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Use CO₂ laser on gingival enlargement

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For The Education Center

Gingival hyperplasia and hypertrophy are histologic terms used often to describe the clinical appearance of gingival enlargement, an increase in the size or thickness of the gingiva.

The term “hyperplasia” refers to an increased number of normal cells in a normal arrangement, and “hypertrophy” describes an increase in the size of individual cells. Both hyperplasia and hypertrophy can only be accurately diagnosed microscopically. When viewed clinically without histologic confirmation, the condition is correctly termed gingival enlargement.

Gingival enlargement can further be classified into one of five categories by etiology:

- Inflammatory enlargement, the most common



Figure 1. Inflammatory gingival enlargement in a mature spaniel

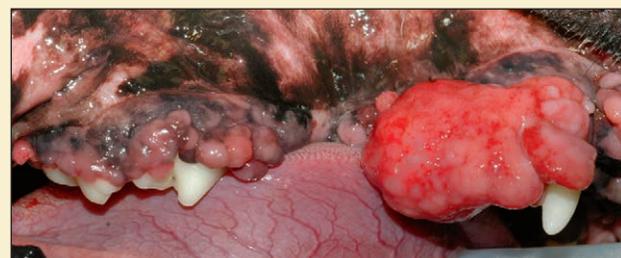


Figure 2. Gingival enlargement in a boxer due to inherited predisposition



Figure 3-A. Gingival enlargement secondary to amlodipine administration



Figure 3-B. An 8-mm pseudopocket created by histologically confirmed gingival hyperplasia



Figure 3-C. Gingival enlargement secondary to cyclosporine

condition induced by the accumulation of plaque. The progression is usually slow and painless, although in advanced cases gingival bleeding and oral malodor can arise, indicating an oral infection secondary to periodontal disease (Figure 1).

- Enlargement due to systemic diseases and inherited predisposition, such as with boxers, great Danes, collies, Rottweilers and golden retrievers (Figure 2).

- Drug-induced enlargement due to medications such as cyclosporine, calcium channel blockers (amlodipine) and seizure preventives (phenytoin, phenobarbital). See Figures 3-A, 3-B and 3-C.

- Neoplastic enlargement. (Figure 4 demonstrates peripheral odontogenic fibroma surrounding the left maxillary first premolar.)

- False enlargement due to an underlying bony protuberance pushing the gingiva outward.

Gingival enlargement often produces increased pocket depths, caused by augmented gingival height, but not attachment loss that is typical of established periodontal disease. The resultant pseudopocket can accumulate plaque, which, if untreated, can progress to tooth attachment loss.

This gingival enlargement may be treated by gingivectomy to eliminate the pseudopocket. The procedure is performed with a scalpel blade or laser, electrosurgery or radiosurgery to remove and sculpt the gingiva.

At least 2 millimeters of attached gingiva should remain after gingivectomy. The client should be informed that gingival hyperplasia tends to reoccur. Alternatively, extraction of the affected tooth or teeth should be considered.

Another commonly used term for a gingival enlargement is epulis, a growth on the gingiva. Epulis (plural: epulides) is a general term referring to a focal growth of any type on the gingiva¹, such as focal fibrous hyperplasia, peripheral odontogenic fibroma, acanthomatous ameloblastoma, nonodontogenic tumors, pyogenic granulomas and reactive exostosis.

The peripheral odontogenic fibroma (POF) is a benign gingival tumor of mesenchymal odontogenic origin. It is most commonly believed that POF arises from the periodontal ligament.^{1,2}

Histologically, the tumor consists of fibrous connective tissue separated from the surface epithelium by a layer of normal fibrous connective tissue.¹ POF is also characterized by the presence of varying number of odontogenic epithelium rests embedded in the looser connective tissue.^{1,3} Finally, the tumor may contain varying amounts of bone and other foci of collagenous matrix.^{1,3}

Management of Gingival Enlargement and Peripheral Odontogenic Fibromas

Surgical management of gingival enlargement has historically included the use of cold steel, electrosurgery and burs to contour the gingiva's shape while removing excess tissue. With the introduction of the surgical carbon dioxide (CO₂) laser, an additional option has become available to the veterinary practitioner.

Laser gingivoplasty/gingivectomy allows precise removal of excess tissue and simultaneous hemosta-



Figure 4. Peripheral odontogenic fibroma surrounding the left maxillary first premolar

sis with a minimum amount of discomfort compared to use of a scalpel. At times, the scalpel is used to remove the bulk of the gingival enlargement and the carbon dioxide laser is used for hemostasis and gingival contouring.

Patient safety includes protecting the endotracheal tube with moist gauze and avoiding laser contact on the tooth surface. Operator safety includes eye protection, a mask and a smoke evacuator.

