

# Equine Nutrition in Health and Disease

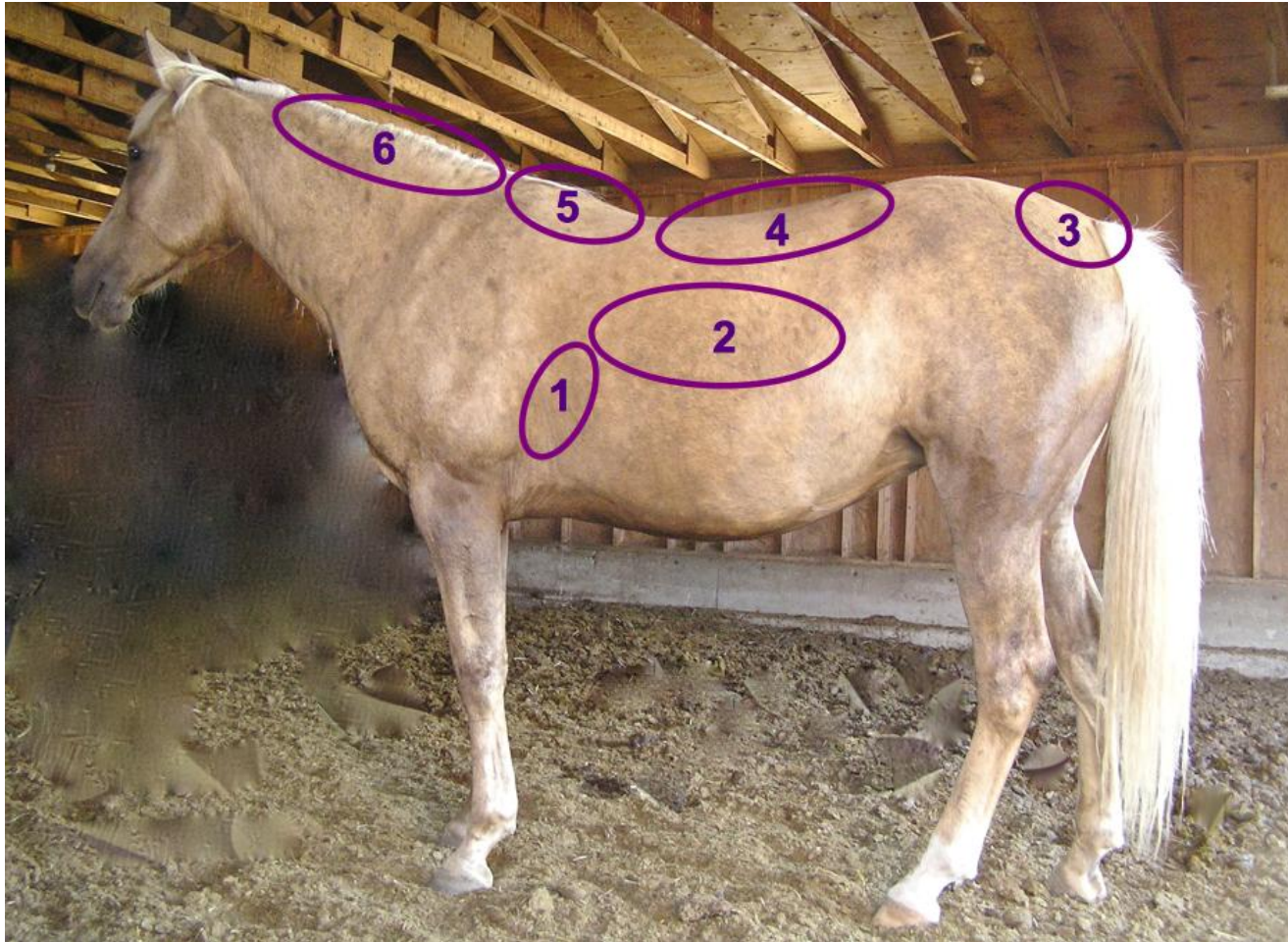
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# What to feed my horse?

