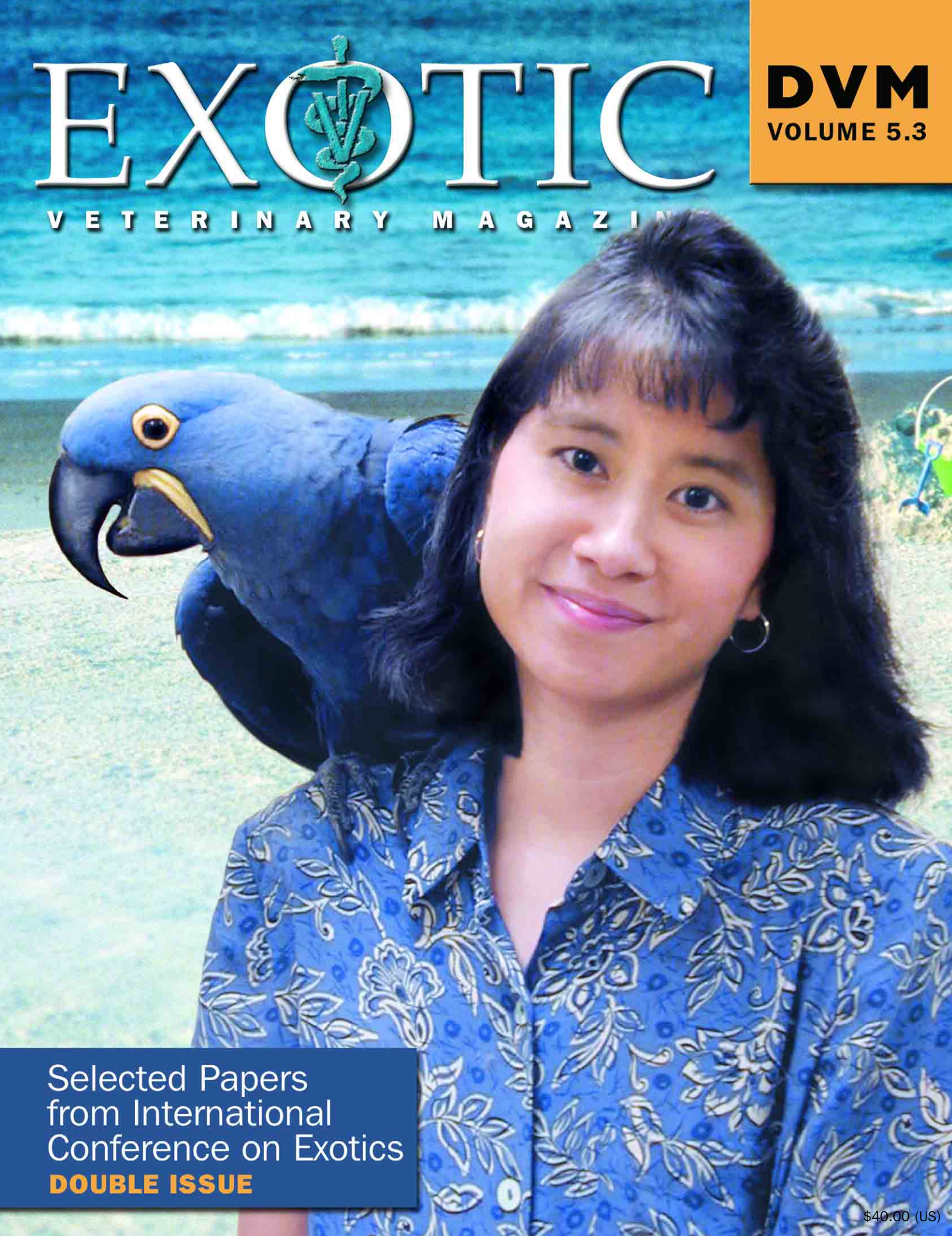
EXOTIC

VETERINARY MAGAZINE

DVM

VOLUME 5.3



Selected Papers from International Conference on Exotics

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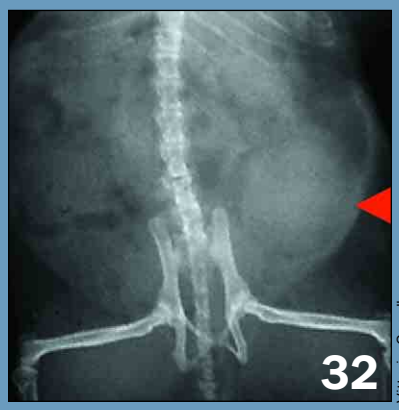

