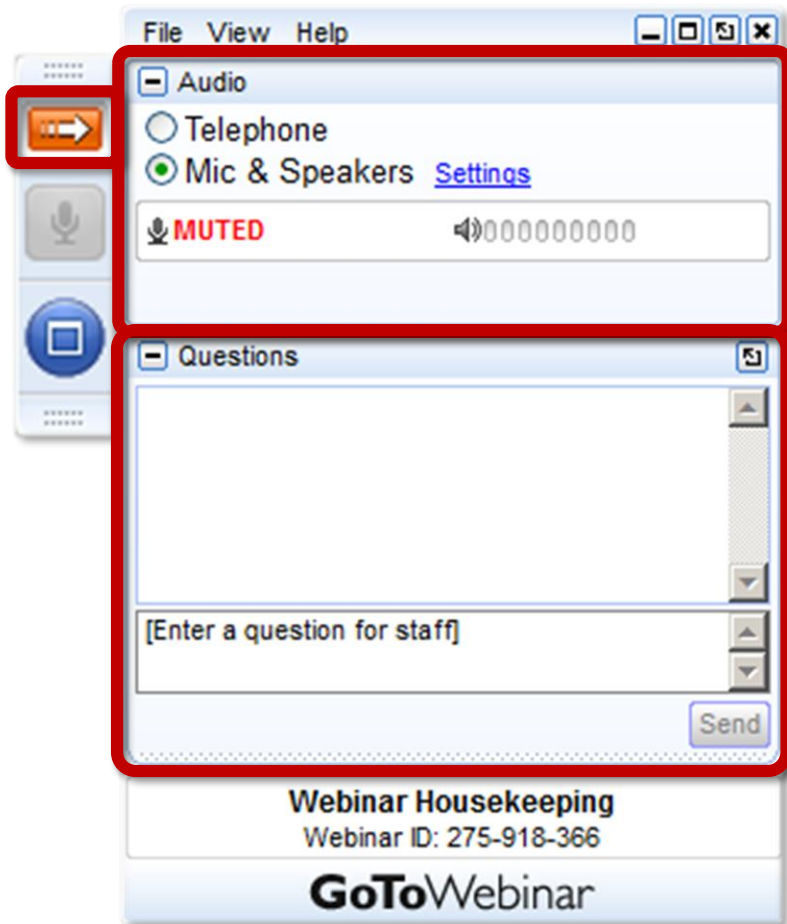




How to Decrease your Horse's Risk of Colic with Nutrition Management



“Nutrition is the key to success”



Your Participation

Open and close your control panel

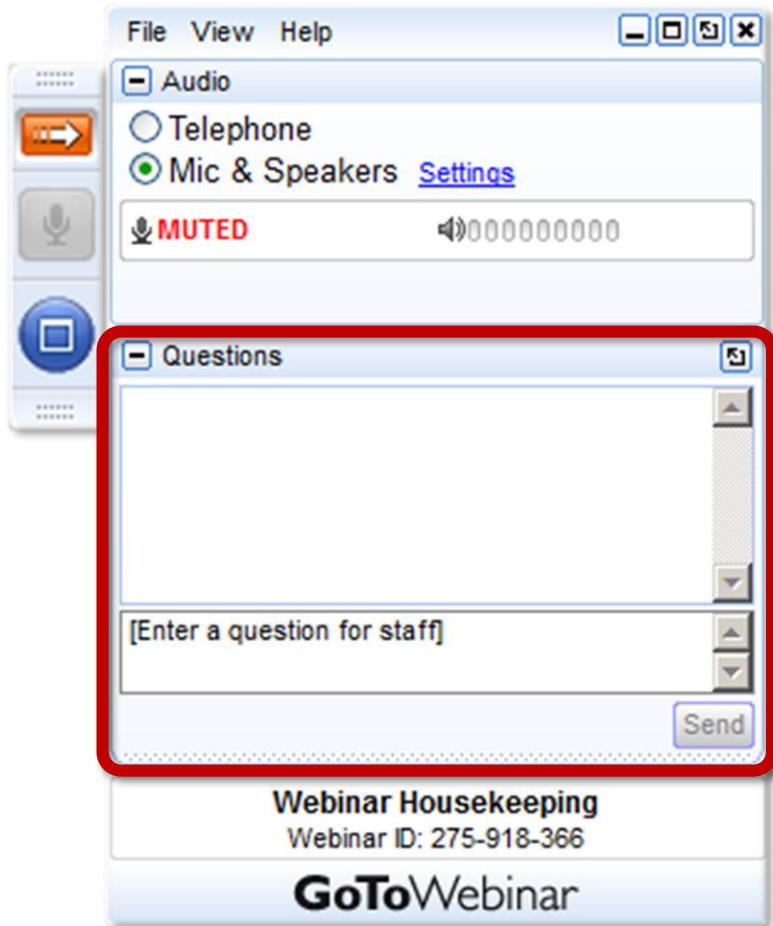
Join audio:

- Choose **Mic & Speakers** to use VoIP
- Choose **Telephone** and dial using the information provided

Submit questions and comments via the Questions panel

Note: Today's presentation is being recorded and will be provided within 48 hours.

“Nutrition is the key to success”



Your Participation

- Please continue to submit your text questions and comments using the Questions panel

For more information, please contact kstarr@standleeforage.com.

