

APPLICATION TO THE ACADEMY OF VETERINARY DENTISTRY

Please read the Application completely before attempting to complete any of the requirements. Also ensure that you have read the Cover Package which outlines requirements for having a mentor and submitting your letter of intent.

1. A completed Academy of Veterinary Dentistry Application Form.

Items 2 – 11 shall be placed into binders. The binders shall be appropriate for 8½ x 11 inch pages containing the required items. The binders shall be assembled beginning with Item #2 (the Agreement signed and notarized) and ending with #11 (Case Reports). The candidate's reference letters (Item #12) will be added by the Secretary.

Two (2) binders are required – a master binder and a duplicate. **The master binder shall contain the original Application Package and the original dental radiographs.** The duplicate binder shall contain copies of the original Application Package and photographs or copies of the original radiographs.

After July 16, 2004, applicants are encouraged to submit their entire application package on CD (two copies). Documents such as the applicant's license, diploma and "agreement" form and dental record forms can be digitized photographically. As is indicated below, and Excel template for logs has been created and is available from Dr. Dodd.

2. The Agreement signed and notarized.
3. Reproduction of your veterinary diploma.
4. Reproduction of your veterinary license.
5. Copy of your oral-dental record forms.
6. Photographs of your dental operatory and equipment, with an accompanying written list of equipment, instruments and supplies. The equipment and supplies shall be arranged according to dental disciplines and should include periodontic, endodontic, restorative, orthodontic, oral surgery, dental radiographic equipment, power handpieces, and anesthetic and monitoring equipment.
7. List the continuing education programs you have attended in veterinary and human dentistry during the past three (3) years. Include dates, sponsoring organizations, names of speakers and topics covered. Required: 40 hours of lecture and 40 hours of wet-lab or in-person instruction by a Fellow of the Academy, a Diplomate of the American Veterinary Dental College or a human dentist.
8. Describe any informal veterinary dental supervision and instruction that you had from dentists, veterinary dentists, or other qualified professionals. Include dates and topics discussed.
9. List the human and veterinary dental texts and journals available in your personal library.
10. **Case Log:** The purpose of the log is to demonstrate to the Credentials Committee the width and breadth of your dental experience during the required time frame. You may record and tabulate this information either manually or by using a computer program. If you plan on using a computer there is a Microsoft Excel Spreadsheet Template available from Dr. Bob Wiggs and Dr. Bert Dodd

(vetdentist@aol.com or (512) 250-1411). The searching and sorting functions of the template make it the most efficient way of tracking, calculating and printing out the information. This is an excellent resource, especially if you are double tracking for both the AVDC and the AVD. NOTE: The credentials committee is in the process of streamlining the credentialing process for those that are double tracking.

A sample log sheet has been provided for you to use as a guide to create your own if you choose to manually track this information. It is recommended that you keep your case logs in a loose-leaf binder.

List your veterinary dental cases **chronologically and consecutively** for the previous **24 months** under the appropriate **procedure heading**. In addition, cases must then be categorized by discipline on separate pages with a discipline as the header. Please total the cases in each discipline at the end of each discipline's log. Finally, it is recommended that you create a table summarizing the total number of cases in each discipline.

In summary

- Create a table summary** that lists the totals of each required discipline
- List all cases consecutive cases for the 24 months.
- List and total the cases under each required discipline.

** Example of table summary

Discipline	Primary	Secondary	Total
Dental Prophylaxis			
Periodontal Surgical Procedures			
Endodontic Procedures			
Restorative Procedures Endodontic & Vital Pulpotomy Restorations Other Restorations			
Oral Surgery Procedures Major Extractions Other Oral Surgery			
Orthodontic Procedures Consultations & Interceptive Orthodontics Appliance or device application			
Oral Radiographic Procedures			

Case logs must be clearly legible.

MINIMUM CASE REQUIREMENTS: FOR THE PREVIOUS TWENTY-FOUR MONTHS
 (24 months must be submitted even if cases exceed minimum requirements)

Dental Prophylaxis including closed root planing	300
Periodontal Surgical Procedures (see note below)	15
Endodontic Procedures	25
Restorative Procedures	15
(Note: Five (5) of these may be endodontic/pulpotomy access restoration; the remainder can be fracture defect restoration, enamel hypoplasia, crowns or enamel bulge reconstruction)	
Oral Radiographic Procedures (can include cases in any procedure)	100
Orthodontic (orthodontic consult, interceptive and appliance orthodontics. 3 of these cases must involve the use of an orthodontic appliance or device.)	15
Oral Surgery	15
(oral/maxillo-facial, major mass excision, fracture repair, oronasal fistula) (five of these may be major extractions)	

If you have difficulty deciding where a procedure belongs in a discipline, please ask your mentor for advice. Endodontic procedures are considered combination endodontic and restorative cases; therefore add one to each category. Perio procedures include open root planing, flap surgeries, lateral sliding flaps, reverse bevel flaps, envelope flaps, gingivoplasty, apical repositioning, coronal repositioning, free gingival grafts. Do not include flaps made for extractions. Closed root planing is not considered a perio procedure unless all four quadrants are done. A maximum of five procedures can be a four quadrant closed root planing.