- 2% DM of ideal body weight (60:40)
- Grass / forage
- Best quality
- Good quality commercial ration (balancer)



# Body Condition Score



Condition	Neck	Withers	Loin	Tailhead	Ribs	Shoulder
1 Poor	Bone structure easily noticeable, animal extremely emaciated, no fatty tissue can be felt	Bone structure easily noticeable	Spinous processes project prominently	Spinous processes project prominently	Tailhead (pinbone) and hook bones project prominently	Bone structure easily noticeable
2 Very Thin	Faintly discernable, animal emaciated	Faintly discernable	Slight fat covering over base of spinous processes. Transverse processes of lumbar vertebrae feel rounded. Spinous processes are prominent.	Tailhead prominent	Slight fat cover over ribs. Ribs easily discernable.	Shoulder accentuated
3 Thin	Neck accentuated	Withers accentuated	Fat buildup halfway on spinous processes but easily discernable. Transverse processes cannot be felt.	Tailhead prominent but individual vertebrae cannot be visually identified. Hook bones appear rounded but are still easily discernable. Pin bones not distinguishable.	Slight fat cover over ribs. Ribs easily discernable.	Shoulder accentuated
4 Moderately Thin	Neck not obviously thin	Withers not obviously thin	Negative crease along back	Prominence depends on conformation; fat can be felt. Hook bones not discernable.	Faint outline discernable	Shoulder not obviously thin

Condition	Neck	Withers	Loin	Tailhead	Ribs	Shoulder
5 Moderate	Neck blends smoothly into body	Withers rounded over spinous processes	Back level	Fat around tailhead beginning to feel spongy	Ribs cannot be visually distinguished but can be easily felt	Shoulder blends smoothly into body
6 Moderately Fleshy	Fat beginning to be deposited	Fat beginning to be deposited	May have slight positive crease down back	Fat around tailhead feels soft	Fat over ribs feels spongy	Fat beginning to be deposited
7 Fleshy	Fat deposited along neck	Fat deposited along withers	May have positive crease down back	Fat around tailhead is soft	Individual ribs can be felt, but noticeable filling between ribs with fat	Fat deposited behind shoulder
8 Fat	Noticeable thickening of neck, fat deposited along inner buttocks	Area along withers filled with fat	Positive crease down back	Tailhead fat very soft	Difficult to feel ribs	Area behind shoulder filled in flush with body
9 Extremely Fat	Bulging fat. Fat along inner buttocks may rub together. Flank filled in flush	Bulging fat	Obvious positive crease down back	Building fat around tailhead	Patchy fat appearing over ribs	Bulging fat

From: Henneke et al. Equine Vet J. (1983) 15 (4), 371-372

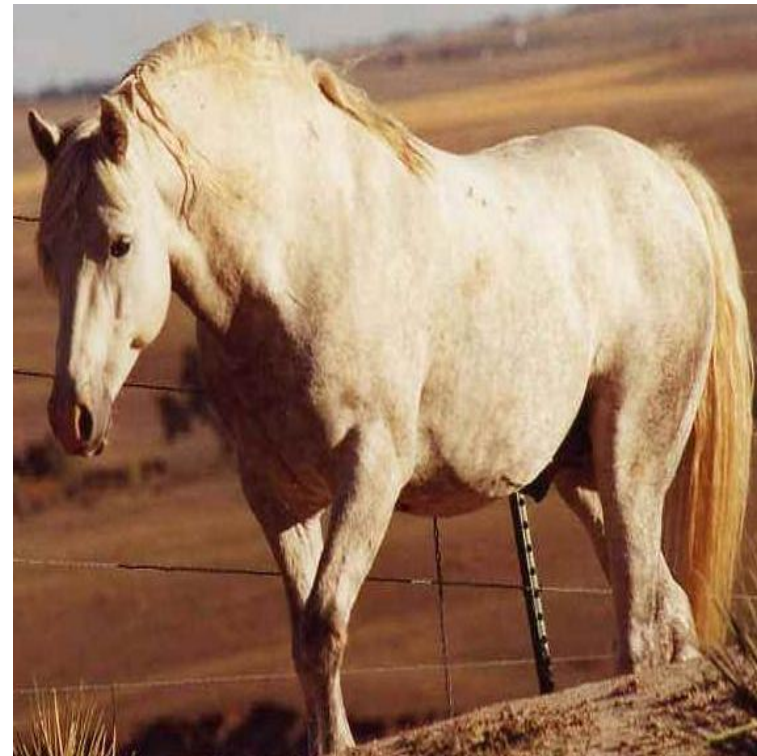
# Feeding horses in various disease states