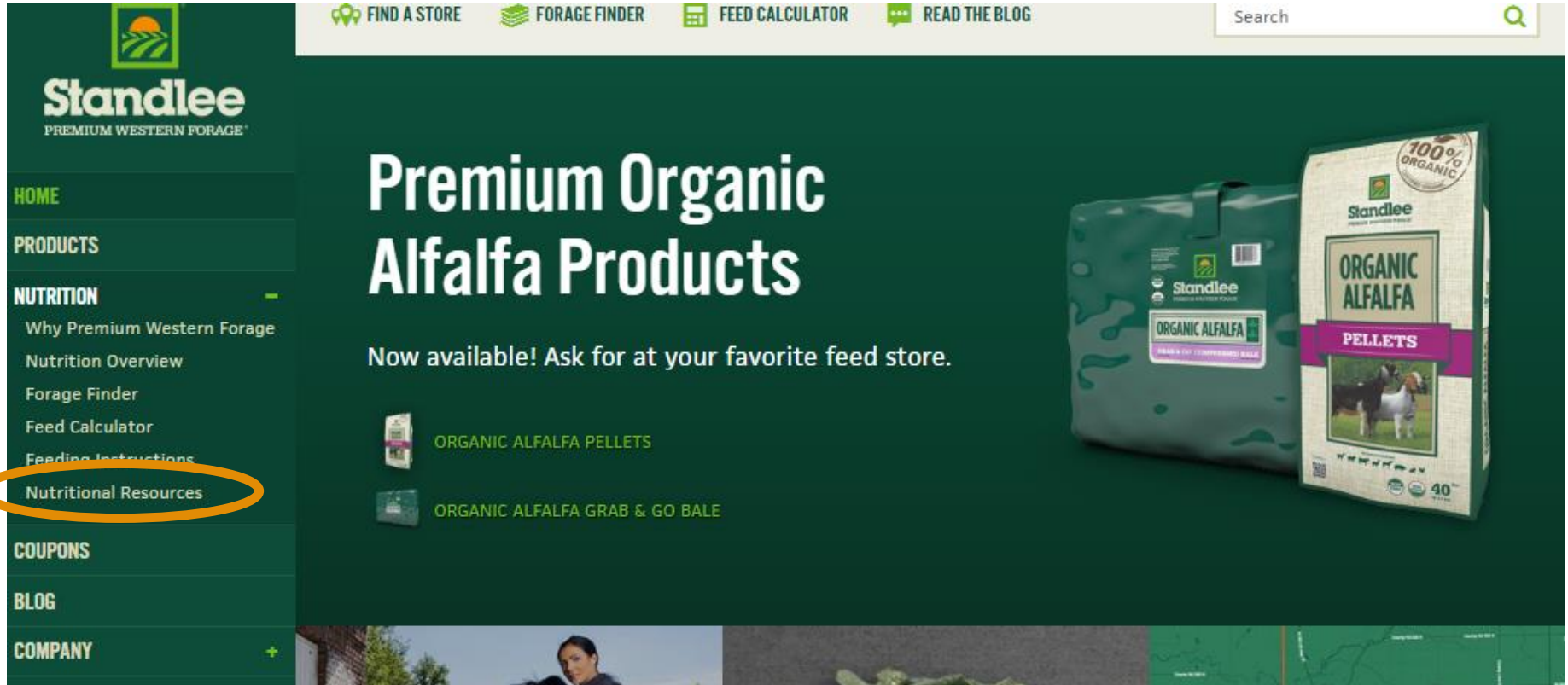
Note: Today's presentation is being recorded and will be provided within 48 hours.

NUTRITIONAL RESOURCES



“Nutrition is the key to success”

standleeforage.com



The screenshot shows the Standlee website interface. The top navigation bar includes links for 'FIND A STORE', 'FORAGE FINDER', 'FEED CALCULATOR', and 'READ THE BLOG', along with a search bar. The main header features the Standlee logo and the text 'PREMIUM WESTERN FORAGE'. The central content area is titled 'Premium Organic Alfalfa Products' and includes the text 'Now available! Ask for at your favorite feed store.' Below this, two product images are shown: 'ORGANIC ALFALFA PELLETS' and 'ORGANIC ALFALFA GRAB & GO BALE'. On the left, a vertical navigation menu lists 'HOME', 'PRODUCTS', 'NUTRITION', 'COUPONS', 'BLOG', and 'COMPANY'. Under the 'NUTRITION' section, the following items are listed: 'Why Premium Western Forage', 'Nutrition Overview', 'Forage Finder', 'Feed Calculator', 'Feeding Instructions', and 'Nutritional Resources', which is highlighted with an orange circle.



How To Decrease Your Horse's Risk of Colic With Nutrition Management

How To Decrease Your Horse's Risk of Colic With Nutrition Management



DR. TANIA CUBITT
PERFORMANCE HORSE NUTRITION



OUTLINE

“Nutrition is the key to success”

- Normal Foraging Behavior
- Stress
- Benefits of Forage
- Feeding Management



Normal Foraging Behavior



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PREMIUM WESTERN FORAGE®

EVOLUTION

“Nutrition is the key to success”

NATURAL DIET

- Fiber-based
- Wide variety of forages
- Nibbler – small amounts
- 12-18hrs grazing
- Moving while eating
- Herd
- Eating from ground
 - Natural drainage of the respiratory tract
 - Increases chewing time
 - Prevents muscular tension in the neck & back
 - Maintains teeth alignment



MODERN DIET

- Cereal grain-based
- Rapid intake
- Increased acidity of GI tract
- Frustration due to confinement
- Lack of socialization
- Exercise level
- Fed at chest height or higher



NORMAL GRAZING BEHAVIOR

“Nutrition is the key to success”

- Pasture provides a slow continuous intake of fiber
 - “Trickle Feeding”
 - Digestive system designed for small continuous meals



NORMAL GRAZING BEHAVIOR

“Nutrition is the key to success”