Radiographs are strongly recommended for all endodontic procedures, FORL cases, restorations, orthodontic cases, crown amputation procedures and in other cases as deemed appropriate. Radiographs taken for endodontic procedures, etc., may be noted on that case log and simply summarized on the radiographic log as:

Radiographs from endo # _____
 Radiographs from ortho # _____
 Etc.

Collaborative Cases: In a separate list, include those procedures performed in collaboration with another veterinarian or dentist including the name of the individual. You must designate whether you were primary or secondary operator for those procedures that were done with another doctor.

If your dental caseload exceeds 400 cases, and there are insufficient cases in any of the above case minimum requirements, please explain the nature of your caseload and the reason(s) for the deficiency.

11. Case Reports: There are **five (5)** case reports required. **Four (4)** of the five case reports shall be from **different** major disciplines. Please title your case report according to discipline. Please read the **Case Report Cover Letter, the Model for Case Reports and a Sample Case Report** at the end of the Application Package. **All five case reports must pass credential review to have your Application approved.**

REQUIREMENTS FOR CASE REPORTS

- **Photographs.** Photographic documentation of all cases is required. The photographs must be of good quality so that the reviewer can easily evaluate your work.
- **Radiographs.** One set of dental radiographs shall be included for cases that have root or attachment pathology. Failure to provide diagnostic quality radiographs in appropriate cases will be grounds for rejection of the case.
- **Medical records.** A copy of your medical record including a completed dental chart shall be included with each case report. All medical records must be done in English.
- **Original work.** You must be the primary person performing the cases you select for the case reports. If another doctor is involved with the case, this person's name and contributions to the case shall be reported.

Case Reports will be assessed and graded in the following criteria:

- Attention to the patient as a whole, including appropriate preoperative diagnostics and pain management.
- Radiographic documentation and interpretation.
- Use of techniques and materials, which are generally accepted.
- Adequate and detailed photographic documentation.
- Complete and adequate charting and adequate medical record.
- Complete and accurate discussion of the case.
- Attention to details of presentation of case report (spelling, references, communication of ideas).
- Adequate follow-up. Please see I of "Model for Case Reports."
- A grade of 80% for each case is required to successfully complete the case reports requirement.

12. **Letters of Evaluation:** Letters of evaluation are required from three (3) colleagues and shall be mailed directly by these individuals to:

Fraser Hale, DVM, FAVD, Dip AVDC
Secretary of the Academy of Veterinary Dentistry
Hale Veterinary Clinic
159 Fife Road
Guelph, Ontario, Canada
N1H-7N8

Phone 519-822-8598
Fax 591-763-6210
Email Toothvet@toothvet.ca

Evaluators **shall** use the enclosed evaluation form. Additional comments are strongly recommended and may be added in a cover letter. Evaluations should come from qualified professionals that are very familiar with veterinary dental techniques and procedures. Academy or College members who have personally observed your work are preferred. A dentist who has observed your work on several occasions could be acceptable. A general practitioner, who has referred multiple cases to you and has seen and followed the referred cases, could also be acceptable, but not as desirable. More weight is given to reference letters from dental experts than from other individuals.

13. Enclose a check for **\$200 U.S.** made out to the **Academy of Veterinary Dentistry** in a separate envelope inside the Application Package.

Note: All applications materials, including radiographs and photographs remain the property of the Academy of Veterinary Dentistry and will not be returned unless the application was rejected as improper, inadequate or incomplete.

ACADEMY OF VETERINARY DENTISTRY APPLICATION FORM

Name _____
(Last, First, Middle)

Office Address _____
(Company Name)

(Street Address, City, State, Zip Code)

Office Phone _____ Home Phone _____ Fax _____

Email Address _____

Date of Graduation _____

Veterinary School and Degree _____

Other Degrees/Diplomas _____

Veterinary License No. _____ State _____

Member of American Veterinary Dental Society since _____

List the names, addresses and business telephone numbers of three (3) colleagues who will be providing letters of reference. Appropriate individuals include human dentists, Fellows of the Academy and board certified veterinary clinicians with whom you have worked.

1. Name _____
Address _____
Business Phone _____

2. Name _____
Address _____
Business Phone _____

3. Name _____
Address _____
Business Phone _____

AGREEMENT

I hereby apply to the Academy of Veterinary Dentistry for admission to the qualifying examination in accordance with its rules and herewith enclose the application fee. I also hereby agree that prior to or subsequent to my examination, the Executive Board of the Academy may investigate my standing as a veterinarian, including my reputation, for complying with the standards of ethics of the profession.

