CO₂ laser gingivoplasty for orthodontic care

By Jan Bellows, DVM, Dipl. AVDC, ABVP, and Elizabeth McMorran, DVM

For The Education Center

Cases of traumatic dental and skeletal malocclusion are significant in veterinary practices with a special interest in dentistry.

A skeletal malocclusion occurs when an abnormal jaw alignment causes the teeth to be out of normal orientation. Conversely, a dental malocclusion, or malposition, occurs when one or more teeth are out of normal alignment but the jaws are normal.

Examples of dental malocclusion include linguover- sision, distoversion and labiobreversion of a tooth or teeth. Individual tooth malposition often is due to delayed exfoliation of the primary teeth. The etiology of dental and skeletal malocclusions is considered to be multifactorial, including genetic, nutritional, endocrine and infectious causes.

Gingival and palatal impingements occur in dogs and cats commonly secondary to mandibular misocclusion (underbite), mandibular distocclusion (overbite) and maxillary/mandibular asymmetry.

In cases of mandibular disclusion, the mandibu- lar canine crown occasionally impinges or penetrates the space between the maxillary canine and third incisor. Over time, repeated contact with the soft tissues leads to the formation of deeper penetration, oral ulceration and in some cases wear of canine enamel and sensitive dentin.

Surgical intervention in the form of extraction or crown reduction and vital pulp therapy of the impinging canine(s) are employed to alleviate the trauma. Another option is gingivoplasty. Gingivectomy and gingivoplasty have been successfully used to remove soft tissue to create a comfortable occlusion in cases where the mesial or caudal deviation is minimal.

In the case described in this article, the cat’s mandibular dislocated canine lacerated the right premaxilla’s gingiva (Figures 2-4). Laser gingivoplasty resulted in alveolation of the presenting signs.

Gingivoplasty has been performed using a surgical scalpel, radiosurgery, laser and high-speed diamond finishing dental burs to shave away the tissue allowing re-epithelialization. In this case the surgery was performed with the 20-watt Aesculight CO₂ laser with straight handpiece and 0.4 mm ceramic tip.

Laser Gingivoplasty

Sophie, 1.5-year-old spayed domestic Persian cat (Figure 1) presented for oropharyngeal inflammation between right maxillary canine (104) and third incisor (103) caused by malposition of the right mandibular canine (404).

Diagnosis

Mandibular canine tooth malocclusion type 1 – dis- toversion (MAL1, DV 404).

Treatment Plan

CO₂ laser ablation for removal of sufficient gingiva between the right maxillary third incisor and canine, creating sufficient space for the seated right mandibular canine crown in order to prevent touching the maxillary mucosa.

Laser Settings

- Spot diameter: 0.4 mm
- Power setting: 2 W
- Power output: CW (continuous wave)

Anesthesia

Patient was placed under general anesthesia, intubated and maintained on isoflurane.

Technique

The Aesculight flexible fiber waveguide CO₂ laser was used to delicately ablate 2-3 mm of the inflamed hyperplastic soft tissue in order to free sufficient space allowing the mandibular canine to reside comfortably in the diaste- ma between the maxillary third incisor and canine.

The laser tip was directed perpendicular to the inflamed gingival tissue. Thermal damage was kept to a minimum as the 0.4 mm ceramic tip focused the laser beam on the exact target area that required treatment. In addition, the laser was also used at 4 W continuous wave to help decrease the periodontal inflammation of the maxillary gingiva caudally (as can be seen in Figure 5). The coagulating capability of the CO₂ laser allowed the surgeon to maintain a bloodless surgical field with great visibility. No sutures were needed for closure.

Clinical Outcome

Immediately after the procedure, the previous impingement was eliminated. No recurrence was noted at six-month follow up.

Figure 1. Sophie, 1.5 year old spayed domestic Persian cat

Figure 2. Maxillary/mandibular asymmetry

Figure 3. Penetration of the right mandibular canine into the maxillary diastema.

Figure 4. Immediate post-op view of the ablated gingiva.

Figure 5. Two month post-operative appearance of functional occlusion.

Conclusions

The use of the CO₂ laser for gingivectomy proved to be beneficial. The laser minimized the bleeding, providing a clean, dry surgical site and no closure was required. Lack of gingival tissue contraction helped to ensure no scarring. The gingivectomy procedure was quick and the surgeon successfully combined it with additional periodontal treatment.

Dr. Bellows was certified by the Board of Veterinary Practitioners (canine and feline) in 1986 and by the College of Veterinary Dentistry in 1990. Currently he is president of the American Veterinary Dental College (2013-14).

Dr. Elizabeth McMorran earned her veterinary degree at the Ludwig Maximilians University of Munich and is completing the residency requirements for the American Veterinary Dental College. Together with her mentor, Dr. Bellows, she practices medicine at All Pets Dental in Weston, Fla.