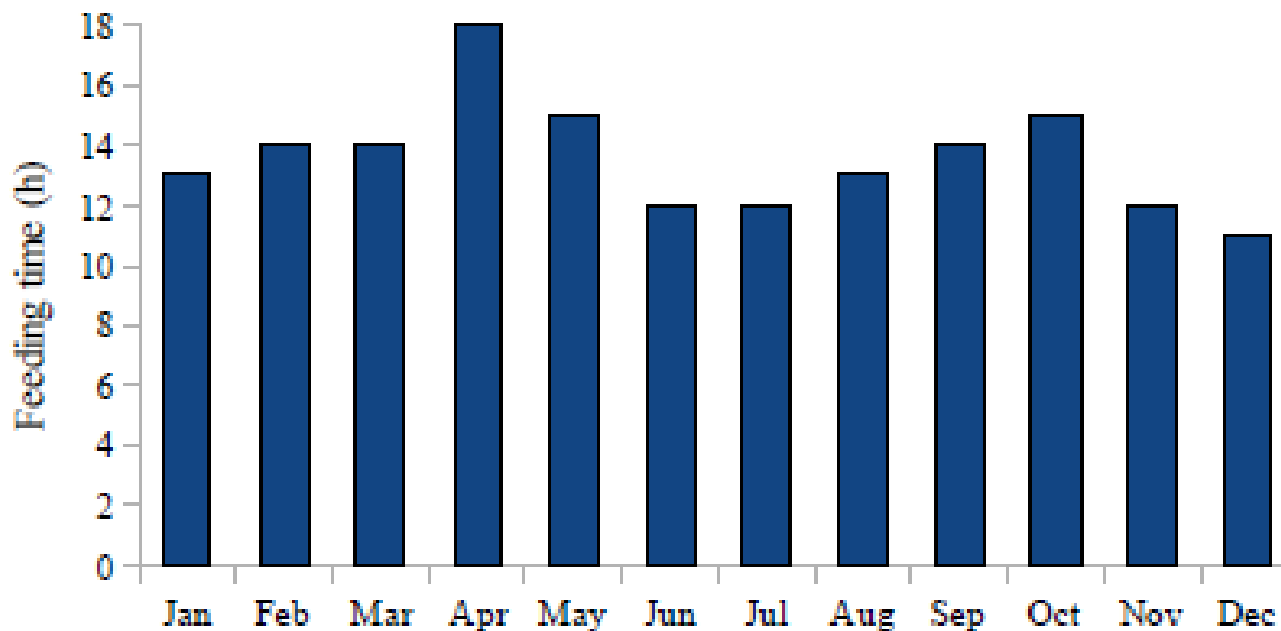
- Pasture provides opportunity for exercise
 - 24hr = 8-9.5miles
 - 7hr = 2.5-3 miles
- Pasture provides socialization
- Natural foraging behavior



GRAZING INTAKE

“Nutrition is the key to success”

- Free-ranging horses tend to show 10-15 distinct feeding bouts within 24 hours and spend around 10-14 hours per day on feed intake behavior. ~60% of 24 hours
- Resting or non-feeding bouts are generally of no more than 3-4 hours duration
(Ralston, 1984; Vulink, 2001; Ellis, 2010)



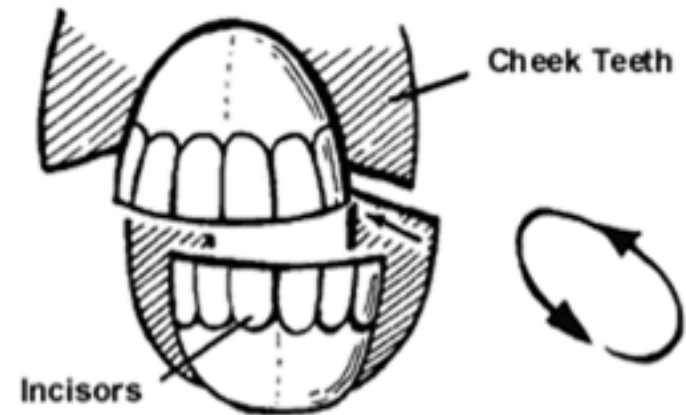
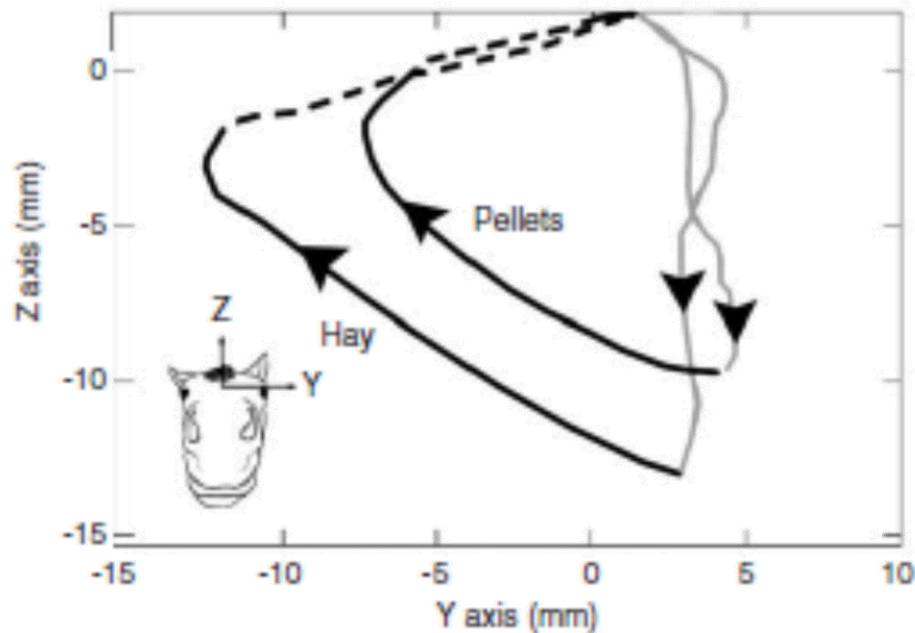
<https://www.ncbi.nlm.nih.gov/pubmed/6392275> Ralston Vulink, JT (2001). Hungry herds: Management of temperate lowland wetlands by grazing. Ministerie van Verkeer en Waterstaat; Lelystad, The Netherlands.

Ellis, A. D. (2010) Biological basis of behaviour and Feed Intake, In: A.D. Ellis, A.C. Longland, M. Coenen and N. Miraglia (2010) The impact of Nutrition on the Health and Welfare of Horses, EAAP Publication No. 128, Wageningen Academic Publishers, pp. 53-74.