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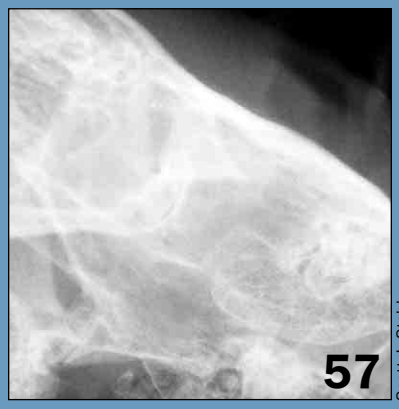

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Dental Diseases and Surgical Treatment in Pet Rodents

by **Vittorio Capello**, DVM

Products at a Glance

★ **Table top rodent gag** - Sontec Instruments, Inc, Englewood, CO, www.sontecinstruments.com and Veterinary Instrumentation, Sheffield, UK, www.vetinst.com
★ **Rodent mouth gag** (and other dental instrumentation) - Jorvet, www.jorvet.com, Dr. Shipp's Laboratories, www.drshipp.com
★ Rabbit cheek dilators (normal and long reach)
★ Rodent cheek dilator
★ Spatula to deflect tongue
★ Crossley incisor luxator
★ Crossley molar luxator
★ Molar fine ("diamond") rasp
★ Dremel tools and accessories, www.dremel.com
★ Different types of burrs
★ Diamond disk
★ 18- to 25-gauge needles (contoured to simulate Crossley luxators)

Fig 1. The rodent table retractor/restrainer (also called "tabletop rodent gag") is a special platform for restraining anesthetized rabbits and rodents with the mouth held open and the cheeks retracted. Using this device, an assistant does not need to hold the retraction instrumentation. A chinchilla is positioned on the tabletop rodent gag with the rodent cheek dilator applied.

Fig 2. The rodent mouth gag is suitable for guinea pigs, chinchillas, degus and prairie dogs in addition to rabbits. It allows more delicate and controlled opening of the mouth compared to the tabletop rodent gag and can be applied with the patient in dorsal recumbency. It does, however, require an assistant to hold it in place.

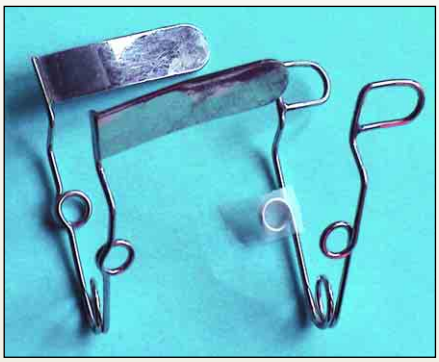


Fig 3. The cheek dilator for selected species of rodents (right) is compared with the rabbit cheek dilator (left).

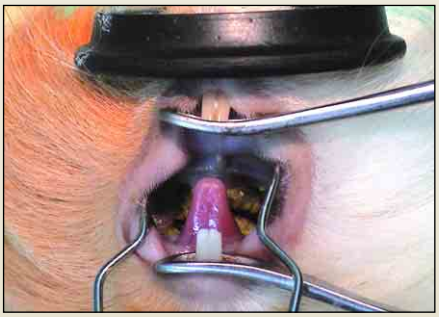


Fig 4. The rodent mouth gag and rodent cheek dilator have been applied to this anesthetized guinea pig.

Fig 5. The Dremel heavy-duty flex shaft tool has a 12.7-mm handpiece and a foot control speed lever.

