

Rabbit and Rodent Dentistry

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RABBIT DENTAL DISEASE

Dental disease is a common manifestation in pet rabbits. The etiology of this disease is typically considered by most to be congenital or acquired. Congenital disease includes jaw malformation and occurs most commonly in your brachiocephalic breeds. Acquired disease may be related to nutrition or trauma. Nutritional issues include lack of fiber (hay) resulting in inadequate wearing of the teeth and inadequate diets (seed, nuts, too many fruits) leading to metabolic bone disease. Trauma includes chewing on inappropriate items (metal bars, wood in cage) and falling and breaking teeth. Age-related wearing can also be a factor in the geriatric rabbit.

Anatomy

Understanding normal anatomy and physiology of rabbits is critical for proper diagnosis and treatment. The rabbit has continuously growing, open-rooted (elodont) incisors and cheek teeth. The molars and premolars in rabbits are indistinguishable and are simply called "cheek teeth." There are two pairs of upper incisors (maxillary) and one pair of lower (mandibular). The second pair of incisors are small "peg teeth" and sit behind the upper incisors. The dental formula is I 2/1 C 0/0 P 3/2 M 3/3. The space between the incisors and cheek teeth is the diastema.

Clinical Signs

Clinical signs of dental disease in rabbits include decreased food intake or anorexia, dysphasia, excessive salivation, epithelia, exophthalmos, facial swellings, inability to fully close mouth, pain on manipulation of mouth or jaw, respiratory signs (nasal discharge or dyspnea), and changes in feces (size, consistency, quantity). Many rabbits that develop dental disease are obese, although the disease process can lead to rapid weight loss.

Dental disease can lead to secondary disease processes including dewlap dermatitis, ocular diseases, gastric stasis and impaction, bloat, and periapical abscesses.

Rabbits being the typical prey species will often hide signs of illness, making early diagnosis difficult. Often on presentation to the veterinary clinic, the rabbit is much sicker and has been sick longer than the owner realizes.

Etiology

Any process interfering with the normal growth or grinding of the incisors, cheek teeth, or both can result in dental disease. Dental disease of the incisors can be primary or secondary to cheek teeth disease. Elongation of the incisors can prevent proper occlusion of the cheek teeth and result in overgrowth and formation of points or spurs.

Metabolic bone disease (MBD) has been proposed by Frances Harcourt-Brown as a potential cause of acquired dental disease. There have been studies that have demonstrated low calcium levels, elevated PTH levels, and demineralization of skull bones in severely affected rabbits. The MBD produces demineralization of the bone, resulting in changes in the skull and structure of the teeth, interfering with normal occlusion and wearing of the teeth.

Lack of sufficient wearing of the continuously growing teeth is the most widely proposed theory for acquired dental disease. This theory is based on evidence that rabbits on a pelleted low-fiber diet do not chew in the same fashion as wild rabbits or captive rabbits eating large amounts of grass hays.

The result of this abnormal wearing is elongation of the crowns and points forming on the medial and lateral aspects and possible soft-tissue damage. Elongated incisors can penetrate into the soft tissues of the lips, the mucosa of the cheeks, or the hard palate. Elongated cheek teeth can cause soft tissue damage to the mucosa of the cheeks or the tongue. The elongation of the cheek teeth can also apply pressure on the tooth roots, causing bending and rotation of the tooth with eventual penetration into cortical bone, causing bone loss, fractures, and tooth root abscesses.

Diagnosis

Malocclusion and abnormal wear of teeth are often evident on oral exam. Abscesses may be palpable along the maxillary and mandibular regions of the face. An initial oral exam with an otoscope or vaginal speculum may aid in determining the presence of disease followed by a more thorough endoscopic oral exam, requiring heavy sedation or anesthesia. Radiographs or CAT scan are helpful in identification of malocclusion, fractures,

abscessed cheek teeth, and osteomyelitis. Multiple radiographic views should be obtained including a lateral, left-to-right oblique, right-to-left oblique, dorsoventral, and rostrocaudal.

Treatment

Treatment includes control of inflammation, pain, and infection and restoring dental anatomy to as normal as possible. Treatment consists of restoring the normal occlusal surface through grinding down of the elongated teeth and associated points, extraction of loose or abscessed teeth, cultures and sensitivities if warranted, antibiotics and analgesics as needed.

Malocclusion of the incisors should be treated by extraction of the incisors. Any time there are fractures, abscesses, or continuous overgrowth of the incisors that requires continuous teeth trims, extraction should be considered. Rabbits are able to chew and eat normally without incisors. If you are trimming the incisors, it is important to both reduce the length and restore the normal chisel-point. Trimming should not be performed with nail clippers or rongeurs, as this can lead to fractured teeth, root damage, and possible abscessation. Instead, a high-speed precision dental handpiece should be utilized, being careful to prevent thermal injury with a water cooling system.