RATE OF INTAKE

“Nutrition is the key to success”

- Horses chew approx. 60,000 times a day when grazing

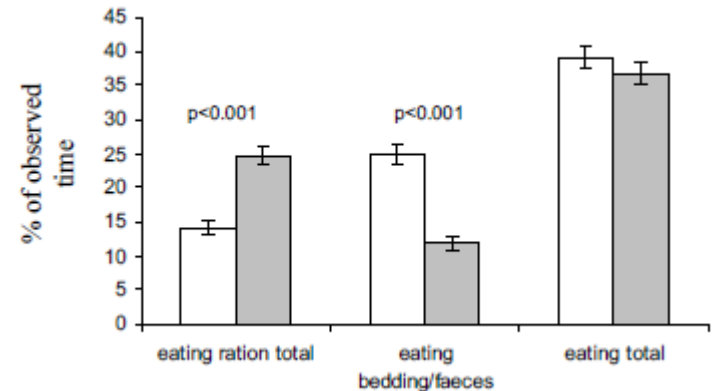


Bonin et al., Comparison of mandibular motion in horses chewing hay and pellets. *Equine vet. J.* (2007) 39 (3) 258-262.

LOW FORAGE

“Nutrition is the key to success”

- 36 - 3 year old horses
- High Forage (HF - conc:haylage = 1:4)
- Low Forage (LF - conc:haylage = 4:1)
- LF horses spent 56% less time on ration eating than HF horses and 44% more time eating bedding material and feces
- LF horses showed significantly more walking activity in the boxes compared to HF horses
- Two LF horses were observed to develop recurring crib-biting behavior
- In the horse walker and on the treadmill, LF horses were more excited and less manageable than HF horses



Ellis, A. D., Visser, C. K., Van Reenen, C.G. (2006) *The effect of a high fibre versus low fibre diet on behaviour and welfare in horses, Proceedings of the 40th International Congress of the ISAE, University of Bristol, p. 42.*

Poll Question

“Nutrition is the key to success”



Stress



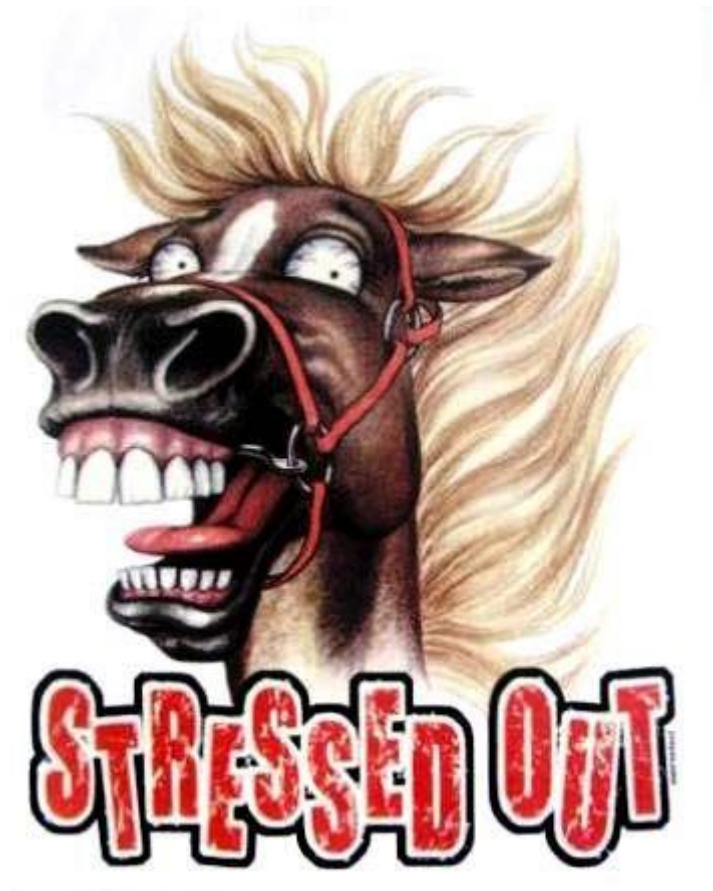
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STRESS IN PERFORMANCE HORSES