I agree that no fee paid by me shall be refundable to me except and as may be expressly provided by the Constitution and By-Laws of the Academy.

I further covenant and agree:

1. that Letters or Reference Forms sent in on my behalf will be confidential to the Credentials Committee and Board of Directors of the Academy and are not available to me for review.
2. to indemnify and hold harmless the Academy of Veterinary Dentistry and each and all of its members, officers, examiners and agents from and against any liability whatsoever in respect of any act or omission in connection with this application, such examination, the grades upon such examination and/or the acceptance or rejection of me as a prospective Fellow of the Academy of Veterinary Dentistry, and
3. that my status and any certificate as Fellow of the Academy, which may be granted to me, shall be and remain the property of the Academy of Veterinary Dentistry.

I hereby state that all documents, photographs, statements and other accompanying material in the application and Credentials Package are true and correct.

Signature

**ACADEMY OF VETERINARY DENTISTRY
CANDIDATE EVALUATION FORM**

Candidate's Name: _____

Evaluator's Name: _____

FOR CONFIDENTIAL USE BY THE CREDENTIALS COMMITTEE

1. My field of expertise is in: Veterinary Dentistry _____; General Dentistry _____;
Dental Specialty _____; which Specialty? _____;
Referring DVM _____; Academic _____;
Other _____, (please explain)

2. During what period of time, [hours, days months or year(s)] and in what capacity did you observe the veterinary dental activities of the candidate? Specifically mention the type of supervision you provided, e.g., mentoring, telephone consultations, performed procedures(s) with the candidate assisting, candidate performed procedures(s) with you assisting. If not applicable, please write N/A.

3. How closely did you supervise the candidate? (e.g., seldom, daily, weekly, monthly, or several times over a period of _____ months)

4. Which of the basic disciplines of veterinary dentistry (periodontics, endodontics, orthodontics, restorative and oral surgery) did you supervise or observe?

5. In terms of primary patient care responsibility, approximately how many cases were under the exclusive control of the candidate during your period of supervision or observation?

Not applicable _____	6-10 cases _____	
Zero cases _____	11-25 cases _____	
1-5 cases _____	Over 25 cases _____	

6. **Candidate's knowledge and skills in veterinary dentistry** – Please state: N/A, unknown, excellent, very good, satisfactory, needs improvement or unsatisfactory.

- Attention to the patient as a whole _____
- Knowledge of dental radiographic technique and interpretation _____
- Proper management of veterinary dental cases _____
- Proper use of techniques and materials which are generally accepted _____
- Complete and adequate dental charting _____
- Awareness of current literature _____
- Ability to make independent decisions _____

7. **Candidate's characteristics.** Please use the same criteria as in #6, i.e., N/A, unknown, excellent, very good, etc.

- Reliability _____
- Motivation _____
- Attention to detail (follows manufacturers instructions exactly) _____
- Client control and attitude _____
- Professional ethical standards _____

8. Do you believe that the candidate has any characteristics of professional performance that would detract from the candidate's fitness for membership in the Academy of Veterinary Dentistry? If so, please describe.

Date: _____ Signed _____

Print Name _____

Address: _____

City, State, Zip _____

Telephone: _____

FAX: _____

Please feel free to attach any other information you have which would support the candidate's application for membership in the Academy. The Academy greatly appreciates your time and effort in writing this evaluation.

This form must be sent directly to and received at the Secretary's office no later than midnight, July 15, 2005. If the postmark is prior to July 8, the form will be accepted even if delayed in transit.

Mail to:

Fraser Hale, DVM, FAVD, Dip AVDC
Secretary of the Academy of Veterinary Dentistry
Hale Veterinary Clinic
159 Fife Road
Guelph, Ontario, Canada
N1H-7N8
Phone 519-822-8598
Fax 591-763-6210
Email Toothvet@toothvet.ca

ACADEMY OF VETERINARY DENTISTRY

Suggested Reading Material

The examination is not limited to the listed readings.

