

Elongation and dental malocclusion in Guinea Pig: a case report

ABSTRACT: Dental problems of guinea pigs have been recognized for many years, including tooth elongation, malocclusion, oral trauma and abscess formation. Malocclusions of this nature may result from genetic, traumatic, dietary and iatrogenic causes. The dietary habits of guinea pigs must be considered as one of the major potential factors in initiating malocclusions. This article proposes to show the dental problems, dietary information and how a proper diet can be beneficial for this rodent. A case report describing the dental treatment of a guinea pig with tooth elongation and oral trauma follows.

INTRODUCTION

Due to the increasing popularity of guinea pigs as *pets*, veterinarians must be prepared for the challenges they will face in treating these patients, due to the unique characteristics of the oral cavity and dental structures of the rodents¹. Radiographs are essential to evaluate the occlusal plane of this species and the knowledge of the normal anatomy is fundamental to its interpretation².

The guinea pig presents a heterodont, elodont, arradicular hypsodont dentition, that is, both the anterior and posterior teeth grow continually throughout life and do not develop anatomic roots^{1,3}. The apical foramen of these teeth remains open throughout life and the length is raised along the apex, but its position remains stationed in the alveolus, occurring intra-oral extrusion⁴. The supragingival portion is the clinical crown, while the subgingival portion is the reserve crown^{1,5} and together they form the anatomical crown¹. The continuous formation of the teeth is balanced with the dental wear during mastication and due to this attrition the length remains constant^{4,6}.

The dental formula of the guinea pig is: 2x (I 1/1, C 0/0, P 1/1, M3/3)=20, being I (incisor), C (canine), P (premolar) and M (molar)^{1,4,5}. Evidence shows that the inappropriate occlusion and the composition of the diet along with conditions in captivity can be responsible for the dental elongation and disease in the oral cavity⁵. These malocclusion conditions affect the animal's health and it leads the caretaker to seek the help of a specialist in veterinary odontology². Therefore, this article aims to describe the most frequent oral problems in guinea pigs, provide information about diet and consistency of the food, show the techniques of treatment and present a case report of a guinea pig with dental elongation and occlusal imbalance.

ORAL PROBLEMS AND CLINICAL SIGNS

Acquired malocclusion, root elongation of the incisors⁶ and elongation of the clinical and reserve crown, along with the extension of the teeth apices to the periapical tissues, can promote an increased volume palpable on the ventral surface of the mandible, although this is more frequent in other rodents than in guinea pigs, which have a predominance of intraoral growth⁵. The irregular wear of the occlusal surface of the teeth leads to formation of dental tips, being that the mandible teeth present tips directed toward the tongue that, depending on the length, can form an arch, trapping it. Teeth from the maxilla will form tips directed to vestibule, causing lesions on the cheeks and pain in the oral cavity^{2,5}.

The dental elongation in guinea pigs can result an inability to completely close the mouth⁵.

There are several oral problems that rodents may have, but regardless of the cause, the clinical signs are always the same: weight loss, anorexia, hypersalivation, elongated incisors, facial abscesses, presence of coarse substances in feces, eye discharge and exophthalmia^{2,5}.

DIET AND FOOD TYPE

Guinea pigs are considered true unspecialized herbivores, and their primary foods in nature are grasses such as *Brachiaria*⁵. In captivity, however, they often only receive concentrated or processed foods in the form of grains or pellets which have a soft consistency and do not have sufficiently abrasive texture such as do vegetable plant fibers, which results in fewer chewing movements^{2,5}.

Feeding a diet with higher energy and lower fiber content results in the animal chewing less⁵. If the patient does not chew vigorously or if the time spent chewing is insufficient, the teeth do not wear naturally, resulting in dental elongation^{2,5}. The stress of confinement and environmental change can also affect the oral health of *pet* rodents, as in the wild guinea pigs originate from an arid region, with strong and fibrous vegetation, silicate-rich and contaminated with soil dust. This highly abrasive and low energy food is ingested in large quantities to meet the nutritional needs of the animals, resulting in marked wear of the teeth⁵.

Nutritional factors, such as vitamin C deficiency and excess selenium, metabolic deficiencies and genetic factors can also cause oral problems^{1,5}.

TREATMENT

The treatment consists of tooth trimming and occlusal adjustment, respecting the natural angulation that exists in the premolars and molars that is approximately 30° relative at the horizontal plane⁵, along with changes in the diet, adding more abrasive foods to prevent recurrence or at least extend the interval between procedures^{2,5}.

The technique is done with general inhalation anesthesia and the odontologic exam is possible with the use of a mouth opener to facilitate visualization of the oral cavity, tongue retractors and spatula to protect the mucosa¹. The procedure normally is done using a slow-speed motor and straight handpiece, using dental diamond burs for the premolars and molars and diamond discs for adjustment of the incisors^{1,2}. Following the procedure, another cranial radiography must be done to verify if the teeth trimming was sufficient².

Since the teeth maintain continuous growth and eruption, the situation is dynamic and the owner must be advised that it may take several treatments over the life of the animal².