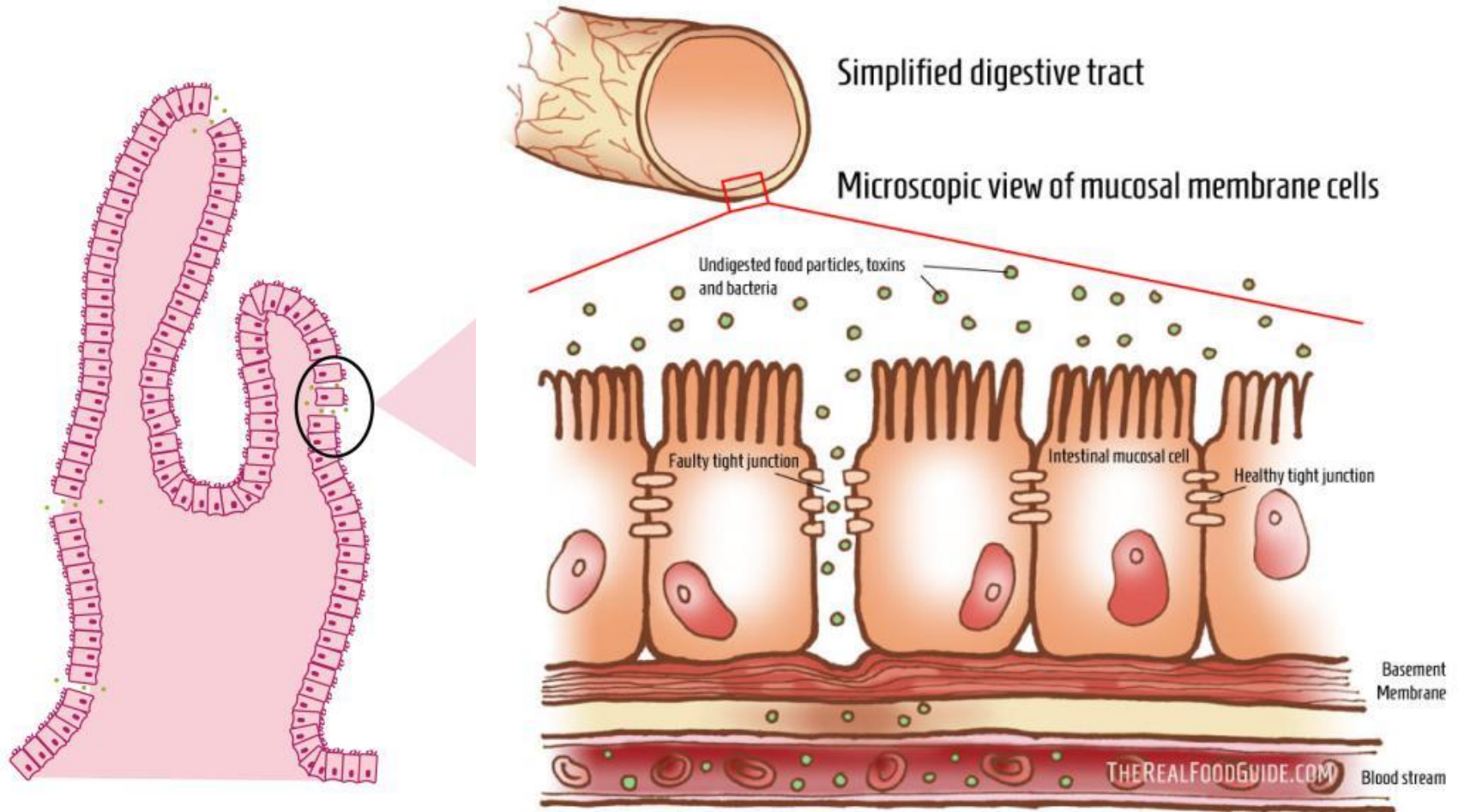
“Nutrition is the key to success”

- Exercise
- Heat
- Transport
- Injury/Pain
- Psychological
 - Separation
 - Feeding Management!!



MUCOSAL INTEGRITY

"Nutrition is the key to success"



Cheng 2014

SYMPTOMS

“Nutrition is the key to success”

- Gastric ulcer & colonic ulcer symptoms
- Dull coat
- Poor hoofs (malabsorption)
- Multiple allergies
- Improves on omeprazole – rapid revert when taken off
- Strong erratic behavior
- Chronic diarrhea

TYPICAL HORSES

“Nutrition is the key to success”

- Ultrasound may reveal thickening of intestinal mucosa, indicative of inflammation
- High performance horses
- Nervous horses
- **Chronic colic**
- Antibiotics with no follow-up probiotic
- Chronic pain (NSAID)
- EMS
- Stress
 - Physical or **psychological**

“Nutrition is the key to success”

Psychological

- Saunders et al. (1997, 2002) stated that psychological-induced GI permeability is related to release of acetylcholine and corticotropin-releasing hormone
- Separation
- Fear
- Feeding management!!



Benefits of Forage



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FORAGE AMOUNT

“Nutrition is the key to success”

- **Absolute Minimum** = 1% of B.W.
1000 lb horse = 10 lbs forage (DM)
- **Weight Loss** = 1.2% of B.W. 1000 lb horse = 12 lbs forage (DM)
- **Recommended Minimum** = 1.5% of B.W. 1000 lb horse = 15 lbs forage (DM)
- **Normal Forage Intake** = 1.8 to 2.5% of B.W. (DM)
- **Maximum Intake** = 3 to 3.5% of B.W. (DM)



FORAGE AMOUNT

“Nutrition is the key to success”

- Fiber digestibility decreases with low intake levels

- Fed ponies at 4 levels of hay intake

- Ad lib ~ 1.9% BW
- 75g/kg^{0.75}/day ~ 1.58% B.W.
- 55g/kg^{0.75}/day ~ 1.1% B.W.
- 30g/kg^{0.75}/day ~ 0.6% B.W.

Intake level	DM Apparent digestibility %
Ad libitum	48 ± 2 ^a
75	50 ± 3 ^a
55	49 ± 2 ^a
30	34 ± 5 ^b

- Below a certain food intake, the major digestive constraint is not fermentation time, but absolute nutrient supply to gut bacteria. Ponies needed a food intake level above 30g/kg^{0.75} /day to maintain proper gut function.

Clauss, et al., (2014). The effect of very low food intake on digestive physiology and forage digestibility in horses. J. Anim. Phys. & Anim. Nutr. 98: 107-118.

FORAGE – NOT ENOUGH

“Nutrition is the key to success”

- Can result in:
 - Hindgut acidosis
 - Colic
 - Gastric ulcers
 - Cribbing
 - Wood chewing
 - Behavior issues
 - Weaving, unexplained aggression
 - Allergy symptoms



Poll Question

“Nutrition is the key to success”



Forage Management



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SOLUTIONS

“Nutrition is the key to success”