1. All issues of The Journal of Veterinary Dentistry.
2. Auer JA, ed. Equine Surgery. Philadelphia. WB Saunders, 1992.
3. Bojrab MJ, Tholen M. Small Animal Oral Medicine and Surgery. Philadelphia: Lea and Febiger, 1990.
4. Carranza FA. Glickman's Clinical Periodontology, 7th ed. Philadelphia: WB Saunders, 1990.
5. Cohen S, Burns RC. Pathways of the Pulp, 6th ed. St. Louis: Mosby-Year Book, 1994.
6. Conference Proceedings of the AVDC/AVD annual meetings.
7. Emily P, Penman S. Handbook of Small Animal Dentistry, 2nd ed. Oxford: Pergamon Press, 1994.
8. Ettinger SJ, ed. Veterinary Internal Medicine, 4th ed. Philadelphia: WB Saunders, 1995.
9. Hartsfield SM. Anesthetic problems of the geriatric dental patient. In: Manfra Marretta S, ed. Problems in Veterinary Medicine: Dentistry. Philadelphia: JB Lippincott, March 1990.
10. Harvey CE, Emily PP. Small Animal Dentistry. St. Louis: Mosby -Year Book, 1993.
11. Harvey CE. Treatment planning for periodontal disease in dogs. JAAHA 1991;27(6):592-596.
12. Harvey CE. Veterinary Dentistry. Philadelphia: WB Saunders, 1985. (out of print but very useful if can get a copy)
13. Haws IJ. Local dental anesthesia and pain management. CVDS Proc July 1999: 55-70.
14. Holmstrom SE, Frost P, Eisner ER. Veterinary Dental Techniques for the Small Animal Practitioner, 2nd ed. Philadelphia: WB Saunders, 1998.
15. Manfra Marretta S, ed. Problems in Veterinary Medicine: Dentistry. Philadelphia: JB Lippincott, Mar 1990.
16. Miles AEW, Grigson C. Colyer's Variations and Diseases of the Teeth of Animals. Cambridge: Cambridge University Press, 1990.
17. Mulligan TW, Aller MS, Williams CA. Atlas of Canine and Feline Dental Radiography, Trenton: Veterinary Learning Systems, 1998.
18. Paddleford RR, ed. Manual of Small Animal Anaesthesia. Philadelphia: WB Saunders, 1999.
19. Plumb DC. Veterinary Drug Handbook, 3rd ed. White Bear Lake, MN: Pharma Vet, 1999.
20. Proffit WR. Contemporary Orthodontics, 2nd ed. St. Louis: Mosby-Year Book, 1993.
21. Rateitschak KH, ed. Color Atlas of Dental Medicine, Vol. 1: Periodontology, 2nd ed. New York: Thieme, 1989.
22. Schroeder HE. Oral Structural Biology. New York: Thieme, 1991.
23. Schwartz R, Summit J, and Robbins J. Fundamentals of Operative Dentistry: A Contemporary Approach. Chicago: Quintessence Books, 1996.
24. Seymour C, Gleed R, eds. Manual of Small Animal Anaesthesia and Analgesia. Cheltenham: BSAVA, 1999.
25. Slatter DH, ed. Textbook of Small Animal Surgery, 2nd ed. Philadelphia: WB Saunders, 1993.
26. Ten Cate AR, Oral Histology: Development, Structure, and Function, 4th ed. St. Louis: Mosby-Year Book, 1994.
27. Wiggs RB, Lobprise HB. Veterinary Dentistry: Principles and Practice, Philadelphia: Lippincott-Raven, 1997.

Model for Case Reports

Title to Include:

1. Discipline, (e.g. Oral Surgery, Endodontics, Periodontics, Orthodontics, Restorative)
2. Procedure with anatomical reference and species

Example: ENDODONTICS

Root canal therapy of maxillary canine on a dog

A. Patient History:

Age, Breed, Gender and other relevant data (e.g., general condition – obese, emaciated, dehydrated, traumatized, etc.)

B. Presenting Complaint

1. Owner's chief complaint
2. Referring veterinarian's findings

C. Preliminary examination

1. History of Presenting Complaint
 - a. How – known causal factors, e.g. oral trauma
 - b. When – when happened? when noticed? (Time frame)
 - c. Subsequent changes – color, size, character

Example: Dog was hit in the mouth with a baseball bat three hours prior to presentation and the upper right canine tooth (104) was fractured and bleeding.

2. Exam of Presenting Complaint
 - a. Visual check of complaint
 - b. Other obvious oral problems – Fx teeth, “neck,” lesions, etc.
 - c. Bite evaluation – predisposing or complicating factors
 - d. Oral health evaluation – gingivitis, calculus deposits, halitosis, bleeding gums, other gross pathology
3. Relevant Medical History (Current and Past)
 - a. Pre-existing and pre-disposing condition(s) which could affect treatments and/or anesthesia
 - b. Conditions(s) affecting causes and prognosis
 - c. Biochemical profile

D. Preliminary treatment plan

1. Pre-treatment antibiotics
2. Anesthesia protocol
3. Intra-operative fluid therapy
4. Dental prophylaxis
5. Dental radiographs
6. Tissue biopsy