NORMAL RADIOGRAPHS OF RODENTS

The five standard radiographic projections for proper dental examination are the lateral, right and left oblique, ventro-dorsal and rostro-caudal. In these tiny animals even more than in pet rabbits, accurate dental evaluation is possible only with good quality and properly positioned radiographs. Anesthesia is mandatory, and the use of high-resolution film (e.g., mammography film) is advisable.

Fig 6. Due to the normal angulation of cheek teeth in guinea pigs, the lateral projection does not allow evaluation of the occlusal plane of these teeth. Radiographic images of all open-rooted teeth are very similar to those of rabbits.

Fig 7. The skull of a chinchilla shows the typically large tympanic bullae. The occlusal plane of the cheek teeth is visible, and the upper incisors are shorter and more curved than in guinea pigs.

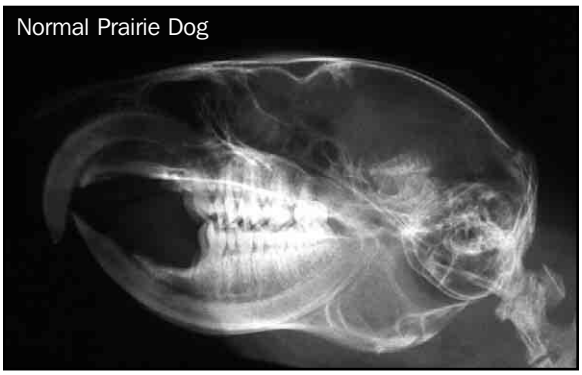


Fig 8. As in other sciuromorph (squirrel-like) rodent species, the incisors of prairie dogs are well developed and have much longer roots (apexes) than other rodents. Note the size, shape and length of the lower incisors. Double-rooted brachyodont cheek teeth are visible.

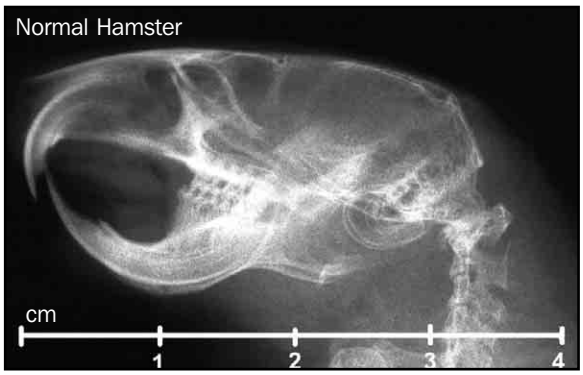


Fig 9. Hamsters, like other common myomorph rodent species (e.g., mice, rats and gerbils), have open-rooted, well developed incisors and rooted molars that do not grow throughout life.

Table 1. Dental Formula of Rabbits and Rodents

Rabbit	2I	0C	3P	3M
	1I	0C	2P	3M
Guinea pig, chinchilla, degu	1I	0C	1P	3M
	1I	0C	1P	3M
Hamster, gerbil, rat, mouse	1I	0C	0P	3M
	1I	0C	0P	3M
Prairie dog	1I	0C	2P	3M
	1I	0C	1P	3M

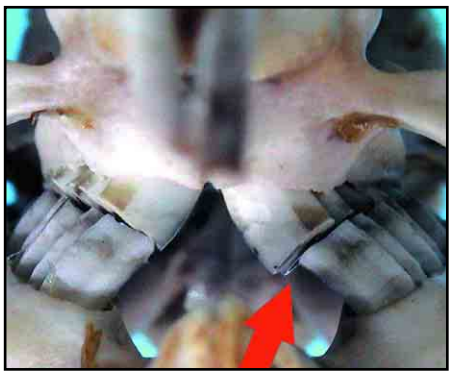


Fig 10. Cheek teeth of guinea pigs are normally curved, and the occlusal plane is also angled. This feature is very important to consider when performing diagnostic radiographs and endoscopy. This guinea pig skull shows early malocclusion of the upper left premolar (arrow).