- Important to mimic grazing behavior
 - **Hay** – Extend meal time



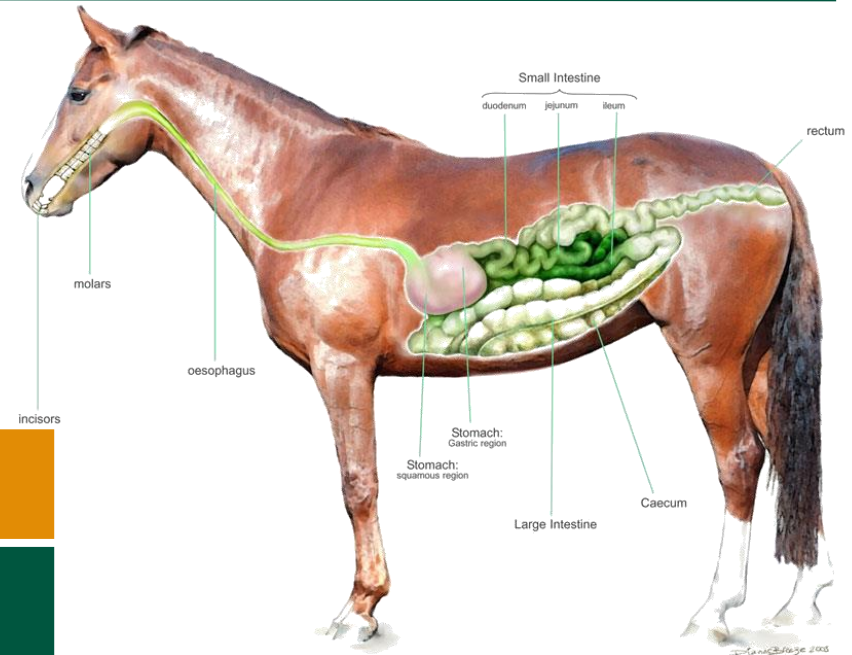
SOLUTIONS – FEEDING POSITION

“Nutrition is the key to success”

- Saliva helps buffer stomach acid – the more time chewing, the more saliva is produced

Ad libitum grazing = 60,000 chews per day

Ingredient	Chew or Jaw Sweep
2lb of oats (on ground)	1,000 times
2lb of hay (on ground)	2,000 times
2lb of oats (chest height)	350-500 times



Ellis, A. D. (2010) *Biological basis of behaviour and Feed Intake*, In: A.D. Ellis, A.C. Longland, M. Coenen and N. Miraglia (2010) *The impact of Nutrition on the Health and Welfare of Horses*, EAAP Publication No. 128, Wageningen Academic Publishers, pp. 53-74.

RATE OF INTAKE

“Nutrition is the key to success”

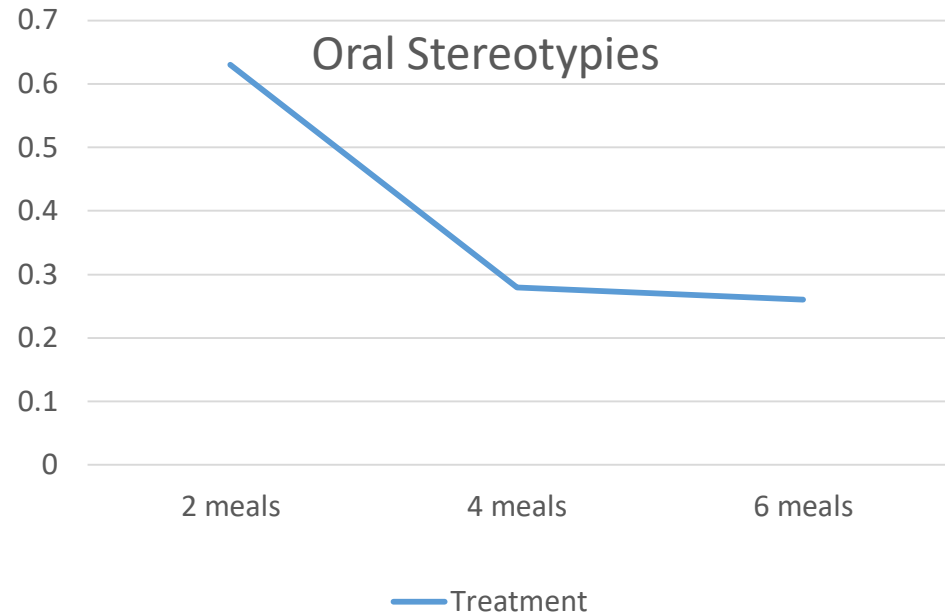
- Adding chopped forage to concentrate feed at a rate 20-38 % increased feed intake time by 50-100% (*Harris et al., 2005; Ellis et al., 2005*)
- Additional studies have shown that when adding fat to diets at a rate of 1g/kg B.W. per day, a very slight increase in total intake time is shown, but at a rate of 2g/kg B.W. per day, the intake time per kg fed, more than doubled (*Zeyner, 2006*)



SOLUTIONS – NUMBER OF MEALS

“Nutrition is the key to success”

- Increasing the number of meals of concentrate (whilst maintaining the same daily intake) on the behavior of stabled horses with particular reference to stereotypic activities
- 2, 4, 6 meals per day
- As the number of meals increased, the treatment horses showed a decrease in oral stereotypies ($P < 0.01$)



Cooper, Jonathan J. et al. 2005. The short-term effects of increasing meal frequency on stereotypic behaviour of stabled horses. Applied Animal Behaviour Science, Volume 90, Issue 3, 351 – 364.

SOLUTIONS – FEEDING DURATION



“Nutrition is the key to success”

- 100 mares
 - 50 continuous feeding (11lbs hay in hay net over 6hrs in paddock during day, 8lbs barley plus 11lbs hay individual box stalls at night, 17hrs)
 - 50 standard feeding pattern (no hay in paddock, 22lbs hay plus 8lbs barley in box stall at night)

Table 1 Time budget of observed mares: mean percentage of scans spent in the different activities \pm s.e.

	Control group mean \pm s.e. (%)	Experimental group mean \pm s.e. (%)	U-value	
Feeding	29.75 \pm 2.45	65.12 \pm 2.40	189.0	$P < 0.001$
Stand resting	27.52 \pm 2.62	11.76 \pm 2.57	654.5	$P < 0.001$
Locomotion	23.56 \pm 1.34	11.70 \pm 1.31	454.0	$P < 0.001$
Alert standing	14.71 \pm 1.23	5.23 \pm 1.20	560.5	$P < 0.001$

Only the behaviours that differed statistically between groups are shown here.