Prior to using laser technology, the veterinarian should practice the technique on a cadaver specimen. Keep in mind that the area treated typically has a thin layer of coagulated tissue (as little as 30 microns⁴) along the gingival border, albeit much smaller than that created by an electrosurge or a diode laser.

Because the accumulation of plaque with the gingiva's inflammatory response to this plaque is a primary cause in the development of gingival enlargement, home care and frequent professional dental cleanings are key in keeping excess tissue formation under control. After initial oral surgery, periodic touch-up procedures to control regrowth are recommended.

Techniques for CO₂ Laser Gingivoplasty to Treat Gingival Enlargement

- Place moist gauze around the patient's endotracheal tube.

- Place periodontal probe in sulcus, assessing pocket depth (marks can be made on the gingiva using the probe to define the pocket's depth). See Figures 5-A and 5-B.



Figure 5-A. Gingival enlargement on the labial surfaces of the left maxillary third incisor and canine

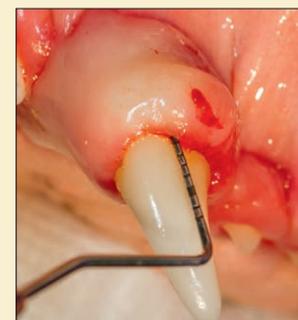


Figure 5-B. Periodontal probing reveals a 5-mm pseudopocket



Figure 5-C. Aesculight tipless handpiece is used to make the initial gingival incision.



Figure 5-D. Completed laser incision around the tooth



Figure 5-E. Excess tissue is removed with a curette.



Figure 5-F. Pseudopocket is eliminated (immediate post-op appearance).

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■ Calibrate the CO₂ laser according to the manufacturer's instructions.

■ Select the focal laser beam spot size (0.4-mm ceramic tip or tipless handpiece) and adjust the settings (4 to 6 watts in continuous mode), as illustrated in **Figure 5-C**.

■ Use the laser to remove (excise and vaporize) excess gingiva and sculpt what remains without coming in contact with the enamel, cementum or dentin. This should result in a free gingival margin at least 2 mm coronal to the cementoenamel junction (**Figure 5-D**).

■ Use a curette to remove excess tissue (**Figures 5-E and 5-F**).

In cases of drug-induced gingival enlargement, the medication causing the problem should be changed to one that does not induce gingival enlargement. Laser treatment of the enlarged gingival tissues is similar to the technique described above (**Figures 6-A, 6-B and 6-C**).

When the periodontal pocket extends beyond the cementoenamel junction (CEJ) and the removal of enlarged tissue is expected to go beyond the CEJ, gingivectomy is no longer an option. In these cases, periodontal surgery or extraction are options remaining.

Peripheral odontogenic fibromas (POFs) can be challenging to treat given their origin from the epithelial cell rests of Malassez within the periodontal ligament space. In planning the surgical approach, the CO₂ laser can be used to biopsy these masses, allowing histopathological evaluation before surgery. Ablation of these lesions with a laser is not recommended because the result only removes the tip of the iceberg.

Following CO₂ laser treatment of gingival enlargement and biopsy of POFs, nonsteroidal anti-inflammatory and narcotics should be administered to control post-surgical pain and discomfort. Two weeks after oral surgery, home care in the form of brushing or wiping should commence. ●

Dr. Jan Bellows is certified by the American Board of Veterinary Practitioners (canine and feline) and by the American Veterinary Dentistry College. He is past president of AVDC and the Veterinary Dental Forum. He is president of the Foundation for Veterinary Dentistry and practices in Weston, Fla.

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RECOMENDED READING

1. Lewis JR, Reiter AM. "Management of Generalized Gingival Enlargement in a Dog: Case Report and Literature Review." *J Vet Dent.* 2005;22(3):160-69.
2. Wiggs RB, Lobprise HB. Clinical oral pathology. In: Wiggs RB, Lobprise HB, eds. *Veterinary Dentistry: Principles and Practice.* Philadelphia: Lippincott-Raven; 1997:104-39.
3. Bellows J. "Laser Use in Veterinary Dentistry." *Vet Clin Small Anim.* 2002;32:673-92.

This Education Center article was underwritten by Aesculight of Woodinville, Wash., the manufacturer of the only American-made CO₂ laser.



Figure 6-A. A 9-mm pseudo-pocket surrounding the right mandibular canine

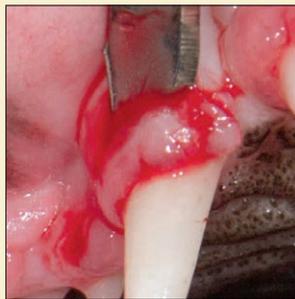


Figure 6-B. Scalpel blade is used to excise enlarged gingiva surrounding right maxillary canine.



Figure 6-C. Aesculight carbon dioxide laser is utilized to sculpt tissue.



Figure 6-D. One month post-op appearance

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