



CANINE TOOTH FRACTURE

Brook A. Niemiec, DVM, FAVD, Diplomate AVDC

Tooth fractures are very common in dogs. The most commonly fractured teeth are the canines and carnassials (maxillary fourth premolars and mandibular first molars).

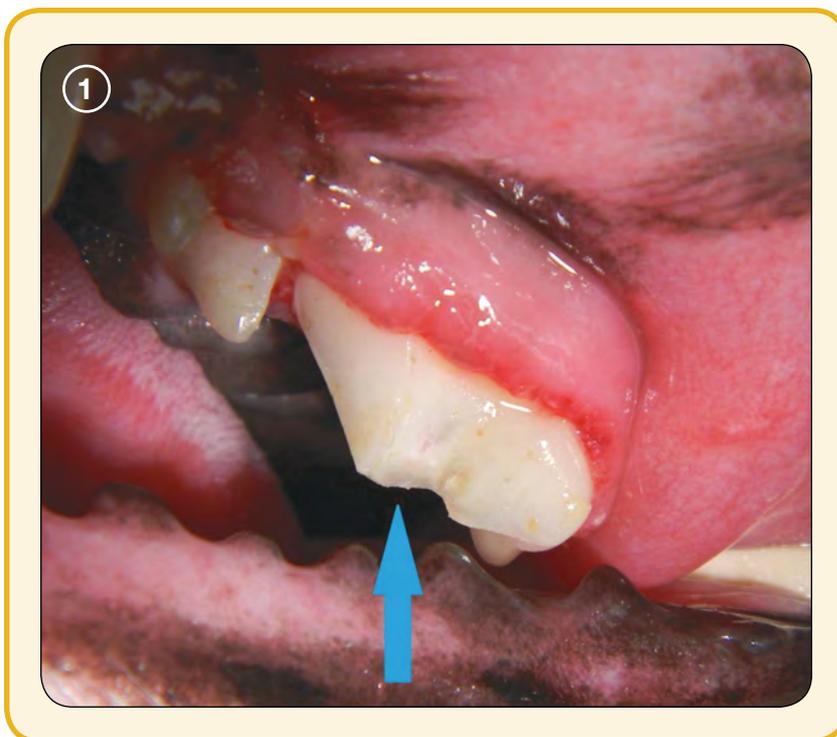
Fractures are further characterized as *complicated* or *uncomplicated*. Complicated crown fractures have direct pulp (nerve) exposure, whereas uncomplicated crown fractures have direct dentin but no pulp exposure.¹

Both types of tooth fractures require therapy; however, treatment differs depending on the physical and radiographic appearance.

QUESTION

Based on the clinical evidence, what type of fracture is shown in Figure 1?

(answer next page)



Read the following articles by Dr. Brook Niemiec at todaysveterinarypractice.com:

- **Diagnosis & Treatment of Crown Fractures** (July/August 2011)
- **Bonded Sealant Application for Crown Fractures** (July/August 2011)
- **Dental Extractions: Five Steps to Improve Client Education, Surgical Procedures, & Patient Care** (May/June 2012)

To view an informational video on fractured teeth, visit dogbeachdentistry.com.



Brook A. Niemiec, DVM, FAVD, Diplomate AVDC, is chief of staff of Southern California Veterinary Dental Specialties. He is the author of *Small Animal Dental, Oral and Maxillofacial Disease: A Colour Handbook* (Manson Publishing) and *Veterinary Periodontology* (Wiley Blackwell).

He founded the veterinary dental telemedicine website vetdentalrad.com, lectures at national and international conferences, and is the coordinator and instructor of the San Diego Veterinary Dental Training Center (vetdentaltraining.com). He received his DVM from University of California–Davis.

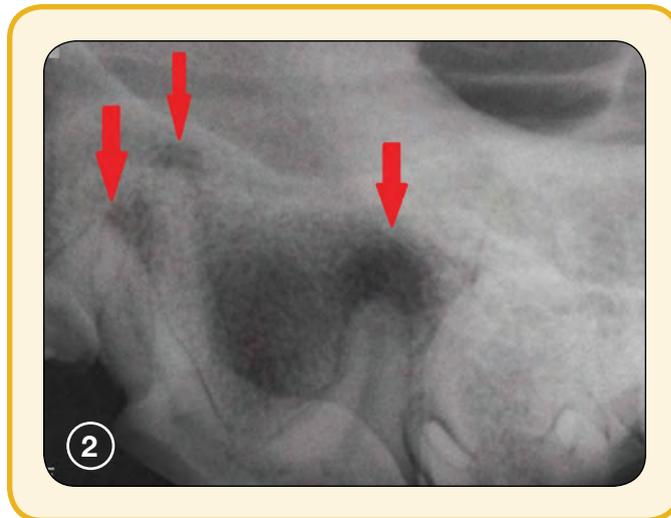
ANSWER

Based on the clinical evidence, what type of fracture is shown in Figure 1?