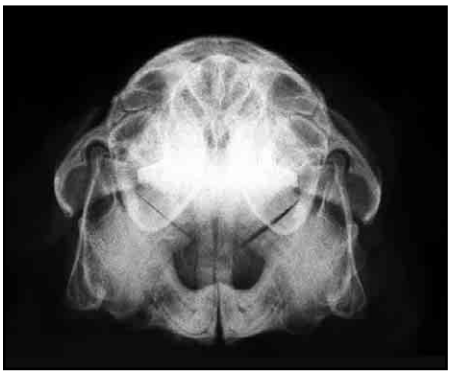


Fig 11. Due to the occlusal angulation of the cheek teeth, a rostro-caudal radiographic projection is the only one that is helpful in viewing these grinding surfaces in guinea pigs. The oblique radiolucent line between the upper and lower cheek teeth in this radiograph indicates a normal occlusal plane. Curved apexes of lower teeth are also visible.

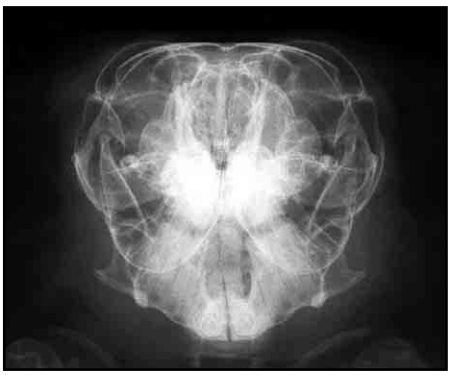


Fig 12. The occlusal plane of the cheek teeth has a shallower angle in chinchillas compared to guinea pigs. In this species, both rostro-caudal and lateral radiographic projections are useful in evaluating the grinding surfaces of cheek teeth. The rostro-caudal projection is also very useful in detecting the typical tooth apex deformities in cases of malocclusion.

NORMAL ENDOSCOPIC VIEW

As with rabbits, rigid endoscopy is a useful diagnostic tool for evaluation of the oral cavity in pet rodents. The normal endoscopic view of the cheek teeth in each of four rodent species is described below.

Fig 13. Unless a guinea pig is completely anorexic, food commonly covers the dental surfaces. Before inspection of the oral cavity, the teeth should be cleaned with cotton swabs. The normal angulation of the premolar/molar occlusal plane is clearly visible, and the surface of the cheek teeth is regular.

Fig 14. Inspection of the oral cavity is easier in chinchillas than in guinea pigs due to the relatively shallower angulation of the premolar/molar occlusal plane in chinchillas. The lower premolar is "triangle-shaped." Like rabbits and other herbivore rodent species, the cheek teeth surface is flat but rough for proper grinding of vegetables and other roughage.

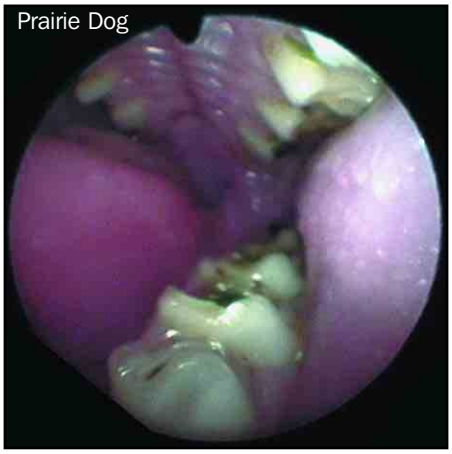


Fig 15. The prairie dog is an herbivorous rodent species, but it has brachyodont molar teeth that are more similar to molar teeth of primates. These teeth cannot develop spurs, but it is useful to check them for the presence of cavities and fractures.

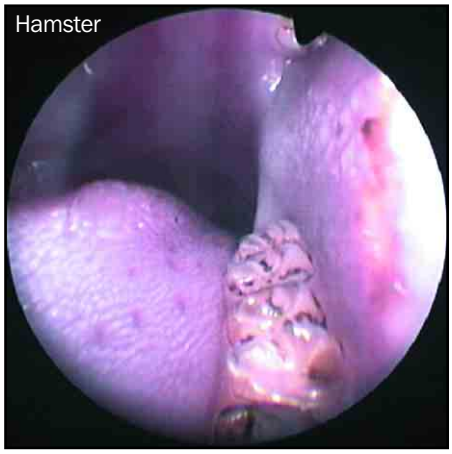


Fig 16. Like mice, rats and gerbils, golden hamsters (as illustrated in this photo) and Russian hamsters have molar teeth that do not grow throughout life. These animals are prone to overconsumption, fractures and cavities. Due to the difficulty of detecting early clinical signs, preventive inspection of the oral cavity is recommended.

