Survey of Common Dental Abnormalities in 483 Horses in the Netherlands

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Take Home Message

In order to detect all the dental abnormalities in the horse's mouth, a thorough examination, using digital palpation, a full-mouth speculum, a dental mirror, and a good light-source is essential. This survey demonstrates that a substantial percentage of the horses examined demonstrated a need for dental treatment.

Introduction

Equine dentistry is an important, but until recently, rather neglected area in equine veterinary practice in the Netherlands. The Netherlands has a population of about 400.000 horses and ponies (Dutch National Horse Sport Federation), and requests for dental work in the horse are growing. The aim of this survey was to investigate the incidence of common dental abnormalities in the population of horses and ponies in the Netherlands.

Materials and Methods

During a period of 10 months, five veterinarians, working in three equine referral hospitals, inspected the oral cavity of 483 anesthetized horses and ponies undergoing surgery, other than dental surgery. After flushing the oral cavity with water, the teeth were inspected using a dental mirror and a light-source. The results were recorded on a standard oral examination form (attached) designed by two equine dental veterinarians. Before the survey was initiated, all the veterinarians involved were trained to identify the dental disorders in a standard manner. During the survey, all investigators met several times to evaluate the results and to discuss the diagnostic criteria. The modified Triadan system was used to identify specific teeth. Data recorded included the age, breed, and gender of the horse, the volume and nature of food intake, and history of any previous dental care.

A list and definition of the dental disorders investigated follows.

Incisor Disorders[3];

Overbite	Upper incisors protrude in front of lower incisors, making no contact with the lower incisors.
Overjet	Upper incisors protrude in front of lower incisors, but upper and lower incisors contact each other.
Underbite	Lower incisors protrude in front of upper incisors, making no contact with the upper incisors.
Underjet	Upper incisors protrude in front of lower incisors, but upper and lower incisors contact each other.
Ventral curvature (smile)	Corner lower incisors are longer than corner upper incisors.
Dorsal curvature (frown)	Corner upper incisors are longer than corner lower incisors.
Offset or diagonal bite	Upper incisors on one side are excessively long, and lower incisors on contra lateral arch are excessively long, causing the occlusal surface of the incisors to be diagonal.

Cheek Tooth Disorders;[3]

Caudal hooks	Portion of dominant lower or upper last cheek teeth overhanging opposing cheek teeth.
Rostral hooks	Portion of dominant lower or upper rostral second premolar overhanging opposing second premolar.
Ramps	Sloping surface in contact with the opposing teeth, can develop on the first upper or lower premolars as on the last upper or lower molars.
Enamel points	Sharp projections that generally form on the buccal side of the upper cheek teeth and the lingual side of the lower cheek teeth.
Sheared molar table	Extreme angulation of chewing surface of cheek teeth.
Wave complexes	Opposing cheek teeth arcades develop an uneven “wavelike” appearance.
Stepped molars	Opposing cheek teeth arcades develop a step-like appearance.
Accentuated transverse occlusal ridges (ATR)	Enlarged ridges positioned transversely across the surface of molars.
Periodontal pockets	Recession and infection of tissue surrounding teeth causing a pocket in which feed can accumulate.
Diastema	Unnatural space that occurs between adjoining teeth
Fractured tooth	Cheek tooth split into two or more parts.
Missing tooth	Congenital or acquired absence of a tooth.
Cemental hypoplasia	Absence of cementum from the central enamel.[1]
Protuberant tooth	Elongated cheek tooth.

Dental disorders and data pertaining to signalment and history were compiled, and analysed using the statistic program, SPSS (= Statistical Product and Service Solutions). Using Cross Tabs with Chi square value and the Fisher exact test for 2*2 tables, significant relationships between particular dental disorders and signalment and history were determined.

Results

The veterinarians of the three equine clinics examined a total of 483 horses and ponies, of which, 152 were mares, 141 were geldings, and 182 were stallions. The sex of 8 horses was not recorded. The breed distribution was: 261 Dutch Warmblood horses; 43 Standardbreds; 36 Friesian horses; 16 Dutch riding ponies; and 127 other breeds. The average age was 5.4 years with a range of 1 to 24 years. Of the total group of horses, 97% received an average of 2.7 kilogram of concentrate each day with a maximum of 9.0 kilogram. For roughage, 60.5% of the horses were fed hay, 32.3% were fed only haylage (high dry matter silage), and 7.2% were fed with a mixture of hay and haylage. The number and percentages of dental disorders found are shown in Tables 1 to 4.

