

**The Effect of Equine Tooth Morphology on
Feed Digestibility and TMJ Cytokine Profiles
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**The EFFECT OF DENTAL FLOATING ON WEIGHT GAIN, FEED DIGESTIBILITY, FECAL
PARTICLE SIZE AND BODY CONDITION SCORE IN PREGNANT MARES**

Objective- To investigate the effect of number of dental lesions and routine teeth floating (rasping) on weight gain.

Design- A prospective, randomized, controlled, blinded trial.

Animals or Sample population- Fifty-six pregnant mares.

Procedure- Mares were randomly allocated into one of 4 feeding groups (n=14) which were then randomly sub-divided into one of two treatment groups, floated and control animals (n=7). All horses were sedated and an oral examination performed after which dental floating was performed in floated horses. Body weight and condition score were recorded prior to and repeatedly over the next 24 weeks. Feed digestibilities and fecal particle size studies were also undertaken during weeks 7 and 19 of the study.

Results- Within feed groups, there was no significant difference in weight gain, body condition score, feed digestibility or fecal particle size between treated and control animals. Floated horses drank more water and retained more water than non-floated controls. Weight gain was significantly associated with feed group.

Conclusions & Clinical Relevance- Routine dental floating of healthy, pregnant mares did not result in significant short-term changes in body weight, body condition score, feed digestibility or fecal particle size. Further studies are necessary to determine the utility of regular teeth floating of apparently healthy horses.

**Assessing THE EFFECT OF DENTAL FLOATING ON ROSTRO-CAUDAL MOVEMENT OF THE
MANDIBLE**

Objective—To evaluate the effect of dental floating on the position of the mandible relative to the maxilla (a measure of rostrocaudal mobility (RCM) of the mandible) during extension and flexion of the head of horses.

Design—Randomized controlled masked trial.

Animals—59 horses housed in 1 barn.

Procedure—Horses were formally randomized into a treatment (n = 33) or control (26) group. All horses were sedated and the distance between rostral portions of the upper and lower incisor arcades were determined with the head fully extended and flexed at the poll (the difference in measurements represented the RCM of the mandible). The oral cavity was examined. For the treatment group, dental floating was performed and the incisor arcade measurements were repeated.

Results—Dental correction resulted in a significant increase in RCM of the mandible in 31 of 33 horses. The mobility was greater in heavy horses than that detected in other breed classifications. Age and number of dental lesions did not significantly affect mobility before or after dental floating.

Conclusions and Clinical Relevance—Dental floating increases RCM of the mandible. Measurement of this variable is not an indicator of the number or extent of dental lesions; no specific dental abnormality appears to significantly affect RCM of the mandible in horses. In horses, measurement of RCM of the mandible can be used as a guide to determine whether dental correction is necessary; after dental floating, it can be used to ensure that irregularities of the occlusal surface have been corrected.

THE EFFECT OF ROSTRO-CAUDAL MOTION ON FEED DIGESTIBILITY AND FECAL PARTICLE SIZE

Objective—To evaluate the effect of rostrocaudal mobility (RCM) of the mandible during extension and flexion of the head of horses on feed digestibility and fecal particle size.

Design—Randomized controlled blinded trial.

Animals—40 horses housed in 1 barn.

Procedure—Horses were formally randomized into a treatment or control group. All horses were sedated and the distance between rostral portions of the upper and lower incisor arcades (RCM) were determined. Horses were weighted on a routine basis. Fecal samples were collected on two occasions and feed analysis was performed on ingested feed and fecal samples to determine digestibility. Particle size analysis was performed on dried fecal samples.

Results—RCM did not affect feed digestibility, weight gain or fecal particle size. There was no breed effect in this study. Age and number of dental lesions did not significantly affect mandibular mobility.

Conclusions and Clinical Relevance—RCM of the mandible did not affect feed digestibility, weight gain or fecal particle size. This data in addition to other recent studies published in the field appears to contradict traditional thoughts on the role of dental abnormalities in equine nutrition. The simple assumption that dental problems are the cause of weight loss until proven otherwise, or that pelvic flexure impactions are the result of poor teeth needs to be re-evaluated.

OBSERVATIONS OF THE CHEEK TOOTH OCCLUSAL ANGLE IN THE HORSE

Objective- To report on a simplified technique for molar angle determination in the horse.

Design- Prospective observational study

Animals- 230 mandibular cheek teeth from 21 horses

Procedure- Lateral mandibular displacement to 1cm beyond the point of incisor separation was performed. A digital photograph was taken which was subsequently processed by annotating it

with four (4) lines from various places on the mandibular incisor arcade to that of the maxillary arcade. Occlusal angles of mandibular teeth were calculated by using one side of a 1" (2.5cm) stiffened hinge was placed on the lingual vertical surface of tooth 306. Linear regression analysis was used to determine whether a statistically significant relationship between incisor separation angle and true cheek tooth occlusal angle existed.