7. Intended dental procedures
- E. Client and Patient Compliance for Oral Health Maintenance
1. Tooth brushing
 2. Oral Rinse
 3. Diet modification (dry foods)
 4. Restrictions (bones, rocks, nylon bones, hooves)
- F. Dental Procedures
1. Discuss actual findings (oral exam and radiographic interpretation)
 2. Describe definitive diagnosis (changes from preliminary diagnosis)
 3. Revisions to preliminary treatment plan, if necessary
 4. Step-by-step description of technique including materials, instruments and equipment
 5. Discuss rationale of significant steps performed
- G. Discussion
1. Procedures, materials and medication including dosages and routes of administration should be described and discussed in detail.
 2. All relevant treatment options should be discussed and referenced when appropriate.
 3. Should a presented case vary from generally accepted technique(s) or is the case did not turn out as expected, these variations should be addressed and referenced during the discussion.
- H. Aftercare
1. Postoperative medications (e.g. analgesics, antibiotics)
 2. Home care instructions (e.g. dietary requirements and/or restrictions, oral hygiene maintenance)
- I. Follow-up and Recall
1. Follow-up: six to 12 months post procedure radiograph(s) is required for any case which could result in root pathology.
 2. Follow-up: three to six month photo of a crown, bridge or any restorative procedure.

Endodontic Therapy of a Fractured Maxillary Fourth Premolar in a Dog

Randi Brannan, DVM

Patient History/ Presenting Complaint

A 7-year-old German shepherd mixed breed, spayed female was presented for assessment and treatment of a fractured maxillary fourth premolar, 108.¹ The owner reported the fracture had occurred three days previously. The owner also commented that at the time of the fracture the patient had a sudden change in behaviour, as she became reluctant to eat and exhibited hyperptyalism. The patient had been diagnosed with hypoadrenocorticism six months prior to her presentation, and this disease was being controlled with mineralocorticoid and steroid therapy.

Preliminary Examination

On physical examination the only abnormalities were limited to the patient's oral cavity. She had a class 6 crown lesion of 108 with a slab fracture that did not extend subgingivally. The pulp of 108 was exposed and still appeared to be vital. Her plaque, calculus, and gingivitis indices ranged from 0 to 2.²

The referring veterinarian had done a complete blood count and biochemical profile including electrolyte assays two days prior to the patient's presentation, and all results were within normal limits.

Preliminary Treatment Plan

1. Ampicillin given intravenously at 22 mg/kg one hour prior to anesthetic induction.³
2. Premedication with butorphanol at 0.2 mg/kg and glycopyrrolate at a dosage of 0.01 ml/kg given subcutaneously 30 minutes prior to anesthetic induction.⁴
3. Placement of an intravenous catheter in a saphenous vein with the administration of a 0.9 percent sodium chloride solution at a maintenance dosage of 10 ml/kg/hr.
4. Anesthetic induction with ketamine and valium in a 1:1 mixture given at a dosage of 0.1 ml/kg intravenously in the fluid line.⁵
5. Intubation and maintenance on isoflurane inhalant anesthesia.⁶
6. Patient monitoring with an esophageal stethoscope and doppler indirect blood pressure measurements.⁵
7. Complete dental prophylaxis including a preoperative 0.2 percent chlorhexidine gluconate oral rinse, supra- and subgingival scaling, polishing, and subgingival irrigation with 0.2 percent chlorhexidine gluconate.²
8. Detailed oral examination and charting.
9. Intraoral radiography of 108.
10. Root canal therapy or extraction of 108 as indicated.

Client and Patient Compliance for Oral Health Maintenance

The owner reported that in the past three days she had not been able to brush the patient's teeth due to her oral pain. She had been very compliant with toothbrushing prior to the slab fracture of 108, and the owner planned to reinstitute daily homecare after the treatment for 108 using a veterinary antibacterial toothpaste.

Dental Procedures

A complete dental prophylaxis was done first to help treat the periodontal disease present and to reduce the bacterial contamination of the oral cavity for the planned endodontic procedure. A detailed oral examination revealed no other abnormalities other than mild to moderate gingivitis and the class 6 crown lesion slab fracture of 108 with pulpal exposure.

A survey intraoral radiograph of 108 using the bisecting angle technique⁷ showed normal root morphology with no evidence of radicular or periapical pathology. The distal root of the mesial tooth, 107, was undergoing root resorption. A decision was made to monitor 107 on follow-up radiography (Figure 1).

Prior to starting endodontic therapy of 108, a right infraorbital local nerve block was placed using 0.5 percent bupivacaine with epinephrine. This would provide intraoperative analgesia so that the depth of isoflurane anesthesia could be shallower, making it safer for the patient. Also, this would provide postoperative analgesia, and would reduce the requirement for postoperative oral analgesics for the patient.⁸

For the root canal therapy of 108, a single coronal access was made for the distal root. The mesiobuccal and mesiopalatal roots were accessed using a transcrown approach through the mesiobuccal aspect of the crown.⁹

The canals were instrumented with 25 mm K-type files. A chelating agent was used to soften the dentin to prevent binding of the files and also for its antibacterial effect. Sodium hypochlorite 5.25% mixed in a ratio of 1: 1 with sterile saline was used to irrigate the canals to dissolve organic debris, kill bacteria, and mechanically flush the debris from the canals. This was followed by irrigation with sterile saline to flush the sodium hypochlorite solution from the canals.