Table 1. Deviation of lateral view of the incisors

Dental abnormality	Number affected/483	Percentage affected/483
Overbite	12	2.5%
Overjet	141	29.2%
Underbite	0	0%
Underjet	15	3.1%
No defect	315	65.2%

Table 2. Deviation of frontal view of the incisors

Dental abnormality	Number affected/483	Percentage affected/483
Smile (i.e., ventral curvature)	45	9.3%
Frown (i.e., dorsal curvature)	5	1.0%
Offset or diagonal bite	8	1.7%
No defect	425	88.0%

Table 3. Abnormalities of the cheek teeth arcades

Dental abnormality	Number affected/483	Percentage affected/483
Sharp enamel points	281	58.3%
Accentuated TRs	102	21.1%
Wave complexes	17	3.5%
Stepped molars	4	0.8%
Sheared molar table	7	1.4%
No defect	72	14.9%

Table 4. Dental abnormalities of individual cheek teeth

Dental abnormality	Number affected/483	Percentage affected/483
Hooks	162	33.5%
Ramps	47	9.7%
Cemental hypoplasia	42	8.7%
Diastemata	34	7.0%
Fractured cheek tooth	21	4.4%
Protuberant tooth	9	1.9%
No defect	168	34.8%

Of the 162 (33.5%) horses with rostral hooks, 25% also had caudal hooks. Twelve percent of horses had only caudal hooks. Of 153 horses with an overbite or overjet, 23% had caudal hooks, whereas only 6% of 315 horses that had no overbite or overjet had one or more caudal hooks ($P < 0{,}001$).

The 483 horses were split into three groups to evaluate the occurrence of cemental hypoplasia: Group 1 was composed of horses 1 to 5 years old; Group 2 was composed of horses 6 to 12 years old; and Group 3 was composed of horses 13 to 24 years old. Horses in Group 3 had the highest incidence of cemental hypoplasia (37.9%) compared to horses in Group 1 (4.9%) and horses in Group 2 (10.4%). This difference between Group 3 and the two other groups was statistically significant ($P<0{,}001$).

Seven percent of horses had diastemata of the cheek teeth. There was no correlation between a specific horse breed and the appearance of diastemata. No significant relation was found between the appearance of a diastemata and the type of roughage the horses were fed. There was also no correlation with the incidence of the diastemata and the age of the inspected horses.

Using the Fisher's exact test, there was no significant difference between the appearances of enamel points and ATR on the same cheek tooth. Mucosal lesions were found in 3% of the 483 horses on the buccal mucosa and less then 1% on the tongue, and they only appeared in horses with sharp enamel points.

Discussion

The investigating clinicians had difficulty accurately identifying some dental disorders, in particular accentuated transverse ridges. The occlusal surfaces of the cheek teeth commonly have a slight "washboard" appearance, but these ridges are usually only 2 to 3 mm in height, measured from their base to their apex[2]. The height of the ridges of the cheek teeth was best evaluated by palpation, because visually assessing height of the ridges in the depth of the oral cavity by sight only was difficult. Similarly, the sharpness of the rostral and caudal hooks and the enamel points was also best determined by palpation. We thought that the incidence of mucosal lesions on the buccal mucosa (i.e., 3%) was surprisingly low, given that 58.3% of horses had sharp enamel points.

The incidence of cemental hypoplasia was significantly higher in Group 3 (i.e., the oldest horses). A maxillary tooth with cemental hypoplasia is more likely to fracture than is a healthy maxillary cheek tooth. Cemental hypoplasia should be diagnosed at an early stage, so that the affected infundibulum can be cleaned and filled to prevent progression of caries and fracture of the tooth.

Feeding haylage instead of hay is popular in the Netherlands, but we found no relation between the appearance of dental abnormalities and differences in diet. A proper dental examination should be a part of any physical examination of a horse because many horses without overt signs of disease have considerable dental abnormalities. New and rediscovered procedures for equilibrating the equine mouth allow horses to masticate more efficiently, carry a bit more comfortably, and to experience improved performance. The horse, the horse owner, and the veterinary profession all benefit from providing complete equine dental care[5].

Conclusion

The most common equine dental abnormalities are sharp enamel points and rostral and caudal hooks. By performing thorough dental examination, the clinician may also detect other dental abnormalities, such as diastemata, periodontal pockets, cemental hypoplasia, cemental caries, and fractured cheek teeth. This examination is best performed with the horse sedated. The investigator should use a full-mouth speculum, a dental mirror, and a good light source. Intra-oral endoscopic systems with a camera and monitor may be beneficial. Knowledge of and experience in equine dental work is an advantage and should secure the horses from suffering from dental pain and other health problems caused by dental abnormalities[4].

