

THE IMPORTANCE OF DENTAL IMAGING IN THE APPROACH OF PERSISTENT DECIDUOUS TEETH IN A SEVEN-MONTH-OLD POMERANIAN DOG – A CASE STUDY

IMPORTANȚA INVESTIGAȚIILOR RADIOLOGICE ÎN ABORDAREA DENTIȚIEI TEMPORARE LA UN POMERANIAN ÎN VÂRSTĂ DE ȘAPTE LUNI – UN STUDIU DE CAZ

Raluca-Ioana NEDELEA^{1),*},
S.M. MARZA¹⁾, M.M. BORZAN¹⁾,
I MARCUS¹⁾

ABSTRACT | REZUMAT

Persistent deciduous teeth are frequently encountered in small breeds. The explanation resides in the small volume of bone in which the same number of teeth need to be aligned. This case report aims to reassess the importance of dental radiography in everyday practice. A seven-month-old Pomeranian male dog was presented with persistent deciduous teeth involving the upper incisors and all deciduous canines. Standard extractions were performed after correlating the dental image findings with the clinical situation under general anaesthesia. Informed consent was obtained from the owner. In addition, a pre-anaesthetic complete blood count and biochemistry were performed along with a thorough examination. Haematological results were unremarkable, so the intervention had no contraindications. The temperature, breathing rate, and heart rate were in the normal range. The persistent deciduous teeth were extracted entirely, thereby obtaining and interpreting radiological findings. The case's complexity resides in identifying and explaining the persistent deciduous canines to the owner, as the definitive ones erupted in a malposition due to persistent deciduous teeth and some permanent teeth were absent. In addition, the small volume of the maxilla and mandibula, with a high density of immature teeth in the proximity of mature deciduous teeth, elevated the complexity of the surgical intervention.

Keywords: deciduous teeth, dog, Pomeranian, dental x-ray

Persistența dinților temporari este frecvent întâlnită la rasele mici de câini. Explicația acestei situații patologice constă în volumul mic osos al oaselor maxilare în care același număr de dinți trebuie să se alinieze. Un Pomeranian în vârstă de șapte luni s-a prezentat pentru extracția dinților temporari persistenți. Dinții temporari persistenți afectau incisivii superiori, precum și toți cei patru canini caduci. S-au realizat extracții dentare standard după realizarea și analiza investigațiilor radiologice intraorale. Manopera s-a realizat sub anestezie generală. Preanestezic au fost efectuate analize de sânge: hemoleucogramă, profil biochimic sanguin, precum și o analiză clinică atentă a animalului. S-a obținut consimțământul informat al riscului anestezic și al intervenției chirurgicale. Analizele sanguine nu au relevat modificări notabile, astfel încât intervenția chirurgicală nu a prezentat contraindicații. Temperatura corporală, frecvența cardiacă și respiratorie s-au situat în limitele fiziologice pentru această specie. Dinții temporari persistenți au fost complet extrași consecutiv obținerii și interpretării imaginilor radiologice intraorale. Complexitatea cazului rezidă în identificarea și explicația prezenței caninilor caduci persistenți în condițiile în care caninii definitivii erau parțial erupți în malpoziții. Volumul redus al maxilarului și mandibulei, în combinație cu densitatea crescută de dinți temporari imaturi aflați în proximitatea imediată a dinților caduci maturi au crescut complexitatea intervenției chirurgicale.

Cuvinte cheie: dinți temporari, câine, Pomeranian, radiografii dentare

Human dentistry assesses that a tooth is considered persistent if more than three per four of the coronal part of the replacing tooth has erupted (8). There is no such a rule in veterinary dentistry. (5) Still, many practitioners remove the persistent deciduous tooth when half of the crown of the permanent tooth has erupted. This is because coexisting on the dental arch, the permanent teeth and the deciduous teeth will lead

to malalignment of the adult teeth. (3) Persistent deciduous teeth offer favourable conditions for developing periodontal disease. (2, 4) Removing the persistent deciduous teeth requires preoperative dental x-rays, postoperative radiographs, gentleness, patience, proper instruments, and a good surgical technique for the operator (7). Trying to minimise the complexity of the surgical act when dealing with persistent deciduous teeth may lead to failure and predictable complications. When facing a case of persistent deciduous teeth, one is obliged to prevent the damage to the permanent follicle that is usually incompletely formed,

1) University of Agricultural Sciences and Veterinary Medicine, Faculty of Veterinary Medicine, Cluj-Napoca, Romania

*) Corresponding author: raluca.nedelea@dentovet.ro

with large pulp chambers and thin dental tissues (enamel and dentin), with the root partially developed.