To determine the working length for each canal, a size 15 K-type file was placed to the apex of each canal, an endodontic stopper on each file was pushed tightly against the crown, and an intraoral radiograph was taken. The files were within 1.0 mm of the internal apical foramen of each canal. The working lengths were measured from the endodontic stop to the tip of each file for each canal. The working length for the distal canal was 19 mm, and the mesiobuccal and mesiopalatal canal working lengths were 19 and 15.5 mm, respectively (Figure 2).

The coronal aspect of each canal was flared using nickel titanium rotary orifice openers on a slowspeed handpiece. Using the working lengths, each canal was hand instrumented up to a size

25 file at the apex. A stepback technique was done for each canal by instrumenting with the next larger sized file 1 mm short of the previous file size. Between each increasing file size, each canal was irrigated with sterile saline and recapitulated with the apical size file to ensure that none of the canals were blocked out. The mesiobuccal and distal canals were stepped back to a size 40 file, and the mesiopalatal canal was stepped back to a size 35 file.

After the final stepback for each canal, they were given a final irrigation with sterile saline and each canal was carefully dried with successive paper points until they were completely dry when removed from each canal.

For obturation, a zinc oxide - eugenol apical cement sealer was introduced into each canal using K-type file. The file was lightly coated with the cement sealer and placed to the apex of each canal, and rotated counterclockwise to be certain that the sealer coated the lining of each canal to its apex.

The canals were then obturated with thermoplasticised gutta percha. The heated gutta percha was placed on a K-type file, coating the apical 2 to 3 mm of the file. The file was introduced into each canal to its working length and was rotated counterclockwise to displace the gutta percha from the file and push it apically. It was then vertically condensed with finger pluggers. Alcohol was applied to the finger pluggers to prevent the gutta percha from adhering to them and being removed from the canal. The process was repeated two to three times to fill the apical third of each canal. A radiograph was then taken to confirm complete obturation of the apical third of each canal leaving no voids (Figure 3).

The three canals were then backfilled with additional thermoplasticised gutta percha using a larger size K-type file followed by vertical condensation. Another radiograph was taken to rule out voids in the coronal portions of the root canals (Figure 4).^{2, 10, 11, 12}

Excess gutta percha was removed from the access openings using a highspeed number 1 round bur. The fracture opening in the crown of 108 was also shaped with a round bur to prepare for its restoration. After application of a 37 percent phosphoric acid gel to each of these sites to remove the smear layer, a light cured glass ionomer liner was placed in the pulp access sites and the fracture opening. The 37 percent phosphoric acid gel was reapplied, followed by a fifth generation dentin bonding system for each of the sites.²

The final restorations were placed using a light cured hybrid composite that was matched to the color of the patient's crown. The composite restorations were finished using a 16-fluted finishing bur, followed by polishing with a finishing disc and polishing paste. The tooth was acid etched as described above and a layer of dentin bonding agent was then applied to each of the restorations to help prevent microleakage. A final radiograph was taken to confirm the restorations were complete (Figure 5).²

Aftercare

The patient made a normal recovery and was discharged with oral clavulanic acid and amoxicillin to be given at a dosage of 13.75 mg/kg twice daily for 10 days.¹³ Oral codeine tablets

were also dispensed for postoperative pain relief at a dosage of 2 mg/kg three times daily only as required for the patient.^{14,15} A 0.2 percent chlorhexidine gluconate solution was dispensed for daily application to the gingival margin for the first 14 days. The owner was also advised to restart daily toothbrushing for the patient.² A recheck was scheduled in 14 days.

Follow-up and Recall

At the 14 day recheck, the patient was doing very well. She had been eating well from the first night home and had only required the codeine medication for the first 12 hours after treatment. The hyperptyalism had discontinued immediately following treatment. The owner was successful in daily application of the chlorhexidine gluconate oral rinse and in restarting a daily toothbrushing program for the patient. The restorations for 108 were smooth and intact and there was no evidence of pain of the crowns or the periapical area of 107 or 108. The gingivitis index had reduced to a range of 0 to 1. The owner was asked to return with her dog in 12 months for follow-up assessment and radiography of 107 and 108.

One year later the patient was seen for her follow-up examination. There were no changes from the previous follow-up findings other than an increase in plaque and calculus. The gingivitis scores ranged from 0 to 2. A complete dental prophylaxis was done. Radiography showed no evidence of periapical pathology of 108. The resorption of the distal root of 107 noted one year earlier was unchanged. It was recommended that intraoral radiographs be taken every 6 months to evaluate the root resorption for 107 and to treat if it became necessary.

