



Extraction of mandibular 1st and 2nd incisor teeth following complicated crown-root fractures using the Extract-Eze

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Tooth fractures are a common dental problem seen in companion small animal practice world-wide. Fractures may result from chewing hard items such as bones and antlers, fences and rocks, or from a moving object such as a motor vehicle, golf ball or sporting equipment, ie cricket or baseball bat and golf or hockey stick.

Fractures may be termed 'uncomplicated' and involve loss of enamel or dentine, or may be 'complicated' and expose the pulp. They may also be limited to the tooth crown, or may extend subgingivally and be termed a 'crown-root' fracture.

Treatment goals are: reducing pulp inflammation and/or infection; eliminating pain; and preventing further damage to the tooth. Treatment options include: extraction; root canal treatment or vital pulp therapy followed by crown restoration.

Many fractures are not observed by the owner at the time of injury due to the pet not showing obvious pain, so immediate therapy is infrequently performed in veterinary practice. The majority of tooth fractures are therefore found by the veterinarian during clinical examination of the oral cavity when the pet is presented for a general consultation, a health check or a vaccination. Because of this, the most common treatment for fractured teeth in veterinary medicine is root canal treatment or extraction.

In this case study, the dog was noticed to be involved in a motor vehicle accident and suffered trauma to the oral cavity, resulting in multiple teeth fractures. The referring veterinarian commenced antibiotics and NSAIDs immediately with the view of reducing inflammation and saving the teeth and the dog was presented at our clinic the same day as the accident.

Case Study

Abbey, a 40kg, 6yo female German Shepherd was referred following presentation at her regular veterinarian after a motor vehicle accident causing multiple fractured teeth on the day of the incident. The referring clinic had commenced Clavulox 500mg IM and Metacam 40mg SQ three hours prior to presentation. The oral examination revealed multiple teeth fractures. A dental chart was completed. The maxillary left 2nd incisor (202) and mandibular left canine (304) had complicated crown fractures. The mandibular left 1st and 2nd incisors (301, 302) had complicated crown-root fractures. There were multiple teeth with uncomplicated crown fractures with dentin exposure: 104, 108, 203, 204, 303, 401, 402 and 403. Clinical examination found Abbey to be healthy - T38.1C, HR 144, RR 12, mentation bright and alert, body condition score 6/9.

Pre-anaesthetic health check using IDEXX in-clinic machines showed the haematology and biochemistry parameters to be normal. Abbey was admitted and intravenous fluid therapy commenced using Hartmann's solution @ 10ml/kg/hr after placement of an indwelling #20 catheter in the left cephalic vein. Anaesthesia was administered using buprenorphine 0.35ug SQ and atropine 2mg SQ pre-med and alphaxalone 60mg IV induction. Abbey was monitored during

anaesthesia by measuring blood pressure, spO₂, temperature, heart rate, CO₂ and respiratory rate and kept warm using an air forced heating blanket. The fractured teeth were radiographed using a #2 Sopix sensor prior to treatment.



Figure 1. View of the rostral mandible showing the fracture to 301, 302 and 304.

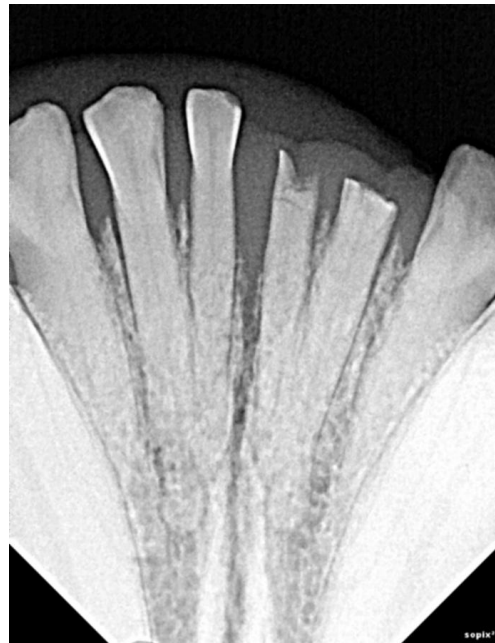


Figure 2. Radiograph of the crown-root fractures of the 1st and 2nd incisor teeth and the apical root fracture of 302.

