SMALL MOUTHS, BIG HOLES:

Small Holes, Bigger Than You Think!

There are many reasons for oronasal fistula also known as oronasal communication. Certainly, the classic location is at the maxillary canine tooth as a complication of extraction. *However, oronasal communication can occur at any location along the maxilla following extraction where communication with the nasal cavity occurs during the extraction procedure* (Fig. 1). In these cases, debridement of the defect is required followed by elevation and apposition of a mucosal flap….a flap that is likely larger than you would expect to ensure a successful outcome.

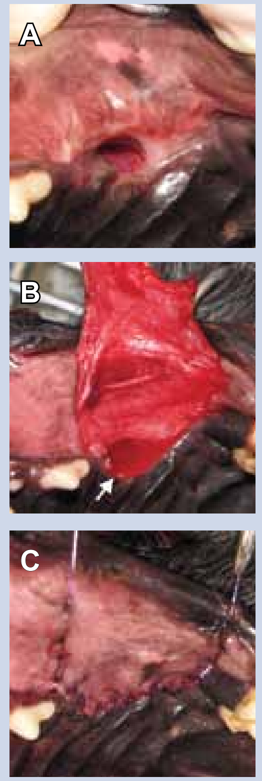

Fig. 1 Oronasal communication at a maxillary fourth premolar extraction site (A). The fistula post debridement (arrow) is larger than anticipated (B). Primary closure of the flap ensures resolution of the problem (C).

Oronasal communication may seem small and the clinician assumes that it really can't be causing a clinical problem. However, *the bone defect may be larger than anticipated* (Fig. 2). Further, dental radiographs are required to check for underlying reasons for oronasal communication.

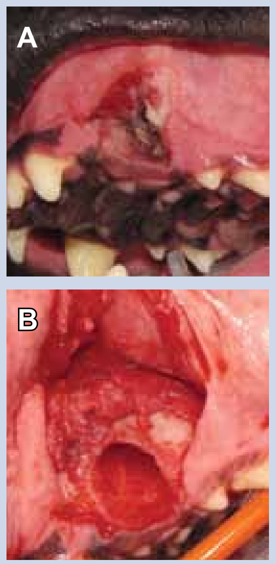

Fig. 2 Traumatic oronasal communication (A) resulting in a large defect at the site of the maxillary canine tooth (B).

Unfortunately, retained tooth roots are common and may lead to complicated healing and oronasal communication (Fig. 3). Retained tooth roots are a complication of extraction when the clinician fails to maintain one of the tenants of oral surgery…*remove the entire tooth root*. It should be no secret that the entire root has not been removed. The questions are: What are you going to do about it? Are you comfortable digging-out root(s) in the nasal cavity with hemorrhaging turbinate tissue, or in the caudal maxillary area near the cranium and suborbital region. The Center handles cases with problematic retained tooth roots all the time regardless of location. As with many surgical procedures, the key is exposure! Large flaps, and complete visualization of the defect ensures complete root removal and resolution of the problem.

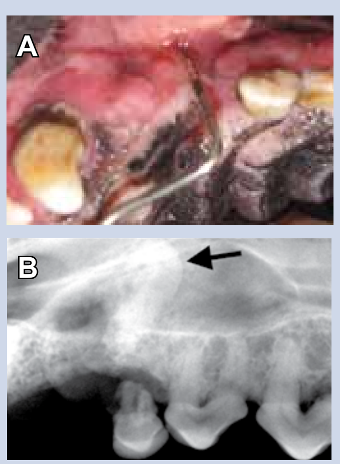

Fig. 3 Oronasal communication at the site where a maxillary canine tooth had been extracted (A). The lesion is secondary to retention of a fragmented canine tooth root [arrow] (B).

Oronasal communication associated with nasal neoplasia may also occur (Fig. 4). Preoperative nasal radiographs will show a soft tissue density that most often will reflect secondary rhinitis but can also be suggestive of neoplasia. The clinician should be prepared to shift gears and be aggressive in obtaining a biopsy since this finding is often surprising.

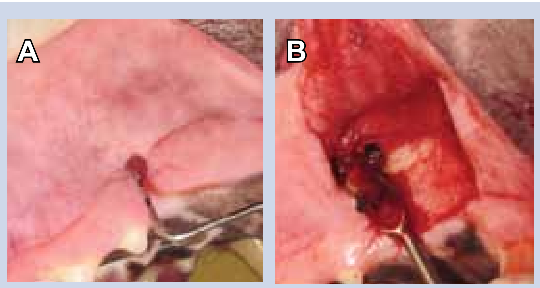

Fig. 4 Oronasal communication at the site of a maxillary canine tooth extraction (A). Soft tissue removed at debridement was reported as malignant melenoma (B).

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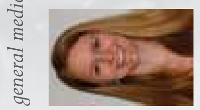

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JAW FRACTURE:
Treat It Before It Breaks!

