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**SUMMER NEWSLETTER**
**Plastic Surgery and Jaw Fractures!**

Oncologic surgery guidelines recommend 1-2 cm of gross tumor-free tissue be included as part of the resected specimen. For neoplasms of the mandible, this parameter must still be followed even if the procedure requires resection of a complete segment of the mandible. However, there are cases of benign neoplasms where there is minimal bone involvement allowing preservation of the ventral mandible.

Dental radiographs provide high-detail images of the mandible to enable the clinician to assess bone involvement. Every effort should be made to preserve the ventral mandible and mandibular stability as long as the tumor can be completely resected.

Acanthomatous ameloblastoma (acanthomatous epulis) is a benign tumor that behaves locally as a malignant lesion with proliferation of soft tissue and radiographic signs of osteolysis and osteous production. Since these tumors originate from periodontal tissues, simply removing the mass without resecting bone and teeth ensures recurrence. The degree of bone involvement determines the amount of mandible and number of teeth that must be resected in order to maximize the incidence of a positive result. Early diagnosis of this form of epulis along with fibrous and ossifying epulis is a key factor in the surgeon’s ability to maintain mandibular integrity.

Mucosal incisions are made using a CO2 laser that minimizes hemorrhage and decreases pain postoperatively. The mandible is resected using a bone-cutting bur. Root apices are removed using standard extraction techniques. Dental radiographs confirm complete removal of the tumor and any tooth roots resected during the procedure. The mandibular neurovascular bundle is ligated and divided on both the rostral and caudal aspects if it must be resected in order to obtain tumor-free margins. Generally, the mandibular canal is preserved along with the mandibular neurovascular bundle. Closure of the resection site is performed by using both labial and lingual mucosal flaps. Patients are essentially normal following marginal mandibulectomy since the integrity of the bones between the TMJs is maintained. Chewing hard objects must be avoided to prevent accidental fracture at the resection site.

**Small Mouths, Big Holes:**
Keeping The Mandible Stable

**Fig. 1** Dental radiograph (A) showing dental and bony destruction between the left mandibular first and second molar teeth from acanthomatous ameloblastoma in a Labrador retriever dog. Gross tumor changes (arrows) can be seen in the same area (B).

**Fig. 2** Intraoperative image (A) following CO2 laser incisions for commissurotomy and the oral mucosa; and marginal osteotomy using a surgical bone cutting bur. The marginal mandibulectomy has preserved the ventral mandible including the mandibular neurovascular pedicle (B). The goal of tumor-free margins necessitated resection of bone including all teeth distal to the left third mandibular premolar tooth.

**Fig. 3** Intraoperative views of the oral (A) and cutaneous commissurotomy (B) wound closures. Note the CO2 laser commissurotomy incision (arrow) before wound apposition.
BEYOND THE MOUTH: Forehead Version Of The "Tummy Tuck".

Plastic and reconstructive surgery is as much art as it is science and knowledge. It is important for the surgeon to "picture" the result and then apply surgical methods and techniques that make it happen. The staff at the Center originally developed reconstructive techniques and flaps that are used by surgeons worldwide including the lateral neck flap in dogs and cats, forehead flap in dogs and cats, and the hard palate mucoperiosteal flap.

Skin of the canine and feline maxillofacial region is relatively immobile, making cutaneous wounds often not amenable to primary repair or second-intention wound management without resultant functional and cosmetic deficiencies. There are cases where the lateral neck flap and forehead flap may not be available or feasible options for wound closure. Rarely is forehead skin redundant, but there are occasions when the excess skin can compromise ocular function. The typical entropion surgeries are bee-bee guns when a nuclear attack is required! Generally big problems in big dogs require aggressive surgical techniques for satisfactory outcomes. Now comes the "art" part of the equation in deciding: How much skin must be removed?

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Where eyelid raising sutures are anchored? Will the eyelids close enough to cover the cornea? The occlusive skin is redundant and must be removed in order to allow for caudal advancement of the periorcular skin. The desired secondary effect is transposition of skin of the upper eyelids to allow the patient pain-free vision, or in the case described here, the ability to see! Excess tension would lead to abnormal eyelid carination similar to an unwanted "hooded" eye lift. Collaboration of an ophthalmology specialist is critical in the perioperative planning period and for postoperative assessment.

