



Dental alterations in young Quarter Horse. Alterações odontológicas em equinos jovens da raça Quarto de Milha.

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Abstract

This study aimed to assess the prevalence of dental alterations in 100 young Quarter Horses aged between 6 and 48 months, sourced from various breeding farms. The animals were divided into four age groups: Group I (6–12 months), Group II (12–24 months), Group III (25–36 months), and Group IV (37–48 months). The identified alterations were documented using an oral-dental mapping form. The primary dental changes observed in this study included the presence of excessive dental enamel points, eruption of the first premolar, limited and asymmetrical lateral excursions, buccal or lingual ulcerations, ramps, caudal hooks, rostral hooks, and steps. Among these alterations, excessive dental enamel points were the most commonly observed in the analyzed samples. The high prevalence of enamel points highlights the importance of preventive and intervention strategies to minimize the negative impact of these alterations on oral health and foal development.

Keywords: Chewing. Enamel points. Equine dentistry. Foal. Stomatognathic system.

Resumo

Um estudo com o objetivo de avaliar a prevalência de alterações odontológicas em equinos jovens da raça Quarto de Milha foi conduzido em 100 potros com idades entre seis e 48 meses, provenientes de diferentes criatórios. Os animais foram divididos em quatro grupos de acordo com a idade: grupo I (6 meses a 1 ano), grupo II (12 a 24 meses), grupo III (25 a 36 meses) e grupo IV (37 a 48 meses). As principais alterações dentárias observadas neste estudo foram a presença de pontas excessivas de esmalte dentário, erupção do primeiro dente pré-molar, excursão lateral limitada e assimétrica, ulceração bucal ou lingual, rampa, gancho caudal, gancho rostral e degrau. Entre as alterações mencionadas, as pontas excessivas de esmalte dentário foi a mais comumente observada na amostra analisada. A alta prevalência de pontas de esmalte destaca a importância de estratégias preventivas e de intervenção para minimizar o impacto negativo dessas alterações na saúde bucal e no desenvolvimento de potros.

Palavras-chave: Mastigação. Pontas de esmalte. Odontologia equina. Potro. Sistema estomatognático.



Introduction

Equine dentistry is one of the most important specialties in veterinary medicine because horses have teeth that erupt continuously throughout their lives (PAGLIOSA et al., 2004). Horse teeth have evolved over millions of years to enable effective gripping and chewing. However, owing to changes in the eating habits of horses resulting from domestication, and more recently, the greater availability of concentrated feed with little variation, an increase has been observed in the frequency of changes in tooth wear (PAGLIOSA et al., 2006).

Dental problems in horses are often associated with irregularities in the occlusal surface that make chewing difficult and contribute to reduced digestibility (PAGLIOSA et al., 2006). Therefore, a thorough examination of the horse's oral cavity is essential to obtain an accurate diagnosis. However, some conditions related to equine dentistry are only visible when they have already progressed; when they are in their initial stages, they are neither apparent nor recognized by the caretaker or handler (STRAIOTO et al., 2018).

In healthy young horses (under 5 years old), oral examinations should be performed every 6 months because of the important dental changes that occur during this period. In adult horses (over 5 years old), only a routine oral examination every 12 months is necessary if no pathological changes are observed. However, any animal that presents with clinical signs associated with dental pathology should undergo a prompt oral examination (GIECHE, 2013).

Any dental problems can compromise the health and well-being of horses. Regardless of how small the dental changes are, they are the minimum requirement for difficulties in the chewing process, and consequently, in digestion (ALLEN, 2003). Dental changes can result from imperfect coaptation between the arches, that is, imperfect maxillomandibular occlusion, which can lead to excessive points of tooth enamel, excessive transverse ridges, physiological crown fractures, retention of tooth caps, hooks, ramps, steps, waves, diastemas, periapical diseases, periodontal diseases, and fractures (MACFADDEN, 2005).

Several studies conducted in Brazil have demonstrated a high prevalence of dental changes in horses of different breeds and regions (RIZZO et al., 2011; BERBARI NETO et al., 2013; SILVA-MEIRELLES et al., 2016; LEITE et al., 2019; MELO; FERREIRA, 2023; VARÃO et al., 2023ab).

