

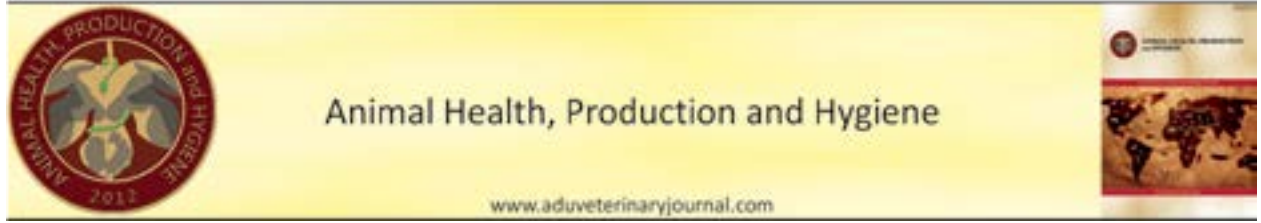
## PAPER DETAILS

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Review

## A Review on The History of Veterinary Dentistry

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### ABSTRACT

Bone and tooth infections have come across in dinosaur fossils from Mesozoic times. In the following period, tooth decays in small triple hoofed horses of the Eocene period have known definitely. The treatments that started empirically developed towards scientific methods over time and the development of veterinary dentistry was parallel to other veterinary practices.

Most of the methods and developments used in today's veterinary practice come across advanced over the centuries as basic ideas and techniques. In this review, the progress in veterinary dentistry was outlined.

*Keywords: Animal dentistry, History of veterinary dentistry, History of veterinary medicine, Veterinary dental surgery, Veterinary dentistry*

## Veteriner Diş Hekimliği Tarihi Üzerine Bir Derleme

### ÖZET

Mesozoic zamana ait dinozor fosillerinde kemik ve diş enfeksiyonlarına rastlanmaktadır. İzleyen dönemde Eosen devrinin üç tırnaklı küçük atlarında diş çürükleri kesin olarak bilinmektedir. Ampirikçe başlayan tedaviler zamanla bilimsel metotlara doğru gelişmeye başlamış ve veteriner diş hekimliği gelişimi diğer veteriner hekimliği pratiklerine paralellik göstermiştir.

Bugünkü veteriner hekimliği uygulamalarında kullanılan yöntemlerin ve gelişmelerin birçoğu temel fikirler ve teknikler olarak yüzyılların boyunca gelişmiştir. Bu derlemede veteriner diş hekimliğinin gelişimi ana hatları belirtilmiştir.

*Anahtar kelimeler: Hayvan diş hekimliği, Veteriner diş cerrahisi, Veteriner diş hekimliği, Veteriner diş hekimliği tarihi, Veteriner hekimliği tarihi*

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## Introduction

It is known that dentistry has been intertwined with other medicine fields throughout the ages. While medicine was developing, the means of administration developed in parallel with this.

Medical historians admit that prehistoric medicine substantially uses instincts at the beginning and thereafter has a magical qualification. As we go into the depths of history, it is seen that the medical tools, which Prehistoric people are likely to use, are usually simple tools made of flint (Anon, 2003a).

In the findings of the first humans and animals, there were too many diseases, like dental caries, deformities due to rheumatism, bone tuberculosis or even similar to Syphilis. Similarly, bone and tooth infections are found in dinosaur fossils belonging to the Mesozoic period. The presence of dental caries and jaw inflammation in small three-hoof horses of the Eocene period also known. In the fossils of these horses, cracks and fractures in the jawbone have been encountered due to inflammation (Dunlop and Williams, 1996; Erk, 1966; Smithcors, 1957).

Here, it was determined that the microorganism that causes tooth decay first causes inflammation and then fractures and dislocations in the jawbone in Eocene Period (Dunlop and Williams, 1996) (Figure 1).

the dental systems of different animals are compared. In this description, there is a simple and faultless different type of classification of teeth according to their functions (Anon, 2002).

In the following period, Columella, one of the most well known authors in the field of agriculture and veterinary medicine in Rome, mentions the age determination of horses by teeth in his work in AD 55. The veterinarian Chiron, who lived in Byzantium in the 4<sup>th</sup> century AD, has mentioned about the teeth and jaw fractures in the 6th chapter of his book (Erk, 1966).

In the later periods (6th century AD), in "Geoponica", which contains the writings of famous physicians of the period, from the age determination with teeth was correctly mentioned. (Beckh, 1895; Dunlop and Williams, 1996).