ORTHOPEDICS: Feline Broken Bones In The Same Room... Will They Heal?

Cats do have an amazing ability to heal, which is good because some of their anatomy is very small and difficult to approach surgically. A perfect example is the caudal mandible and temporomandibular joint. Surgical repair of injuries in these areas are very difficult due to the small size and thin bony anatomy. So what can be done when you have a patient with caudal maxillofacial injuries? How can correct occlusion be restored or maintained? Without a normal occlusion the cat may suffer non-union of fractures, unnecessary discomfort, and difficulty eating. To achieve the goals of fracture union and occlusal restoration, we take a page from human maxillofacial surgical techniques.

When humans have jaw surgery, the movement of the mandible is often restricted to allow for complete bony healing and prevent malocclusion from occurring if the jaws were to shift during healing. This is accomplished by "wiring the jaws shut" using thick rubber bands or orthodontic wires. We can achieve this same goal by using the long canine teeth to "fix" the mandible to the maxilla and prevent any motion. The technique is called acrylic maxillomandibular fixation (MMF) and allows the fractures to heal while keeping the cat in normal occlusion. The appliance is generally left in place for approximately 4-weeks. Enough space is left to allow the cat to lick up food and water if they wish, and many cats will eat on their own in this manner. For those cats that don’t eat or to supplement their nutrition, an esophageal feeding tube is always placed to provide an alternate means of feeding. MMF may appear somewhat dramatic but will provide the best chance for healing while maintaining normal occlusion since these caudal injuries may be difficult to repair surgically.

Fig. 1 Caudal mandibular fracture (arrow) adjacent to the temporomandibular joint in a cat. This injury would be difficult to repair surgically.

Fig. 2 Severe maxillary fractures in a cat (A). The fractures were comminuted and unstable. Primary surgical repair would not be possible. Same patient after MMF (B).

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Fig. 3 Dramatic malocclusion due to caudal mandibular fracture and symphyseal separation (A). Same patient after symphyseal wire and MMF (B).

Fig. 4 Feline patient with multiple maxillofacial injuries before (A) and after (B) MMF. The tongue is able to protrude through the appliance for the patient to lap-up a gruel diet, or nutrition can be provided through the esophagostomy tube.

TOOTH RESORPTION: Not Only In Cats!

Unfortunately for other species, tooth resorption is not restricted to felines only. Humans can be affected by tooth resorption, and so can dogs. In fact, we have noted anecdotally and in talking to colleagues that tooth resorption in dogs seems to be on the rise. Perhaps this observation is more frequent since the standard of dental care has improved in recent years and veterinarians are taking full-mouth radiographs more frequently. Whatever the reason, there are certain guidelines for treatment of resorptive lesions in the dog. As in cats, if a resorative lesion is diagnosed in a dog, we recommend full-mouth radiographs to diagnose any other lesions. The general rule with resorative lesions is: if there is one, there are likely more. Since we do not know the cause of tooth resorption, it is hard to predict when and what teeth will be affected. Recommended treatment for resorbing teeth is extraction. If teeth are nearly completely resorbed, subgingival crown amputation and “intentional root retention” can be performed. This technique can only be done for roots that are barely distinguishable from bone and therefore have resorbed so much that extraction is not possible.

In some cases, we may find that multiple teeth are resorbing but there are no visible signs of crown resorption. These early lesions in the dog can often be re-checked at a later date rather than extract multiple teeth that have these early signs. However, if there is any visible resorptive lesion on the crown or near the gingiva, these teeth should be extracted as soon as possible since there is likely pain and discomfort from erosion of dental structures and exposure of the pulp and nerve.

Fig. 1 Tooth resorption of the left maxillary second and third premolar teeth in a dog (A). In the same dog, whole-mouth dental radiographs show severe resorption of the left mandibular second premolar tooth and less severe signs of resorption of the left mandibular third premolar tooth (B).

Fig. 2 Tooth resorption was suspected in this dog based on gross lesions in the mouth. These teeth would definitely require complete extraction (A). In the same dog, whole-mouth dental radiographs show resorption of the right maxillary third and fourth premolar teeth (B).

Fig. 3 This tooth could potentially be treated with a subgingival crown amputation due to the extensive root resorption. The roots are barely distinguishable from the surrounding bone.