Although several studies have addressed the prevalence of dental changes in horses of various ages subjected to different management practices, research specifically investigating the occurrence of wear changes in foals is lacking. This niche of knowledge is crucial, given the relevance of healthy tooth development to the well-being and general functionality of horses throughout their lives. This study aimed to evaluate the prevalence of dental changes in young quarter horses.

Material and methods

One hundred young Quarter Horses aged from 6–48 months from different farms were evaluated. The animals were divided into four groups according to age: Group I (6–12 months), Group II (12–24 months), Group III (25–36 months), and Group IV (37–48 months). Each group consisted of 25 animals.

The dental examination consisted primarily of a visual assessment, which included checking for the presence of nasal discharge, halitosis, and wounds on the lip, gums, tongue, and sides of the cheek. To evaluate the oral cavity, sedation was performed with detomidine hydrochloride (Dormiun V, Agener União Saúde Animal, Brazil) at an intravenous dose of 20 µg/kg. After sedation, the foals

were maintained in a station, and the oral cavity was accessed using a McPherson-type autostatic equine mouth opener. Subsequently, the oral cavity was washed with water by spraying and with the aid of a dental photophore (EVO, HDC, Brazil) associated with a 50 mm angled mirror, its evaluation was carried out.

The general conformation of the dental arches and teeth and the presence of changes in the palate, vestibule, and tongue were observed. The changes were described in a dental oral mapping form following the methodology described by Silva-Meirelles et al. (2016) and Leite et al. (2019). The classifications proposed by Dixon & Dacre (2005) and Easley et al. (2016) were used to identify the dental changes. All foals were assessed by a single author (SOUTO, E.W.).

To test for differences in the frequency of dental changes among different age groups and between sexes, generalized linear models with binomial distributions were fitted. After adjusting the models, the mean prevalence and 95% confidence intervals (CIs) were calculated for each group (age and sex).

Results and discussion

The main dental changes observed in this study were excessive tooth enamel tips, eruption of the first premolar, limited and asymmetrical lateral excursion, buccal or lingual ulceration, ramps, caudal hooks, rostral hooks, and steps. Among the changes mentioned, the presence of excessive tooth enamel points was most commonly observed in the analyzed samples, as shown in Fig. 1.

