



Extraction of deciduous mandibular canine and incisor teeth to treat a Class 2 malocclusion causing hard palate trauma

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Oral pathology and the dentition of young animals is often overlooked and under treated. This is often because, during the period deciduous teeth are present, a puppy is examined only twice for vaccinations. It is also common for the veterinary practice to find it difficult to thoroughly examine the oral cavity, especially as a puppy may wriggle, bite or resent having its mouth opened. Therefore, many dental problems and malocclusions may be missed during this important growth period.

The juvenile pet and deciduous dentition has unique conditions, and dealing with them correctly and in a timely manner is essential. When a puppy has a malocclusion and/or the deciduous dentition show abnormal positioning, retention of the canine and incisor teeth may not only cause a detrimental interlock of the teeth into the hard palate, resulting in ulceration and interfering with mandibular growth, but they may also influence their permanent counterparts to erupt into an abnormal position.

In this case study, a Class 2 malocclusion was noticed and early intervention undertaken to remove hard palate trauma, encourage mandibular growth and eruption of permanent teeth into atraumatic occlusion.

Case Study

Momo, a 5.2kg 10.5 wo female Keeshond was referred following presentation at her regular veterinarian for a routine vaccination. During the examination, the mandible was found to be short (Class 2 malocclusion) resulting in malposition of the mandibular canine (704, 804) and incisor (701, 702, 703, 801, 802, 803) teeth, which were penetrating and causing ulceration of the hard palate. Clinical examination found Momo to be healthy - T38.9C, HR 168, RR 20, mentation bright and alert, body condition score 5/9. Oral examination confirmed the above findings.



Figure 1. Front view showing relationship of jaw length and Class 2 malocclusion.



Figure 2. Right side of mouth showing the malocclusion.

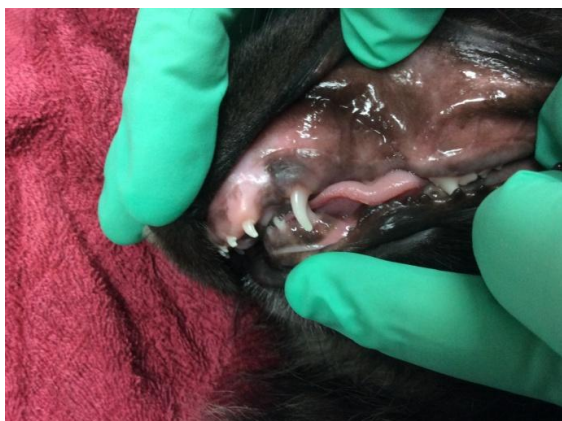


Figure 3. Left side of mouth showing the malocclusion.



Figure 4. Front ventral view of mouth showing malocclusion.

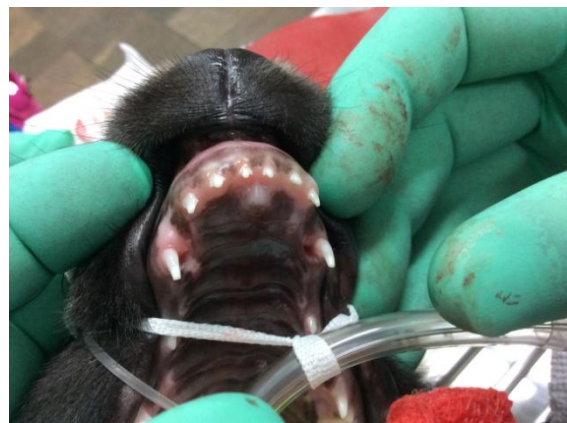


Figure 5. Open mouth view to show trauma and ulceration of the hard palate.

It was recommended that the deciduous incisor and canine teeth be extracted as soon as possible to relieve the unfavourable trauma and inflammation, relieve pain and give the mandible an opportunity to lengthen if it was not genetically short and the permanent mandibular canine and incisor teeth opportunity to erupt and achieve normal occlusion. At 10 weeks of age, there is only a short period in which extraction will yield a favourable outcome. Ideally extractions of this nature are undertaken at 7 - 8 weeks of age and no later than 12

weeks of age¹. This is primarily because the crown of the canine tooth forms between 8 and 13 weeks of age, which is followed by root formation and crown/tooth eruption. The permanent canine teeth erupt approximately 5-6 months of age, so a longer time to allow the mandible to lengthen is desirable. If the deciduous teeth remain persistent, it is highly likely the permanent teeth will erupt lingual to the deciduous teeth. Momo's owner was advised that malocclusion of the jaw is highly likely to be genetic in nature and the permanent teeth may require further surgery to assist in their positioning even after surgical extraction of the deciduous teeth. In animals with serious malocclusions, where dental contact or advanced soft tissue injury occurs, extraction of the deciduous teeth may not relieve the problem due to the genetic influences on jaw growth.

Pre-anaesthetic health check using IDEXX in-clinic machines showed the haematology and biochemistry parameters to be normal. Momo was admitted and intravenous fluid therapy commenced using Hartmann's solution @ 5ml/kg/hr after placement of an indwelling #22 catheter in the right cephalic vein. Anaesthesia was administered using a methadone pre-med and propofol induction, bilateral mental nerve blocks were placed using 0.2mls mepivacaine 3% solution.

