental wearing, malpositioning of teeth, dental mobility, dental trauma, caries, odontoclastic resorptive lesion, periodontal disease, and oral manifestations of viral disease (Table 1, 2 and 3).

Table 1. Prevalence of oral lesions in captive jaguars (Panthera onca) and pumas (Puma concolor) in the State of São Paulo, Brazil

<table>
<thead>
<tr>
<th>Oral lesion</th>
<th>Prevalence in Panthera onca</th>
<th>Prevalence in Puma concolor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacterial plaquea</td>
<td>3 (7.14%)</td>
<td>0%</td>
</tr>
<tr>
<td>Gingivitis</td>
<td>21 (50%)</td>
<td>12.55%</td>
</tr>
<tr>
<td>Dental calculus</td>
<td>42 (100%)</td>
<td>83.33%</td>
</tr>
<tr>
<td>Fissuration exposure</td>
<td>6 (14.28%)</td>
<td>4.16%</td>
</tr>
<tr>
<td>Dental mobility</td>
<td>0 (0%)</td>
<td>8.33%</td>
</tr>
<tr>
<td>Gingival recession</td>
<td>6 (14.28%)</td>
<td>16.66%</td>
</tr>
<tr>
<td>Periodontal pocket</td>
<td>14 (33.33%)</td>
<td>12.50%</td>
</tr>
<tr>
<td>Dental wearing</td>
<td>35 (85.71%)</td>
<td>70.83%</td>
</tr>
<tr>
<td>Dental staining</td>
<td>5 (11.90%)</td>
<td>8.33%</td>
</tr>
<tr>
<td>FORL</td>
<td>12 (28.57%)</td>
<td>4.16%</td>
</tr>
<tr>
<td>Dental fracture</td>
<td>32 (76.19%)</td>
<td>58.33%</td>
</tr>
<tr>
<td>Pulp exposure</td>
<td>18 (42.85%)</td>
<td>12.50%</td>
</tr>
<tr>
<td>Caries</td>
<td>0 (0%)</td>
<td>4.16%</td>
</tr>
<tr>
<td>Gingival hyperplasia</td>
<td>3 (7.14%)</td>
<td>4.16%</td>
</tr>
<tr>
<td>Malocclusion</td>
<td>20 (47.61%)</td>
<td>0%</td>
</tr>
<tr>
<td>Dental absence</td>
<td>14 (33.00%)</td>
<td>20.83%</td>
</tr>
<tr>
<td>Oral ulcers</td>
<td>0 (0%)</td>
<td>16.64%</td>
</tr>
<tr>
<td>Total</td>
<td>42</td>
<td>30</td>
</tr>
</tbody>
</table>

a No staining solution used. b,c Number of cases and percentage.
Discussion and conclusion: All these diseases could result in the affected individuals suffer an altered homeostasis and possibly death. The syndromes and diseases found seem to be associated with the living conditions to which these individuals were submitted (stress, nutritional imbalance, dietary texture, or environmental adaptation). The animals captured in free wild life presented subtle degrees of oral diseases that did not compromise the function and health of the stomatognathic system, however we do not know if these diseases can develop throughout their lives.


INDEX TERMS: Felidae, jaguar, puma, animal handling, captivity animals, animals at extinction, stomatognathic system, diseases, mouth, biologic conservation.

058. Rossi Jr J.L. 2007. Ramphothec repair in birds and shell damage in chelonians. Pesquisa Veterinária Brasileira 27(Supl.). Laboratory of Comparative Dentistry, Surgery Department, FMVZ-USP, São Paulo, Brazil. E-mail: vetjrossi@gmail.com

Introduction: The birds and chelonians are different on several physiologic aspects of mamifers. Injuries in the ramphotheca of these animals or in the chelonian shell can cause problems in homeostasis, difficulties in food apprehension and locomotion. The early diagnosis and a fast clinic and surgical intervention are necessary for the treatment success.

Literature Review: The beak of birds is a dynamic structure in constant growth, constituted by upper bones, the maxilla (pre-maxilla and nasal bone and lower jaw, covered by keratinized epidermis, denominated ramphotheca (Ritchie et al. 1994, Rupley 1999). Other structures also compose the beak as nervous-vascular bunches, articulations and germinative sheathes (Rossi et al. 2005). Anatomically, the ramphotheca is subdivided in rhinotheca (upper) and gnatotheca (lower) (Rupley 1999). The mucosa of the oral cavity and of the tongue the birds is covered by stratified epithelium and the keratinization degree varies according to the location of the epithelium in the oral cavity (Rossi et al. 2005). The consistency of the ramphotheca varies among the species. It is strong in Psitaciformes (parrots, parakeets and macaws) and soft and flexible in Anseriformes (geeses) (Rossi et al. 2005). The ramphotheca can be considered as horny stratum of the beak and the derm is well vascularized and connected to the periosteum. Trauma or necrosis of the derm can frequently result in lesions that induce deformities of the beak (Ritchie et al. 1994). The ramphotheca has several functions in different species of birds, as food apprehensions, preparation of the food for deglutition, defense and attack, social and sexual interaction, locomotion and construction of nests (Ritchie et al. 1994, Rupley 1999, Rossi et al. 2005). The growth of keratin of the beak happens whenever there is a underlying germinative layer (attached to the periosteum, but the incremental growth in the direction of tip of the beak (Getty 1989). The time of replacement of keratin of the ramphotheca

<table>
<thead>
<tr>
<th>Oral lesion</th>
<th>Classification of the oral lesions according to severity and location a</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gingivitis</td>
<td>Grau II na região do dente CSD e Grau I no 4 PMSD</td>
</tr>
<tr>
<td>Dental calculus</td>
<td>Degre II at RUCT region and degree I at RUPFT, Degree I at RUCT and degree II at RUPFT</td>
</tr>
<tr>
<td>Gingival recession</td>
<td>3 mm recession at the mesial aspect of LUCT</td>
</tr>
<tr>
<td>Dental wearing</td>
<td>Teeth cuspsids: LUCT, RLLU, II (all incisors)</td>
</tr>
<tr>
<td>Dental fracture</td>
<td>Cuspsids of RUCT and LLTC</td>
</tr>
<tr>
<td>Pulp exposure</td>
<td>RUCT and LLCT, with tertiary/reparative dentine</td>
</tr>
</tbody>
</table>

Table 2. Prevalence of oral lesions in wild jaguar (Panthera onca) captured in the Atlantic Forest, State of Minas Gerais, Brazil

<table>
<thead>
<tr>
<th>Oral lesion</th>
<th>Classification of the oral lesions according to severity and location a</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dental calculus</td>
<td>Degree I at RUCT region and degree II at RUPFT</td>
</tr>
<tr>
<td>Gingivitis</td>
<td>Degree I at RUCT and RUPFT region</td>
</tr>
<tr>
<td>Dental calculus</td>
<td>Degree I at RUCT and RUPFT region</td>
</tr>
<tr>
<td>Gingival recession</td>
<td>3 mm recession at the vestibular aspect of RUCT and LUCT</td>
</tr>
<tr>
<td>Dental wearing</td>
<td>Cuspsids of canine, premolar and molar teeth</td>
</tr>
<tr>
<td>Dental fracture</td>
<td>Cuspsid of RUCT and longitudinal fracture of RFLT</td>
</tr>
<tr>
<td>Pulp exposure</td>
<td>RUCT with deposition of tertiary dentin</td>
</tr>
<tr>
<td>Malocclusion</td>
<td>Lower incisors with cranio-caudal displacement</td>
</tr>
</tbody>
</table>

