



## A Prospective View of Oral and Dental Examination and Dental Diseases in Horses in İzmit and Karacabey Pension Hara of Turkey Jockey Club

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**Abstract:** This study, the aim was to prospectively examine the oral cavities and teeth of 300 horses of various age groups housed at the İzmit and Karacabey Pension Hara of the Turkish Jockey Club, focusing on dental disorders and dental diseases. Within the scope of the study, the oral cavities of the examined 300 horses were inspected, including the color of the oral mucosa, their appetite, whether they finished their feed, body condition scores, the type of feed they were fed, and whether salivation occurred during feeding. Following clinical examinations of the 300 horses, endoscopic and radiological examinations were performed, revealing dental disease and disorders, particularly in the molar teeth, in 59 horses. Among the group of 59 horses, consisting of stallions, broodmares, and yearlings aged 7-25 years, tooth extraction of deciduous teeth, tooth displacement, mobile teeth, caries, sharp-edged teeth, odontoclastic tooth resorption, and conditions such as equine odontoclastic tooth resorption and hypercementosis (EOTRH), fistula formation, gum abscess, gingivitis, and periodontitis were identified. Clinically, 54 out of 59 horses had their molar teeth rasped to correct sharp edges, resulting in the normalization of chewing movements and the ability of horses to consume their feed comfortably. Following treatment, the horses were monitored, and efforts were made to improve their nutrition and body condition scores. This study emphasizes the significance of oral health in horses and the impact of regular dental care on their overall well-being.

**Keywords:** Equine, Periodontal disease, Teeth.

### Türkiye Jokey Kulübü İzmit ve Karacabey Pansiyon Hara Müdürlüklerinde Bulunan Atlarda Ağız Diş Muayenesi ve Diş Hastalıklarına Prospektif Bir Bakış

**Özet:** Atlarda diş hastalıkları veteriner hekimlik açısından oldukça önemlidir. Ancak ülkemizde yakın zamana kadar oldukça ihmal edilmiştir, birçok atın teşhis edilmemiş, ağrılı diş hastalıklarından muzdarip olduğu gözlenmiştir. Ağız padanı (spekulum) kullanılarak yapılan detaylı klinik muayenede, ön koşul tüm dişlerin muayenesini gerçekleştirmektir. Bu tez çalışmasında Türkiye Jokey Kulübü'nün İzmit ve Karacabey Pansiyon Hara Müdürlüklerinde 2012-2013 yıllarında barınmakta olan çeşitli yaş gruplarındaki 300 atın ağız boşluğu ve dişleri muayene edilerek, diş bozuklukları ve diş hastalıkları yönünden incelenerek prospektif olarak ele alınması amaçlandı. Çalışma kapsamında muayene edilen 300 atın nabız, vücut sıcaklığı, solunum sayısı ve kalp atım sayısı gibi hayati fonksiyonları not edildi. Ayrıca tüm atların ağız boşluğu muayene edilerek; ağız mukozasının rengi, iştahları, yemlerini bitirip bitirmediikleri, vücut kondüsyon skorları (VKS), hangi tür yemle beslendikleri, ağızlarından yem tüketimi sırasında salivasyon olup olmadığına bakıldı. Bunların yanı sıra yem tüketimiyle ilişkili olarak herhangi bir sağlık sorunu geçirip geçirmediikleri araştırıldı. Klinik olarak muayenesi yapılan 300 atın endoskopik ve radyolojik olarak da muayenelerinin yapılmasından sonra 59 atta özellikle molar dişlerde (MD) diş hastalığı ve diş bozukluğu olduğu tespit edildi. 59 adet at grubunu oluşturan, 7-25 yaş aralığındaki damızlık aygır, kısıraklar ve 1 yaşlı taylarda; süt dişi çekimi, dişlerde yer değiştirme, mobil dişler, karies, keskin kenarlı dişler, odontoklastik diş rezorpsiyonu ve hipersementozis (EOTRH), fistül oluşumu, diş eti apsesi, gingivitis ve periodontitis tespit edildi. Diş hastalıkları ve diş bozukluklarının modern teknikler kullanılarak tedavi edilmeleri sağlandı. Özellikle beşeri diş hekimliğinde ülkemizde kullanılan dolgu materyalleri denendi ancak ağız boşluğunun aşırı ıslak oluşu ve atların kuvvetli çiğneme hareketleri nedeni ile bir başarı elde edilemedi. Karies olgularında diş çekiminde, gingivitis ve periodontitis vakalarında dişler başarıyla tedavi edildi. Klinik olarak ele alınan 59 attan 54' ünün MD' i törpülenerek dişlerin keskin kenarları düzeltilerek atların çiğneme hareketlerinin normale döndüğü ve yemlerinin tamamını rahatlıkla tüketebildikleri görüldü. Tedavi sonrası atlar takip edilerek beslenmelerinin ve VKS' nin yükseltilmesi sağlandı.