When the time comes to the period of Islamic Civilization, Ibn Ahi Hizam, one of the famous veterinarians of the 9th century, defines "the determination of the teeth" and "the function of teeth" in the first chapter of "Book al-Hayl val-Baytara". Definition made as follows:

*"Five days after the foal is born, two front teeth appear in the lower jaw, followed by two teeth in the upper jaw. These are called "Shaya". At two months of age, two more teeth appear at the top and bottom. These are called "Rubaiyat". When Foals are 8-9 months old, they have 12 teeth. The last four teeth are called "Kavarih". It is mentioned that in the book,*



Figure 1. Fracture and dislocation of the jawbone caused by tooth decay (Dunlop and Williams, 1996).

## The Emergence and Development of Veterinary Dentistry

In the development of the treatment, people started to observe the disease first on themselves, then on the animals they add into their daily lives by domesticating. Since it was impossible to find a logical cause for illnesses at that time, it was normal to think of supernatural forces as in other natural phenomena. Empirically started treatments developed towards scientific methods in time (Barbee, 1961; Dunlop and Williams, 1996; Smithcors, 1957).

### Veterinary Dentistry in Ancient Times

They attached much importance to horse breeding and managing in Ancient Greece. The most important of the works on this subject is the book named "The Choice of Horses" written by Simon the Athenian and emphasizes the need for strong teeth in horse selection (430 BC) (Erk, 1966).

However, in this Ancient Greek scientific period, Aristotle (384-322 BC) founded natural history and comparative anatomy. A part of his book "Other Chapters of Animals" is devoted to the study of teeth, and in a book called "History of Animals",

horses use their front teeth to eat grass, and they eat barley with their molars". In this chapter, incomplete but accurate information is given about horses' teeth. Hizam says, "If there is an inflammation in the mouth due to the bridle, medicine, which is made with alcea (althaea pallida), is applied, and it is removed when outnumbering teeth are found" in chapter 9 of his book. Moreover, he mentions gingivitis and some oral and dental diseases in the 33rd episode (Erk, 1959; Erk, 1962; Erk, 1966).

In the third chapter of his most important work "Book Fadl al-Hayl" (the virtue of horses), Abd Al-Mûmin Al-Dimyâtî (1217-1306), who is another writer of Islamic civilization, mentions about that when choosing horses, their teeth were carefully looked after. Ibn Hudail, who lived in Spain in the second half of the 14th century, in the fourth part of his work titled "Hilyat al-Fursân va Şiar al-Şucan", names of various locations of horses including the teeth and in the fifth part, he mentions the qualifications that should be sought in these parts (Erk, 1962).

In the 14th century, Abu Bakr Ibn Bedr Al-Din Ibn Al-Mundhir Al-

Baytar expound the determination of age in horses by looking at teeth in the first article of his book Naserî. In addition, in the first part of the fourth article, he explains oral diseases, which are one deformity and defects of horses, and in the second part of the same article, inflammation of the gums and oral diseases (Erk, 1959). In the same period, in the middle of the 14th century, the horse physician performing the oral and dental treatment of a horse with his assistant was portrayed in the first book, of Juan Alvares de Salamiellas named (a Spanish general) "Libro de Menescalca de Albeiteria et Fisica de las Bestias" that wrote in dedication to Al-Baytar in Spain (Dunlop and Williams, 1996) (Figure 2 and 3).



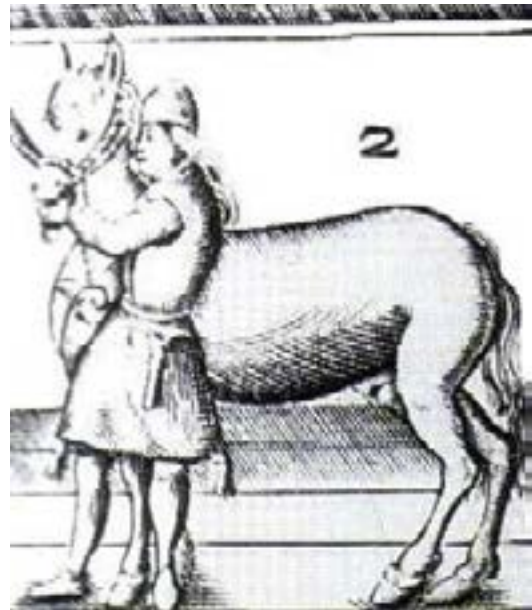
**Figure 2.** The horse doctor curing the horse's mouth with his assistant (Dunlop and Williams, 1996).