Table 3. Prevalence of oral lesions in wild jaguar (Panthera onca) captured in the Amazon Forest, State of Pará, Brazil
is intimately linked to the use of the beak. In great macaws, the complete substitution of the ramphoteca happens in approximately six months, while in the Ramphastidae, there is an approximate growth rate of 0.5 cm in a period of two years (Rossi et al. 2005). The keratin of the gnavotheca is usually substituted two to three times faster than the rhinotheca (Rossi et al. 2005). Several portions of the digestive system of the birds, including the beak, they are adaptive modifications in function of the diet. The size of the beak is an important factor in the regulation of the ingested food, showing that birds present great difficulties in consuming larger or smaller alimentary items than the anatomical dimension of the beak, having a direct relationship between the anatomy of the beak and the alimentary preference of each species (Rossi et al. 2005). Studies state that the alimentary preference for items of different sizes can occur in function of the age of the bird, in agreement with the size of the beak, and not of the chemical composition of the food (Getty 1989). In the birds, the oral cavity and the pharynx connect to form the oropharynx. The orofaringe communicates with the nasal breasts through the medium fissure in the palate, called choana. There are several papilas caudally located, associated to the choana. The glottis is located directly behind the tongue, and the birds do not have epiglottis (Rupley 1999). The tongue of the Psittaciformes is muscular and blunt. Most of the Passeriformes (little birds) present a narrow and triangular tongue, and the color varies from white to black, depending on the species involved (Ritchie et al. 1994). The oropharynx is covered again by a stratified epithelium which keratinized in the areas subject to abrasion. There are several salivary glands that secrete mucus at the oropharynx coat. Those glands can suffer metaplasis in the cases may happen as a result of deficient nutrition; non-appropriate incubation; viral, bacterial, fungal and parasitic infection and traumas. Those factors can cause exaggerated growth of the beak, rhinotheca and gnavotheca (“scissors beak”), shortening of the superior beak (“relative prognathism”), infections, necrosis and fractures (Ritchie et al. 1994, Rupley 1999, Rossi et al. 2005).

**Discussion and Conclusions:** In accordance with literature, some surgical techniques can be used for the restoration of ramphoteca of birds and chelonians. Surgical techniques had been adapted some and equipment that had become surgical act faster e diminishes costs. It better had adaptation of the birds and chelonians after the procedures, allowing better adaptation of the animals the new condition of life.


INDEX TERMS: Veterinary dentistry, wild animals, avian, chelonians, fracture, ramphoteca, repair.
**Introduction:** During the felines' oral cavity exam or during the prophylaxis some lesion can be found on the surface of their teeth. The resorptive lesion in cats is known by many names. In articles and annals, it has been reported as a lesion of the cervical line, erosion of the cervical line, resorption of the cervical line, odontoclastic resorptive lesion, feline odontoclastic resorptive lesion (FORL), feline's dental resorption lesion, cervical resorption buccal of the root, among others (Wiggs & Lobprise 1997). The first description of the disease was made in 1955, when it was presumed as being decay on the root. The lesion was described again in the middle of 1970s, when a new description was published and the disease appeared with great incidence. Retrospective evaluation of the cats' cranium found in 1800 revealed a small incidence of the disease, and in a text by Colver (1936) the discovering of this lesion's nature failed. A reevaluation in 1991 of 80 craniums originally inspected by Clover in 1936 revealed a cranium with resorptive lesion (1.25%). The resorption is characterized by a defect of the enamel, dentin and cementum. This lesion is always referred to as a cervical lesion or a lesion of the cervical line, because the rustic defect is observed more frequently in the cervical area of the tooth. Due to the lesion being more common in premolars and molars covered by plaque or gingivitis and stomatitis, these lesions are frequently associated (Harvey 1993). The lesion was initially described as decay, due to the radiographic similarity of the lesion with the decay and the clinic similarity (radiolucency) with the contact of the decay in human teeth. However since Schneck & Osborne (1976) related this lesion in the teeth of cats with periodontitis resulting from the resorptive odontoclastic lesion, the defect has been included within the category of periodontal disease (Harvey 1993).

**Materials and Methods:** It was made a survey about FORL at the Veterinary Dentistry Center (ODONTOVET) in 1994-2004 with the purpose to observe the incidence of the lesion in cats through the comparison with breed, sex and age. The research is based on the clinical file card of the local, noticing the animal's data and its affections. Some tables were developed in Excel and after their analysis, it was observed that the total number of the cats attended during this period was 1,233 (760 Mongrel, 261 Siamese, 166 Persian, 13 Birman, 5 Angora, 6 British shorthair, 5 Maine coon, 4 Oriental, 2 Ragdoll, 2 Himalayan, 2 Abyssinian, 2 Exotic, 2 Russian Blue, 1 Egipsy, 1 Tortoiseshells, 1 Wild cat). Through these data, the animals were divided into affected animals by FORL and healthy animals. To develop a comparative research, the affected animals were divided into breed, sex, age, allowing this way the development of graphics and the index.

**Results and Discussion:** From the total of 1,233 animals, 567 animals (46%) have FORL, but it wasn't possible to compare the number of lesions and their extension, because many file cards didn't have complete data (Fig. 1). Between the animals that presented the disease, 307 (54%) were females and 260 (46%) were males (Fig. 2). As there were 645 (52%) females and 588 (48%) males from a total of 1,233 animals, this shows that females are more predisposed to FORL.

The second topic analyzed was the prevalence of the lesion compared to the breeds. Based on the data, the breeds with higher incidence during the period were Persian, Mongrel and Siamese, and the breeds with lower incidence were considered in a single group, called others. From the total of 1,233 animals, 760 (62%) were Mongrel, 261 (21%) were Siameses, 166 (13%) were Persian, and 46 (4%) were others. By this way, 367 (48%) Mongrel have FORL, and 126 (48%) of the Siameses, 53 (32%) of the Persian and 21 (45%) of the others had the lesion. It can be concluded...
that Mongrel and Siameses are among the most predisposed breeds for FORL, compared with Persian and other investigated ones, despite that the samples of Mongrel and Siameses were more numerous. It can be suggested then that both the Mongrel and Siamese breeds have the same predisposition for developing FORL (Fig.3).

Another topic investigated during the survey was regarding the cats’ age of the sample. According to Pollard (2003), the cats reach their maturity within 1 year, becoming adult with 8 years, and from 9 years on they are considered elderly. In this way, the samples were divided into 0-1 year, young (138 animals), from 2-8 years (712 animals) adult, and after 9 years elderly (383 animals). All the animals were computed and the following sampling was determined: 5% (7 animals) of the young ones have the lesion. Among the adults, 44% (318) have the lesion, and 63% (241) of the elderly were charged too (Fig.4, 5 and 6) as follows:

The prevalence of FORL was compared between the breeds and their ages, what resulted in a demonstrative index.

Examining the figures and the table related to the animals’ age, we can conclude that the animals of 9 years are more predisposed to FORL independent of the breed. Comparing this study with other researchers, it can be seen that Wessun et al. (1992) showed in their study that the males and animals with advanced age were more easily affected. Ingham et al. (2001) demonstrated that the females and animals with advanced age were the more affected. Our research shows that the females and animals with advanced age were the more affected. Regarding the breeds, there can’t be a comparison, because most of the researches are from other countries and they don’t have Mongrel breed to compare; so it becomes more difficult to know if they really are more affected. What has been already demonstrated is that the Asian breeds like Siamese and Persian have more predisposition for FORL. The results above show that these breeds are plenty affected, but it can’t be concluded which of the breeds have a higher prevalence. There must a more detailed research be done involving other institutions to come to a coherent conclusion.

**Conclusion:** The felines’ odontoclastic resorptive lesion is a disease with a still uncertain etiology, so that many researchers try to solve its mystery. The disease is quite common in the feline’s odontology, making the animals feel great pain and their owners look for a veterinary frequently. But many times, because of the lack of information, the disease is wrongly treated and mostly the problem isn’t solved. Therefore, it is important to orientate the owners about the conditions of the treatment, because many of the cats become reluctant to the treatment due to the excessive loss of teeth. However, the disease is common, it isn’t the more severe of the oral pathologies, being easy to treat and having a good prognosis. With the survey made at ODONTOVET, it is possible to conclude that the lesion has higher prevalence in females, where it reaches higher significance in Mongrel and Siameses. The more affected animals are the ones with advanced age, from 9 years on. We can say that it was a survey of great importance for the study of the lesion, because there are few investigations about this kind of affection in cats.