**Anahtar Kelimeler:** At, Diş, Periodontal Hastalık.

## Introduction

Dental abnormalities are an important problem in equine medicine practice (Dixon et al., 1999; Dixon and Dacre, 2005; Simhofer et al., 2008). Dental abnormalities in horses can cause weight loss, poor performance, pain, behavioral abnormalities and disease (Kirkland, 1994). Equine dental disease is common, but there are few reports documenting the prevalence of dental disease in the general equine population (Dixon et al., 1999; Kilic et al., 1997; Kirkland et al., 1994). Dental problems are the third most common medical problem in large animal practice in the USA (Traub-Dargatz et al., 1991). Most equine dental disorders have not been adequately studied, and as a result, it is unclear how abnormalities progress (Dixon et al., 1999; Kilic et al., 1997). In addition, many autopsy studies have reported significant levels of undiagnosed dental disease in horses (Brigham and Duncanson, 2000; Jasiński et al., 2025; Kirkland et al., 1994; Wafa, 1988). With the development of diagnostic techniques in recent years, it is now recognized that equine dental disease has a significant impact on the welfare of domestic horses (Gorski et al., 2022; Kennedy and Dixon, 2018).

Especially in recent years, horse owners' knowledge about the welfare of their horses to dental care has improved (Rebecca et al., 2024). The majority of oral problems in horses are associated with dental diseases and routine oral cavity examinations should be performed (de Melo and Ferreira, 2023). Horse breeders typically allocate up to 10% of their expenditure to oral cavity-related issues (Hain et al., 2025; Samad et al., 2020).

The most common equine dental problem is overgrowth of the buccal margin of the maxillary cheek teeth (CT) and the lingual margin of the mandibular CT (O'Neill et al., 2010). A common symptom of periodontal disease and dental caries is bad breath (Dixon et al., 2000). Dental problems are less likely to cause weight loss because horses with these conditions spend more time chewing food. 'Diastema' describes a gap between the cheek teeth and predisposes to periodontal disease (Easley, 2009). Successful results may not be achieved in all cases, but good treatment can be achieved with anti-inflammatory, antibiotic, and restorative agents. Otherwise, the traumatized tooth cannot be saved, and tooth extraction will be necessary (Buonavoglia, 2021).

The results of this study may help horse owners and veterinarians horses understand the prevalence of dental problems among different horse groups and thus pay more attention to susceptible groups.

## Material and Methods

### Animal Material

The study material consisted of a total of 300 Thoroughbred British horses, including breeding mares (adult 1-year-old in females), breeding stallions (adult males), and 1-year-old foals between the ages of 7 and 25 years, housed at the Izmit and Karacabey Pension Hara of the Turkish Jockey Club.

### Clinical Examination

The body temperature, respiratory rate, and heart rate of all horses included in the study were determined. In addition, the color of the mucous membrane of the mouth, appetite, weight loss, hair cover, dehydration, the way of eating feed, whether they left feed during feeding, what kind of feed they eat, the way the feed was given, chronic diseases and whether they had gastrointestinal symptoms related to feed were examined in detail and recorded.