INCISOR MALOCCLUSION

Malocclusion of incisor teeth in rodent species usually occurs as a result of fractures (commonly due to traumatic injuries), improper diets or gnawing on cage wires. Apical infection is a common sequela.

Fig 17. This guinea pig's incisors show an early stage of malocclusion.

Fig 18. This golden hamster has severe upper incisor malocclusion and fractured lower incisor crowns that are unable to regrow.

Fig 19. Functional incisor malocclusion in this gerbil was due to excessive chewing of cage bars. The malocclusion was resolved by trimming the incisors and moving the gerbil to a plastic box enclosure.

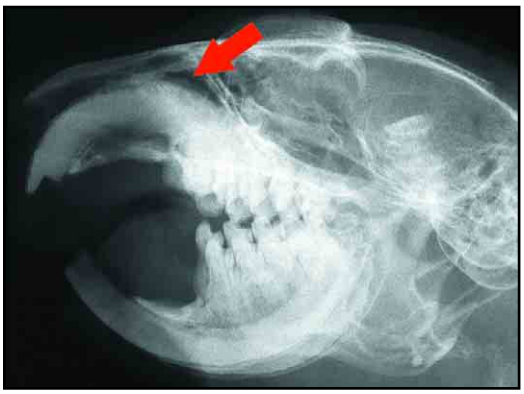


Fig 20. Malocclusion of incisors in prairie dogs is most often due to continuous chewing of cage bars, and this condition frequently results in fractures and odontomas. This radiograph of a 3-year-old male prairie dog shows how the odontoma occludes the nasal cavity and severely limits airflow (arrow).

Fig 21. Clinical signs in a prairie dog with maxillary incisor odontoma increase from initial "reverse sneezing" to depression, anorexia and severe dyspnea with open-mouthed breathing. Surgical techniques for extraction of incisors or rhinostomy to provide airflow are described elsewhere.[1,9]

Table 2. Clinical Signs and Symptoms Related to Dental Diseases

	Guinea pigs	Chinchillas	Prairie dogs	Hamsters
Incisors	No reliable symptoms or mild difficulty in prehending food	No reliable symptoms or mild difficulty in prehending food, ptyalism, sneezing	Initially no reliable clinical signs; in severe cases, sneezing, dyspnea, anorexia	Weight loss, anorexia, ptyalism, mandibular swelling
Cheek teeth	Anorexia, weight loss, pain when chewing, ptyalism, mandibular swelling due to abscessation	Anorexia, weight loss, pain when chewing, ptyalism, palpable hard swellings along the ventral mandible	—	Anorexia, weight loss, pain when chewing, mandibular swelling (abscessation)

DISEASES OF THE CHEEK TEETH

Fig 22. Due to the occlusal plane angulation of their cheek teeth, guinea pigs are prone to develop overgrowth of cheek teeth (in particular the lower premolars) in a "bridge-like" pattern, which entraps the tongue.

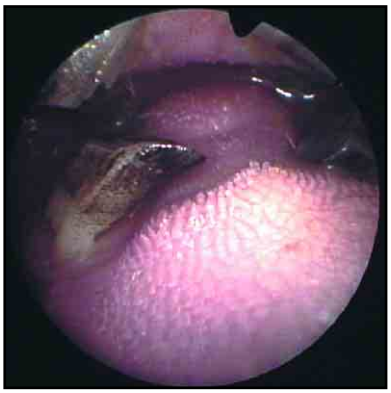


Fig 23. Sharp medial edges can develop on the lower cheek teeth in cases of malocclusion, but they usually do not cause lesions on the tongue. In guinea pigs, anorexia is mainly due to the pain caused by pressure of the elongated root(s) on the infra-alveolar nerves. For this reason, trimming of cheek teeth is sometimes unrewarding.