**INDEX TERMS:** Lesion, teeth, cats.
Introduction: “Prevention is better than cure”, a statement that should be applied when local anaesthetic drugs are administered. Accidental intravenous (IV) injection is the most common cause of systemic local anaesthetic toxicity in man. Just as doses are calculated before anaesthetic drugs are administered, should maximum doses be calculated before the administration of local anaesthetics. Reported clinical toxicity cases in veterinary science are rare but does not imply that it does not occur. The use of dogs as laboratory models for local anaesthetic toxicity is common (Groban et al. 2001). A possible scenario for such toxicity in veterinary practice is the local infiltration for the suturing of large skin wounds in a toy dog breed.

Literature Review: Mechanism of action: Local anaesthetics block impulse conduction (depolarization) in various tissues such as nervous tissue, but also cardiac tissue. Non-ionised drug molecules diffuse from extracellular fluid through the cell membrane to the intracellular fluid in nervous tissue to block the Na-channel, thus preventing depolarization. Factors affecting toxicity: (i) Dose (i.e. mass). Forty ml of a 1% solution (=400mg) = 20ml of a 2% solution (= 400mg). Toxicity may occur after administering an overdose (max. dose not calculated) or as result of accumulation during continuous administration. (ii) Rate of absorption as influenced by the route of administration; and in decreasing order from IV, intercostal, interpleural, epidural, brachial plexus, and peripheral tissue. (iii) Distribution and metabolism. Ester local anaesthetics are metabolized in peripheral tissues and toxicity is rarely seen. Amide local anaesthetics are primarily metabolized in the liver. (iv) Acidosis (as induced by hypoxia or hypercarbia) increases intracellular ionized local anaesthetic and therefore prevents its removal from the cells (Wildsmith 2003). Nervous system: Early signs reported in man are numbness of the tongue and lips, light-headedness, or tinnitus, followed by slurred speech - all signs that may go unnoticed in veterinary patients. Sympathetic nervous activation results in an increase in heart rate, cardiac output and blood pressure. Onset of drowsiness is a sign of severe toxicity. Muscle twitching, loss of consciousness, convulsions (associated with excessive oxygen consumption) and apnoea rapidly result in acidosis and hypoxia. If resuscitation measures are not expediently applied, cardiac arrest is imminent. In laboratory models of toxicity the cumulative dose required to induce convulsive activity in dogs is 22 mg/kg for lidocaine and 5mg/kg for bupivacaine. The dose for irreversible cardiovascular depression is 3.5-6 times higher (Liu et al. 1983). Cardiovascular system: Local anaesthetics are just as toxic to cardiac tissue and may result in direct cardiac arrest without preceding nervous symptoms (Rosenblatt et al. 1980). Ventricular fibrillation was observed in man after accidental IV injection of the long acting local anaesthetic bupivacaine. This is somewhat contradictory to the traditional perception of local anaesthetics as anti-arrhythmics. As the QT interval is prolonged this may be a contributory factor in initiating ventricular fibrillation. Tissue toxicity: Nerve damage from the local anaesthetics is rare. Preservatives added to solutions such as sodium bisulphate may result in nerve damage. Trauma to the nerve may occur from mechanical damage of the needle or direct intraneural injections. Injection into a canal (e.g. infraorbital nerve block) should be done slowly to prevent pressure damage to the nerve. Prevention of toxicity: Maximum doses should be pre-calculated. Aspiration test should be performed before injection commences, and when large volumes are involved, should the aspiration test be repeated during injection. Continuous monitoring of the animal is essential for the early detection of adverse reactions. Treatment of local anaesthetic toxicity: signs of nervous excitation may be treated with a benzodiazepine such as diazepam or midazolam. Propofol may be considered but is limited by its cardiorespiratory depression. Administer oxygen with a mask and when consciousness is lost, intubate en ventilate. In the event of cardiac arrest should external cardiac massage be applied. To increase cardiac conduction, should adrenaline be administered. Intralipid may be administered as a 4ml/kg bolus followed by an infusion of 0.5ml/kg/min. for 10min. (Weinberg et al. 2003)

Discussion and Conclusions: High plasma concentrations of local anaesthetics may result in toxicity associated with neurological and cardiovascular dysfunction. Systemic local anaesthetic toxicity although rare in veterinary science may be fatal from cardiorespiratory collapse. Expedient treatment is necessary that may include cardiopulmonary resuscitation and Intralipid administration.


INDEX TEMS: Local anaesthetic, toxicity, intralipid.
and postoperative recovery. Indications for oral pain control include, but are not limited to tumors, reconstruction surgery, oral trauma, jaw fractures, root canal treatment, pulpotomies, extractions, and palatal defects (Goldstein 2002). The maxillary and mandibular nerves originate from the trigeminal nerve and supplies sensory fibers to bone, soft tissue and teeth. Regional nerve blocks allow reduction in the concentration of inhalant anaesthetic, which minimize the risk for hypotension, bradycardia and hypoventilation. This provides for a safer option, especially for geriatric patients that often require dental surgery. Patients recover faster, especially in day cases where the animals are to be send home on the same day. Pre-emptive analgesia furthermore decreases the requirement for systemic pain medication and improves postoperative comfort (Beckman & Legendre 2002, Skarda 1996).

Literature Review: Local anaesthetic drugs: Bupivicaine (0.5%). Rapid onset (10-15min), long duration (3-10 h) of action. Volume administered 0.1-0.5ml for dogs and 0.1-0.3ml in cats. The maximum total dose is 2mg/kg (Beckman & Legendre 2002). Ropivicaine (0.75%) is less cardiotoxic and should be safer to use, but no published data exists in animals. Mental Nerve Block: Bone, teeth and soft tissue rostral to the second premolar is affected. The mental foramen location varies depending on breed, size and species. In dogs it is found just caudal to the mandibular labial frenulum in the ventral third of the mandible on the buccal aspect. The foramen is normally easy to palpate. Aspirate and inject very slowly. Digital pressure for 60 seconds will ensure caudal diffusion of the drug into the mandibular canal. In cats, the middle mental foramen is located at the level of the mandibular labial frenulum and cannot be readily palpated (Beckman & Legendre 2002). Mandibular Nerve Block: The mandibular nerve supplies the bone, teeth, soft tissue, and tongue on the ipsilateral side. The mandibular foramen can be palpated intra-orally while the needle is advance extra-orally (Beckman & Legendre 2002). Cranial infra-orbital nerve block: The area affected will be dependant on the volume injected. The bone, soft tissue and teeth rostral to the maxillary first molar will be affected. The infra-orbital nerve branches from the maxillary trunk of the trigeminal nerve at the pterygopalatine fossa. The infra-orbital nerve gives off the caudal superior alveolar nerve before entering the infra-orbital canal. The caudal superior alveolar nerve then branches to supply the maxillary fourth premolar and molars. Once it enters the infra-orbital canal, the infra-orbital nerve branches into the middle superior alveolar nerve that innervates the premolars. The rostral superior alveolar nerve branch just before the infra-orbital nerve exits the infra-orbital canal to innervate the canine and incisor teeth. Unless the agent diffuses beyond the caudal borders of the infra orbital canal, adequate anaesthesia cannot be provided to the maxillary fourth premolars and molars. If anaesthesia to the caudal cheek teeth is required, the maxillary nerve block is used. It also provides anaesthesia to the hard and soft palate (Beckman 2002). The infra-orbital foramen is palpated as a bony ridge in the maxilla dorsal to the distal root of the third maxillary premolar in dogs, and is halfway between a line drawn from the apex of the canine tooth to the dorsal border of the zygomatic arch. In cats, the site of the infra-orbital foramen is palpated as a bony ridge dorsal to the second premolar just ventral to the eye, where the zygomatic arch meets the maxilla (Goldstein 2002). In cats the needle should not be advanced into the foramen as the feline infra-orbital canal is short, and the needle may cause trauma to the orbit (Carmichael 2004). Maxillary nerve block: The maxillary nerve supplies the fourth premolar, molars, soft tissue and palatal tissue caudal to the maxillary premolars. The nose is supplied as well (Beckman 2002). The maxillary nerve enters the maxillary foramen and the infra-orbital canal from the pterygopalatine fossa. The needle is inserted perpendicular to the horizontal line of the palate directly adjacent to the bone at the ventral border of the zygomatic arch. In a dorsal and medial direction, walk the needle slightly rostral along the rostral side of the maxilla to a level just beyond the root tips of the last molar (Goldstein 2002). Alternatively - as for the infra-orbital nerve block, but additional bupivicaine is used. Inject slowly and apply digital pressure to encourage caudal flow to reach the mandibular nerve where it enters the infra-orbital canal. Even though this is easier, damage to the maxillary artery, vein and nerves may occur. With inadequate infiltration - only the soft tissue and teeth cranial to the 4th premolars will be blocked (Goldstein 2002). Palatine block: The palatine nerve innervates partially the maxillary incisors, canines and premolars. This block is recommended in cats. Most of the innervation to the maxillary arch comes from the infra-orbital nerve, and the palate block only offers some degree of anaesthesia. This block in dogs should be combined with the infra-orbital block. The foramen is found at a midpoint between the mesial aspect of the maxillary carnassial tooth and the palatal midline (Carmichael 2004). Additional drug therapy: For post operative pain control (Rochette 2001), the analgesic should vary depending on the anticipated level of discomfort. Stomatites, multiple extractions, hard or soft palate manipulation should be assumed to have a high level of pain. Opioids are excellent in controlling severe pain. Butorphanol has a duration of 1–2 h, morphine 2-4 h, buprenorphine 8–10 h. Fentanyl patches are an option in severe pain. NSAIDS. Carprofen is a popular choice.