### Oral Cavity Examination

A dental examination card was prepared for each horse to be examined, and the defects observed during the oral cavity examination and recorded separately. Before the oral cavity examination, the oral cavity was washed to remove feed residues, foreign bodies and grasses covering the teeth. After the clinical examinations of the traumatized horses were completed, oral cavity examination was started. For oral cavity examination, during the examination of stallions, mares and 1 year old foals, McPherson (Austria) model mouth speculum or padan was used to open the mouth. The intraoral area of the horse opened with the padan was illuminated with a head lamp. The oral cavity was examined for the presence of foreign bodies, mucous membranes of the upper and lower lips, mucous membranes of the cheeks, and possible anatomical abnormalities of the tongue. Teeth were visually examined using a dental mirror. The areas where the cheek blocked the view, especially the posterior molars of the upper jaw, were examined using a dental mirror. The oral cavity was examined for anatomical arrangement of the teeth, color, pain, mobility, spikes, sharp edges, decayed teeth, broken teeth and gingival dental disorders. After completion of the oral cavity examination, endoscopic and radiologic examinations were performed.

### Endoscopic Examination

After inspecting and palpating the oral cavity, the cheeks and teeth were examined for dental and periodontal disease using endoscopic techniques. Endoscopic examination was performed with a 40 cm long, 5 mm - 8 mm diameter device with a 60-degree viewing angle (Richard Wolf, Germany). The endoscopy device was used for observation of ulcers on the cheek and tongue, detection of tooth elongation, detection of sharp-pointed teeth, detection of gaps between teeth, periodontitis, cementum abnormalities, observation of parasite formations in the gums and examination of calculus fractures (Figure 1).

### Radiography

Intraoral radiographs were taken at doses of 50 kVp and 0.5 mAs to reveal the periodontium of the incisor, canine and molar teeth and 60 kVp and 0.6 mAs for the molar teeth.

### Treatment Protocols for Dental Diseases

#### Treatment Protocol for Horses Diagnosed with Periodontal Disease

In horses diagnosed with periodontitis, the first goal was to balance the occlusal surfaces mutually. Occlusal problems, or in other words, malocclusional areas, were



**Figure 1.** Endoscopic examination of a molar tooth.

corrected by simple filing, and occlusal balance was achieved. Swabs were taken from periodontal pockets for culture and antibiogram. These areas were washed with chlorhexidine to mitigate the risk of bacterial infection. Samples taken with swabs were analyzed in the Laboratory of Istanbul Veliefendi Hippodrome Racehorse Hospital. After cleaning the periodontal pockets, the remaining area was filled with aluminum oxide powders for period repair, and tooth repair was performed.

#### **Treatment Protocol for Horses with Odontoclastic Tooth Resorption and Hypercementosis (EOTRH)**

The affected tooth was extracted as treatment in horses with EOTRH. After extraction, the area was disinfected with chlorhexidine solution for 3 days and the gingiva and alveolar clots were removed for healing of the tooth cavity and gingiva. In addition, the nonsteroidal anti-inflammatory agent Flumed (Alke, Istanbul, Turkey) was administered at a dose of 2.2 mg/kg by IV injection every other day. In addition, Danilon powder (Esteve Pharmaceuticals, Barcelona, Spain) 2.2 mg/kg was administered orally for 7 days post-operatively.

#### **Treatment Protocol for Horses with Dental Calculus (Calculus, Tartar)**

During the oral cavity examination, tartarage was performed on the teeth of horses with tartar formation in their teeth. Feed residues around the teeth were cleaned and the area around the teeth was cleaned with oral antiseptic.

#### **Treatment Protocol for Horses Diagnosed with Caries (Dental Caries, Caries)**

First, the carious tooth was diagnosed radiologically. The superficially affected teeth were firstly restored with filling material. Teeth that could not be restored were extracted after applying a maxillary nerve block and local infiltration anesthesia around the tooth.

#### **Treatment Protocol for Horses with Mobile Teeth**

The treatment protocol was determined according to the mobility of the tooth.

-Stage 1 mobile tooth: Sharp edges were corrected after simple routine filing. Gingiva was cleaned with chlorhexidine solution.