**Figure 3.** The horse doctor is doing the dental treatment of the horse (Dunlop and Williams, 1996).

In Gervase Markham's book published in 1644 under the name of "Markham's Maister - Peece", he described some applications in horses with pictures and also, illustrates the opening and fixing of a horse's mouth with "yavaşa", which

is a pincer made of wood or rope and attached to the lips of the horny and grumpy horses to bring them the road, for examination (Figure 4) and surgical intervention on teeth (Dunlop and Williams, 1996) (Figure 5).



**Figure 4.** Opening the horse's mouth in Markham's book (Dunlop and Williams, 1996).



**Figure 5.** Surgical intervention on horse's teeth in Markham's book (Dunlop and Williams, 1996).

In a painting made in Farrier's workshop in 1648 by the painter Paulus Potter (1625-1654), who has many drawings of animal husbandry, a veterinarian, wearing a red leather apron and taking care of the horse, and his control of teeth on the mouth of a horse under "zapt-î râpt", which is meaning of immobilizing an animal by holding or tying it up, was shown in front of the blacksmith (Flemish, 1648). Dunlop and Williams (1996), regarding this picture; "in the 17th century stated that made painting was an ordinary situation in the Netherlands but it shows the subjects applied in real life" (Figure 6).





Figure 6. Table of the veterinarian's oral and dental examination done by Paulus Potter in 1648 (Dunlop and Williams, 1996).

#### **Veterinary Dentistry at the Beginning of the Modern Age**

Anton van Leeuwenhoek discovered microorganisms in teeth and their tubular structures using a microscope in 1683 (Uzel, 1984). That's the major lines of today's veterinary medicine also were drawn in the 19th and 20th centuries (Erk, 1966). And in the diagnosis of other diseases, some developments such as penicillin, quinine, the use of X-Ray for diagnostic purposes and clinical instruments have been the pioneers of some similar diagnostic methods that will come after it in the diagnosis of dental diseases (Erk, 1966; Smithcors, 1957) (Figure 7).



Figure 7. Some clinical instruments in veterinary dentistry (Erk, 1966; Smithcors, 1957).

Veterinary dentistry will develop as a sub-component of

veterinary surgery with the book "Outlines of Veterinary Medicine and Carnivor Pathology" written by Delabere Blain in 1832 (Barbee, 1961).

Meanwhile, in 1799, Sir Humphry Davy (1778-1829) suggested that nitrogen monoxide (gas that makes laugh) could be used in medical operations. Although it was also used in dentistry for a short time but was unsuccessful. William Morton (1819-1868), who worked at Boston Hospital where these unsuccessful trials were made, was advised to try ether. Later, ether was used

in tooth extraction in 1846. With the discovery of anesthesia in the 19<sup>th</sup> century, important steps were taken in veterinary surgery. This development in human medicine has also made positive developments in veterinary medicine and has also been reflected in veterinary dentistry (Erk, 1966; Smithcors, 1957).

#### **Development and Status of Veterinary Dentistry in the 20th Century**

In the following periods, Dr. Lous A. Merillat published his book *Animal Dentistry and Oral Diseases* in 1908, the first part of which was entirely devoted to veterinary practices and animal dentistry (Merillat, 1908). Dr. Merillat defended the following hypothesis regarding the future of dentistry and veterinary medicine (Merillat, 1908):

*"Although it does seem that there is no future for animal treatment in animal dentistry, it is much more accepted than is generally thought and dental operations are performed skillfully by veterinarians in veterinary dentistry as in other serious branches of surgery... The limited availability of patients, likely averted the development of animal dentistry within veterinary profession. Firstly the veterinarian, for this reason, needs the impeccability required in the practice of this art."*

Merillat (1908) has compartmentalized the teeth anatomically as follows; tooth crown (head), neck, long section (molar or tooth body), and root. The terminology of Veterinary surgery has been updated with these first observations and opinions. Afterward, he has defined the teeth lost by falling out, the eruption of new ones, and the temporary teeth of dogs (milk teeth), but although not all of his thoughts about the loss of teeth and tooth eruption are true, his early writings have been effective for being recognized the importance of carnivores dental diseases.

Later, in 1925 Hobday (1925) in his book "Surgical Diseases of Dogs and Cats", described the teeth, the oral cavity, the health status of the mouth, the infection in the sinuses of carnivora, and the condition that is known as canine tooth abscess or upper 4th premolar tooth abscess (Figure 8).

Hobday (1925) states that the treatment involves the removal

of deposits, such as dental plaque or tartar from the enamel surface of the teeth. Also defined treatment as; “the instrument used to clean teeth, usually when the patient is awake and his mouth is closed, is applied under or close to the gum and scraped toward the body of the tooth; some teeth should be extracted as for part of the treatment of this disease”.