Momo was monitored during anaesthesia by measuring blood pressure, spO₂, temperature, heart rate, CO₂ and respiratory rate. Momo was kept warm using an air forced heating blanket. The mouth was examined and a dental chart completed. The rostral mandible was radiographed using a #2 Sopix sensor prior to extraction.



Figure 6. Radiograph of the rostral mandible showing the roots of the incisor and canine teeth.

The epithelial attachment of the canine and incisor teeth was initially severed using a Molt 2/4 periosteal elevator and 1.3S-XS elevator respectively. The 1.3S-XS elevator was then advanced apically on the lingual and buccal canine tooth root surfaces to approximately 75% of the length of the root to sever the periodontal ligament with firm but controlled force.

The curved deciduous elevator was introduced into the gingival sulcus to sever the mesial and distal periodontal ligament using the concave surface against the mesial root and convex surface against the distal root to approximately 50% of the length of the root. Once the tooth became mobile, the Molt was reintroduced along each surface and gently rotated moving the tooth in each direction. The incisor teeth were extracted using a 1.3S-XS elevator to continue to work around the circumference of each tooth to sever the periodontal ligament as the elevator was pushed apically. Each tooth was then grasped with the small animal extraction forceps and gently removed from the socket with gentle rotation. All teeth were examined to ensure complete removal, which was confirmed visually and by radiography.

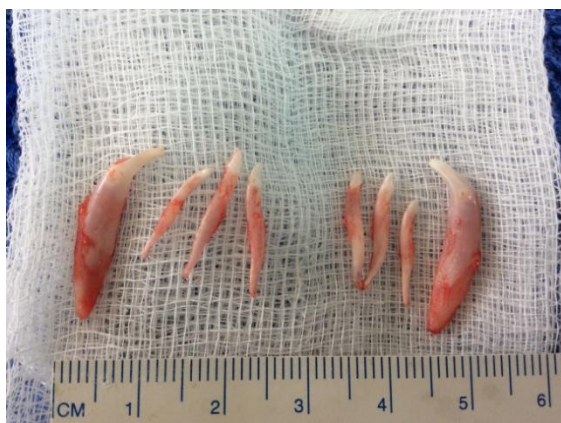


Figure 7. Extracted teeth.



Figure 8. Radiograph of right rostral mandible showing complete removal of canine and incisor teeth.



Figure 9. Radiograph of left rostral mandible showing complete removal of canine and incisor teeth.

The sockets were also visually checked to ensure a blood clot was present and left open to granulate.



Figure 10. Blood clots post extraction.

Momo recovered well from anaesthesia. She was given Metacam injectable 2.5mg SQ and discharged home the same day with 0.75mg SID PO for 2 days. No antibiotics were required.

Re-evaluation every 2 weeks was conducted to fit in with the owner's schedule. Her owner was advised to monitor the extraction sites for any abnormal swelling or discharge and was asked to offer food which could be compressed between the owner's thumb and forefinger, without being mushy.

Momo was scheduled for re-examination to check eruption of the permanent teeth once they have erupted through the gingiva. At this time, if the mandible has lengthened and the teeth are erupting into a normal occlusion, no treatment is required. Whereas, if the mandible remained short and the permanent teeth are lingually displaced, or causing trauma

to the hard palate or maxillary teeth, further treatment options include:

1. Coronal extensions to direct the erupting canine teeth into the correct occlusion.
2. Placement of an incline plane to orthodontically tip the mandibular canine teeth laterally.
3. Crown amputation and direct pulp capping of any or all teeth causing trauma.
4. Extraction of the mandibular canine and/or incisor teeth.

Discussion

The practice of interceptive orthodontics should ideally be performed between six to eight weeks, (no later than 12 weeks), after which time the permanent teeth eruptions are imminent, and often take the abnormal place of their predecessors.

The actual process of exodontia should be carried out with extreme caution to minimise potential damage to the permanent tooth bud under the gingival surface. Infiltration of a local anaesthetic will help with local discomfort. Elevation of the tooth should be done gently with gradual forces.

During extraction, care was taken not to lever against the underlying crown and developing permanent tooth buds, which are positioned on the lingual aspect of the

deciduous teeth. Taking care to reduce inflammation, reduces the surrounding temperature, thus avoiding damage to the enamel of the developing permanent dentition, as the ameloblasts are sensitive to temperature change.

Extreme gouging and rotation should be avoided to prevent fracture of the delicate deciduous roots. If the crown breaks off, attempts should be made to completely retrieve the remaining roots, but again with care. If necessary, a moderate gingival flap and alveoloplasty may be performed to expose the root tip. If infection is present, oral antibiotics should be continued post-operatively. Whenever attempting deciduous extractions, the owner should be notified that changes may occur to the permanent tooth, no matter how carefully the procedure is done. These changes may range from very mild enamel pitting, to more severe enamel and root dysplasias, and even malpositioned or unerupted teeth.

Class 2 malocclusions, although not proven to be under genetic control, are certainly observed commonly in general small animal practice, and are not breed nor sex dependent. When a puppy is found with a Class 2 malocclusion, interceptive orthodontics can be performed, however the owner should receive genetic counselling and the patient desexed to prevent future generations suffering the same fate.

References:

1. Wiggs RB, Lobprise HB Veterinary Dentistry Principles and Practice. Philadelphia: Lipincott-Raven 1997