

Anatomy and Disorders of the Oral Cavity of Guinea Pigs



Loïc Legendre, DVM, FAVD, Diplomate AVDC, EVDC

KEYWORDS

• Guinea pig • Oral cavity • Dentistry • Malocclusion • Dental abscesses

KEY POINTS

- Guinea pigs are *-chomorpha* rodents; their incisors and cheek teeth grow continuously (elodont) and are long crowned (hypsodont).
- The cheek teeth of guinea pigs are different than those of other *-chomorpha* rodents, having curved reserve crowns and oblique occlusal planes.
- Clinical signs and symptoms of oral disorders are not pathognomonic; they include vague symptoms such as reduced food intake, weight loss, and difficulty eating.
- The inspection of the oral cavity, with or without anesthesia, is not completely diagnostic for dental disease; additional diagnostic imaging is essential for diagnosis, prognosis, and treatment.
- The most common dental disease is coronal elongation of cheek teeth which is usually due to inappropriate nutrition. Secondary malocclusion of incisor teeth typically accompanies cheek teeth disease as well as other complications.

INTRODUCTION

Acquired dental disease represents the most common oral disorder of guinea pigs, as in other small mammals with continuously growing teeth, such as the rabbit, chinchilla, and other cavy-like rodents. Several anatomic features characteristic of this species, such as curved cheek teeth and an associated oblique occlusal plane, make diagnosis and treatment more challenging than in rabbits. Most patients are presented with nonspecific clinical signs and symptoms, such as reduced activity, weight loss, reduced food intake, and difficult chewing and/or swallowing. The physical examination must be followed by radiologic diagnosis with standard radiography and/or computed tomography (CT), and thorough inspection under general anesthesia. Several complications may follow early and intermediate stages of malocclusion,

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West Coast Veterinary Dental Services Ltd, 1350 Kootenay Street, Vancouver, British Columbia V5K 4R1, Canada

E-mail address: ledentiste58@gmail.com

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including periodontal disease, subluxation of the temporomandibular joint, periapical infection, and abscessation.

The dental treatment is aimed to restore the proper length and shape of both the incisor and the cheek teeth, associated with medical and supportive treatment. Abscesses should be surgically addressed by complete excision.

ANATOMY AND PHYSIOLOGY OF DENTITION

The guinea pig belongs to the order *Rodentia*, which includes more than 2000 species of placental mammals.¹⁻³ The anatomic feature typical of members of this order is that they possess large, continuously growing incisor teeth that are used for gnawing.^{2,4-6} Rodents are monophyodont^{2,5} (having a single set of teeth, of which none are replaced at a later stage of growth)⁵ and *simplicidentata*, possessing a single pair of maxillary incisor teeth for each arcade (ie, unlike lagomorphs, which have a single maxillary incisor tooth for each quadrant).^{2,5-7} Guinea pigs belong to the suborder *Caviomorpha* (or *Hystrichomorpha*).² The species in this group are more or less strict herbivores and (unlike other suborders of rodents) have a full set of continuously growing teeth.^{2,5,8} This group includes selected other species kept as pets, such as the chinchilla, degu, and Patagonian cavy.²

Classifications of suborders of rodents depend on the position and function of the superficial and deep portion of the masseter muscle.² They have an enlarged deep masseter muscle and a prominent, anteriorly displaced, infraorbital zygomaticomandibularis section of the masseter.⁹ Unlike rabbits, guinea pigs lack the masseteric fossa of the mandible. The masseter muscle covers the lateral surface of the body of the mandible and the angular process.¹⁰

The dental formula is 2(I 1/1, C 0/0, P 1/1, M 3/3) for a total of 20 teeth (**Fig. 1**). The premolars and molars are anatomically similar and are commonly described as cheek teeth.² Guinea pig teeth are aradicular (open-rooted, with germinal cells producing dental tissue at their apical end), elodont (continuously growing and erupting), and hypsodont (long crowned).^{2,5,6} The clinical crown (the portion above the gingiva) is short, whereas the reserve crown (the portion below the gingiva and within the alveolus) is long. Guinea pigs are anisognathic with the mandible wider than the maxilla.² The cheek teeth of guinea pigs are different than cheek teeth of other hystrocomorph rodent species because their reserve crown is curved, having a buccal convexity for mandibular cheek teeth, and a palatal convexity for maxillary cheek teeth.^{2,5} The result is their occlusal plane is an approximate 30° angle from dorsobuccal to ventrolingual.²

Guinea pigs are grazers and use their incisor teeth to cut grass and hay. The incisors are covered by white enamel, which is thicker on the labial surface, thinning out on mesial and distal aspects toward the lingual surface, where it is absent. This enamel distribution is most likely responsible for their chisel-shaped occlusal plane. The maxillary incisors grow 1.9 mm per week, whereas the mandibular incisors grow 2.4 mm per week.^{6,11}

The temporomandibular joint allows both side-to-side and rostrocaudal movements. This combined movement has a propalinal (lateral and rostrocaudal, ie, diagonal) chewing action.²

PATHOPHYSIOLOGY OF DENTAL DISEASE

Most dental problems are related to inappropriate nutrition. When elodont teeth do not wear sufficiently to match the rate of eruption, the clinical crowns will elongate.¹²⁻¹⁴ Elongated clinical crowns result in the mouth being forced open, and the increased slope of the occlusal plane increases the leverage effect. When the strength of the

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