Discussion and Conclusion: With frequent use, regional nerve blocks can become a valuable part of the anaesthetic protocol, improving patient safety and comfort.


INDEX TERMS: Bupivacaine, dental nerve blocks, ropivacaine.
Introduction: Anesthesia is relatively safe in the 21st century; even for the most debilitated patients. Some veterinarians do not perform oral procedures due to perceived anesthetic risks for patients with systemic disease. Paradoxically, these are probably the patients that need the treatment the most. Veterinary dentistry requires general anesthesia and intubation. Perioperative planning for systemic medical issues, anticipated pain, duration of the procedure, risks to animal and veterinarian, species differences, and postoperative treatments are necessary. Multimodal-balanced anesthesia to maximize analgesia/anesthesia and minimize the deleterious individual drug side effects is recommended. Selecting and individualizing patient drug protocols is essential. Anesthesia trend monitoring with equipment and physical parameters can maximize patient safety. Thermoregulation is necessary to maintain patient warmth and prevent sequelae to hypothermia.

Literature Review: Planning begins with principles of multimodal pain management (Ko 2004, Beckman 2006) and balanced anesthesia(Thurmon 1996) to minimize individual drug side effects and maximize each drug benefit.(Woolf 1993) Balanced anesthesia is a state of unconsciousness, muscle relaxation, and analgesia. Neuroleptanalgesia (Muir 1998) involves choosing a combination of a neuroleptic and an analgesic in order to obtain hypnosis and analgesia for chemical restraint. There is no excuse for not having an appropriate armamentarium of anesthetic medications. Patient assessment involves signalment, duration of disease, concurrent disease, previous anesthetic history and physical exam.(Thurmon 1996) The body condition score needs to be considered.(Morgan 1997) Obese patients have diminished ventilatory function and need to be dosed on estimated lean body weights. The cachexic, anorexic patient is physiologically stressed and may have little metabolic reserves for anesthesia. The cardiovascular system should be evaluated for murmurs, pulse deficits, arrhythmias, mucous membrane colour, and capillary refill time. Abnormalities necessitate further diagnostics such as thoracic radiographs, echocardiography, and/or electrocardiogram. The pulmonary system needs to be evaluated for rate, character, and effort. Abnormalities may warrant further diagnostics with thoracic radiographs. Brachycephalic airway syndrome (elongated soft palate, stenotic nares, collapsing trachea, and everted laryngeal sacculs) (Koch 2003) is common. Due to the malocclusion and rotation and crowding of the teeth, these patients often present for periodontal abscission and airway surgery. The hepatic and renal systems must be evaluated in all patients since these organ systems are involved in clearance of medications associated with anesthesia. All patients should have their packed cell volume, total protein, blood urea nitrogen, and glucose evaluated. Obviously, older and more debilitated patients should have a complete blood count, chemistry panel, and urinalysis to screen for underlying conditions. The nervous system, gastrointestinal system, endocrine, integumentary, ophthalmic, and musculoskeletal system need evaluation. Finally, the temperament of the patient must be known. The physical status of the patient can be categorized by the American Society of Anesthesiologists classification scheme (I, II, III, IV, V, E) (Muir 1995). The feline and canine patient should be fasted for 8-12 hours to diminish the likelihood of regurgitation and aspiration. Water can be allowed up to the time of anesthesia. There are few dental and oral surgery emergencies. Therefore, the patient should have preexisting abnormalities corrected prior to anesthesia. Preanesthetic medications decrease patient anxiety, provide chemical restraint, diminish dosages of other drugs, provide pre-emptive analgesia, and block adverse effects of other drugs. Classes of preanesthetic drugs (Brock 1998) include major tranquilizers such as phenothiazines (acepromazine), minor tranquilizers (benzodiazepines) such as diazepam, midazolam, and zolazepam, alpha-2 agonists (medetomidine) (Paddleford 1999), opioids (pure agonists: morphine, oxymorphone, fentanyl, and hydromorphone), (partial agonists: butorphanol and buprenorphine (Taylor 1999)), and dissociative anesthetics (ketamine and tiletamine). An anticholinergic such as glycopyrrolate or atropine can be chosen to counteract the bradycardic effects of opioids and to decrease oral salivary secretions for the dental procedure. Induction agents(Brock 1998) include propofol (Branson 1994, Bufalari 1998, Short 1999, Matthews 2004), ketamine/diazepam, tiletamine/zolazepam, etomidate, and opioid inductions. Better yet, combinations of low dose ketamine, diazepam, and a touch propofol can provide smooth inductions as well as act in multimodal analgesia with ketamine preemptively blocking the NMDA central receptors (Wagner 2002, Beckman 2006). Propofol is a good induction agent for outpatient dental procedures. However the apneic and negative inotropic effects must be taken into consideration. Cardiac patients may experience the negative inotropic effects and have difficulties with blood pressure. An etomidate or opioid induction is a better alternative in the cardiac patient. (Brock 1998, Harvey 1999, Pablo 1999) Prior to induction the anesthetic machine should be checked for proper function. Anesthetic machine maintenance is necessary for delivery of safe anesthesia. Carbon dioxide absorbing granules must be changed frequently. Gas anesthetics include halothane, isoflurane, and sevoflurane. (Clarke 1999, Harvey 1999, Galloway 2004). If using halothane, intraoral analgesia and gingival retraction cords should not contain epinephrine since catecholamine induced arrhythmias may occur (Mealey 1999). Local analgesia should be utilized for all dental procedures. Intraoral analgesia is part of a multimodal pain approach and decreases inhalant gas anesthetic requirements (Beckman 2002, Lantz 2003, Carmichael 2004). Post-operative pain can be controlled by diminishing central sensitization in the spinal cord before a painful stimulus occurs (Woolf 1993, Wolfe 2003, Savage &Henry 2004). Regional analgesia will decrease transmission of painful stimuli to the central nervous system from surgical pain.
stimulation (Beckman 2006). Intravenous catheter placement must occur in each patient. The catheter provides access for administration of anesthetic medications, intravenous fluids (Brock 1998, Broadstone 1999), and emergency situations. Crystalloid solutions are administered intravenously to all dental patients. A starting guideline is to administer crystalloids at 10ml/kg/hr during anesthesia. Additionally, colloidal solutions such as hetastarch may be necessary in uncorrectable hypotensive patients. Blood products such as packed red blood cells may be necessary for surgeries where the major palatine, infraorbital, or mandibular artery may be compromised. Anesthetic monitoring is important to prevent critical changes in a patient’s physiological status. It is recommended to address physiological and pathological complications before they happen rather than when they happen. Particular areas of concern include hypoxia, hypercapnia, hypotension, and hypothermia which increase the risk for deaths as well as postsurgical secondary complications. Many anesthetic medications depress the respiratory and cardiovascular systems. Subjective evaluations include jaw tone, palpebral reflex, mucous membrane and capillary refill time (only estimates perfusion - anemic and poorly perfused animals can have relatively normal mucous membranes and CRT and be in serious danger), respiratory rate and character, and heart rate and rhythm. Objective anesthesia monitoring [pulse oximetry (SpO₂), capnography (End Tidal CO₂), blood pressure, electrocardiogram (ECG), and blood gas analysis] is available in most hospitals. However, it is the author’s pet peeve when veterinary technicians and veterinarians spend several minutes after induction setting up the electronic monitoring devices without patient assessment. SpO₂ is a mathematical calculated estimate of hemoglobin-oxygen saturation measured by infrared light (indirect measurement of oxygen saturation) (Wright 1996, Grosenbaugh 1998b). Hypovolemia, motion, pigment, placement, and anemia can result in inaccurate readings. The SpO₂ should be between 95-100% in patient breathing oxygen under anesthesia. End Tidal CO₂ is a graphic display of carbon dioxide pressure over time (indirect measurement of carbon dioxide partial pressure) that allows assessment of ventilation, the breathing circuit, and ventilation-perfusion function in the lungs (Wright 1996, Grosenbaugh 1998c). End Tidal CO₂ should be between 35-45 mmHg. Blood pressure can be measured indirectly (via cuff) or directly (via arterial catheter attached to a transducer) (Meurs 1996, Grosenbaugh 1998a). Pressure changes are as important as the actual pressures. Blood pressure can be related to the depth of anesthesia, blood volume, strength of cardiac contraction, and systemic vascular resistance. The minimum mean arterial blood pressure should not drop below 60 mmHg in order for the kidneys, brain, lungs, and heart to maintain perfusion. Blood gas analysis to assess pH, PaO₂, PaCO₂, bicarbonate, and electrolytes can be assessed with an ÄRTERIAL blood sample evaluated on an ISTAT machine. The ECG allows assessment of electrical activity of the heart not the mechanical function. It allows for identification of specific arrhythmias. Thermoregulation is important in the dental patient. The patients are often small, under anesthesia for 1-2 hours, and experiencing coolant from ultrasonic scalers and high speed dental drills. Heat is lost via radiation, convection, evaporation, and conduction. Hypothermia (Muir 1995, Thurmon 1996) can affect the central nervous system (prolonged recovery), cardiovascular bradycardia (not anticholinergic responsive), gastrointestinal (ileus), respiratory (depression, acidosis, apnea), and metabolic systems (decreased clotting and decreased immune system functions). Rectal temperature is affected by regional blood flow and may be 1 degree Celsius less than the core temperature. Esophageal temperature monitors may more accurately reflect core temperature. PREVENTION of hypothermia is the best treatment. Force air heating systems, circulating water blankets, and intravenous fluid warmers can be utilized for prevention of heat loss. Ambient temperature should be considered. A cool room with the air conditioning vent near or over the dental area can dramatically cause hypothermia despite warming devices. Electrical heating pads, heat lamps, and radiating heaters should not be utilized due to the risks of thermal burn injuries.