For extraction of the incisors, place the animal in dorsal or lateral recumbency. Scrub the gingiva with dilute iodine or dilute ChlorhexiDerm solution. A #11 blade is inserted into the gingival sulcus to separate the gingival attachment from the entire tooth. A luxator will help to progressively loosen and sever the periodontal ligament. Care must be taken to follow the natural shape of the subgingival portion of the tooth. Avoid excessive force to prevent fracturing the tooth. The shape of the rabbit incisor luxators makes them useful on the mesial and lateral aspects of the tooth, but not the lingual or labial aspect. A contoured 20- or 18-gauge needle is better suited for severing the ligaments on those surfaces. Once the tooth is free of all attachments, it can be gently elevated, being careful to follow the natural curve of the tooth. Once the tooth is extracted, examine it carefully to be sure the entire tooth and pulp have been extracted. Remaining alveolar tissue can be destroyed by curetting the alveolar tissue with a curved luxator or needle. This will eliminate the possibility of regrowth. The tooth socket can then be flushed with dilute iodine or chlorhexidine and, if no infection is present, closed with 3-0 absorbable suture. The peg teeth can be removed using a 22-gauge needle as a luxator. If the incisors break off below the gingiva, they can be difficult to impossible to remove. Allow the tooth to regrow to a level where you can come back and extract it at a later date. Always prepare the owner prior to the procedure that incisor breakage and potential regrowth are always possible.

Restoring cheek teeth to a proper occlusal plane requires a moderate-speed straight handpiece. Protect soft tissues with a metal tissue protector on the handpiece or with a dental spatula. You can also make your own tissue protector from a syringe case. Thermal damage is prevented with saline or water cooling via the

handpiece or a syringe, again taking care not to use excessive fluid in a nonintubated patient. Resulting tooth dust can be removed with a moistened cotton-tipped applicator.

Extractions of cheek teeth may be necessary with loose or abscessed teeth or severely deformed teeth that cannot be corrected with grinding. The goal is retention of as many cheek teeth as possible to aid in crushing and grinding of foods. If a cheek tooth is extracted, you do not have to extract the corresponding opposing tooth, as the rostral and caudal jaw motion during chewing should ensure proper grinding of the remaining teeth.

Extraction of cheek teeth can be performed either intra- or extraorally. Intraorally, a Crossley cheek teeth luxator is used to sever the periodontal ligaments on all four aspects. The tooth is gently extracted again following the natural curve of the tooth and root. Extraorally is used any time intraoral is too difficult. Common indications for extraoral extraction include retained root tips, dental ankylosis, periapical abscesses, osteomyelitis or severe deformation of the tooth root. Certain teeth are extremely difficult to extract in the rabbit; for example, the last maxillary cheek teeth. In these cases, maxillotomy may be necessary.

Extraoral extraction involves dissection of the skin, subcutaneous and muscular layers revealing cortical bone which is then perforated with a dental bur on a water-cooled dental handpiece. The tooth is loosened with a needle or a luxator and then extracted. Multiple approaches are required for multiple extractions. The site is debrided and flushed and closed if no infection is present. With infection, the site should be marsupialized and treated as an abscess. Postoperative radiographs will help to confirm complete removal.

Periapical abscesses are common in rabbits. Successful outcomes require surgical excision and debridement of the abscess and capsule, extraction of diseased teeth and/or infected bone, and marsupialization of the soft tissues and postoperative debridement as needed. Antibiotics, both topical and systemic, will be necessary until healing is complete. Excision of the entire abscess and capsule is accomplished by incising the skin over the abscess and then dissecting the intact capsule from the surrounding tissues. Once the capsule is isolated to the point that the only connection is to bone, the capsule is incised and the capsule and purulent material are removed. A culture of the capsule wall is obtained, and culture and sensitivity performed. The site is debrided thoroughly and flushed copiously. Marsupialization is performed with 3-0 to 4-0 nonabsorbable suture. Marsupialization, although unsightly, allows daily debridement, flushing, and packing with topical antibiotics. Sutures are removed 10 days post-surgery, and the wound is then allowed to granulate in. Owners can usually be taught to perform daily flushing and packing at home, with frequent rechecks for evaluation.

Other therapies that have been utilized involve opening the capsule, flushing and packing with topical antibiotics or packing with antibiotic-impregnated beads, and closing. The marsupialization technique,

although less cosmetic, often holds a more favorable prognosis. As discussed above, the goal is to retain as many cheek teeth as possible to facilitate proper chewing, but if the need arises for multiple extractions or even the removal of all the cheek teeth, there are reports of rabbits surviving on long-term liquid diets (Oxbow Critical Care products).