-Stage 2 mobile tooth: The problem was solved by reducing the height of the opposing tooth and cleaning the

periodontal formation around the affected tooth with chlorhexidine solution.

-Stage 3 mobile tooth: The tooth was found to be stage 3 mobile due to periodontal pocket formations measuring up to 3 mm, accompanied by occlusal wear. These teeth were extracted completely. In addition, the alveolar pocket was washed with chlorhexidine solution, and antibiotic treatment was applied.

## **Results**

It was learned that oral cavity examinations and dental controls of the purebred British breed stallions, breeding mares, and foals used in the study were not performed recently, and the majority of them were last examined or controlled for oral cavity and dental health 2 years ago.

It was determined that the horses evaluated were in the age range of 1-25 years ( $13.70 \pm 6.3$  years). The body weights of the horses constituting the study material were found to be in breeding stallions ( $578.13 \pm 26.33$  kg), mares ( $561.81 \pm 23.94$  kg), 1-year-old racehorses ( $327.14 \pm 9.75$  kg) and foals separated from their mothers ( $257.33 \pm 67.57$  kg).

The treatment protocol and the results of the treatment of horses with dental disorders and diseases were recorded. The information about the horses with dental disease or disorder as a result of oral cavity examination within the scope of the study is presented in Table 1.

Out of a total of 300 horses whose oral cavity was examined, 59 horses were found to have tooth and gum disorders. 45 breeding stallions, 9 breeding mares and 5 1-year-old foals were treated.

Within the scope of the study, sharp edges, pointed tips and abnormal length were detected in the molar teeth of a total of 31 horses, including 23 breeding stallions, 7 breeding mares and 1 1-year-old foal. It was observed that periodontitis was formed due to the accumulation of feed and similar residues between the teeth, especially due to occlusal imbalance, and then the feed and similar residues accumulated between the teeth due to excessively long teeth or wavy teeth could not be removed and where they accumulated; they damaged the teeth and gums, caused bacterial accumulation and infection, and in this way, gingivitis, periodontal pocket formation, weakness in the



**Table 1.** Dental Disorders Observed in Horses as a Result of Dental Examination.

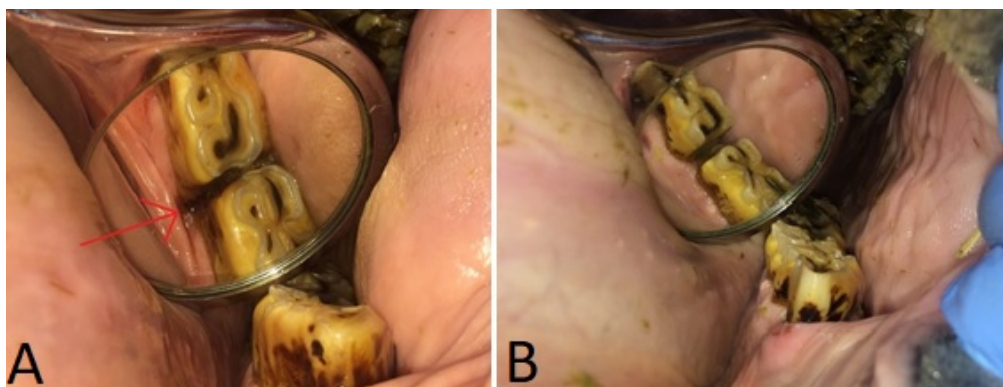
	Breeding Stallion	Breeding Mare	1 Old Foal	Total	Total Percentage(%)
Gingivitis	14			14	(%10,5)
Peridontitis	8			8	(%6)
Gum abscess	2	1		3	(%2,25)
Fistula formation	1			1	(%0,75)
Eotrth	5	2		7	(%5,25)
Sharp-edged tooth	23	7	1	31	(%23,25)
Karies	5			5	(%3,75)
Mobile tooth	3			3	(%2,25)
Relocation	1		1	2	(%1,50)
Milk tooth extraction			1	1	(%0,75)

periodontal ligament and damage to the alveolar bone occurred. Among the horses examined, gingivitis was diagnosed in 13 breeding stallions and periodontitis in 8 breeding stallions. In addition, in the clinical examination of

