Deciduous Malocclusions
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A deciduous malocclusion is one that is not standard for the breed which occurs during the deciduous phase of dentition. Any class of malocclusion can present in the deciduous phase, however jaw length discrepancies are more commonly seen at this time. Moreover, these malocclusions may be temporary or develop into a permanent problem.

Etiology:
Orthodontic problems may arise from several different sources, which are broadly classified as genetic or non-genetic. Malocclusions associated with jaw length discrepancies are typically considered genetic in origin. In some cases, the patient may be genetically programmed for a normal bite and only temporarily maloccluded. These temporary malocclusions occur when the maxilla and mandible grow at varying rates during development, due to an independent jaw growth surge. Self-correction is more likely to occur when the alignment problem is mild. In most cases, the deciduous teeth are trapped by either a tooth or the soft tissues on the opposite arcade, which may interfere with genetically programmed jaw growth and subsequent self-correction. This condition is termed an adverse dental interlock. (Figure 1)

![Figure 1: Adverse dental interlock.](a) (b)

- **a)** In this class II malocclusion, the mandibular canines (and incisors) are hitting the palate/maxillary teeth which will not allow the mandible to grow to its full genetic potential.
- **b)** In this base narrow malocclusion, the mandibular canines are hitting the palate which will not allow the mandible to grow to its full genetic potential.

Presentation:
Routine oral examinations of young growing puppies are very important, in order to find deciduous dentition problems and develop an early treatment plan. In cases with jaw length discrepancies, oral exam reveals the mandible and maxilla out of correct alignment. Any orthodontic presentation is possible, but class II (overjet), III (underjet), and linguoversed mandibular canines are the most common presentations. Depending on the class of malocclusion, palatine/gingival/lip/tooth trauma can occur. (Figure 2a) One major difference between adult and deciduous malocclusions is the anatomy of the teeth involved. The deciduous teeth are much sharper than the corresponding permanent, so trauma and pain resulting from misalignment are significantly more intense initially. Therefore, pain and/or bleeding may be the presenting complaint. (Figure 2b) It is critical to note however, that
veterinary patients rarely demonstrate signs of oral pain. Occlusal trauma is traumatic and painful, regardless of the lack of clinical signs, and therefore immediate therapy is strongly recommended.

![Figure 2: Palatine/gingival trauma from malocclusions.](image)

a) In this case of combined class II and linguocluded mandibular canines, there is marked paltine trauma which has resulted in infection as evidenced by the purulent exudate.

b) Gingival/palatine trauma from a class II malocclusion has resulting in hemorrhage.

Although the visual exam is diagnostic, general anesthesia is necessary for complete evaluation. In addition, dental radiographs are required prior to therapy. Dental radiographs are critical to document the presence (or absence) of the permanent dentition, and to reveal the location and integrity of the permanent teeth. Furthermore, the root structure of the deciduous teeth will be elucidated, which is critical knowledge as resorption roots can make the extraction procedure challenging. (Figure 3a) It is also important to know if root resorption is partial or complete (Figure 3b), in order to avoid unnecessary exploration for a resorbed root or leaving a retained root in place.

![Figure 3: Dental radiographs of resorbing deciduous canines.](image)

a) Left maxillary canine with an area of resorption at the gingival margin. This will predispose to a fracture. However, the remainder of the root is normal (blue arrows). This means that complete extraction is mandated. Therefore a careful surgical approach from the beginning is ideal.

b) Right mandibular canine with complete root resorption. There is no root remaining, therefore removal of the crown is sufficient in this case.
**Therapy:**
If occlusal trauma is present, extraction of the offending deciduous teeth should be performed expeditiously to alleviate the trauma and pain resulting from the impingement. In cases without occlusal trauma, selective extraction of the deciduous teeth should be performed to remove the adverse dental interlock and allow unimpeded jaw movement. This procedure is termed *interceptive orthodontics*. Deciduous extractions should be performed as soon as possible after the problem is discovered (ideally between 6-8 weeks of age).

Determining the correct teeth to extract can be challenging. Any tooth that is causing trauma should be extracted. In cases of pure interceptive orthodontics, the classic rule is to extract the teeth on the jaw that needs to grow. However, recent texts recommend extracting any deciduous tooth that is or is likely to become a hindrance to movement, while leaving teeth that may constitute a *favorable dental interlock*.

Extractions of deciduous teeth can be very difficult as the roots are proportionally much longer and thinner than in the corresponding permanent dentition. (Figure 4) Deciduous tooth extraction must be performed very carefully, gently, and patiently.

![Figure 4: Extracted deciduous canine and incisor showing the tremendous root length.](image)

Another reason to be cautious during deciduous extractions is to avoid damaging the developing permanent tooth. Prior to eruption, the immature enamel is very susceptible to damage and this can certainly be provided by an elevator. This can result in enamel hypocalcification, which exposes the dentin and therefore leads to pain and sensitivity. Some veterinary dentists perform surgical extractions for deciduous canines to decrease the possibility of causing iatrogenic damage. Current literature recommends closed extractions in cases with significant root resorption and a surgical approach when the tooth appears intact. However, many veterinary dentists (including this author) prefer the simple (closed) technique for the majority of deciduous extractions due to decreased surgical time and trauma.

Root fractures are common complications of deciduous extraction attempts. If this occurs, every effort should be made to remove the retained piece(s). A retained root tip may become infected, or more likely will act as a foreign body, creating significant inflammation. Unfortunately, for animal patient, there are rarely clinical signs associated with this, but retained roots are painful and/or infected. (Figure 5) Retained roots are best extracted utilizing a surgical approach.

Post-operative dental radiographs are strongly recommended following extraction, in order to prove complete removal of the deciduous tooth as well as the presence and proper condition of the unerupted permanent teeth.
Figure 5: Dental radiograph of the left maxilla of a 7 year old dog with a facial abscess. The canine was “extracted” at 7 months of age. There is a retained root of the canine (blue arrows) with periapical rarefaction (red arrow). Extraction resolved the infection.

Key Points
- If occlusal trauma is present, the patient is painful despite the lack of obvious clinical signs.
- Extractions should be performed ASAP to alleviate pain and allow maximum jaw growth.
- Extractions should be performed with caution in order to avoid fracturing the root and/or damaging the permanent tooth.
- Pre-and post-extraction dental radiographs provide critical information.