**Discussion and Conclusions:** Anesthesia can be performed safely on most, if not all, dental and oral surgery patients. Patient assessment and balanced-multimodal anesthesia is critical to outcome. Assessment of the anesthetic patient is a dynamic process. Changes in monitoring parameters are as important, or more important, than the actual parameters at any given time. Infrequent and limited monitoring can be detrimental to the patient. Consultation with a veterinary anesthesiologist can assist with high risk patients. Anesthesia is a team approach. A veterinarian and a veterinary technician should be present for the entirety of each procedure to perform the dental and anesthesia safely.

An oronasal fistula (ONF) is a communication between the oral and nasal cavity. A fistula is defined as a communication between two epithelial surfaces (Noden 1985). Communication with the oral cavity and nasal cavity can occur with periodontal disease, loss of any of the maxillary teeth, trauma, electrical burns, cleft palates, neoplasia, and/or maxillectomy site dehiscence. The communication most often occurs with the loss of the maxillary canine teeth (Harvey 1985). Anatomically the maxillary teeth are closely associated with the nasal cavity (Evans 1993). A vertical periodontal palatal pocket of 104 and 204 can lead to destruction of the thin bone separating the root apices and the nasal cavity (Manfra-Marretta 1992). Oral stratified keratinized squamous epithelium and the nasal stratified cuboidal epithelial cells is necessary to cover the nasal surface of the defect, respectively (Dellman 1993, Wiggs 1997). Without correction of the fistulae, oral bacteria, food, and fluids will communicate with the nasal cavity and cause a chronic rhinitis, infection, and morbidity. Repair techniques of ONF include single buccal mucoperiosteal flaps, palatal and labial buccal pedicle flaps, split U-flaps, rotational palatal flaps, and advancement flaps (Marretta 1988, Smith 2001, Holmstrom 2004, Marretta & Smith 2005, Van de Wetering 2005). For oronasal defects secondary to periodontal disease of teeth 104 and 204, a single buccal mucoperiosteal flap is adequate for primary repair. With large defects or failures, an inverted double palatal and buccal sliding flap can be utilized to close the defect. With large defects secondary to cleft palates, trauma, burns, and neoplasia other aforementioned techniques are often utilized.

**Literature Review:** A single buccal mucoperiosteal flap is utilized when attached gingiva remains to provide strength for suturing. A periodontal flap creates visibility of the underlying bone and root surface by surgically separating gingiva or mucosa from the underlying tissues (Newman 2002). Visualization of the bone defect into the nasal cavity is necessary to debride the necrotic bone margins and to remove communicating epithelium. A full thickness flap includes all the overlying soft tissue and the periosteum (Newman 2002). Full thickness flaps are stronger, less painful, and have less post-operative swelling (Eisner 1997). The goal of surgical intervention is to provide an epithelial surface on the nasal and oral sides of the flap (Smith 2000). Migration of nasal epithelial cells is necessary to cover the nasal surface of the flap. During creation of periodontal flaps, vascularization must be preserved to ensure appropriate healing. The dorsal and ventral labial arteries and the angular artery provide vascularization of the buccal mucosa (Smith 2000). Long narrow flaps may have inadequate blood supply and lead to necrosis of tissue at the tip of the flap (Luskin 2000). A broad based flap would help preserve vascularization to the tissue. The margins of the ONF are excised using a scalpel blade to remove the epithelium and create fresh bleeding margins for reattachment. Fresh vascularized margins will allow first intention healing to occur. Creating fresh margins with scissors can bluntly crush tissue (Luskin 2000) and damage the microvascular supply leading to delayed second intention healing. The mucoperiosteal flap is elevated using a periosteal elevator directed toward the bone and moving in an apical direction. Care is taken not to perforate the mucosa which will diminish the success of the procedure (Bojrab 1990). Closure of flaps without tension is very important. Tension can be released by harvesting a large broad based flap, releasing underlying connective tissue and periosteum, and using a walking suture technique (Luskin 2000). A broad flap is created from distal 103/203 to distal 105/205. The periosteal flap is released by carefully transecting the periodontal ligament fibers at the base of the flap. Transection of these fibers allows the alveolar mucosa to stretch and the mucoperiosteal flap to cover the defect without tension. The flaps are initially apposed and sutured at the vertical margins to the palatal mucosa. After the flap is anchored, the fresh margins of the palatal mucosa and free margin of the mucoperiosteal flap are sutured. Finally, the vertical releasing incisions are sutured in apposition. The simple interrupted sutures are placed approximately 2-3mm apart and no less than 2-3mm from the incision (Newman 2006). Closure of the flap is achieved with poliglecaprone, polyglyactin 910, or
chromic gut. Polyglactin 910 is a braided multifilament (Slatter 1993) which has the potential to wick bacteria. Monofilament sutures withstand bacterial contamination from surgical sites better than multifilaments (Boothe 1998). Polidoxanone is not an appropriate suture for the oral cavity due to its long degradation time and potential to cause foreign body reactions (Slatter 1993, DeNardo 1996, Boothe 1998). Normally, poliglecapron on a precision point-reverse cutting needle is chosen for oral surgery by the author. - The double-flap technique is often utilized following a previous single flap failure, to cover large defects, or when insufficient attached gingiva is present for suture anchorage. However, if the previous single flap failure was due to inappropriate flap size or disregard for flap principles, a broader based flap with adherence to principles can often resolve the defect without a double-flap technique. The double-flap provides and epithelial surface to the nasal cavity. With this technique, a full thickness palatal flap is created by incising the palatal mucosa parallel to the mesial and distal margins of the defect near or past the midline of the palate. (Holmstrom 2004) The midline incisions are extended buccally toward the fistula. Hemorrhage will occur due to a branch of the palatal artery (Evans 1993). Digital pressure is often sufficient to control the minor hemorrhage. If necessary, the branch can be ligated. The palatal flap is elevated with a periosteal elevator and inverted to cover the fistula. The hinge of the inverted flap is adjacent to the palatal margin of the fistula. A buccal mucoperiosteal flap is then created, as above, and sutured to the palatal flap. The palatal defect is allowed to heal by second intention. Care should be taken with a full thickness flap in the rostral oral cavity to not expose the nasopalatine foramen. If necessary, a partial thickness flap may be needed in the region. If there is insufficient tissue to create the buccal mucoperiosteal flap to cover the palatal flap, a partial thickness sliding buccal pedicle flap can be created (Holmstrom 2004). Two distal to mesial incisions can be created in the alveolar mucosa. The more apical incision should be made just coronal to the mucogingival junction. The width between the two incisions should be 1.5 to 2 times the diameter of the defect to cover. The incisions are extended mesially to obtain the appropriate length and connected mesially with a perpendicular incision (apical-coronal). Care should be taken to preserve the vascular supply in the flap. The pedicle flap is rotated and sutured over the palatal flap. The mucosal defect is then sutured closed. - Regardless of the flap repair, the patient should receive antibiotics for 10 days, soft food for 14 days, 0.12% chlorhexidine rinse for 10-14 days, no toys for 14 days, minimal client and handling of the flap, and an Elizabethan collar to prevent the patient for pawing at the incisions. A recheck to evaluate the flap in 14 days is recommended. (Holmstrom 2004)