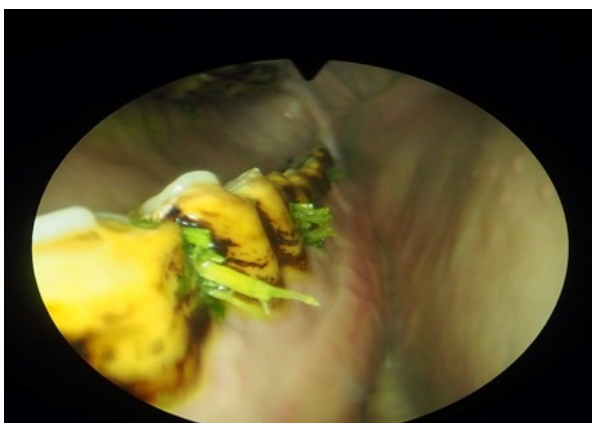
the horses with occlusal imbalance in the teeth, it was noted that there were complaints of feed refusal, bad odor in the mouth, ulcerations on the cheeks and increased salivation (Figure 2, Figure 3, Figure 4).



**Figure 2.** A) Excessive growth of teeth, B) Appearance after rasping, C) Ulceration formation in the left cheek mucosa, D) Appearance of the ulcer after treatment, E) Gingivitis with dental plaque on canine tooth number 204, F) Appearance after treatment.



**Figure 4.** A) Diastema and periodontal pocket formation, B) Post-treatment appearance.



**Figure 3.** Endoscopic visualization of diastema and periodontal pocket.

In mild and moderate periodontal disease, occlusal balancing and cleaning of feed residues between the teeth and disinfection with chlorhexidine were mostly sufficient to prevent periodontitis. In 4 of 59 horses with grade 3

periodontitis; severe inflammation, edema, gingival bleeding, pustular discharge, bone tissue loss and 25-50% loss of periodontal support were observed. In 4 of 8 horses with grade 4 periodontitis, severe inflammation, edema, gingival bleeding, pustular discharge, severe mobility in the affected tooth, and more than 50% loss of periodontal ligament support were found (Figure 5, Figure 6).

After examination of the teeth, EOTRH was detected in a total of 7 horses, 5 stallions and 2 mares. In clinical examinations, horses with EOTRH had difficulty in eating, difficulty in tearing even soft grass, increased salivation, drainage canals and ulcer formations in the gums. For this reason, chewing movements were painful and limited. Radiographic examinations showed resorption, fracture or hypercementosis of the tooth roots. EOTRH was detected mostly in the incise teeth of older horses brought with the complaint of difficulty in eating grass.

Within the scope of the study, caries was detected in the teeth of 5 breeding stallions. In horses with caries, symptoms included a bad odor in the mouth, excessive salivation, difficulty in feeding, feed withdrawal, and head



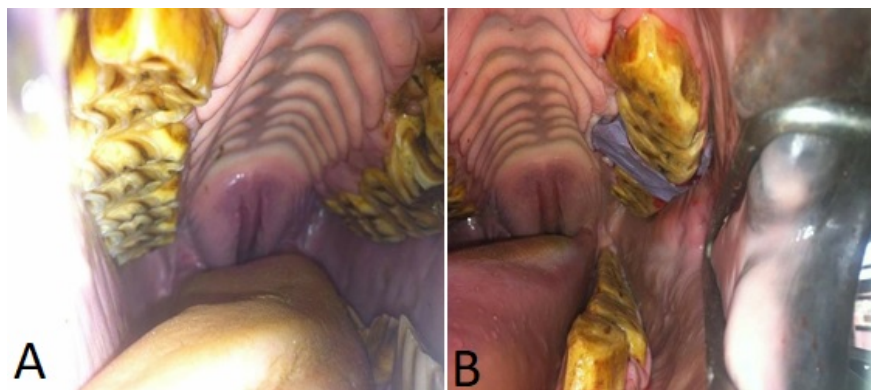
**Figure 5.** A. Appearance of EOTRH before dental care, B. Appearance after dental care.