Acknowledgments

A special thanks to all the people who spent their time making this survey a success. Thanks to Gordon Baker for reviewing this article.

References

1. Baker G.J., Easley J., Equine Dentistry, W.B. Saunders Company Ltd. Reprinted 2003;80.
2. Allen T., Manual of Equine Dentistry, Mosby St. Louis, Missouri 63146, 2003;100.
3. Common Equine Dental Malocclusions, brochure Advanced Equine Dentistry, Johnson T.J., DVM and Porter C.M., DVM, Grass Lake MI 49240, copyright 11/2000.
4. Survey for dental abnormalities in 483 horses in the Netherlands, dissertation, Baukje de Boer, student University of Professional Education for Agriculture, Food Technology, and Environmental and Animal Sciences, Leeuwarden NL 2005, 810924001.
5. Green S.K., Equine Dental Advances, Vet Clin North Am Equine Pract, 2001;17(2); 319-34.

Attach one PROTOCOL 2004 v.2 name of client and date

Survey Dental abnormalities 2004-2005 Jan en Gabrielle Broeze and Julius Peters
In cooperation with the equine clinics;

- o Emmeloord
- o Lienden
- o Bodegraven

HORSE / PONY INDICATION SURGERY DENTAL YES OR NO

AGE:

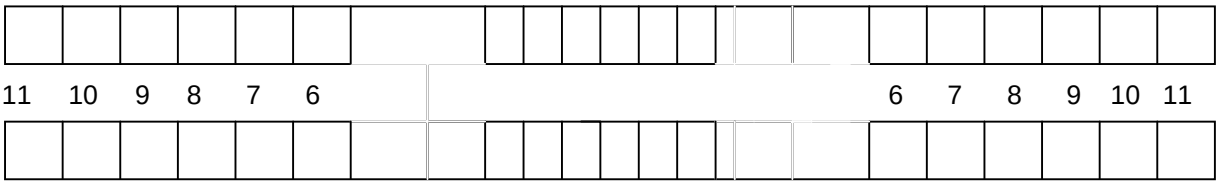
GENDER: MARE / GELDING / STALLION

BREED: DUTCH WARMBLOOD / FREISIAN / STANDARDBRED / OTHER
PONY YES WHICH BREED ……

DENTAL TREATMENT YES OR NO WHEN ……

FEEDING 0 CONCENTRATE YES/NO AMOUNT KILOS …….
0 HAY
0 SILAGE
0 PASTURE YES OR NO HOW MANY HOURS …….

SIDEVIEW DRAWING Smile or frown or diagonal bite
QUADRANT 1 **QUADRANT 2**



QUADRANT 4 **QUADRANT 3**

INCISORS

SIDEVIEW
- OVERBITE
- OVERJET
- UNDERBITE
- UNDERJET

FRONT VIEW
- NORMAL
- SMILE
- FROWN
- DIAGONAL UPPERLEFT (Q1) TO RIGHT UNDER (Q3)
- DIAGONAL UPPERRIGHT (Q2) TO LEFT UNDER (Q4)

MOLARS

O ATR	QUADRANT 1 / 2 / 3 / 4	
O STEPPED MOLARS	QUADRANT 1 / 2 / 3 / 4	
O WAVE COMPLEXES	QUADRANT 1 / 2 / 3 / 4	
O ENAMEL POINTS	QUADRANT 1 / 2 / 3 / 4	FEW OR A LOT
O SHEARED TABLE	QUADRANT 1 / 2 / 3 / 4	YES OR NO
O LESIONS BUCCAL	QUADRANT 1 / 2 / 3 / 4	YES OR NO
O LESIONS LINGUAL	QUADRANT 1 / 2 / 3 / 4	YES OR NO

ABNORMALITIES SINGLE ELEMENTS

101		201		301		401		
102		202		302		402		
103		203		303		403		
104		204		304		404		
105		205		305		405		
106		206		306		406		
107		207		307		407		
108		208		308		408		
109		209		309		409		
110		210		310		410		
111		211		311		411		

1 = FISSURE
2 = FRACTURE
3 = HOOKS
4 = PROTUBERANT
5 = RAMP
6 = MISSING ELEMENT
7 = DECIDUOUS ELEMENT
8 = DIASTEMA
9 = PERIDONTAL POCKET
10 = CEMENTAL HYPOPLASIA

DIAMETER OF CEMENTAL HYPOPLASIA