Destructive periodontal disease is relatively common especially in older, small breed dogs. In fact, a study has shown that when compared to larger dogs, small breed dogs have a larger first mandibular molar tooth:bone width ratio. In other words, *small and toy breed dogs have big molar teeth for the amount of bone able to support them*. Therefore, bone lysis from destructive periodontal disease can be less severe than in large dogs but still have devastating effects on bone support for these important carnassial teeth.

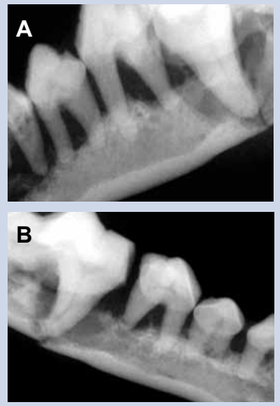

Fig. 1 *Bilateral pathologic mandibular fractures (A and B) at the first mandibular molar secondary to periodontal disease.*

These anatomical considerations and subsequent pathology make pathologic mandibular fractures from periodontal disease the most common jaw fracture in dogs (Fig. 1). It is incumbent upon the clinician to monitor this area during annual professional teeth cleaning procedures in order to provide appropriate treatment (eg. root planing, periodontal bone grafting, local antibiotics) to maintain this tooth and the health of the surrounding bone. Periodontal probing and dental radiographs quantify the severity of periodontal disease. Obviously, it is best to treat the tooth for the slow, but inevitably progressive periodontal disease….*but don't be in denial*! The tooth may require surgical extraction. This procedure can be intimidating especially in small breed dogs since extraction of the first mandibular molar *is also the most common cause of iatrogenic jaw fracture*. Avoid this complication by making a mucoperiostael flap, judicious removal of alveolar bone, crown sectioning, and root elevation using gentle force.

For pathologic fractures, the treatment requires extraction of diseased teeth and application of an intraoral splint to stabilize the fracture (Fig. 2). Segmental mandibulectomy may be required in severe cases. It is no surprise that this procedure is viable and effective since it is commonly performed in dogs for malignant neoplasms (Fig. 3).

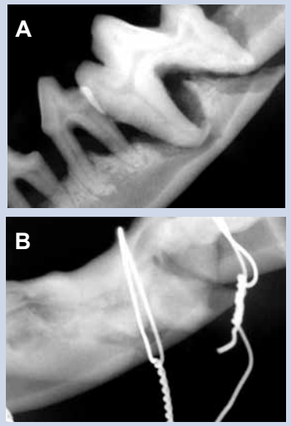

Fig. 2 *Pathologic mandibular fracture at the first mandibular molar secondary to periodontal disease (A). The fracture was repaired with an intraoral splint after extraction of diseased teeth (B).*

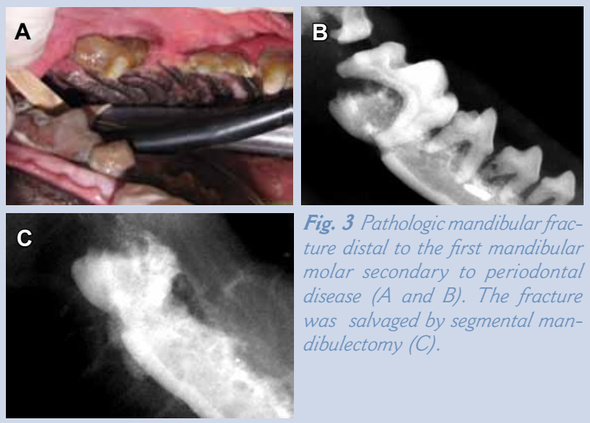

Fig. 3 *Pathologic mandibular fracture distal to the first mandibular molar secondary to periodontal disease (A and B). The fracture was salvaged by segmental mandibulectomy (C).*

BEYOND THE MOUTH:
Nasal Congestion - Tooth or Sinus Problem?

It is not uncommon for dogs and cats to have chronic nasal and sinus congestion. Certainly, the differential diagnosis includes neoplasia, infection, and tooth abscess. Diagnostic tests include serological testing for upper airway viruses, bacterial and fungal cultures, nasal radiographs, and…..don't forget dental radiographs. *In fact, dental radiographs can be placed in a grid to provide excellent detail for dorsoventral nasal radiographs*. More invasive diagnostic techniques include rhinoscopy, endoscopic biopsy, and traumatic nasal lavage to yield cytologic specimens for evaluation.

Fig. 2 *Anatomic specimen shows the tooth roots of the maxillary fourth premolar entering the maxillary recess: distal root (black arrow), mesiobuccal root (arrowhead), and mesiopalatal root (white arrow) after removing the floor of the infraorbital foramen.*

Tooth abscessation is most commonly associated with fractured teeth and secondary pulpitis with apical lucencies around the tooth roots. *However, never forget that intact teeth may also develop pulpitis and abscess* (Fig. 1). Periapical disease extends into the maxillary sinus or recess based on the proximity of the tooth roots to this area and destruction of surrounding bone (Fig 2). A similar pathologic process affects maxillary canine teeth with direct extension of disease into the nasal cavity. Again, the incisive bone separating the root apex and nasal cavity is thin and easily disrupted in the face of infection.