Discussion

The patient was showing signs of significant pain from the pulp exposure of 108. If this condition had been left untreated, the pain would have continued. The pulp would also have continued to become infected and would likely have become necrotic. The necrotic pulp would then result in periapical pathology as well as systemic absorption of bacteria that could cause significant vital organ disease.

Endodontic therapy was chosen for 108 for this patient over extraction in order to alleviate pain and retain a strategically important tooth to improve the patient's quality of life. Standard root canal therapy was chosen over a partial pulpectomy and pulp capping as the pulp had been exposed for greater than 48 hours in a senior patient which gave a poor prognosis for continued pulp vitality.²

Ampicillin was given intravenously one hour prior to anesthetic induction so that there were target tissue levels of ampicillin at the time of the dental procedures. This would serve to protect vital organs from bacterial colonization during the procedures.³

On the survey radiograph prior to treatment of 108, there was no evidence of periapical pathology. This is not an unexpected finding in a tooth that has undergone pulpal exposure in the past three days. The follow-up films demonstrated the benefit of radiography as a diagnostic tool. Radiography reveals changes in the periapical area of teeth as well as other dental or osseous

pathology. The radiographs showed normal periapical anatomy in all three roots of 108, and no change in the root resorption for the distal root of 107.

This indicated that the root canal therapy for 108 had been successful. The root resorption for 107 was non-painful and non-progressive. This will be monitored at regular intervals in the event that intervention is necessary in the future.¹⁶

References

1. Floyd MR. The modified Triadan system: nomenclature for veterinary dentistry. *J Vet Dent* 8(4); 18- 19, 1991.
2. Wiggs RB, Lobprise HB. *Veterinary Dentistry: Principles and Practice*. Philadelphia: Lippincott-Raven, 1997.
3. Dow SW. Improving the effectiveness of antimicrobial prophylaxis. *ACVIM Forum Proc* 1994: 791-796.
4. Benson GJ, Dodman NH, Hartsfield SM, Haskins SC, Riedesel DH, Sawyer DC, Shaw K. Analgesic and anesthetic applications of butorphanol in veterinary practice: proceedings of a roundtable discussion. Lawrenceville, NJ: Veterinary Learning Systems, 1988.
5. Paddleford RR. *Manual of Small Animal Anesthesia*. New York: Churchill Livingstone, 1988.
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Dental Abbreviations