Left sided infra-orbital and mental nerve blocks were placed using 0.5mls mepivacaine 3% solution each. Teeth 202

and 304 were treated by direct pulp capping. Teeth 301 and 302 were extracted. Flowable composite was placed on the teeth with uncomplicated fractures.

The epithelial attachment of both mandibular incisor teeth was severed using a #15 scalpel blade. A 1.3S-XS and winged #1 elevator were then advanced subgingivally into the space occupied by the periodontal ligament. Apical progression of the instruments severed the ligament and loosened the tooth from attachment to the bone with firm but controlled force. At this point, the teeth were grasped with small animal extraction forceps and gently removed from the socket with gentle rotation. 301 was removed entire, whilst 302 was missing the root tip. A radiograph was taken to confirm the root tip was still in situ.



Figure 3. Radiograph confirming the root tip of 302 in situ.

An attempt to extract the root tip using the 1.3S-XS and a root tip pick instrument was not successful, so a surgical extraction was performed. Two vertical diverging incisions were made commencing at the gingival margin on either side of the tooth into the mucosal tissue to the level of the tooth root to expose the overlying bone. A Molt 2/4 periosteal elevator was used to raise a full thickness muco-gingival flap and expose the underlying bone. A 2mm height of bone was removed with a #2 diamond bur in a high speed water-cooled handpiece to the level of the fractured tooth root. The root tip remover was screwed into the pulp canal of the tooth root to stabilise it and the 1.3S-XS elevator was used to sever the remaining periodontal ligament. Once loose, the root tip remover was used to lift the tooth root from the socket. The gingival flap was sutured with 4/0 polyglycolic acid.

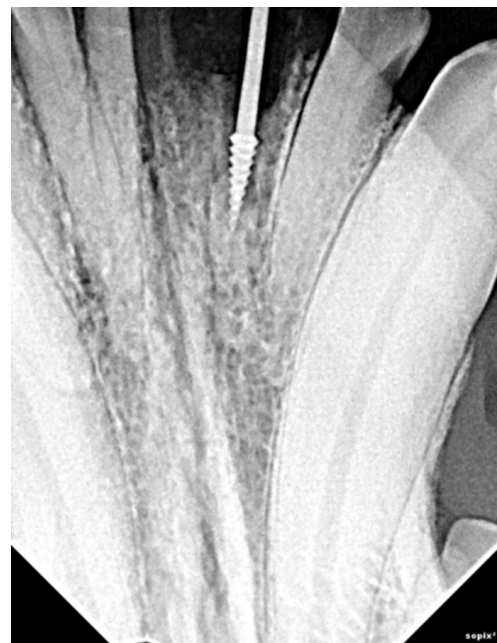


Figure 4. Radiograph of 302 with root tip remover in place.

Complete tooth removal was confirmed visually and by radiography.



Figure 5. Radiograph confirming complete extraction of both 301 and 302.



Figure 6. Extracted tooth root attached to the root tip remover.

Abbey recovered well from anaesthesia. She was continued on Metacam 40kg oral dose sid and Clavulox 500mg PO bid for 10 days.

Re-evaluation in 3 weeks showed healing of the sutured surgical site and retention of the restorations. The owner was asked to offer food which could be compressed between the owner's thumb and forefinger, without being mushy until rescheduled radiographs would be obtained of the direct pulp treated teeth.

Discussion

The practice of extracting root tips of traumatically fractured or iatrogenically fractured teeth can be a challenge for most veterinarians. When the tooth roots are located in close proximity to the maxillary and nasal sinus, the mandibular canal, or deep in rostral mandibular bone, the addition of a root tip remover during the extraction process can both make for an easier extraction, as well as, prevent accidental penetration into the nasal cavity and mandibular canal of the tooth root.

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