

Crown Reduction for Malocclusions

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For a discussion on the ethics of providing orthodontic correction in animals that may be shown of bred, please see the paper found at - www.toothvet.ca/PDFfiles/OrthoEthics.pdf

Even in neutered animals, there are ethical considerations to consider. Some owners request orthodontic corrections that could be considered purely cosmetic. Since the treatment will involve at least one if not many anesthetics as well as some discomfort, I will refuse to do it unless there is a medical need or a real benefit to the patient to justify the risks involved.

On the other hand, if there is abnormal tooth-to-tooth or tooth-to-soft tissue contact, there will be pain and possibly infection resulting from these traumatic contacts and so treatment is needed. The primary goal of the treatment is to alleviate the abnormal contacts and allow the animal to close its mouth without biting itself. Each case must be evaluated on its own merits to determine which treatment option is the best. We must consider the malocclusion itself, the patient's personality and behaviour, the owner's expectations and level of commitment among other things.

I would now like to look at one particular (and quite common) malocclusion and the most common treatment option offered to manage the problem. Specifically, I want to look at the class II malocclusion.

In a class II malocclusion, the mandibles are too short compared to the maxilla. If the jaw-length discrepancy is just right (or wrong, really) then the lower canines will be trapped on the palatal side of the upper canines. In these cases, it is usually not possible to move the lower canines far enough forward to but them in front of the uppers or far enough back to place them behind the uppers. Therefore, we have to deal with the lower canines where they are.

If we do nothing, the tips of the lower canines will usually slide along on the palatal side of the upper canines and then dig in to the gingiva palatal to these upper teeth. As the lower canines continue to erupt, they create deeper and deeper damage to the palate and periodontal support for the upper canine teeth. In time (and it may not take long), the result can be end-stage periodontal disease for the upper canines and/or oronasal fistulation. All of this is most unpleasant for the patient. They will likely still be eating and the owners may be oblivious to the plight of their pet, but you can be assured that it is a problem that needs to

be addressed. See Myth #1 at www.toothvet.ca/PDFfiles/mythology.pdf

We do not really want to extract these lower canine teeth as the lower jaw is already too short and loss of the lower canines will result in bone loss and further regression of the chin. We can't move them forward and we can't move them back, so the only option left is to shorten the crowns enough to take them out of contact with the palatal/maxillary structures. This is known as crown reduction.

The following is a brief description of the procedure of crown reduction. It is not intended as a guide to allow you to perform this procedure. Crown reduction is a very technique-sensitive procedure and is not for the casual operator. See the following articles for some more background on this subject: www.toothvet.ca/PDFfiles/endo.pdf www.toothvet.ca/PDFfiles/Pulpotomy.pdf

We start with a pre-operative radiograph of the roots of the mandibular canine teeth to document the size of the pulp chambers and to assess how much more eruption may take place following the procedure. Using "clean" technique (no oral procedure is sterile) and brand new carbide burs, the crowns of the lower canines a cut of horizontally at a level that will allow closure without contact allowing for further eruption. This exposes the pulp of the tooth and so the next step is to deal with that.

Partial Vital Pulpotomy involves using a brand new, sterile carbide or diamond bur to remove the pulp from the remaining crown of the tooth (to a depth of about 6-8 mms into the tooth). The freshly cut pulp stump is then lavaged with cold sterile saline to flush away debris and cause vasoconstriction to aid in hemostasis. We need a dry field for the next step.

Direct Pulp Capping involves placing a medicament on top of the pulp stump to protect it and stimulate undifferentiated stem cells in the pulp to become odontoblasts which producing dentin. For over a hundred years, the pulp capping material of choice has been calcium hydroxide, but in the past decade, mineral trioxide aggregate has been shown to be superior in many ways and so has largely replaced CaOH. The MTA powder is mixed with a few drops of saline to form a paste and then this is lightly tamped into place on top of the pulp to a thickness of 2-3 mms. To keep this paste in place during the final restoration of the access hole, a thin layer of some intermediate restorative material is placed. I am

currently using a light-cured liner/base material known as DeLite.

Bonded Composite Restoration is the placement of the final filling in the access hole to create a bacteria-tight seal in the crown of the tooth. It involves placing a bonding agent (glue) in the hole followed by a light-cured composite resin restoration. After placing, curing and smoothing this restoration, the blunt top of the crown (enamel, dentin, restoration) is sealed with a final coat of the bonding agent.

As well as shortening the lower canines, any damage to the palate and maxillary canines needs to be assessed and addressed. In most cases, if we are seeing the patients at an appropriate age, this involves merely removing debris from the palatal defects and allowing them to heal on their own.

So, when should I be seeing these patients? We want to wait as long as we can (for maximum eruption and root development) without waiting too long (to avoid permanent and serious palatal damage). Usually this means seeing the patient at six to seven months of age (5.5 months is too soon and 8 months may be too late). Since we are currently fully booked for several weeks in advance, we recommend calling to arrange an appointment for an appropriate date as soon as the problem is noticed.

Six months or so following treatment, I will need to see the patient again. At this point, I re-radiograph the canines to look for continued root development/maturation and the formation of dentin directly below the MTA. I check the integrity of the restorations and make any necessary adjustments to the crown height (if the tooth has erupted so much more that it is contacting the palate again). Following that, the teeth should be re-radiographed periodically throughout the animal's lifetime as the opportunity arises.



The top radiograph is immediately post-op and the lower one is six months later.

And here is a post-operative photograph of the lower canines of a young Labrador dog. You can see the outer ring of enamel then the dentin and in the centre, the bonded composite restoration.