Any pressure applied to these permanent successors will irreparably damage them. It is essential to consider that it is not only the crown of the deciduous teeth that needs to be removed but also the root. The persistence of the root is what causes the misalignment of the permanent tooth. Furthermore, a persistent intrabony root can lead to unwanted infectious complications by opening the pulp chamber, allowing the oral cavity's bacteria to colonize the pulp and develop endodontic and periapical complications. Also, leaving the roots of deciduous teeth unextracted as an ethical consideration places the operator in a precarious position. (7) The oral cavity of the dogs should be examined at the veterinary doctor's first visit for immunisation. Dogs and cats should have the dental eruption process finished by six months. (6) So, any missing persistent tooth may be diagnosed before any local complications appear. Dental radiographs are the gold standard for a precise diagnosis and to confirm that the procedure was made according to veterinary dentistry standards.

MATERIALS AND METHODS

A seven-month-old Pomeranian dog was presented for the persistence of all four temporary canines, five temporary upper incisors, and one temporary upper

molar. A detailed physical examination, a complete blood test and serum biochemistry, and a radiological examination were performed prior to the surgical intervention. Dental X-rays were imperative to obtain as the coronal parts' morphology for temporary teeth and the definitive ones were quite similar. In addition, photographs were taken before and after the surgical intervention and represented an essential part of the postoperative discussion with the owner. General anaesthesia was medically induced and inhaled during the surgical procedures. Surgical extractions were performed, and resorbable sutures were applied.

RESULTS AND DISCUSSIONS

Physical examination findings

A physical examination revealed a weight of 1.250 kg, a heart rate of 140, a 35 breathing rate, and an internal temperature of 39 °C.

Haematological findings

A complete blood count and serum biochemistry had no remarkable results that would have interfered with the general anaesthesia.

Intraoral clinical findings

Intraoral examination (Fig. 1) revealed that five temporary upper incisors, 503, 502, 501, 602, and 603, were present in a vestibular position regarding the definitive ones. 201, the first left definitive upper incisor, was present; 601 was missing.