This patient has an uncomplicated crown fracture,¹ which is very common in large-breed dogs. These types of fractures occur when a piece of the crown is broken, exposing the dentin but not the pulp.

The radiograph (**Figure 2**) reveals that this tooth is nonvital and infected, both of which are evidenced by the periapical rarefaction surrounding all 3 roots (red arrows).² Additional radiographic signs of endodontic disease include a wider endodontic space (or on occasion, narrower) and internal or external resorption.²

Figures courtesy vetdentalrad.com (Importance of Dental Radiology client educational poster)



QUESTION & ANSWER

What therapeutic measures should be pursued—keep an eye on the fracture, extract the tooth, or perform a restoration or root canal?

Hopefully your answer was not “keep an eye on the fracture.” Despite the fact that veterinary patients rarely show clinical signs, uncomplicated crown fractures can be very painful.³

Role of Dentinal Tubules

Dentinal tubules surround the tooth, running from the root canal to the enamel. Each tubule contains an odontoblastic process—basically a nerve supply that is limited to sensory function. There are approximately 50,000 dentinal tubules per mm² coronal dentin, which is about twice the number found in human teeth.^{4,5}

When enamel is lost, the dentin is exposed; therefore, a 1-cm area of enamel loss in a canine tooth exposes 3 to 4 million odontoblasts. This exposure leads to quicker dentinal fluid flow out through the dentinal tubules via the capillary effect. The increase in flow deforms the A-delta fibers and C-fibers, which is perceived by the patient as pain.³

Factors, such as heat, cold, and desiccation, change the flow rate, cause the nerves to fire, and result in pain (sensitivity).⁶ Sensitivity is actually a sign of low-grade pulp inflammation called *pulpitis*.

Bacterial Infiltration

Loss of enamel also allows bacteria to potentially ingress into the root canal system.^{3,7} In some cases,

these bacteria can result in endodontic infection and subsequent abscessation, which can occasionally manifest clinically as a swelling or draining tract, but is generally subclinical and, therefore, undiagnosed. The only way to definitively diagnose this infection is via dental radiographs.

Therapeutic Measures^{1,7,8}

There are 2 options for nonvital and infected teeth: root canal therapy or extraction.

- Treatment of infected teeth with root canals has a similar success rate as vital teeth treated with root canals; therefore, root canal therapy should be considered.
- If extraction is elected, postoperative dental radiographs should be taken because retained roots are a common complication of these extractions.

Treatment for this Patient

Because the tooth was nonvital and infected, I elected to perform a root canal, based on the success of this therapy in my experience. If root resorption had been seen on the radiograph, extraction would have been the selected therapy.

Bonded Sealant Therapy

If no radiographic evidence of disease had been present in this case, the tooth would have been treated with a bonded sealant.⁹ This therapy resolves sensitivity, blocks off the pathway for infection, improves aesthetics, and smooths the tooth to decrease plaque accumulation, retarding periodontal disease. ■

References

1. DuPont GG. Problems with the dental hard tissues. In Niemi BA (ed): *Small Animal Dental, Oral and Maxillofacial Disease: A Colour Handbook*. London: Manson Publishing, 2010, pp 127-156.
2. Niemi BA. Veterinary dental radiology. In Niemi BA (ed): *Small Animal Dental, Oral and Maxillofacial Disease: A Colour Handbook*. London: Manson Publishing, 2010, pp 63-87.
3. Startup S. Tooth response to injury. In Niemi BA (ed): *Veterinary Endodontics*. Tustin, CA: Practical Veterinary Publishing, 2011.
4. Theuns P. Endodontic anatomy. In Niemi BA (ed): *Veterinary Endodontics*. Tustin, CA: Practical Veterinary Publishing, 2011.
5. Lewis JR, Reiter AM. Anatomy and physiology. In Niemi BA (ed): *Small Animal Dental, Oral and Maxillofacial Disease: A Colour Handbook*. London: Manson Publishing, 2010.
6. Trowbridge HO, Syngcuok K, Hideaki S. Structure and functions of the dentin-pulp complex. In Cohen S, Burns RC (eds): *Pathways of the Pulp*, 8th ed. St Louis: Mosby, 2002, pp 411-456.
7. Woodward TM. Bonded sealants for fractured teeth. *Top Companion Anim Med* 2008; 23(2):91-96.
8. Niemi BA. Oral pathology. *Top Companion Anim Med* 2008; 23(2):59-71.
9. Theuns P, Niemi BA. Bonded sealants for uncomplicated crown fractures. *J Vet Dent* 2011; 28(2):130-132.