**Discussion and Conclusions**: Success of periodontal flaps is contingent on proper surgical techniques and understanding principles of periodontal surgery. Attached gingiva, incorporated periosteum, tension free flaps, and no sutures over bone defects are necessary to increase success of mucoperiosteal flaps. (Eiser 1997; Newman 2006) Furthermore, owner and patient compliance is an additional factor that must be considered. Oronasal fistulas are common findings in canine patients with severe periodontal disease of the maxillary canine teeth. Appropriate extraction techniques and mucoperiosteal flap repair will often solve the pathological communication. However, if the owner and patient are noncompliant, principles of periodontal surgery are not followed, and inappropriate suture materials are selected, the patient may develop a communication between the oral and nasal cavity.


INDEX TERMS: Oronasal fistula, single buccal mucoperiosteal flap, double inverted palatal flap.

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**064. Surgeon T.W. 2007. Indications planning and ethical considerations for orthodontic treatment. Pesquisa Veterinária Brasileira 27(Supl.). ANC. Veterinary Center, 1 Cottage Place, New Rochelle, New York 10801, USA. E-mail: surgeon668@cs.com**

**Introduction**: The identification of an orthodontic problem rests with both the Veterinarian and the client. In early puppy or kitten life a number of genetic/developmental conditions may be manifest. Frequent oral examinations during this early phase will dictate the need for Guidance of the occlusion (interception). **Literature Review**: The indication for orthodontic intervention is based on an understanding of the accepted nor-
mal anatomical variance among the breeds and the sequence of dental events that occur in the early stages of a pet's life. Timing of orthodontic intervention is an important consideration. There are instances in which early orthodontic therapy is justified, necessary and prudent. However the tendency of early termination necessitating retreatment is higher when the early intervention option is chosen, thereby lengthening the treatment period. Guidance of occlusion by the timed extraction of primary teeth so that the permanent teeth can erupt into a favorable occlusion, intercepting in part, the occurrence of a major malocclusion. A malocclusion may contribute to both oral discomfort and periodontal disease. In areas that are out of occlusal alignment, making the self cleaning mechanism dysfunctional, excessive plaque accumulation occurs. Although a malocclusion can compromise oral function, this condition is dysfunctions, excessive plaque accumulation. Although the condition of minor consequence for the 21st century pet which has all its food provided by the owner. Malocclusion is not a disease, rather is a disability with a potential influence on physical health which can be averted by appropriate therapy. Treatment Planning: The initial step in treatment planning is prioritizing the existing problems and deciding in which order to strategize the procedures. Force application needs to be determined, whether to use continuous, intermittent or interrupted force duration. The goal in treatment planning is to predict accurately the final resting position of the tooth/teeth that are to be moved and the need for retention until both the soft and hard tissues have stabilized. The visualization of this goal can be accomplished using models or computer generated imaging modalities photography and radiography to facilitate a three dimensional conceptualization of the task ahead. The ultimate objective of orthodontic therapy is to obtain an optimal occlusion that facilitates normal function and physiologic adaptation. A good working knowledge of the biomechanics and physiologic principles governing tooth movement is essential for success. It is also imperative to understand the genetic, developmental and environmental forces that can impact the functional occlusion of our patients so that an autonomous rather than a paternalistic approach can be taken during the dialog with clients. The eventual outcome is invariably more predictable when the client is an integral part of the decision making process. Ethical Considerations: The obligation of the orthodontist as stipulated in the American Association of Orthodontists Code of Ethics (1998) is "to perform the highest quality orthodontic service within his/her power while respecting the patient's right to decide the treatment best suited to personal needs". The ADA (1998) Principles of ethics state, "The Dentist's primary professional obligation shall be service to the public. The competent and timely delivery of quality care within the bounds of the clinical circumstances presented by the patient, with due consideration being given to the needs and desires of the patient shall be an important aspect of that obligation". The AVMA Principles of Professional Ethics states, "It is unethical to perform a procedure for the purpose of concealing a congenital or inherited abnormality that sets the animal apart from the normal as described for the breed. Any procedure that will alter the natural dental arcade is unethical. Should the health and welfare of the individual patient require correction of such genetic defects, it is recommended that the patient be rendered incapable of reproduction". Ethical and Professional Standards Statement: AVDC endorses the AVMA Principles of Veterinary Medical Ethics and the American Board of Veterinary Specialties statement that members of ABVS-recognized colleges are to "Demonstrate unquestionable moral character and ethical professional behavior".

Discussion and Conclusions: The early recognition of occlusal problems and the early intervention to correct them will result in a more comfortable lifestyle for the pet and a worry free existence for the owner. It is an ethical obligation. It is our collective responsibility to ensure that undesirable genetic traits are not perpetuated in the species that we service.


INDEX TERMS: Orthodontics, treatment planning, ethics.
is not only more economically feasible for the client but involves less anesthetic episodes for the patient. Clients that must travel long distances are truly appreciative of having the consultation the impression and device placed at a single visit. Elastic wire can be placed on the initial visit. Lab Fabricated devices on the other hand require an additional anesthesia for the impression and model with subsequent anesthesia for placing of the appliance when it returns from the lab. A third anesthesia episode is required to remove the appliance.

066. Valduga M.I.R. 2007. Pets Dental Care Campaign: dream or reality? Pesquisa Veterinária Brasileira 27(Supl.). Odontocão, Curitiba, PR, Brazil. E-mail: hel@odontocao.com.br

Introduction: Odontocão, a Veterinary Dental Care Clinic, in the course of 10 years taking care of dental problems in dogs and cats noted that owners don’t know that the majority of their pets have some kind of dental disease. To help clarify and spread the need to take care of the pets’ oral health, Odontocão developed in 2006, from May to August a dental care campaign in Curitiba, Paraná, Brazil. The campaign goals were make a study about the dental condition of the pet population in Curitiba, inform about the importance of dental care and clarify that pet life quality is connected to oral health.

Materials and Methods: Twenty pet shops were selected to participate in the campaign. The shops received the campaign materials as follow: banner about the campaign that had the number of participants and the name of the pets that were selected in the contest to receive the weekly prizes; folders about the campaign (prevention tips, how-to’s, teeth brushing tips, etc); and coupons to identify the pets and to be used as a ticket to participate in the contest. The pet that was selected received a dental care kit and oral exam at Odontocão. Every pet that brushed their teeth were then add to the campaign numbers showed in the banners.