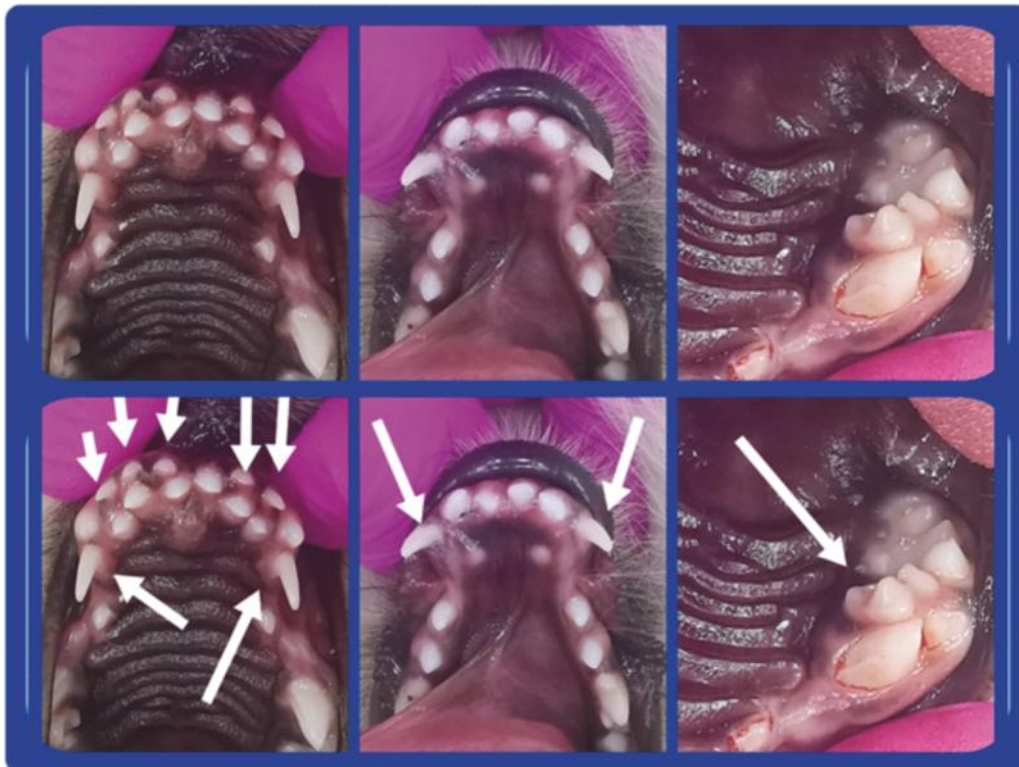


Fig. 1. Intraoral situation at presentation. White arrows indicate the persistent deciduous teeth

201 was aligned with the dental arch of the temporary ones. The definitive upper canines had only the tips of the crowns erupted, mimicking the morphology of the incisors, and were aligned to the arch described by the temporary ones. The morphology of the third definitive upper incisors, 103 and 203, was similar to the temporary ones. A novice could have easily said that 103 and 203 are, in fact, 503 and 603. The part of the crown seen from the canines mimicked the 103 and 203 normal coronal morphologies. So, one could say that 104 and 204 are 103 and 203. The upper temporary molar, 509, did not raise any problems in identifying it. The tooth was mobile, with extensive root lysis and associated local gingivitis. Examining the mandibula, the situation was even more complicated. Only four incisors were present on the dental arch, and the tips of the definitive canines were severely localised lingually.

Diagnostic imaging findings

Mandibular radiological preoperative aspects: The radiograph of the rostral lower jaw of the patient revealed two teeth to the left and right of the mandibular symphysis, with the apex completely closed and the coronal morphology of definitive lower first incisors. Due to these aspects, they were considered 401 and 301. Distally positioned to these can be found another two teeth, with the pulp chamber wholly formed and the radiological apex closed, which were considered

302 and 402. More mesial, there is a 3mm space without dental buds, followed by two teeth with a sharp coronal morphology and closed apex. They were interpreted as being the temporary canines (704 and 804). The lack of 303 and 403 is most likely due to agenesis. This diagnosis of dental agenesis in 303 and 403 is confirmed by the 3 mm space mentioned before, between 302-704 and 402-804, where the normal localization of these two permanent teeth should have been. In conclusion, there is a persistence of 704, 804 and 303, 403 agenesis. (Fig. 2)

Maxillary radiological preoperative aspects: The radiograph of the rostral upper jaw revealed two teeth to the left and right of the inter-incisive suture, with a large pulp chamber and a very thin apex closure. The coronal morphology of these two teeth was similar to the definitive upper first incisors. So, they were considered to be 101 and 201. Labially positioned, doubling the 201, there is a tooth with a foreshortened crown due to its near-parallel orientation to the X-ray beam because of its curvature (1). As the pulp chamber has aspects of a mature deciduous tooth, it was considered 601. Any tooth did not double 101. 201 and 101 are distally positioned, continuing the dental arch, with two teeth with large pulp chambers and an open apex. These were 102 and 202. Doubling 102 and 202 labially, 502 and 602 have all the characteristics of the tem-