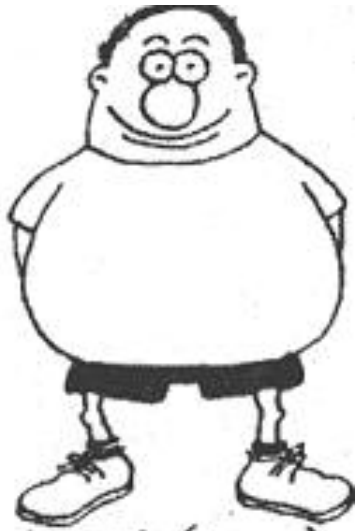
- Equine Metabolic Syndrome
- Hyperlipaemia / hyperlipidemia
- HYPP
- Myopathies
- Colic
- Gastric ulcers
- Developmental orthopaedic disease
- Feeding the starved horse

# Equine Metabolic Syndrome

(Peripheral or Omental Cushing's Syndrome)

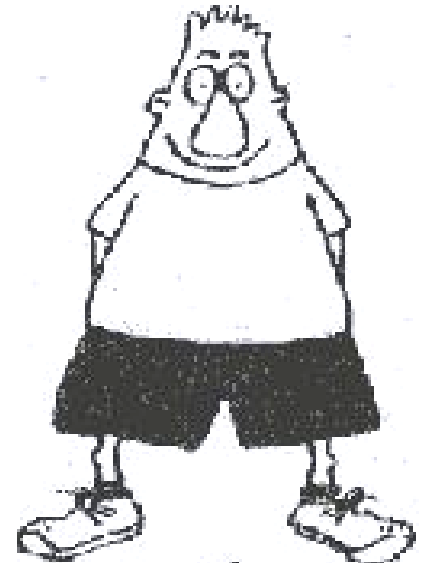
- Middle aged (8-18years); no sex predilection
- Clinical signs
  - **EASY KEEPER**
  - generalized overweight (can be normal / underweight)
  - cresty neck
  - laminitis
- Insulin resistant





ANDROID (APPLE)

## Fat Distribution: APPLE vs PEAR



GYNUID (PEAR)

### Apple:

- More visceral and omental fat
- More metabolically active
- More insulin resistance

### Pear:

- More subcutaneous fat
- Less metabolically active



# Equine Metabolic Syndrome



# Equine Metabolic Syndrome

## Insulin Refractory State

- Regional Adiposity
- Insulin Resistance
- Predisposition to Laminitis



- Hypertriglyceridemia /dyslipidemia
- Hyperleptinemia (satiety factor)
- Altered reproductive cycling
- Increased systemic markers of obesity (adipokines)
- Arterial hypertension

# Equine Metabolic Syndrome

- Affects energy metabolism
- Perturbs adipocyte function
- Promotes thrombosis
- Induces inflammations and oxidative stress
- Leads to vascular endothelial dysfunction

# Equine Metabolic Syndrome

## Key Points

- Fat horses with cresty necks and fat deposited in sheath, at tailhead, etc
- Insulin resistant
- Prone to laminitis
- Do not have PPID
- No specific treatment – diet and weight management

# Factors that Influence Insulin Sensitivity in Horses

- Sex
- Diet
- Age
- Exercise
- Pregnancy
- Breed ?
- Stress
- Obesity
- Disease States:
  - PPID
  - Hyperlipemia
  - Laminitis

# Metabolic Syndrome: Prevention and Treatment

Avoid Obesity / Weight  
Reduction!!!