Results: During the campaign period 7,440 pets had their teeth brushed. From the pets that received the oral exam: 1.5% had good oral health, 2% neck lesion, 2.5% dental fracture, 11% persistent deciduous and 83% periodontal disease. From the 1.5% pets that had good oral health, 98% of them were less than one year old.


INDEX TERMS: Dental care, campaign, periodontal disease.


Introduction: The goal of periodontal therapy is to protect and maintain the patient’s natural dentition over his lifetime for optimal comfort, function and esthetic appearance (Zander et al. 1976, Carranza et al. 2002). After periodontal or oral surgery, healing proceeds by repair or regeneration. Repair is the healing of a wound by tissue that does not fully restore the architecture or function of the affected unit, whereas regeneration is reproduction or reconstitution of a lost or injured part (American Academy of Periodontology 2001). The aim of regenerative periodontal procedures is to induce regeneration at the alveolar bone and cementum and to develop a new functional periodontal ligament (Giannobile et al. 1996, Camargo et al. 2002, Carranza et al. 2002).

A recent innovation in dentistry is the preparation and use of platelet-rich plasma (PRP), a concentrated suspension of the growth factors found in platelets. These growth factors

Pesq. Vet. Bras. 27(Supl.), April 2007

**Materials and Methods:** Preoperative PRP preparation. PRP is prepared in a laboratory or a surgical suite from blood collected from a venous puncture in the immediate preoperative period because surgery itself leads to platelet activation of the coagulation system (Marx et al. 1998, Man et al. 2001, Gonshor et al. 2002). Recent publications have indicated that PRP prepared from 8 to 10 mL of whole blood is sufficient for periodontal regenerative therapies (Weibrich et al. 2001, Camargo et al. 2002, Lekovic et al. 2002). However, in oral and maxillofacial reconstruction, 8 to 500 mL of whole blood should be drawn, so as to obtain the greater amounts of PRP needed for larger surgical defects (Marx et al. 1998, Man et al. 2001, Gonshor et al. 2002). The blood sample is drawn into a citrated tube (1 mL of citrate phosphate dextrose to 5 mL of blood) (Marx et al. 1998). If more than 8mL is needed (e.g., for larger defects), more than one tube of blood should be drawn. The sample tube is then spun in a standard centrifuge (gradient density centrifugation process) for 10min at 3,500rpm to produce platelet poor plasma (PPP), red blood cells anduffy coat or platelet rich plasma (it contains between three to tenfold over baseline native concentration of platelets) that contains platelets and leucocytes, acting like an autologous antibiotic. Because of differential densities, the red blood cell layer forms at the lowest level, the PRP layer in the middle, and the PPP layer on the top (Marx et al. 1998). The PPP is taken up into a syringe with a long cannula and an additional air-intake cannula. Than we removed the supernatant (upper platelet poor plasma zone) and the centrifuge speed is lowered to 2,400rpm (14 minutes) to obtain a real separation between the red blood cells on the bottom and the buffy coat on the supernatant. The second supernatant is also taken up by a long cannula and an air-intake cannula. For each 8mL of blood, the volume of supernatant is about 0.6-0.7mL; this is the PRP, to be used for the surgical procedure. At the time of the application, the PRP is combined with an equal volume of a sterile saline solution containing 10% calcium chloride (a citrate inhibitor that allows the plasma to coagulate) and 5,000 U of sterile bovine thrombin (an activator that allows polymerization of the fibrin into an insoluble gel, which causes the platelets to degranulate and release the indicated mediators and cytokines); the result should be a sticky gel that will be relatively easy to apply to the surgical defects (Man et al. 2001, Camargo et al. 2002, Lekovic et al. 2002). The PPP can be stored for use as a protective barrier over the wound. The addition of thrombin and calcium to PRP results in activation of the clotting cascade with conversion of fibrinogen to fibrin, and also the activation and subsequent degranulation of the platelets.

**Results:** The platelets become trapped in the fibrin mesh, secreting their contents and stabilizing the clot via receptors for fibrin, collagen and adhesive glycoproteins. The fibrin matrix that results is that of a native fibrin clot, allowing normal cellular infiltration of monocytes, fibroblasts and other cells critical to wound healing. A number of substances released by degranulated platelets contribute to their role in primary haemostasis. They include: serotonin, catecholamines, ADP, ATP, fibrinogen, fibrinectin, factor V, Von Willebrand factor VII, Thromboxane A2, and calcium. Of equal and perhaps greater importance is the release by platelets of a number of growth factors that enhance body’s wound healing. They include: Platelet-Derived Growth Factor (PDGF), Transforming Growth Factor-alpha and beta and (TGF-â) (TGF-á), Platelet-Derived Endothelial Cell Growth Factor (PD-ECGF), Platelet-Derived Angiogenesis Factor (PDAF), Inulin Like Factors I and II (IGF I), (IGF-II), Acid and Basic Fibroblasts Growth Factors (aFGF) (bFGF), Bone Morphogenetic Proteins (BMPs 1-15), Epidermic Growth Factor (EGF), Interleukins (IL-1-22), Parathyroid Related Protein (PTHRP), Cement-Derived Growth Factor (CDGF), Adhesion Factors (fibronectina, osteopontina, bone sialoprotein), Conjunctive Peptide III Activator (CTAP-III), Vascular Endothelial Growth Factor (VEGF) and Colony Stimulation Growth Factors (CSF-G; GM and M) (Appel et al. 2002).

**Discussion and Conclusions:** PRP is a new application of tissue engineering and a developing area for clinicians and researchers. It is a storage vehicle for growth factors, especially PDGF and TGF-â, both of which influence bone regeneration. Although the growth factors and the mechanisms involved are still poorly understood, the ease of applying PRP in the dental clinic and its beneficial outcomes, including reduction of bleeding and rapid healing, hold promise for further procedures. Most important, this autologous product eliminates concerns about immunogenic reactions and disease transmission. Animal studies and recently published human trials have demonstrated successful results. More welldesigned and properly controlled studies are needed to provide solid evidence of PRP’s capacity for and impact on wound healing, soft-tissue reconstruction and (in combination with bone grafts) augmentation procedures, especially in oral and periodontal therapy.

Introduction: The goal of periodontal therapy is to protect and maintain the patient’s natural dentition over his lifetime for optimal comfort, function and esthetic appearance. (Zander et al. 1976, Carranza et al. 2002). After periodontal or oral surgery, healing proceeds by repair or regeneration. Repair is the healing of a wound by tissue that does not fully restore the architecture or function of the affected unit, whereas regeneration is reproduction or reconstitution of a lost or injured part. (American Academy of Periodontology 2001). The aim of regenerative periodontal procedures is to induce regeneration at the alveolar bone and cementum and to develop a new functional periodontal ligament. (Giannobile et al. 1996, Camargo et al. 2002, Carranza et al. 2002).

A recent innovation in dentistry is the preparation and use of platelet-rich plasma (PRP), a concentrated suspension of the growth factors found in platelets. These growth factors are involved in wound healing and are postulated as promoters of tissue regeneration, including those in the periodontal area. (Anitua et al. 1999, Man et al. 2001, Petrucco et al. 2001, Aghalo et al. 2002, Camargo et al. 2002, Carlson et al. 2002, Lekovic et al. 2002). This review focuses on PRP, an autologous, economic and safe substance with significant benefits in Dentistry on several fields as implantology, periodontology, oral and maxillofacial surgery, among others, to enhance wound healing and regeneration (Pierce et al. 1991, Marx et al. 1998, Man et al. 2001, Kim et al. 2002). The purpose of this study was to prove the effect of the soft laser compared to the PRP in the reconstruction and healing of hard and soft periodontal tissue after periodontal reconstructive surgery.


INDEX TERMS: Blood platelets, growth factors, periodontal regeneration.


INDEX TERMS: Platelet Rich Plasma, periodontal regeneration.