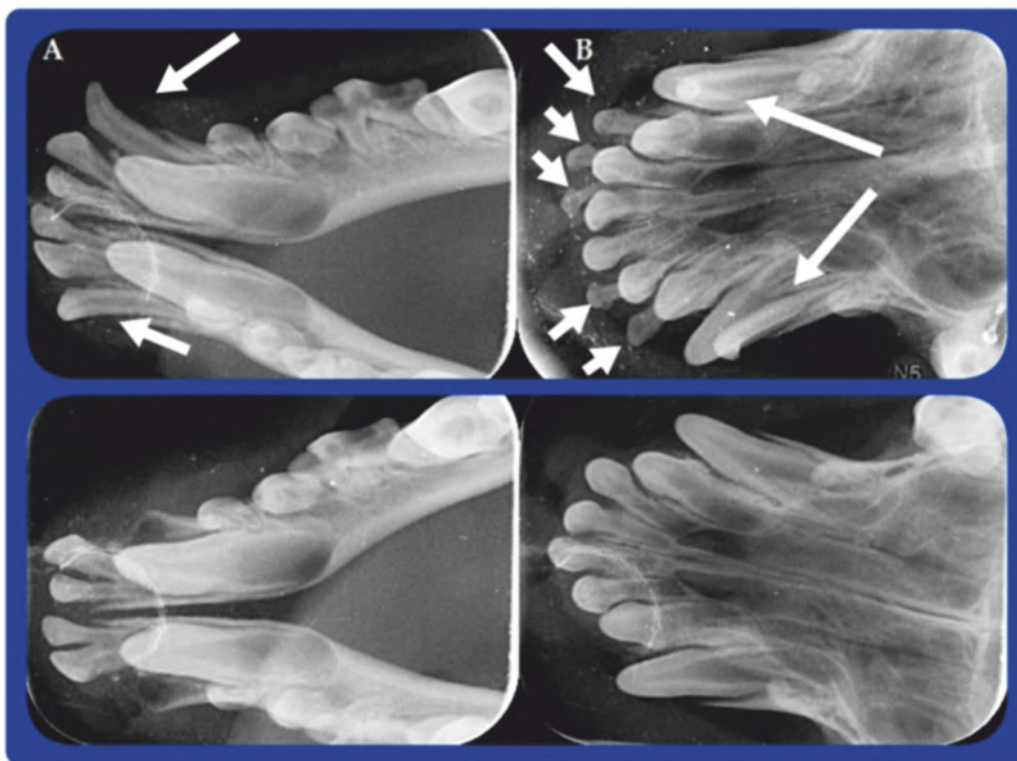


Fig. 2. Radiological aspects of the case. The A column is for the mandibula and the B column is for the maxilla. The first row is before the surgical approach and on the second row are the dental X-rays after the intervention

porary incisors mentioned before. More distally, 103 and 203 have large pulp chambers with incompletely formed roots and a bony crypt of permanent teeth. The roots were formed at around 2/3 of their usual length. 103 and 203 were also doubled by 503, 603. Right next to the 203 and 103, it can be seen that the crowns of the 104 and 204 were doubled by 504 and 604. 504 has an apical third with lysis. 504 and 604 have narrow pulp chambers and root apices that are completely closed. In conclusion, there is a persistence of 601, 602, 603, 604, 502, 503, and 504.

Postoperative radiological aspects: Postoperative dental X-rays reveal the complete extraction of the deciduous teeth without any other complications. The buds of the permanent mandibular canine teeth were lingually displaced because of the persistent temporary canines and narrow mandibula. Only half of the root was formed, but the bony crypt of the permanent tooth follicle was present. As they erupt more lately on the dental arch, the upper canines have only the coronal third of the root formed. The crowns of the permanent teeth had all the recognisable pulp chamber, dentin, and enamel components. (Fig. 3)

Deciduous teeth were removed, and one can easily see that the roots are double the length of the crowns. That is why one should pay attention when extracting deciduous teeth, as they may easily be broken by the high forces applied by the surgeon.