→ **Therapeutic life-style changes:  
Diet and Exercise !!!!**

- Change diet: less food, lower glycemic index
- Increase physical activity

# Metabolic Syndrome: Prevention and Treatment

## Decreasing Food Intake

- Do not cut feed TOO much or TOO fast - risk of increased insulin resistance or hyperlipemia)
- Feed grass hays (not > 10% sugar & starch combined) at 1.5 – 2% **target** BW

# Hyperlipemia

## Susceptible Individuals

- Ponies
- Donkeys
- Miniature horses/  
donkeys
- Late pregnancy or lactating





# Hyperlipemia

## Clinical Signs

- Inappetance
- Depression, weakness
- +/- Diarrhea
- +/- Ventral edema
- Muscle fasciculations, ataxia, recumbency



# Hyperlipemia

## Prognosis

- Good if caught early (hyperlipidemia stage)
- Guarded to poor if lipemic and there is a high degree of fatty infiltration of the liver

# Hyperlipemia

Prevention is better than cure

- Can die within 3-4 days
- MUST get calories into them (by any means necessary)
  - Syringe-feed syrup
  - Tube jungle oats/ liquidized pellets
- Parenteral nutrition, insulin & heparin

# Hyperkalaemic Periodic Paralysis (HYPP)

- Quarter horses, paint, appaloosas – Impressive
  - Autosomal dominant
- Defect in skeletal muscle sodium channel
- Clinical signs:
  - Triggered by stress, fasting, anaesthesia, sedation, trailer rides, cold etc.
  - Myotonia and prolapse of third eyelid
  - Muscle tremors, spasms, weakness
  - Resp stridor/distress, upper resp. muscle paralysis
  - Episodes last 15-60 min

# Hyperkalaemic Periodic Paralysis (HYPP)

1. Decrease dietary potassium
  - Avoid lucerne, soybean meal & molasses
  - Soak hay high in  $K^+$  (<1%)
2. Increase  $K^+$  excretion  
Acetazolimide (2-3 mg /kg q 8-12h)



# Myopathies – ‘Tying up’

- Polysaccharide storage myopathy (PSSM)
- Exertional / recurrent exertional rhabdomyolysis (RER)
- High fiber, low carb
- Increase fat
- Maintain daily exercise with turnout
- Minimize stress

# Nutritional factors proven to predispose to colic

- Limited / no access to grazing
- Overly mature hay
- Frequent changes to hay source
- Lack of long-stem hay
- Ingestion of soil / sand / abnormal products (e.g. wood)
- Too much concentrate (> 2kg per day)

# Gastric ulcers

- Turnout & grazing
- Ad lib hay (legumes)
- Feed small, frequent meals (decrease/stop concentrates)
- Increase ration fat content (7-10%)
- Avoid hypertonic electrolyte paste



# Developmental orthopaedic disease

- DO NOT over-feed foals
- Want to see ribs
- Good quality hay / grazing and a balancer pellet
- Reduce DE while maintaining protein, vitamin & mineral requirements (excess protein not the culprit)

# Feeding the Starved Horse

- Avoid re-feeding syndrome
- 0.5-1kg lucerne every 4h for 3 days
- 2kg lucerne every 8 hours for 10 days
- 1-2 kg grass hay every 4 hours for 3 days
- 3-4 kg grass hay every 8 hours for 10 days
- Weight gains should be very slow