

The Fractured Tooth

Anson J. Tsugawa

What are fractured teeth?

Broken or fractured teeth are common in the dog. Teeth are often fractured as a result of trauma (i.e., during an altercation with another dog or when a dog is hit by a car) or from chewing on an inappropriate object (e.g., cow hooves). In other cases, teeth are worn down over time (i.e., abraded), for example in dogs who gnaw on wire fences or metal cage bars. These severely worn teeth are whittled down to the width of a "matchstick," are fragile, and eventually their tips may fracture.

Tooth fractures are classified by the depth of the fracture. The layers of the tooth crown from outside-in are the enamel, dentin and pulp (internal portion of the tooth containing the nerve and blood vessel). Superficial or uncomplicated fractures are those that only involve the two outer layers of the tooth (enamel and dentin). Complicated fractures are those where the pulp of the tooth is exposed. Complicated fractures are associated with bleeding, pain and a higher infection rate compared to uncomplicated fractures. Differentiating between uncomplicated and complicated tooth fractures is important in defining an appropriate treatment plan.

What are the symptoms of fractured teeth?

Fractured teeth are sensitive so dogs may salivate from pain or discomfort, shy away from touch, drop food, preferentially chew food on the side of the mouth opposite the fractured tooth or stop eating altogether. Some patients may appear asymptomatic, but it is important to remember that animals display and exhibit pain differently than humans, and signs as subtle as a slight decrease in activity or willingness to play with a favorite toy, can all be indicators of orofacial pain. In chronic cases, a tooth root abscess can occur and impressive swellings of the face may develop.

What tests are needed?

Examination of the affected tooth under anesthesia is usually necessary to determine the appropriate treatment. Fractured teeth are sensitive, and a detailed examination awake, without analgesia, is both hurtful to the patient and potentially injurious to the examining veterinarian. Under anesthesia, the veterinarian will determine whether the fracture is complicated or uncomplicated based on tactile examination of the fractured surface with an instrument called an explorer to assess whether the pulp is exposed. Dental x-rays are also obtained to assess tooth vitality, the integrity of the tooth root and for the presence of bone destruction around the root tip. Tooth root tip destruction and/or bone destruction around the root tip may occur secondary to infection of the pulp.

What treatment is needed?

Uncomplicated fractures that include loss of only the enamel and/or dentin do not require extensive therapy. They are treated conservatively by smoothing of the sharp fracture edges with a bur and application of a light-cured resin bonding agent or adhesive onto the dentin. Dentin is porous and within these pores or dentinal tubules are nerve endings that extend from within the pulp. Fluid that exists within the tubules shifts in response to fluctuations in hot or cold. This fluid shift stimulates the nerve endings, resulting in tooth sensitivity. Resin bonding agents are applied to plug the porous surface and reduce sensitivity.

Complicated fractures that have exposed pulp are treated by either vital pulp or root canal therapy. The former, vital pulp therapy is reserved for the treatment of complicated fractures where the injury to the pulp has occurred within 48 hours. In essence, the longer the pulp of the tooth is exposed, the deeper bacteria can travel into the depths of the pulp. When the exposure is greater than 48 hours, the current literature suggests decreased treatment success due to the significance of the contamination. With vital pulp therapy, the superficial and contaminated portion of the pulp is removed, a filling is placed to cover the exposure and the vitality of the tooth is preserved. In cases of chronic exposure or complicated fractures of undefined age, root canal therapy is the only other option to save the tooth. Root canal therapy differs from vital pulp therapy in that the tooth is essentially killed through the removal of the entire pulpal contents with specially designed files. The void left following removal of the pulp is then filled with a rubber-like material called gutta percha. Prosthetic metal or more aesthetic crowns (porcelain or ceramic) may be placed over the remaining crown of the root canal treated tooth to restore normal contour and protect the remaining crown.

Although less desirable from a functionality standpoint, teeth with complicated fractures may also be extracted.

Extraction effectively removes the source of infection and pain. The difficulty of the extraction surgery varies with the tooth type, and may involve tooth sectioning and bone removal in the case of the canines ("fang" teeth), multiple-rooted or carnassial (upper fourth premolar and lower first molar) teeth.

Prognosis

The prognosis for a fractured tooth is good following treatment. Treatment success is highest with extraction surgery, followed by root canal and vital pulp therapies. Root canal and vital pulp therapies are technique sensitive procedures, and therefore are associated with a varied percentage of success. Vital pulp or root canal therapies are also more time-consuming procedures under anesthesia that require follow-up visits (with anesthesia) to obtain x-rays of the treated tooth (6 months and yearly thereafter) that may be less feasible in older patients or those with concomitant medical disease. With extraction however, the tooth is gone forever, and the patient does not benefit from the functionality of the tooth. The standard re-examination interval for extractions is 2 weeks and can be performed awake.

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