**Figure 6.** EORTH in incisor teeth numbered 303-401-402-403.



**Figure 6.** A) Caries in tooth number 201 B) Caries in tooth number 106.



**Figure 7.** A) Corrected views of the pointed ends, ramps and wavy appearance. B) Filling the space of the rotated (left) molar tooth number 208 with filling material (aluminum oxide powder) after extraction.

shaking in painful cases. In cases of caries without severe destruction, treatment was provided with filling material (3 cases). In some cases, caries was too advanced to allow restoration (2 cases). In cases with advanced caries, the tooth was extracted.

Bacteria were not isolated in 34 (63%) of 54 horses from which swabs were taken, while bacteria were isolated in 20 (37%) of the remaining horses. Among the isolated bacterial species; 10% *Bacteriodes* spp.(2 horses), 10% *Fusabacterium* spp.(2 horses), 50% *Streptococcus* spp.(10 horses), 15% *Bacillus* spp.(3 horses) and 15% *Corynebacterium* spp.(3 horses) were grown.

The treatment protocol was determined based on the mobility of the tooth in horses with mobile tooth cases identified during the examinations. Stage 1 mobile teeth were generally observed in 8 horses used in the study, aged between 14 and 25 years. It was observed that the sharp-edged teeth affected the gingiva, resulting in abrasion of the soft tissues of the mouth. In horses with stage 2 mobile teeth, the occlusal surface of the tooth was also affected (4 cases). The presence of premolar stage 3 mobile teeth was detected in 3 horses with periodontal pocket formations up to 3 mm with occlusal abrasion (Figure 7).

## Discussion and Conclusion

Endoscopic and radiological examinations of 300 horses were found to have various dental diseases and disorders. Oral examinations and dental care for these horses were provided using modern techniques and treatment options, resulting in improved nutrition and performance.

In many of the adult horses used in the study, sharp-edged teeth, pointed corners, teeth called steps, and ramps with a wavy appearance were observed. In such teeth, the sharp edges were corrected, the pointed corners were filed to ovalize them, and the tooth took its normal shape. The step and ramp appearance was gradually corrected by filing to allow the horse to eat, and the wavy appearance was minimized. Especially in cases with hook-shaped elongation, teeth numbered 106 and 206 were shortened gradually, and the worn occlusal surfaces of the opposing teeth were corrected. Opposite teeth were followed up for gingivitis and periodontal disease.

Malocclusions, or overgrowth, contribute significantly to the development of periodontal disease. Therefore, they should be identified and addressed as a part of many treatments. Regular care and filing of teeth help eliminate such malocclusions and prevent the development of diseases (Weijs and Dantuma, 1975).

In this study, gingivitis and periodontitis were identified as important pathological diseases affecting horses. Periodontitis was classified according to the periodontium of the tooth and the support of the periodontal ligament. It was also evaluated according to the mobility of the teeth. Teeth should be carefully examined one by one by hand for mobility. This procedure can be performed easily in horses with calm and quiet temperaments, but it is important for the safety of the practitioner to give mild sedation to the horse when there is a feeling of pain (Barone, 1997). The

most basic treatment principle in periodontal disease is early diagnosis, controlling the bacteria is the main goal (Richardson et al., 1995). If the bacteria are controlled, enzyme production can be stopped, thus ensuring the continuity of periodontal support and preventing the accumulation of food around the teeth. Treatment starts with diagnosis and the treatment option may vary depending on the location in the mouth (Muyllé et al., 1998). When the problem is detected in the canine and incisor teeth, it may be possible to treat the disease without tooth extraction by cleaning the teeth and removing food residues trapped between them at regular intervals, depending on the stage of the periodontal disease. However, in cases of gingivitis and periodontitis formed on the cheek teeth, the treatment protocol is determined according to gingivitis, periodontal pocket depth, tooth mobility and pain status. Especially for the treatment of ulcerations with edema and inflammation in the gingiva, oral disinfection with chlorhexidine solution was performed, yielding effective results by spraying the chlorhexidine solution directly onto the affected gingiva and tooth with the aid of a syringe.