3D	Tertiary Dentin	GH	Gingival Hyperplasia/ Hypertrophy	PLQ	Plaque
AB	Abrasion	GI	Gingivitis Index	PG	Periodontal Pocket, Gingival/Pseudo
ACY	Acrylic	GLS	Glossitis	PP	Periodontal Pocket
ADD	Polylactic Acid Implant	GM	Gingival Margin	PRO	Complete Dental Prophylaxis
AL	Attachment Loss	GP	Gutta Percha	PS	Periodontal Surgery
AP	Alveoloplasty	GP/GV	Gingivectomy/ Gingivoplasty	PSB	Periodontal Pocket, Suprabony
APG	Apexogenesis	GR	Gum Recession	PTD	Palatal Trauma Defect
APX	Apexification	GTR	Guided Tissue Regeneration	PXB	Posterior Crossbite
AS	Apical Sealer/ Cement	IDW	Interdental Wiring	R/A	Restoration, Amalgam
AT	Attrition	IFA	Inferior Alveolar Local Nerve Block	R/C	Restoration, Composite
AXB	Anterior Crossbite	HT	Hairy Tongue	RAD	Radiograph
BE	Biopsy, Excisional	IFO	Infraorbital Local Nerve Block	RC	Root Canal
BFR	Buccal Fold Removal	IL	Inlay	R/I	Restoration, Ionomer
BG	Bone Graft	IMP	Implant	RCS	Root Canal, Surgical
BI	Biopsy, Incisional	IM	Impression	RD	Retained Deciduous
BKT	Bracket	INT	Intrusion	RL	Resorptive Lesion
BL	Bone Loss/ Recession	IO	Interceptive Orthodontics	RE	Root Exposure
BP	Bridge Pontic	IOD	Interceptive Orthodontics, Deciduous	RP	Root Planing
BR	Bridge	IOP	Interceptive Orthodontics, Permanent	RPC	Root Planing, Closed
BRC	Bridge, Cantilever	LFD	Lip Fold Dermatitis	RPO	Root Planing, Open
BRM	Bridge, Maryland	LIP	Local Infiltration of Palate	ROT	Rotated Tooth
BUC	Buccal Local Nerve Block	LPS	Lymphocytic-Plasmacytic stomatitis	RR	Root Resorption
CA	Cavity, Fracture, Defect (1-8)	M	Mobile Tooth	RRT	Retained Root Tip
CAL	Calculus	MAL	Malocclusion	RRX	Root Resection (Hemisection)
CAM	Crown Amputation	MAX	Maxillary Local Nerve Block	S	Suturing
CBU	Core Build-Up	MEN	Mental Local Nerve Block	SAL	Salivary Gland (S, M, P, Z, Mo)
CFL	Cleft Lip	MGM	Mucogingival Margin	SBI	Sulcular Bleeding Index
CFP	Cleft Palate	MM	Mucous Membrane	SC	Subgingival Curettage
CFP/R	Cleft Palate Repair	MN/FX	Mandibular Fracture	SE	Stain, Extrinsic
CFW	Circumferential Wiring	MX/FX	Maxillary Fracture	SI	Stain, Intrinsic
CM	Crown Metal	NE	Near Exposure	SL	Sublingual
CMG	Crown Metal, Gold	NV	Non-Vital Tooth	SLE	Systemic Lupus Erythematosus
CMO	Craniomandibular Osteopathy	O	Missing Tooth	SM	Surgery, Mandibulectomy
CR	Crown	OA	Orthodontic Appliance	SN	Supernumerary
CS	Culture and Sensitivity	OAI	Orthodontic Appliance, Install	SP	Surgery, Palate
CT	Citric Acid Treatment	OAA	Orthodontic Appliance, Adjust	SPL	Splint
CU	Contact Ulcer	OAR	Orthodontic Appliance, Remove	STM	Stomatitis
CUL	Culture	OAF	Oroantral Fistula	SUL	Sulcus
CWD	Crowded Tooth	OC	Orthodontic Consultation	SX	Surgery, Maxillectomy
DB	Dentinal Bonding	OI	Osseous Implant	SYM	Symphysis
DC	Dilacerated Crown	OL	Onlay	SYM/S	Symphysis/ Separation
DCT	Dentigerous Cyst	OM	Oral Mass	TA	Tooth Avulsed
EC	Elastic Chain	OM/ADC	OM/ Adenocarcinoma	TIP	Tipping
ED	Enamel Defect	OM/FS	OM/ Fibrosarcoma	TL	Tooth Luxated
EG	Eosinophilic Granuloma	OM/LS	OM/ Lymphosarcoma	TMJ/ DP	TMJ Dysplasia
EH	Enamel Hypocalcification	OM/MM	OM/ Malignant Melanoma	TMJ/ DL	TMJ Dislocation
EP	Epulis	OM/SCC	OM/ Squamous Cell Carcinoma	TMJ/L	TMJ Luxation
EP/A	Acanthomatous Epulis	ONF	Oronasal Fistula	TMJ/FX	TMJ Fracture
EP/F	Fibrous Epulis	ONF/R	Oronasal Fistula Repair	TN	Treatment Needed
EP/G	Giant Cell Epulis	OP	Odontoplasty	TP	Treatment Planning
EP/O	Ossifying Epulis	OR	Orthodontic Recheck	TRANS	Translocation (Bodily Movement)
EXT	Extrusion	OST	Osteomyelitis	TRX	Tooth Resection (Hemisection)
FAR	Flap, Apically Repositioned	OSW	Osseous Wiring	VER	Veneer
FB	Foreign Body	PAP	Papillomatosis	VP	Vital Pulpotomy
FCR	Flap, Coronally Repositioned	PCD	Pulp Capping, Direct	VT	Vital Tooth
FE	Furcation Exposed	PCI	Pulp Capping, Indirect	VWD	Von Willebrand's Disease
FEN	Flap, Envelope	PCT	Perioeucitic Therapy	W1	One Walled Bony Pocket
FFR	Flap, Full Releasing	PD	Palatal Defect	W2	Two Walled Bony Pocket
FG	Fluoride Gel	PDL	Periodontal Ligament	W3	Three Walled Bony Pocket
FGG	Free Gingival Graft	PE	Pulp Exposure	W4	Four Walled Bony Pocket (cup)
FLS	Flap, Lateral Sliding	PEM	Pemphigus	WIR	Wire
FRB	Flap, Reverse Bevel	P&FS	Pit and Fissure Sealant	WRY	Wry bite
FRE	Frenectomy	PFM	Porcelain Fused to Metal	X	Extraction, Elevation
FRN	Frenotomy	PH	Pulp Hemorrhage	XS	Extraction, Sectioned
FV	Fluoride Varnish	PI	Plaque Index	XSS	Extraction, Surgical
FX	Fracture (Tooth, Jaw...)	PIB	Periodontal Pocket, Infrabony	ZOE	Zinc Oxide Eugenol
GCF	Gingival Crevicular Fluid	PLT	Palate		