Benhajali, H., Richard-Yris, M.-A., Ezzaouia, M., Charfi, F., Hausberger, M., 2009. Foraging opportunity: a crucial criterion for horse welfare? Animal 3, 1308–1312. <http://dx.doi.org/10.1017/S1751731109004820>.

SOLUTIONS – FEEDING DURATION



“Nutrition is the key to success”

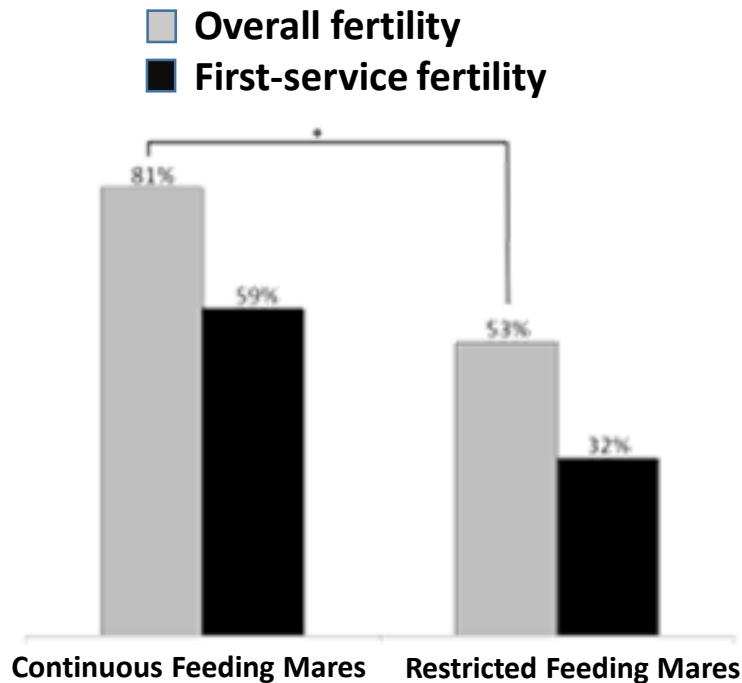


Figure 1. First-service and overall fertility (%) of CF (N=32) and RF (N=38) mares. Significant differences (p<0.05) are indicated by the symbol*.

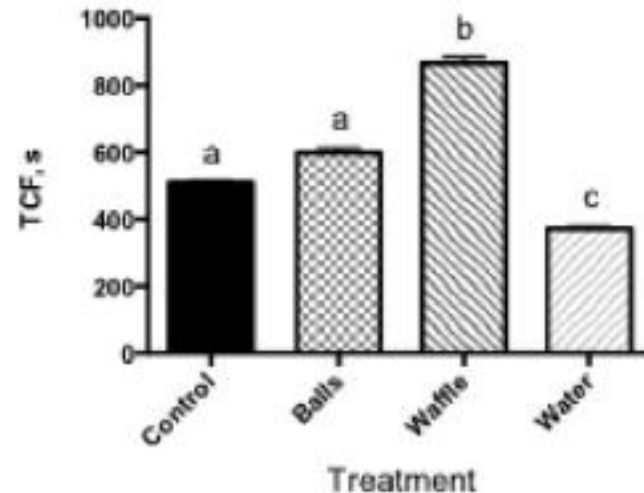
- SFP mares had no food left in the morning, when horses would feed most in natural condition
- Stress can interfere with GnRh/LH pulse frequencies
- “Continuous foraging” pattern decreased estrus abnormalities and increased conception rates

Benhajali, H., Ezzaouia, M., Lunel, C., Charfi, F., Hausberger, M., 2013. Temporal feeding pattern may influence reproduction efficiency, the example of breeding mares. PLoS One 8, e73858. <http://dx.doi.org/10.1371/journal.pone.0073858>.

SOLUTIONS – RATE OF INTAKE

“Nutrition is the key to success”

- Rate of intake

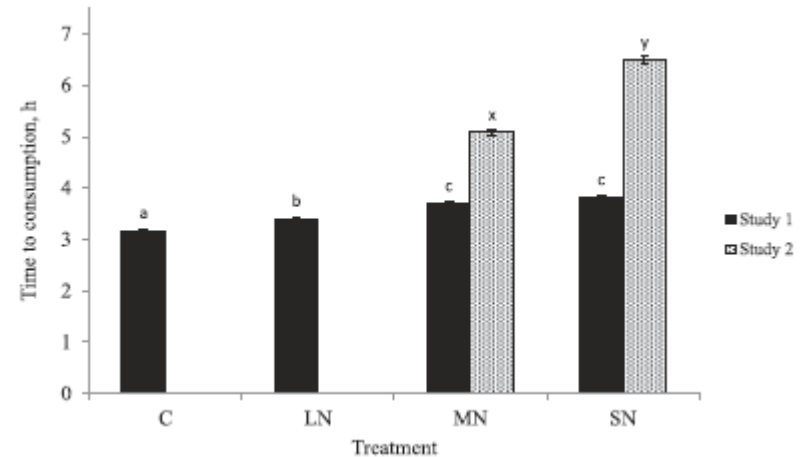


Kutzner-Mulligan, J., J. Eisemann, P. Siciliano, J. Smith, K. Hewitt, J. Sharlette, and S. Pratt-Phillips. 2013. The effect of different feed delivery methods on time to consume feed and the resulting changes in postprandial metabolite concentrations in horses¹. *Journal of animal science* 91, (8) (08): 3772-9.