Interpretation of dental radiographs will rule-out dental lesions as a cause of dental disease. They can also show signs of nasal disease. *Now what to do?* At the Center, we offer diagnostic biopsies via the oral cavity whether after tooth extraction through the empty alveolus or by primary mucoperiosteal incision and ostectomy of the hard palate (Figs. 3 and 4). These techniques offer the advantage of providing the pathologist with adequate *and* accurate specimens for biopsy, without hair clipping, skin incision, or complicating postoperative hemorrhage. *As in most aspects of medicine, direct visualization of lesions is best for allowing the clinician to make an accurate diagnosis in an efficient manner.*

Fig. 1 *Intact right maxillary fourth premolar tooth (A) with radiographic signs of periapical infection (B).*

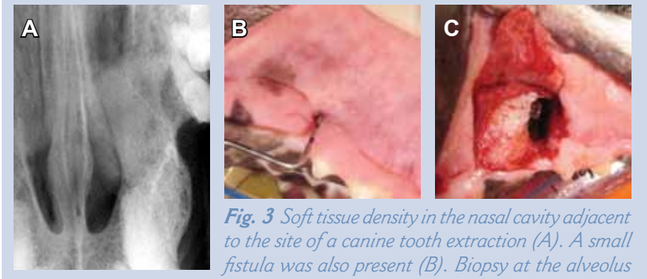

Fig. 3 *Soft tissue density in the nasal cavity adjacent to the site of a canine tooth extraction (A). A small fistula was also present (B). Biopsy at the alveolus for the canine tooth showed aspergillosis (C).*

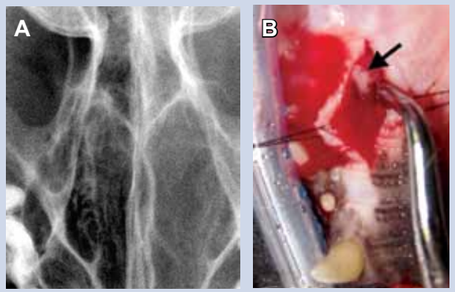

Fig. 4 *Soft tissue density in the entire left nasal cavity in a cat (A). Biopsy through the hard palate yielded (arrow) a diagnosis of squamous cell carcinoma (B).*

ORAL TRAUMA:
Old Trauma, New Dog.

Louie had a rough life early on. He was abandoned as a puppy and picked up by animal control. He waited patiently for someone to recognize his potential and fortunately found his forever home. His new owners thought his snaggletooth appearance was cute and added to his spunky personality. *As time went by Louie's owners noticed that his snaggletooth was looking more and more gray and unhealthy*. They sought assistance from their veterinarian who referred them to the Center once the many abnormalities in the mouth were discovered. Not only did he have a discolored tooth, but he appeared to have a major malocclusion. Upon examination it appeared that Louie had a previous mandibular fracture that had healed on its own, leaving Louie with quite the interesting occlusion (Fig.1)! On dental radiographs, a healed rostral right mandibular fracture was noted. The fracture must have occurred when Louie was very young, as evidenced by the immature canine "snaggletooth" that was in desperate need of extraction. The entire left mandible was also shifted laterally, giving Louie a reverse bite, or posterior crossbite (Fig. 2). The root of the right mandibular canine was exposed and the left mandibular canine was shifted mesially and causing trauma to the hard palate (Fig. 3). The good news is that with treatment, Louie should function quite normally despite the abnormal occlusion. *By removing the dead canine tooth, the right mandibular first molar, three maxillary incisors, and performing a crown reduction and vital pulp therapy on the remaining mandibular canine*, Louie should not experience any pain when he is eating and playing (Fig. 4). So even though Louie's mouth will never be "normal", we were able to create a functional and comfortable occlusion.

Fig. 1 *Healed, untreated rostral mandibular fracture (A) and associated malocclusion (B). Note the discolored, non-vital right mandibular canine tooth.*

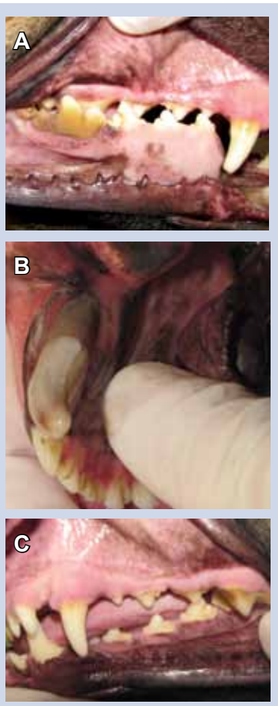

Fig. 2 *Posterior crossbite from a healed, untreated rostral mandibular fracture (A) and the discolored, non-vital right mandibular canine tooth (B). The left mandibular canine tooth is shifted mesially causing trauma to the hard palate (C).*

Fig. 3 *Right lateral view following extractions (A). Rostral view of the occlusion following crown reduction (arrow) and incisor tooth exraction (B).*