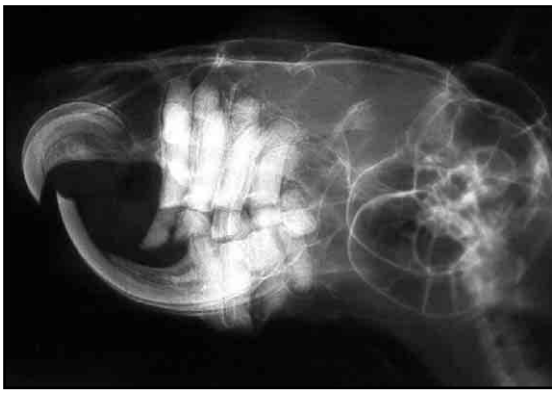


Fig 24. Malocclusion of the cheek teeth in chinchillas has peculiar features that differ from the same disease in rabbits. Improper wear usually leads to both crown and apex elongation of cheek teeth. An oblique radiograph shows severely elongated upper cheek teeth. A rostro-caudal projection is even more useful in detecting root elongation of the lower molars.

Fig 25. Apexes of the cheek teeth can pierce the mandibular cortical bone, and typical firm swellings can be palpated in a more lateral position than in pet rabbits. Cheek teeth abnormalities also lead to incisor malocclusion.

Fig 26. Cheek teeth can also develop spurs, but usually they are less sharp than in rabbits and rarely cut the tongue.

Fig 27. Due to the extreme difficulty in detecting early signs of molar disease in small pet rodents (e.g., hamsters, gerbils, duprasi, mice and rats), these animals are frequently presented with maxillary and/or mandibular swelling due to abscessation. The eye can eventually be affected. In the face of consistent clinical signs, this differential diagnosis must be considered along with cheek pouch disease. Surgical debridement should be mandatory, but extraction of a molar tooth can be extremely difficult or impossible, leading to recurrence of abscessation. Nevertheless, antibiotic therapy seems more effective in rodents than in pet rabbits and can resolve the infection.

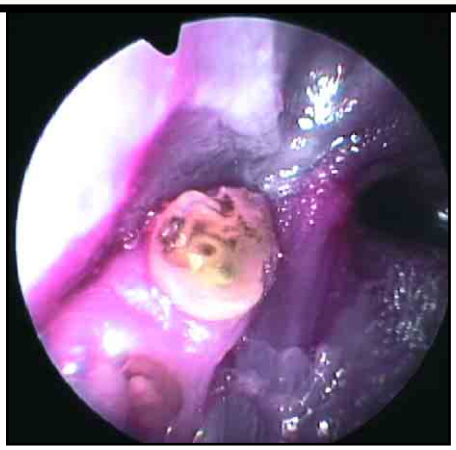


Fig 28. This 18-month-old golden hamster has a fracture of the second lower molar and a cavity involving the third lower molar.

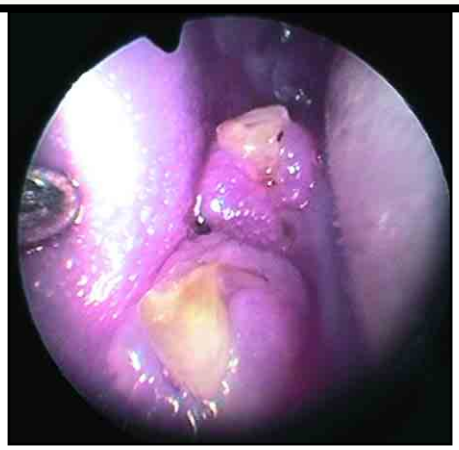


Fig 29. The first lower molar is fractured and the second lower molar is absent in this 4-year-old rat.