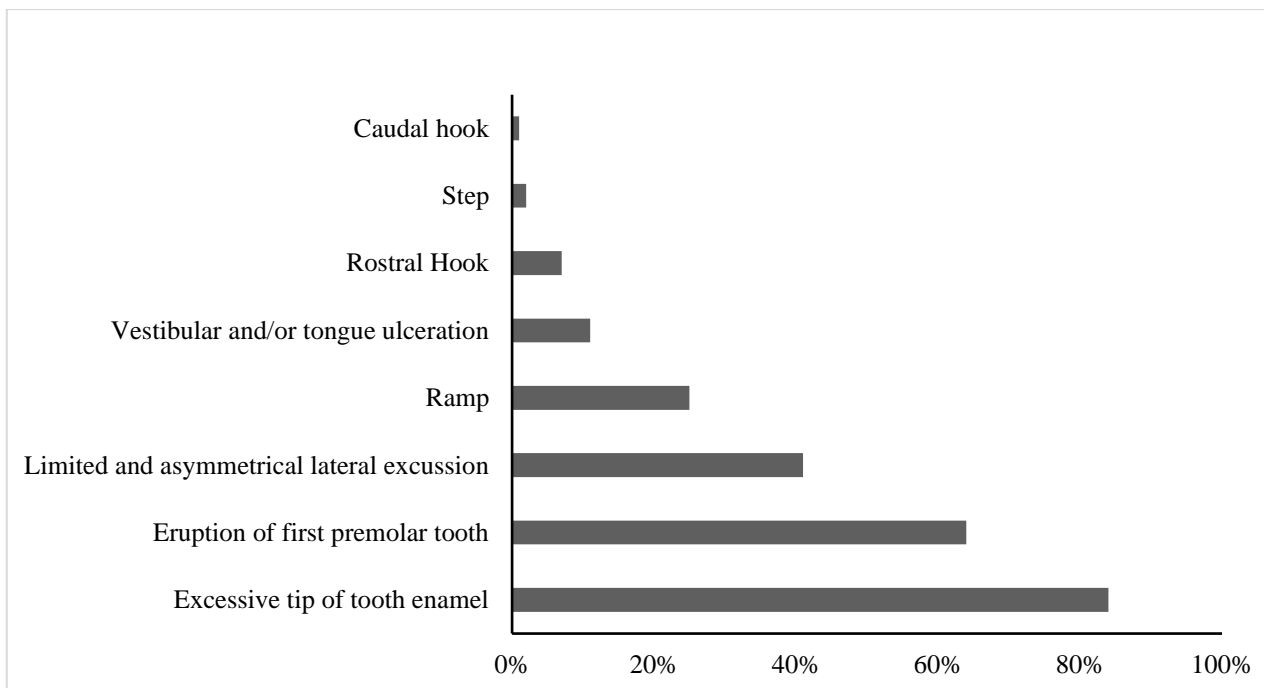


Figure 1 - Common dental changes in young Quarter Horses.

Differences were observed among the groups for all the changes (except steps) investigated ($p \leq 0.05$) (Table 1). Although changes were observed in all age groups, they were more frequent in Group IV. Group I had the lowest frequency of changes observed and, among the changes observed, excessive points of tooth enamel were the most prevalent (72%). No difference was detected ($p \leq 0.05$) in the prevalence of changes between sexes (Table 2).

Table 1 – Effect of age on the prevalence of dental changes in young Quarter Horses.

	Group I	Group II	Group III	Group IV
Lupine tooth exteriorization	28% ^c (7/25)	60% ^b (15/25)	72% ^{ab} (18/25)	96% ^a (24/24)
Excessive tip of tooth enamel	72% ^b (18/25)	88% ^b (22/25)	76% ^b (19/25)	100% ^a (25/25)
Limited and asymmetrical lateral excussion	20% ^b (5/25)	52% ^a (13/25)	32% ^b (8/25)	60% ^a (15/25)
Vestibular and/or tongue ulceration	12% ^b (3/25)	20% ^b (5/25)	28% ^b (7/25)	44% ^a (11/25)
Rostral Hook	0% ^b (0/25)	8% ^{ab} (2/25)	12% ^a (3/25)	4% ^b (1/25)
Caudal hook	0% ^b (0/25)	0% ^b (0/25)	4% ^a (1/25)	0% ^b (0/25)
Step	0% ^a (0/25)	4% ^a (1/25)	4% ^a (1/25)	0% ^a (0/25)
Ramp	20% ^b (5/25)	52% ^a (13/25)	20% ^b (5/25)	4% ^b (1/25)

Different lowercase letters in the line indicate differences revealed using *t*-test ($p \leq 0.05$).

Table 2 – Effect of sex on the prevalence of dental changes in young Quarter Horses.

	Male	Female
Lupine tooth exteriorization	63,07% (41/65)	65,71% (23/35)
Excessive tip of tooth enamel	83,07% (54/65)	85,71% (30/35)
Limited and asymmetrical lateral excussion	38,46% (25/65)	45,71% (16/65)
Vestibular and/or tongue ulceration	26,15% (17/65)	25,71% (9/35)
Rostral Hook	4,61% (3/65)	11,42% (4/35)
Caudal hook	0% (0/65)	2,85% (1/35)
Step	3,07% (2/65)	0% (0/35)
Ramp	21,53% (14/65)	28,57% (10/35)

Considering the type of management to which the animals were subjected (Table 3), intensive versus extensive, no differences were observed ($p \leq 0.05$), with the exception of the greater prevalence of ramps in animals maintained under intensive management (stabling).

The most frequently reported dental change in horses is the presence of excessive tooth enamel tips. These points form on the buccal and lingual edges of the occlusal surfaces of both the maxillary and mandibular premolars and molars. This disorder results from an anisognathia, which leads to an increase in the angle of occlusion between the premolars and molars. Excessive enamel tips occur mainly because of changes in the eating habits of horses (PAGLIOSA et al., 2006).

