Anatomy and Disorders of the Oral Cavity of Chinchillas and Degus

Christoph Mans, Dr med vet, DACZM[a,*],
Vladimir Jekl, MVDr, PhD, DECZM (Small Mammal)[b]

KEYWORDS

• Dental disease • Dentistry • Periodontal • Caries • Resorption • Teeth
• *Chinchilla lanigera* • *Octodon degus*

KEY POINTS

- In chinchillas, apical elongation of the mandibular cheek teeth can be palpated on the ventral aspects of the mandibles; apical elongation can be palpated in the preorbital fossa.
- Apical elongation of maxillary cheek teeth in degus commonly leads to partial obstruction of nasal meatuses with subsequent dyspnea.
- Periodontal disease, caries, and tooth resorption are common findings in chinchillas; an intraoral examination should be performed carefully to avoid missing these lesions.
- Diagnostic imaging is essential in the diagnosis of dental disease, and should be performed in all cases of suspected dental disease in chinchillas and degus.
- Endoscopy-guided examinations are recommended for chinchillas and degus to minimize the risk of missing intraoral pathology and iatrogenic trauma during the intraoral treatment.

INTRODUCTION

Dental disease is commonly diagnosed in pet chinchillas and degus as it is in other small herbivorous mammals with elodont (continuously growing) incisors and cheek teeth. However, subclinical dental disease has been detected in 35% of clinically healthy chinchillas and in 60% of degus examined; therefore, subclinical dental abnormalities should not be always assumed to be responsible for clinical signs and symptoms, such as anorexia.[1,2] Animals of all ages can be affected by dental disease, but older animals are more likely to be diagnosed with acquired dental disease.[1] Most animals with dental disease present with weight loss, reduced food intake or anorexia,

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[a] Department of Surgical Sciences, School of Veterinary Medicine, University of Wisconsin-Madison, 2015 Linden Drive, Madison, WI 53706, USA; [b] Avian and Exotic Animal Clinic, Faculty of Veterinary Medicine, University of Veterinary and Pharmaceutical Sciences Brno, Palackého tr. 1946/1, Brno 61242, Czech Republic
* Corresponding author.
E-mail addresses: christoph.mans@wisc.edu; jeklv@vfu.cz

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drooling, or poor fur quality. Degus are also commonly presented with dyspnea. In the scientific literature, dental disease in chinchillas and degus has been primarily referred to as elongation and malocclusion of the cheek teeth. However, periodontal disease, caries, and tooth resorption are common diseases in chinchillas, although they are frequently missed during routine intraoral examination, even if the examination is performed under general anesthesia. For this reason, a thorough diagnostic evaluation, including an endoscopy-guided intraoral examination and diagnostic imaging of the skull, is necessary to detect oral disorders and to perform the appropriate therapy.

ANATOMY AND PHYSIOLOGY OF THE ORAL CAVITY

All teeth in chinchillas and degus lack an anatomic root (aradicular), grow continuously (elodont), and have a long crown (hypsodont). Each incisor tooth is separated from premolars and molars (commonly named "cheek teeth") by a large diastema, resulting from the loss of the canines and selected mesial (rostral) premolars (P1 through P3). Both species have 4 cheek teeth in each dental quadrant, which are morphologic identical. The dental formula is 2 (I 1/1, C 0/0, P1/1, M 3/3) for a total of 20 teeth (16 cheek teeth). These features are shared among all hystricomorph rodents, which include the guinea pig (*Cavia porcellus*), chinchilla (*Chinchilla lanigera*), degu (*Octodon degus*), and Patagonian cavy (*Dolichotis patagonum*) as well as the old world and new world (North American) porcupines (*Hystricidae* and *Erethizontidae*), the nutria (*Myocastor coypus*) and the capybara (*Hidrochoerus hydrochaeris*), which are occasionally kept as companion animals.

The term *reserve crown* is used to describe the part of the tooth below the gingival level and within the alveolus. The portion above the gingival margin visible within the oral cavity is termed the *clinical crown*.[3]

Incisor Teeth

Rodents are some of the most highly specialized mammals with regard to their feeding apparatus. The labial surface of the incisor teeth is pigmented yellow-orange in chinchillas (**Fig. 1**) and degus. Chinchillas have maxillary incisor apices that reach to approximately one-half of the diastema, with mandibular incisor apices that end near the mesial–lingual aspect of the premolar (mandibular first cheek tooth). In degus, the maxillary incisors apices extend two-thirds of the diastema with mandibular incisor apices that end distal to the last molar.

The incisors have enamel only on the full length of their labial surface, extending from the apical area to the occlusal edge. The enamel of the incisor teeth of *Hystricognathi* have multiple serial Hunter–Schreger bands with an angular arrangement of the interprismatic matrix to the prism long axes, which strengthens the enamel and provides a higher wear resistance.[4] As a result these teeth wear to a chisel-shaped cutting edge owing to the rostral–caudal gliding movement of the jaw during normal feeding.[5] Upper lip skin folds are pushed inward through the diastema and meet behind the upper incisor and above the tongue to close off the oral cavity, so that the incisors occlude outside the mouth.[5]

Cheek Teeth

Premolars and molars have a similar structure and represent a uniform functional grinding unit in each quadrant. They are commonly named "cheek teeth." The crowns of the cheek teeth in chinchillas and degus diverge from rostral to caudal, however, to a much lesser extent than in guinea pigs.[5] The occlusal surface of the cheek teeth is horizontal and consists of ridges of enamel alternating in between exposed surface of