TRIMMING AND EXTRACTION OF TEETH

Trimming of Cheek Teeth

Techniques used for trimming cheek teeth in pet rodents (e.g., guinea pigs, chinchillas and degus) are based on those used in pet rabbits. However, the smaller size and narrow oral cavity, particularly in the guinea pig, make the procedure more difficult in rodents. The patient, properly restrained with the tabletop gag, is maintained under general anesthesia with isoflurane delivered by mask or nasal intubation. In the author's experience, orotracheal intubation greatly hampers the procedure.

The trimming procedure is very delicate, so the use of the Dremel flex shaft tool, with the smallest handpiece available as well as the foot speed control lever (or alternatively, a professional dental unit), is advisable. For pet rodents, the author prefers the use of a burr with a silicon or aluminum oxide head instead of one made of a heavy metal. A softer material allows more precise and delicate trimming and, most importantly, significantly reduces the risk of lesions to the gum and the tongue.

The tooth is wet with saline before trimming to reduce the risk of thermal damage and the production of "tooth dust." The tongue is manipulated and protected by a spatula, and the tooth is properly trimmed and contoured. An attempt should be made to file the four cheek teeth at the same level to restore the normal occlusal plane. During the procedure, the teeth are frequently wet with saline, and the tooth dust is wiped with cotton swabs.

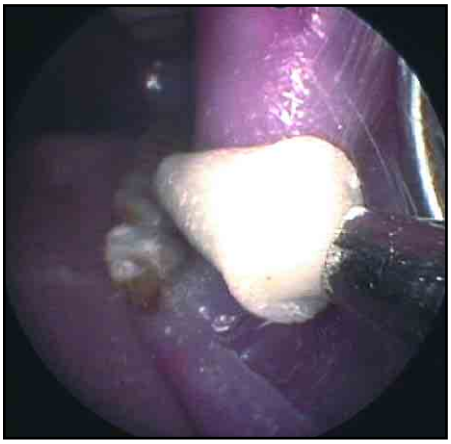


Fig 30. The irregular occlusal plane of the cheek teeth is being trimmed in this chinchilla.

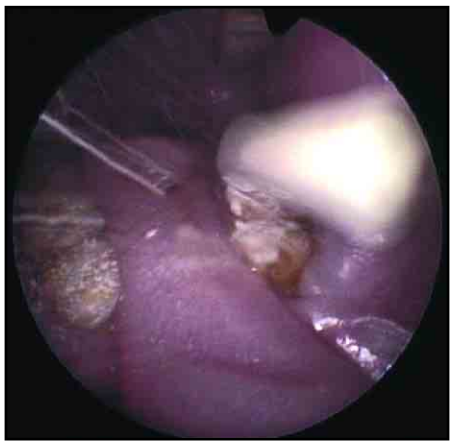


Fig 31. The rotating burr is trimming the first and second left cheek teeth of the animal in Fig. 31. The white material is tooth dust. For illustration purposes, the protective spatula is not shown here.

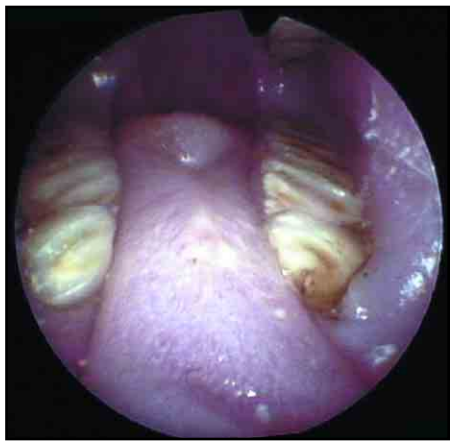
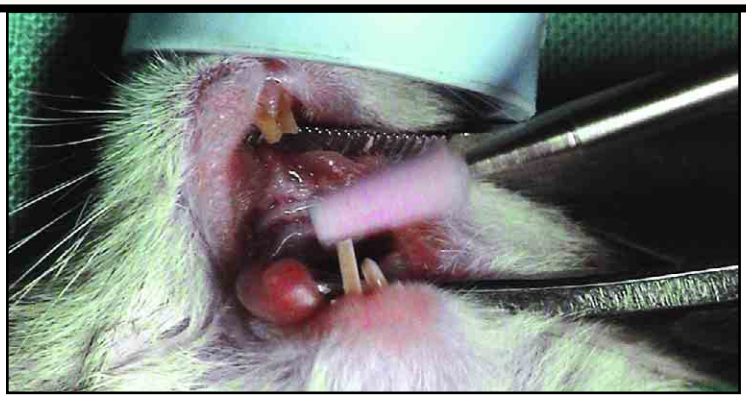


Fig 32. After trimming, the left occlusal plane of the chinchilla in Fig. 31 has been reduced to 2 mm and contoured into the proper shape.