CASE REPORT

A guinea pig, 2 years and 10 months old, female, 0.720 kg, was seen at Odontovet – Centro Odontológico Veterinário [Veterinary Dental Center in Brazil] for an evaluation of the oral cavity. The owner reported that the animal's behavior changed a week ago, had appetite loss, showed selectivity of food, was chewing slowly and gnashing posterior teeth. The last tooth trimming was done three months ago.

A clinical examination diagnosed elongation of mandibular incisors. Clinical examination of this species is difficult due to the small mouth opening, primarily caused by the soft tissue structures, so a radiographic examination of the skull was performed under general anesthesia using the following protocol: ketamine (0.07 ml / IM) + midazolam (0.07 ml / IM) and maintenance accomplished using isoflurane (Figure 1). The radiograph showed dental elongation of premolars and molars (Figure 2). The patient was placed on the proper table for dental



Figure 1: Patient under effect of inhalation general anesthesia with isoflurane in odontologic surgery table for rodents.

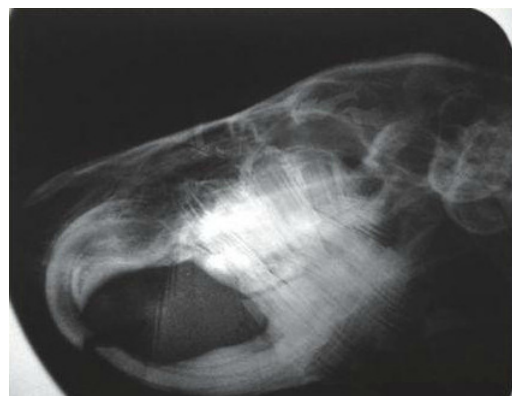


Figure 2: Lateral cranial radiography in guinea pig. Observe dental elongation in mandible and maxilla.



Figure 4 and 5: instruments used in the treatment: mouth opener, spatula, periodontal probe, low-speed motor, straight handpiece, carbide burs and diamond discs.

trimming of rodents and lagomorphs and after using mouth openers (Figure 4) it was observed in both maxillary and mandibular teeth dental elongation with dental tips toward the tongue (Figure 3). The teeth trimming was performed using a low-speed motor and straight handpiece with carbide bur for premolars and molars and diamond disc for incisors (Figure 5). After treatment (Figure 6), another cranial radiography was performed for comparison (Figure



Figure 3: View of the oral cavity. Observe dental elongation and dental tips toward the tongue on the mandibular teeth.



Figure 6: View of the oral cavity after dental wear and occlusal adjustment.

7). Dipyron [metamizole] (1 drop [25 mg] /q24h/10 days) was prescribed postoperative.

CONCLUSION

The most common dental problems in guinea pigs are: dental malocclusion and elongation. In most cases, diet is the determining factor for developing this condition. Because this species has continuous dental growth throughout life, chewing fibrous and low calorie food in large quantity is needed to promote dental wear. Treatment by a veterinary dentist is required when a proper diet is insufficient to keep the teeth in good oral health.



Figure 7: Lateral cranial radiography in guinea pig after tooth wear.

DVM Elisângela Perez de Freitas
Odontovet team – unit Campinas [São Paulo, Brazil]
Master in surgery by FMVZ-UNESP-Botucatu [São Paulo, Brazil]

DVM Daniel G. Ferro
Odontovet team – unit Anália Franco e Butantã [São Paulo, Brazil]
Master in surgery by FMVZ-USP [São Paulo, Brazil]

DVM Dentist Surgeon Michèle A. F. A. Venturini
Odontovet team – unit Butantã e Moema [São Paulo, Brazil]
Master in surgery by FMVZ-USP [São Paulo, Brazil]

DVM Herbert Lima Correa
Odontovet team – unit Butantã e Moema [São Paulo, Brazil]
Master in surgery by FMVZ-USP [São Paulo, Brazil]

References

- 1 – WIGGS, R.B.; LOBPRISE, H.B. *Veterinary dentistry: principles and practice*. Philadelphia: Lippincott-Raven, 1997, 748p.
- 2 – LEGENDRE, L.F.J. Malocclusions in guinea pigs, chinchillas and rabbits. *Can. Vet. J.*, v.43, p.385-390, 2002.
- 3 – CROSSLEY, D.A. Clinical aspects of lagomorph dental anatomy: the rabbit (*Oryctolagus cuniculus*). *J. Vet. Dent.*, v.12, p.137-140, 1995.
- 4 – KERTESZ, P. *A colour atlas of veterinary dentistry & oral surgery*. Aylesbury: Wolfe, 1993, p.35-50.
- 5 – REITER, A.M. Pathophysiology of dental disease in the rabbit, guinea pig and chinchilla. *J. Exot. Pet Med.*, v.17, n.2, p.70-77, 2008.
- 6 – OKUDA, A.; HORI, Y; ICHIHARA, N.; ASARI, M.; WIGGS, R.B. Comparative observation of skeletal-dental abnormalities in wild, domestic, and laboratory rabbits. *J. Vet. Dent.*, v.24, p.224-229, 2007.