Table 3 – Distribution of changes in young Quarter Horse horses based on the management system.

	Intensive	Extensive
Lupine tooth exteriorization	67,74% (42/62)	57,89% (22/38)
Excessive tip of tooth enamel	88,70% (55/62)	76,31% (29/38)
Limited and asymmetrical lateral excussion	43,54% (27/62)	36,84% (14/38)
Vestibular and/or tongue ulceration	29,03% (18/62)	21,05% (8/38)
Rostral Hook	8,06% (5/62)	5,26% (2/38)
Caudal hook	4,83% (3/62)	5,26% (2/38)
Step	3,22% (2/62)	0% (0/38)
Ramp	32,25% ^a (20/62)	10,52% ^b (4/38)

Enamel tips are the most reported alterations in equine dentistry, with a reported incidence between 44% and 85.1% (BERBARI NETO et al., 2013; LEITE et al., 2019; MELO; FERREIRA, 2023), being more prevalent in horses up to 9 years of age because of the rhizogenesis of permanent teeth (PAGLIOSA et al., 2006). The introduction of concentrated feeds and the reduction in forage supply decrease chewing time and promote more vertical chewing movements, which result in changes in tooth wear.

Bertonha et al. (2023) investigated dental changes in Mangalarga Marchador foals induced by different types of diets and observed that all diets resulted in dental changes after 90 days of consumption in most animals. Enamel tips and vestibular ulcers were the most frequently diagnosed changes, particularly in foals fed corn silage.

Although this change was associated with changes in the horses' eating habits, it is important to highlight that no differences were observed between the group of animals subjected to intensive management and those raised on pasture. Further, it is worth noting that the region in which the study was conducted is characterized by variable periods of drought throughout the year, resulting in a decrease in forage availability. In this scenario, the supply of concentrate becomes essential, which may predispose animals kept on pastures to dental changes.

The high prevalence of enamel tips in animals kept on pastures in this study corroborates the findings of Leite et al. (2019), who reported a high prevalence of enamel points in horses under extensive farming. These findings suggest that other factors may be involved in the development of these changes, in addition to feeding practices. In addition to diet, factors such as individual tooth conformation and specific chewing activity of each animal can play a crucial role in forming enamel tips.

Conformations are the major contributors to excessive tooth growth. Discrepancies in the lengths and positions of the mandible and maxilla also contribute to the formation of hooks and ramps (LEITE et al., 2019). Hooks and ramps develop because of the misalignment of the molar arches. This is often the result of an overbite or underbite (parrot mouth or sow mouth) of the incisor arch

(DIXON; DACRE, 2005; EASLEY et al., 2016). However, none of these developmental changes were observed in the study population.

Dental overgrowth restricts anterior/posterior and lateral movements of the jaw (DIXON; DACRE, 2005; EASLEY et al., 2016). Recently, Melo & Ferreira (2023) observed a high correction between the enamel tips and limited and asymmetrical mandibular lateral excursion. The presence of enamel tips may justify the limited mandibular excursion in some of the study population; however, Dixon & Dacre (2005) contended that hooks or ramps can also result in impaired jaw movement.

Conclusion

The high prevalence of enamel tips highlights the importance of preventive and interventional strategies to minimize the negative impact of these changes on the oral health and development of young horses. Furthermore, identifying other changes highlights the need for a holistic approach to dental management to ensure the well-being and adequate functionality of the stomatognathic system in horses. Based on these findings, it is suggested the implementation of regular dental evaluation protocols as preventive and therapeutic measures to maintain oral health and the ideal development of these animals.

Conflict of interest statement

The authors declare no conflict of interest regarding the execution, writing, or dissemination of the results of this study.

Authors' contribution

Edeugardes Welys de Souto and José Henrique Lisboa de Menezes Silva - conceptualization, writing – original draft, and investigation; Ubiratan Pereira de Melo - conceptualization, methodology, and writing – review & editing; Cíntia Ferreira - conceptualization.

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