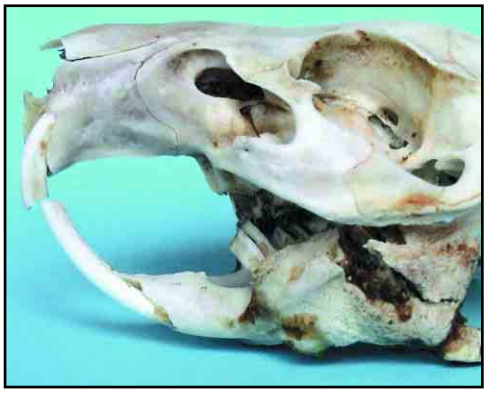


Trimming and Extraction of Incisors

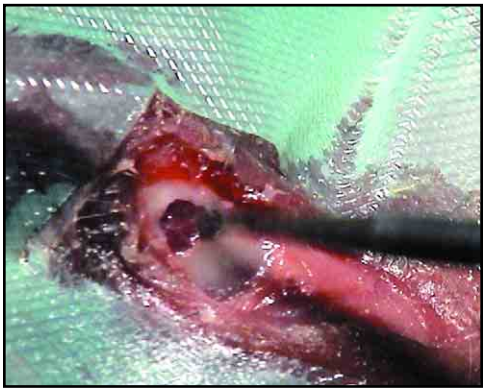
Fig 33. Incisor malocclusion in rodents can be treated, as in rabbits, by trimming or extraction. Trimming, as shown in this Russian hamster, can be easily performed with a dental burr. Lower incisors in small rodent species and guinea pigs are more mobile than in rabbits and chinchillas; therefore, special attention must be paid to avoid fracture or diastasis of the mandible.

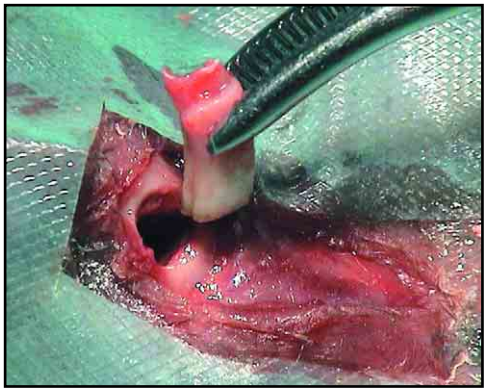
Fig 34. Golden hamsters do quite well after extraction of the incisors, as shown in this post extraction radiograph. Tube feeding is advised for several days after surgery, and correction of the diet (with fewer seeds and more vegetables) is mandatory.

Extraction of Cheek Teeth



Figs 35 a,b. Although seen much less frequently in rodents than in pet rabbits, malocclusion and periapical infection of the cheek teeth can result in severe abscessation (a) and osteomyelitis of the mandible (b), as seen in this guinea pig. Extraction of the affected tooth can be very difficult only with the intraoral approach, due to the narrow oral cavity. A common sequela is fracture of the tooth or even fracture of the mandible.





Figs 36 a,b. An intraoral approach to extraction is very difficult in rodents due to the small oral cavity, so extraction can be performed via an extraoral approach. This chinchilla is in dorsal recumbency, and a skin incision has been made over the section of the mandible containing the tooth to be extracted. Soft tissues are dissected down to the ventral mandibular surface. The thin mandibular cortex is drilled around the apex of the tooth, and the tooth is luxated using a needle as a dental elevator. Once the alveolar ligaments have been broken down, the tooth is extracted from the mandiular osteotomy site.

References and Further Reading

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