Supportive Care and Anesthesia

Most rabbit dental procedures should be performed under general anesthesia. A combination of injectable and inhalant agents works most reliably. Local anesthetics are helpful in reducing the level of gas anesthesia needed for a procedure and offer postoperative analgesia. Intubating rabbits can be difficult, especially in some of the smaller types. Rabbits can easily be maintained with a small mask that covers only their nose since they are obligate nasal breathers. A nasal cannula can also be used for inhalant anesthesia. Fluid therapy is recommended. Subcutaneous fluids may be given for short dentals (trimming incisors or filing mildly overgrown molars). For more extensive dental procedures (severe malocclusion, extractions), an intravenous catheter and fluids are recommended. Pre- and postoperative analgesics should be utilized.

Specialized rodent and rabbit dental equipment greatly facilitates examination of the oral cavity. The tabletop mouth gag positions the anesthetized rabbit without additional technical support. The tabletop mouth gag holds the head at a slight incline with adjusting bars to raise the maxilla and lower the mandible. The bars sit behind the maxillary and mandibular incisors, making it difficult to use in rabbits that have had their incisors extracted. Cheek dilators are used to laterally retract the cheeks. There is also a rabbit and rodent adjustable mouth gag combined with cheek dilators, but requires a technician to hold the patient's head in position. There are flat and curved spatulas designed to reflect the tongue and soft tissues. The Crossley incisor and molar luxators follow the natural curve of the teeth to aid in extraction. Reducing the length of the incisor and molar crowns should only be done with a high-speed straight handpiece (greater than 25,000 rpm) and cutting burs. In the past, Dremel-type tools have been used. The commonly used small animal low-speed dental handpieces run at 8,000 rpm, which is too slow to be effective and may cause unacceptable thermal damage. Recently several manufacturers have developed precision, higher rpm, low-speed straight handpieces that work well. The rodent and rabbit rasps available are effective for removing points on teeth but should not be used for reduction of tooth height. The small oral cavity of rodents and rabbits makes it difficult to utilize these rasps effectively without risk to the soft tissues.

RODENT DENTAL DISEASE

Rodents have considerable differences in their dental anatomy. Guinea pig, degus, and chinchillas are similar to rabbits with both incisors and cheek teeth continuously growing (elodont). Squirrel and rat-like rodents

have elodont incisors but their cheek teeth do not grow continuously (anelodont), so overgrown cheek teeth are not a problem in these species.

Guinea pig-like rodents have similar dental problems as the rabbit, with both overgrown incisors and elongated cheek teeth. Incisor disease can be a result of trauma or can be secondary to disease of the cheek teeth. Cheek teeth disease in guinea pigs is most often due to improper wear (acquired disease). Dental disease of squirrel and rat-like rodents is most often related to trauma. Chewing on inappropriate items such as wire bars, large nuts or seeds can damage their incisors. Traumatic injuries to incisors can lead to fractures and/or malocclusion. Trauma to cheek teeth results in fracture, caries, and/or abscesses. Prairie dogs (squirrel-like) develop pseudo-odontomas. This deformation of the tooth root is mass-like and can occlude the sinuses. Formation of pseudo-odontomas is often the result of trauma, chewing on wire cages, or from falling and damaging the incisors.

Clinical Signs

Clinical signs of dental disease in rodents include anorexia, diminished food intake, dysphagia, epiphora, and weight loss. Abscesses may present as palpable firm masses along the mandible or maxilla. Prairie dogs with pseudo-odontoma may present with upper respiratory signs or dyspnea.

Diagnosis

Affected incisors are apparent on physical exam; affected cheek teeth may require general anesthesia for evaluation. Often an otoscope can aid in visualization. The endoscope is also helpful in direct visualization of the oral cavity.

Radiographs or CAT scan can help visualize the jaw, fractures, root abnormalities, abscesses or osteomyelitis and pseudo-odontomas in prairie dogs.

Incisor deformation can be readily apparent, but disease affecting cheek teeth requires anesthesia and proper instruments to identify. A variety of dental speculums and other instruments are available for this purpose. The endoscope is an extremely valuable tool for direct visualization of the oral cavity. The rostral caudal view must be evaluated to visualize the occlusal plane in guinea pigs, due to the unique slope of their cheek teeth; this is not visible on the lateral radiograph.

Treatment

The goal in treatment is to control infection and pain and to restore anatomy to as close to normal as possible. The same techniques that are used in rabbits are used in rodents. The incisors of most rodents are extremely long and curved, and trauma to surrounding structures is possible on extraction, including fracture of the mandible.

Treatment for pseudo-odontomas in prairie dogs can be difficult due to the tooth root mass being adhered to the surrounding tissues. Extraction can be successful if diagnosis is early. Often a rhinotomy or excision through the hard palate is necessary to extract the tooth root. Treatment of dental-related abscesses is similar to those in rabbits.

References

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