SOLUTIONS

“Nutrition is the key to success”

- Measured
 - Control – hay off floor
 - Large net (LN - 6 in)
 - Medium net (MN - 1.75 in)
 - Small net (SN - 1 in)
- Completion
 - MN – 5 hours
 - SN – 6.5 hours
 - Control – 3.2 hours
 - LN – 3.4 hours
- Control & LN consumed hay approximately 1.5 kg (3.3 lb) per hour
- SN approximately 0.88 kg (1.93 lb) per hour

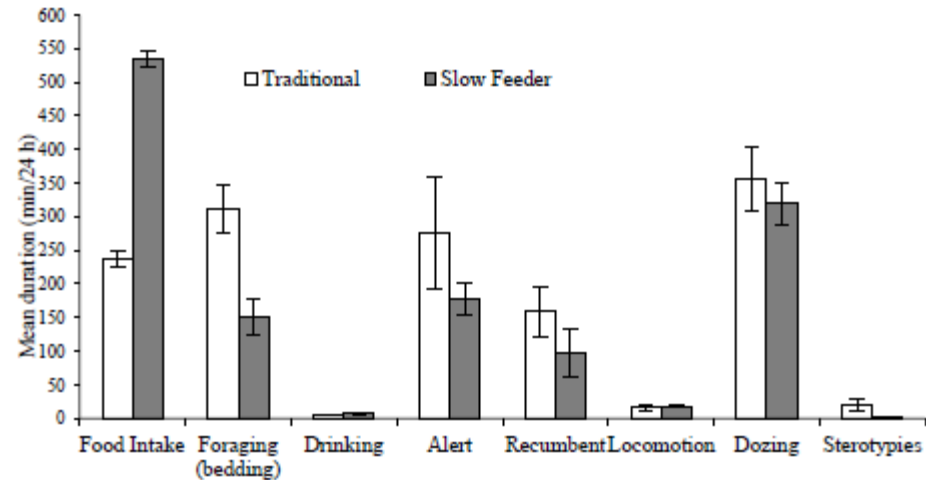


Glunk, E.C. et al. 2013. The effect of hay net design on rate and amount of forage consumed by adult horses Journal of Equine Veterinary Science, Volume 33, Issue 5, 362 – 363.

SOLUTIONS

“Nutrition is the key to success”

- **SF = Meal times removed, Forage based diet in novel all inclusive feed bin system, bins replenished when horses are away from stable for grooming or on horse walker**
- The speed at which horses consumed hay from the hay nets provided twice per day averaged 22 minutes/kg hay
- 13.7% reduction in chews/minute ($P < 0.05$; $T = 2.8$) occurred on SF treatment
- There was significantly more time spent performing stereotypical behavior (light weaving and wood chewing) during traditional treatment ($P = 0.05$, $T = 2.4$)



Hallam, S., Campbell, E. P., Qazamel, M., Owen H. and A. D. Ellis (2012) Effects of traditional versus novel feeding management on 24 hour time budget of stabled horses, In: Forages and Grazing in Horse Nutrition, EAAP Publication No. 132, Wageningen Academic Publishers, pp. 319-321.

SOLUTIONS

“Nutrition is the key to success”



Fig. 1. The different modalities of hay distribution: a) horses' usual hay stall ground distribution (SG); b) hay-bag (HB); c) slow-feeder (SF). Each group of horses had each modality during 3 weeks (session 1: week1-3, session 2: week 4-6, session 3: week 7-9).

- Horses spent less time eating straw when they had hay through the SF
- Horses still had hay after 11hrs in SF
- More frustration with HB compared to SF

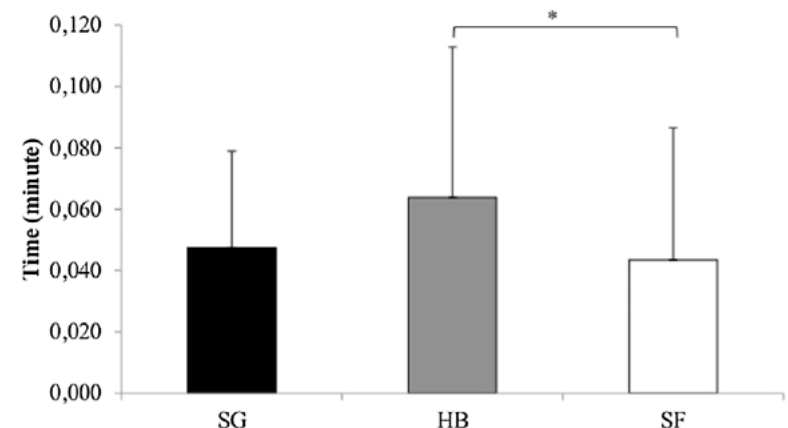


Figure. 3. Time (in min per 5 min ad libitum recordings +/- SE) spent expressing stereotypic and abnormal repetitive behaviours according to the type of hay distribution (SG; Stall ground distribution, HB: Hay-bag, SF: slow-feeder). Friedman and Wilcoxon signed-rank tests, *P < 0.02.

SOLUTIONS

“Nutrition is the key to success”



McKinlay & Peters Equine Hospital
March 2 at 7:08pm

Like Page

“We regularly see this type of incisor damage on a horse who has been eating out of a slow feeder with a steel grate. We have seen a few fractured incisors and even pulp form infections from these feeders. We are big fans of using slow feeders, but not the type that have the steel grate attached.”

SOLUTIONS – FORAGE TYPE

“Nutrition is the key to success”

- Alfalfa Hay
- Research Texas A&M University, USA, (Lybbert et al., 2007)
- Alfalfa was a natural buffer to acidity in the stomach (Calcium)
- Feeding alfalfa was more effective at reducing the incidence of gastric ulcers than Bermuda grass hay
- Preferably provide alfalfa at regular 5 – 6 hour intervals (Nadeau 2000)
- Saliva production that results from chewing also serves to buffer stomach acid and stomach contents for horses that have free choice access to forage throughout the day



SUMMARY

“Nutrition is the key to success”

- Decrease stress that can be controlled
 - Feeding management
- Minimum intake 1.5% BW
- Mimic grazing
- Multiple forage sources
- No rapid feeding changes
 - Hay included



Questions?



PHN
PERFORMANCE HORSE NUTRITION



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Thank you for joining us!

For follow-up questions, please contact our customer relations:

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