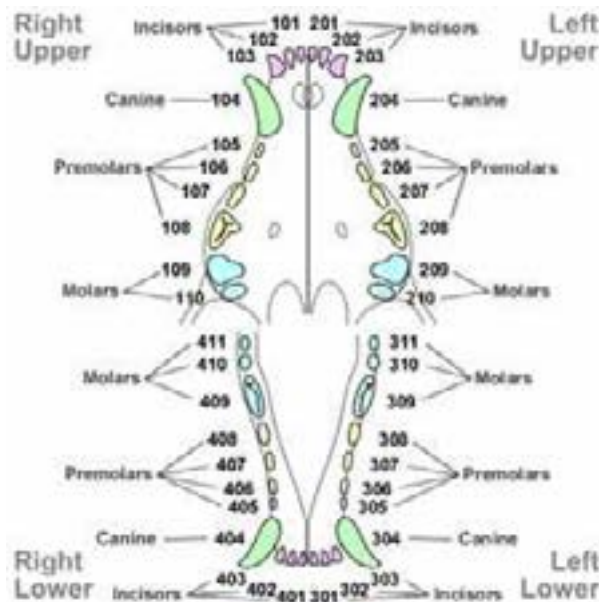


Figure 8. Jaw and tooth structure in the dog (Hobday, 1925).

Garbutt (1938), in 1938, made a theoretical definition of the condition of the teeth, formal structures, the oral cavity and dental cleaning programming according to the procedure, and dental prophylaxis in veterinary practices. He pointed to the prevention of dental plaque by brushing with salt tablet and pumice stone solutions. When he cleaned a large amount of plaque on the teeth under general anesthesia, was cleaning it along with the sick place (tissue).

Garbutt has suggested that pet owners bring the animals to the veterinarian twice a year for dental protection and treatment. This proposals, also can be named as dental prophylaxis, was the prevention, from plaque and tartar accumulation that caused tooth loss, by brushing the teeth under the supervision of a veterinarian in a veterinary clinic, cleaning and polishing with basic control with appropriate to the method (Garbut, 1938).

Garbutt (1938), again, discussed tooth loss (drop out) in dogs and suggested that he identified 42 permanent teeth-like temporary (milk) teeth, along with those outside other than temporary large molar teeth. Permanent tooth falling out problem was defined as irregularity of teeth before falling out. If temporary teeth, namely milk teeth, fall out or pull out before permanent teeth come out, it would give permanent teeth the chance to grow properly and form a regular row. However, if temporary teeth remained in the mouth, permanent teeth could erupt incorrectly. One report recommended in the treatment of this disease called malocclusion was the early separation of temporary teeth from the mouth, extirpation in mandatory situations and in the first stages of the disease (Garbut, 1938).

This practice, which has become increasingly sought after among dog breeders in recent years, is known as interceptive orthodontics. Veterinary dentistry has developed more rapidly inside of surgery, especially in the last two decades. While

it continues as a sub-branch of surgical in Turkey, in some countries it is a separate branch. In some countries such as America, it has become schools that provide veterinary dentistry education under the name of Veterinary Dental College (Hale, 2003; Anon, 2003b; Anon, 2004; Anon, 2005; Wilwerding, 2001).

The development of veterinary dentistry and oral surgery shows parallelism to the development of other medical branches and veterinary practices. Many of the methods and developments used in today's veterinary practice have been shaped over centuries of duration, as basic ideas and techniques (Douglas, 1993).

## Discussion, Conclusion and Inference

How did veterinary dentistry originate and develop? The answer to this question can be given accurately for the last few hundred years, and the information for previous periods is based on assumptions. As in all branches of medicine, historical examples of the development of veterinary medicine abound, and similar examples abound abundantly for veterinary dentistry, too.

As it is known, technological inventions have contributed greatly to the development of dentistry.

In other words, dentistry is one of the leading fields of medicine where technology is reflected in medicine. The necessity and benefits of knowing the histories of other fields and branches of medicine are also valid for veterinary dentistry. It is possible to explain this with the following quote that explains the benefits of knowing the history of human dentistry; “Throughout his career, every dentist experiences a technical and technological evolution. If so, every dentist must acquire this concept (Technology Evolution Concept) so that he can apply continuous innovations in his professional life. This can be achieved by knowing the history of the profession well and understanding that medicine constantly renews itself, too” (Anon, 2003a). “

Besides all these, the age of the history of this veterinary dentistry profession in Turkey and the world is still very young is another reason for why we need to know better.

It can be brought forward that this study will constitute the basis for more detailed studies on the subject.

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