Malocclusions, or overgrowth, contribute significantly to the development of periodontal disease. Therefore, they should be identified and addressed as a part of many treatments. Regular care and filing of teeth help eliminate such malocclusions and prevent the development of diseases (Leue, 1941). Therefore, prevention of the disease with early diagnosis should be the main goal in periodontal disease. In all cases, occlusal surfaces were exposed in the first intervention. Gingivas were checked more accurately. Tooth defects were corrected through routine filing, addressing sharp edges, hooks, pointed tips, wavy appearance, steps, and ramps. Jaw movements were balanced by adjusting the opposing teeth in the presence of existing teeth.

In general, two factors contribute to the development of periodontitis. The first of these is periodontal pocket formation and the second is diastema. Both teeth with diastema should be intervened with special diastema files and the space should be carefully widened (Ten Cate, 1998). The prognosis is generally favorable in diastemas, but a disciplined dental cleaning should be performed at regular intervals after the gap is widened. In addition, diastema areas can be resealed with dental sealant, and thus, healing of gingivitis can be accelerated. Surgical and non-surgical treatment methods were tried in patients with periodontal disease. In non-surgical methods, the main goal was oral hygiene and oral disinfection to stop the progression of the disease. Malocclusions and periodontal diseases remain problems that cannot be completely cured, although they have been a focus of equine dentistry for years. For this reason, it is argued that prophylactic treatment is more important than cure. Based on the depth of the periodontal pocket, non-surgical and easier-to-apply oral hygiene and oral disinfection, swabs were taken from the cases before isolation of the causative agent, and after the diagnosis of the source of infection, parenteral and local treatment options were applied with appropriate antibiotic selection.



Advanced periodontitis cases that could be detected with dental probes or revealed endoscopically in detail were surgically intervened. Restorative treatment and extraction of mobile teeth are mostly recommended as surgical treatment (Ramzan et al., 2001). Surgical intervention was performed according to the percentage of gingivitis and periodontal attachment loss. In cases with periodontal disease, it was found that the depth of perioceps increased due to advanced age and lack of dental care for years, and restorative treatment was mostly not possible. Restorative treatment could only be used in two cases due to the lack of sufficient dental instruments and restorative composite materials. However, in two cases, it was observed that it fell off after the chewing movements and grass consumption of the horses.

In cases with gingivitis and periodontal ligament support of more than 50%, extraction was performed as the tooth could not be saved. In these cases, agent identification and by performing antibiograms, periodontitis and infection were prevented from affecting healthy teeth, and it was noted that the horses' feeding activities were regulated. In addition, the risk of infection in tooth extraction and tooth cavities was reduced.

High numbers of streptococci, micrococci, starch hydrolyzers are isolated as normal bacterial flora in the oral cavity of horses. Moderate anaerobic bacteria, villanelle species, and hydrogen sulfide producers are isolated. At low level, lactobacillus, fusabacterium species and coliforms are isolated (Baker, 1979). In our study, bacterial identification was achieved in accordance with the literature. After isolation and identification of the agent, antibiogram tests were performed to determine to which antibiotics the agent was resistant and susceptible. Of the 300 horses used in the study, 59 horses were intervened in terms of dental disorders and dental diseases. Bacteria (*Bacteroides spp.*, *Fusabacterium spp.*, *Streptococcus spp.*, *Bacillus spp.*, and *Corynebacterium spp.*) were isolated from the gums and pockets of 18 of these 59 horses. Although the majority of the patients were elderly, the progression of non-severe periodontal disease was halted with effective antibiotics and oral hygiene.

In cases of dental trauma, the use of sedation and analgesics is necessary to achieve a good result and a detailed examination (Colyer, 1931). Loose, loose or fragmented tooth fragments should be carefully removed from the area. In cases of severe fractures, total tooth extraction is performed, and in less severe fractures, the teeth are treated conservatively. In all cases, careful tetanus prophylaxis and antibiotic treatment should be used. Accordingly, dental cracks were examined radiographically. Total tooth extraction was performed in teeth with high mobility and lost functionality. The bleeding around the teeth with low mobility was stopped and the area around the tooth was cleaned. Antibiotic treatment appropriate for the horse's age group with a tooth fracture and a diet consisting of feeds available in the facilities was applied. It was noted that all of the horses treated in this way regained their dental health.