Treatment implemented and outcome: After obtaining the intraoral radiographs, flapless surgical extractions of the deciduous teeth were performed. Slowly, with root elevators specially designed for deciduous teeth, the periodontal ligament fibres that attached the teeth to the alveolar bone were severed. The elevators were placed on root surfaces that were not adjacent to the adult tooth. This was not to harm the thin dental structures of the permanent tooth. Postoperative radiographs were taken to confirm the proper surgical extraction of the deciduous teeth. Finally, the labial and oral gingiva were opposed with resorbable sutures containing 3.0 polyglycolic acid. (Fig. 4)

Deciduous tooth extractions should be handled with patience and gentleness. The close proximity of the permanent dental buds elevates the level of complexity of the surgical approach. Any misplacement of the luxation or any high pressure applied to the dental instruments may lead to definitive, irreplaceable damage to the permanent teeth. Knowing the procedure, identifying the permanent teeth, taking dental x-rays, and taking before and after photographs will improve owners' satisfaction. Even more, it will stop any further discussion based on the operating skills of the surgeon or the extracted teeth.

Mandibular canines were severely lingualized so that further future exams implying the bite were communicated to the owner. A high risk of narrow mandibula because of 304 and 404 lingualized positions



Fig. 3. Postoperative photographs with identification of the teeth present on the dental arch

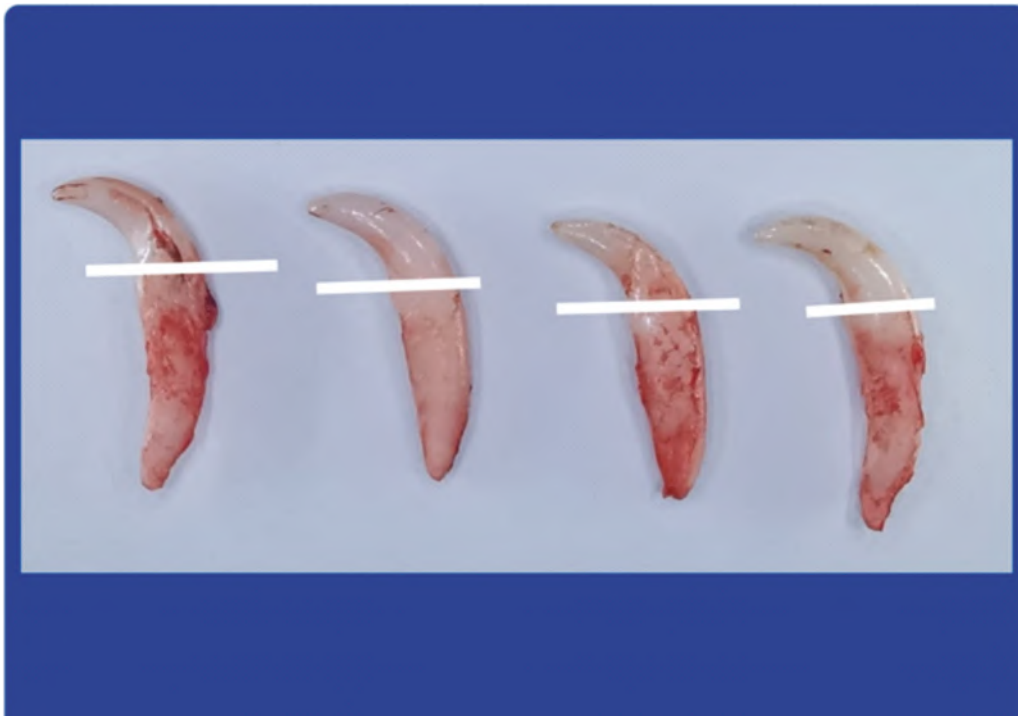


Fig. 4. Deciduous canines completely extracted, with the white lines indicating the limit between the coronal part and the radicular one

was registered. The agenesis of 303 and 403 were announced and explained on the dental photographs and X-rays. Misalignment of the permanent incisors was noticed and will be monitored with all the periodontal problems involved due to this crowding situation.

CONCLUSIONS

Surgical extractions of the deciduous teeth should not be performed without dental x-rays. Mandibular canines erupt lingually from the definitive ones. Teeth are germs for developing the maxillary bones. As they erupt lingually and the persistent deciduous teeth remain in place, the development of the maxillary bones will be compromised. Small breeds are more likely to develop narrow mandibula due to persistent deciduous teeth. Our case confirms the presence of persistent deciduous teeth in a small breed. Case documentation through photographs and dental x-rays before, during, and after the surgical intervention will enhance the quality of communication between the owners and doctors.

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