Results- Mean horse age was 9.7 years. Mean tooth age was 7.5 years with a mean angle of 10.2 degrees. Tooth angle did not increase with tooth age. Occlusal angle was not affected by position of the tooth within the mandibular arcade. Figure lines a, b and c of the left arcade could all be used to predict mean OA of that arcade as well as overall mean OA (mean of both arcades), however Line c gave the most consistent result.

Conclusions and Clinical Relevance- Cheek tooth occlusal angle can be determined by using the incisor separation angle method but that the dental lines used are different from those currently published.

THE EFFECT OF CHEEK TOOTH ANGLE AND MOLAR OCCLUSION ON FEED DIGESTIBILITY AND FECAL PARTICLE SIZE

Objective- To investigate the effect of cheek tooth occlusal angle on feed digestibility, water balance and fecal particle size.

Design- An observational study

Animals or Sample Population- Forty pregnant mares housed in a single barn.

Procedure- The horses were randomly allocated into one of 5 feeding groups (n=8). All horses were sedated and cheek tooth occlusal angle was measured by two different methods and an oral examination was performed. Body weight was recorded one day before and at four weekly intervals after examination for a total of 24 weeks. Feed digestibilities, water balance and fecal particle sizes were undertaken during weeks 7 and 19 of the study.

Results- 37 horses were available for final data analysis. There was no relationship between cheek tooth occlusal angle and either weight gain, feed digestibility, water balance or fecal particle size. The number of dental lesions did not affect feed digestibility. Horse age was not related to occlusal angle.

Conclusions and Clinical Relevance- Cheek tooth occlusal angle was not significantly related to any of the outcome variables measured in this study. A potential inter-relationship between cheek tooth occlusal angle and molar surface area needs further study as does the interaction between molar surface area and feed digestibility.

THE EFFECT OF ENAMEL RIDGE PERIMETER DISTANCE AND CHEEK TOOTH SURFACE AREA ON FEED DIGESTIBILITY AND FECAL PARTICLE SIZE.

Objective- To examine the effect of enamel ridge perimeter distance and cheek tooth surface area, amongst other measurements, on subsequent feed digestibility and fecal particle size in the horse.

Design- A prospective, observational study

Animals or Sample Population- Twenty horses (including Quarter horses, Persheron, Clydedales and an Arabian horse). Horses ranged in age from 2 to 30 years.

Procedure- The same free choice hay was fed to each horse for a minimum of 14 days. Horses were euthanased and two-liter gastrointestinal samples were collected from stomach, ileum, pelvic flexure and small colon/rectum. Digital photographs were taken of the mandibular and

maxillary arcades. Several computer based graphics programs were used to process the images and return data concerning various anatomical features of the teeth. Feed and ingesta samples were processed for feed digestibility and fecal particle size.

Results- To be determined

Conclusions and Clinical Relevance- To be determined

THE EFFECT OF AGE ON ENAMEL RIDGE PERIMETER DISTANCE AND CHEEK TOOTH SURFACE AREA

Objective- To attempt to develop a new method of ageing horses by their teeth

Design- A prospective observational study

Animals or Sample Population- Twenty horses of known age

Procedure- Horses of known age as determined by breeding or pedigree records were euthanased for reasons other than dental disease. Digital photographs were taken of the mandibular and maxillary arcades. Several computer based graphics programs were used to process the images and return data concerning various anatomical features of the teeth. Three experienced equine clinicians with a profound interest in dentistry were asked to evaluate the anatomical specimens and deliver an age based on incisor morphology, the most common method of age determination in the horse. A kappa statistic was used to investigate the inter-observer variation in age determination. There was no statistical difference between these age determinations and a mean age was recorded. A computer model was developed to calculate age based on molar morphology and the results of this were compared to the results of clinician ageing.

Results- To be determined

Conclusions and Clinical Relevance- To be determined

THE EFFECT OF INCISOR AND CHEEK TOOTH PATHOLOGY (INCLUDING MORPHOLOGICAL CHARACTERISTICS) ON TEMPOROMANDIBULAR JOINT CYTOKINE PROFILES

Objective- To determine whether incisor or cheek-tooth pathology in addition to normal cheek tooth morphological characteristics influence the intra-articular environment of the equine temporomandibular joint

Design- A prospective observational study

Animals or Sample Population- Twenty horses of various age and breed

Procedure- Horses free of dental correction were euthanased for reasons unconnected with the study. None of the animals had received non-steroidal anti-inflammatory medication prior to euthanasia. Immediately post mortem an arthrocentesis of the dorsal pouch of both temporomandibular joints was performed. Samples were spun and stored prior to assay. Biological assays were performed to determine the concentration of IL-1, IL-6, IL-8, TNF α , and TGF β 1,2,3. Eight horses (aged 2 years) were defined as a normal population and the remaining horses (of various age) were compared to this population.

Results- To be determined

Conclusions and Clinical Relevance- To be determined