Pulp stones, also known as calcified dentin, give the impression of a second pulp around the tooth (Huidekoper, 1891). The presence of these calculi causes pulp irrigation or inflammation and thus pulpitis is formed. They damage the pulp layer due to microcirculation. Therefore, they negatively affect dentin production and the production rate, causing tooth weakening and tooth loss, which can lead to caries in the future (Hayward, 1981). Cleaning of these stones is usually neglected by clinicians (Tomeck, 1994). Therefore, tartar formations resembling a pulp layer on the incisors, especially on the canines, were cleaned with a dental curette in all cases during the examination. During cleaning, bleeding occurred in many cases. It was noted that the tartar formation formed inflammation and edema in the gingiva. After removal of tartar formations, i.e. detartarage, the teeth were disinfected with chlorhexidine solution for 3 days. After the use of disinfectant, it was observed that tartar formations completely disappeared, inflammation and edema in the gingiva improved, and feed residues did not accumulate between the gingiva and teeth.

In cases of caries, caries were classified. The grading was decided according to the extent to which the cementum layer, enamel layer and dentin layer were affected. Mobile and painful teeth were extracted under sedation, analgesics and anesthetics. The bleeding was stopped, and antibiotic treatment was administered. Such cases resulted in prophylactic cleaning of the tooth, removal of the affected gingiva, disinfection of the oral cavity and antibiotic treatment to try to save the affected tooth. As in human dentistry, broken teeth and partially decayed teeth can be saved by filling and repairing with light-curing epoxy materials, but these are very costly applications (Hiiemae, 1978). The average age of the horses used in the study was 13.7 years, and since they were mostly older horses, positive results could not be obtained, especially in terms of odontoclastic tooth resorption and hypersementosis. In these horses, tooth root lysis due to odontoclastic tooth resorption and related dental caries resulted in the total extraction of teeth.

As in periodontal disease, it causes the formation of drainage canals and ulcers in the gingiva and therefore chewing movements become painful and limited (Weijs, 1975). Definitive diagnosis of EOTRH is possible with radiography. The disease is recognized when resorption, fracture or hypersementosis is observed in the tooth roots (Bonin, 2001). As a treatment, the affected teeth are extracted; however, after tooth extraction, it is essential to check whether any remaining fragments are present using radiography (Leue, 1941). In our study, EOTRH cases were observed in very old stallions. General oral care and dental cleaning were performed. There was a serious difficulty in eating feed in EOTRH. It was detected that the biting resistance was very weakened and the horses in this condition could not pluck soft dry grass. The affected teeth were extracted in cases where EOTRH was detected in the study. In some cases of advanced age, adequate intervention could not be performed because the number of affected teeth was high and multiple extractions were required. However, in general, tooth extraction and radiographic

examination were performed in cases where EOTRH was detected.

Extraction is generally recommended for wolf teeth and canine teeth that have not erupted completely and are found to be embedded under the mucosa (Richardson et al., 1994). The rudimentary wolf teeth embedded under the mucosa (wolf teeth numbered 105 and 205) were removed by applying sedation Domosedan (Detomidine HCL, 0.01 mg/kg) and injecting the local anesthetic agent directly into the mucosa where these teeth were located.

In conclusion, routine oral and dental care of horses at intervals of 6 months or 1 year at the latest would be beneficial in preventing dental disorders and, thus, dental diseases. It was concluded that the use of antibiotics based on bacterial identification and antibiogram testing can successfully treat many dental diseases.

### Conflict of Interest

The authors stated that they did not have any real, potential or perceived conflict of interest.

### Ethical Approval

This study was approved by the Erciyes University Animal Experiments Local Ethics Committee (11.01.2021, 12/03 Number Ethics Committee Decision). In addition, the authors declared that Research and Publication Ethical rules were followed.

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