Introduction: The goal of periodontal therapy is to protect and maintain the patient’s natural dentition over his lifetime for optimal comfort, function and esthetic appearance. (Zander et al. 1976, Carranza et al. 2002). The aim of regenerative periodontal procedures is to induce regeneration at the alveolar bone and cementum and to develop a new functional periodontal ligament. (Giannobile et al. 1996, Camargo et al. 2002, Carranza et al. 2002). The last decade has seen an explosion of research work in the application of laser technology to general dental practice. Despite the many advantages which ‘hard’ or ‘hot’ surgical lasers (such as CO2, Nd:YAG and Er:YAG) offer for tooth-related procedures, issues such as instrument costs and the potential for thermal injury to dental pulp from thermal changes, have limited the uptake of this technology in general dental practice (Walsh et al. 1994, Pick et al. 1995). At the opposite end of the equipment spectrum are the semiconductor diode lasers, which are sometimes referred to as ‘cold’ or ‘soft’ lasers. In medicine and dentistry, diode lasers have been used predominantly for applications which are broadly termed low level laser therapy (LLLT), biostimulation or “biomodulation” (The latter term is more appropriate, since the therapy can not only stimulate, but also suppress biological processes) (Goldman et al. 1987) however, there is controversy surrounding the effectiveness of some of these procedures (Nemeth et al. 1993, Basford et al.1995). Low-level laser therapy (LLLT) refers to the use of red-beam or near-infrared nonthermal lasers with a wavelength between 600 and 1000nm power from 5-500 milliwatts. In contrast, lasers used in surgery typically use 300 watts. These types of lasers have been advocated for use in wound healing (Borgogna et al.1983, Armida et al.1989, Braeck et al. 1991, Hall et al.1994). The exact mechanism of its effect is unknown; however, hypotheses have included improved cellular repair and stimulation of the immune, lymphatic and vascular systems. The purpose of this study was to prove the effect of the soft laser in the reconstruction and healing of periodontal tissue after periodontal reconstructive surgery.

Materials and Methods: In this experiment 5 Beagle dogs were used. The procedure was the following: 7mm large periodontal defects were created in the mandibular vestibular face at the 4th premolar and the 1st molar. The root surfaces were then instrumented to remove all cementum and the wounds immediately closed by replacing and suturing the flaps just coronal to the cementum-enamel junction. All the defects were filled up with collagen, and during a period of 4 weeks, 5 days a week, the teeth were treated with soft laser only on experimental side. The dogs were sacrificed 16 weeks postsurgery. Histometric recordings included height and area of alveolar bone regeneration, height of cement regeneration, connective tissue repair, and junctional epithelium. We evaluated the bone regeneration, the dental cement regeneration, the new PDL, the collagen sponges persistence, root resorption and/or ankylosis histologically (Wikesjo, 1991). Group means, standard deviations, and P values are shown (Student t test; n=5 y ÷2; n=2).

Results: The size of regeneration with laser measured 1.8 + 0.5 against 2.3 + 0.8 on control (ns). Bone-values with laser were 2.1 + 0.8 against 2.7 + 1.0 on control (ns). The regenerated cement measured 1.7 + 0.5 with laser against 2.8 + 0.8 on control (p=0.006). The junctional epithelium measured 2.7 ± 1.1 with laser against 2.8 + 0.1 on control (ns). The connective tissue repair measured 2.2 + 1.0 with laser against 1.6 + 0.4 on control (p=0.04). Ankylosis was 0.0 + 0.0 with laser against 0.0 + 0.0 on control (ns). One could find root resorption on 12/20 with laser against 17/20 on control. The irradiated bone presents architectural disorganization and an intense activity of bone remodelling. We could see some empty osteocytes lacunes and some osteocytes nucleus in picnosis or cairosis. The PDL presents a few density of functionally oriented periodontal fibers and was poorly irrigated. We couldn’t find collagenous vehicles in both the experimental and the control groups.

Discussion and Conclusions: These various treatment procedures are used to treat a wide range of medical conditions. There does not appear to be standards regarding the dose, number of treatments or the length of treatment. Controlled clinical studies have demonstrated that while LLLT is effective for some specific applications, it is not a panacea. Our data suggest that laser helps with the soft tissue cicatrization but it stops the bone regeneration.

Introduction: Periapical diseases of teeth in horses can end up causing fistulous tracts with purulent secretion that can persist and become chronic even with the administration of antibiotic treatment. In these cases, nowadays there are two possible treatments: exodontics or apicoectomy. Exodontics in horses should be considered the last option because the absence of a dental piece may unstabilize the rest of the teeth, push the pieces, form beaks, and cause overgrowth (Kirkland et al. 1996, Baker 1999). This would require periodic controls and treatments for the rest of the animal’s life; therefore whenever the tooth does not present mobility and periodontal tissue is healthy, apex resection should be the choice. Apicoectomy permits the maintenance of the tooth for a long time and, therefore maintain the stability of the oral cavity (Kirkland et al. 1996, Baker 1999, Steenkamp et al. 2005). The percentage of success of the apicoectomy in horses varies in 36 to 84% as a consequence of the complexity of the pulpar chamber, the difficulty to clean it completely and most importantly the difficulty to seal adequately the apex (García et al. 1990, Kirkland et al. 1996, Baker 1999, Steenkamp et al. 2005).

Materials, Methods and Results: Case 1. A young female Shetland pony, presented a chronic fistulae with purulent secretion in the infraorbital region. In the oral examination nothing was found that could justify the lesion. In the oblique x-ray a radiolucence periapical area was seen in the distal root of piece 207. An apicoectomy of both of the roots of piece 207 was decided under general anaesthesia. For the post surgical treatment, analgesics for 3 days in all cases.

Discussion: Apicoectomy is defined as the section of the apical portion of the dental root in order to seal adequately the canal at this level (Raspal 1994). In humans and small animals...
the apicoectomy is always followed by cleaning and complete obturation of the canal and the pulpar chamber (Ruiz de Tremiño 1990, Raspal 1994). In horses cleaning of the dental pulp is very complicated due to the irregular shape and size of the canals (Kirkland et al. 1996, Baker 1999). Nevertheless, an exhaustive cleaning of the canal is not as important as a good hermetic sealing of the apex for a successful technique (Kirkland et al. 1996, Baker 1999). The most frequent cause of failure of an endodontic treatment is an insufficient apical sealing. According to Baker (1999), the drying of the pulpar canal must be done routinely with paper points, but the size of the points available is insufficient for a complete drying of the canal, so we think. Instead we use cotton and above all pressured air. The use of gutta-percha points for filling the canal has also been described, but they present the same problem, the size is insufficient and the canal has many dentine wrinkles. The technique we use is to fill the canal completely with calcium hydroxide in paste which is injected inside the canal with a syringe in order to distribute it completely in the spaces. Once it is hardened, a retentive cavity is created in the canal and it is sealed with light-curing composite. In one of the cases in order to improve the sealing, glass ionomer and flow composite were used. In human dentistry amalgama, composite resins, glass ionomer cements, zn phosphate cements and zn oxide-eugenol have been used (Ruiz de Tremiño 1990, Raspal 1994) Amalga-ma has been the most used for apicoectomies but its toxicity, material contraction and filtrations through the union dentine-amalgama have limited its use. In an in vitro study of three materials (amalgama, glass ionomer and IRM) proved that there were no significant differences between these materials (Steenkamp et al. 2005). In all these cases the apicoectomy of both apexes of each dental piece was performed. In one of them necrotic tissue was observed inside each root and in the rest even though necrotic material was observed only in one root, both roots were resected because of the possible communication with the rest of the pulp chamber. According to a study done by Kirkland (2005), the pulp canals in animals less than 6 years old, are communicated in the pulp chamber, in horses over 10 years both canals are separated and there is no communication between them and in horses between 7 and 9 years old, the canals can be communicated or not depending on the dental piece.

**Conclusion:** We think that in the case of dental fistulae in horse teeth, that present a healthy coronal surface without periodontal lesion or other affections, the best alternative to exodontics is the apicoectomy. The apicoectomy, if successful (75%), permits the maintenance of the dental piece and the absence of oral or dental complications, that could appear in exodontic procedures.


INDEX TERMS: Endodontic disease, apicoectomy, chronic fistulae.