Feeding mares and foals in relation to Equine Osteochondrosis (OC/OCD)
The latest insights to prevent this important disease in horses
26 October 2011

Introduction
• My name is Rob Krabbenborg, product manager at Pavo
• Background in animal nutrition (Wageningen University and University of Minnesota)
• Pavo: one of the main horsefeed companies in Europe

What am I going to do?
• Domestication of the horse
• Osteochondrosis (OC)
• How about OC and horse feed?
• Results of recent research (2009 – 2011)
• Conclusions
• Take home message
Horse is 65 million years old

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Osteochondrosis (OC) and Osteochondrosis Disscans (OCD)

- OC: youth - disease in (very) young horses
  - Starts very early (pre – birth)
  - Highest incidence at 5 months
  - Disorder in transformation of cartilage to bone

- Osteochondrosis dissicans (OCD)
  - Bone fragment
  - First described in 1947 (Nilsson)
  - From 70's clinically important
  - Since 2000 growing concern for breeders

OC: Osteochondrosis

- Osteochondrosis: orthopedic diseases of the joint that occur in rapidly growing animals, particularly pigs, horses, and dogs. They are characterized by interruption of the blood supply of a bone, in particular to the epiphysis, followed by localized bony necrosis, and later, regrowth of the bone. This disorder is regarded as having a multifactorial etiology, so no one thing accounts for all aspects of this disease.

Multifactorial
Which factor's influence OC / OCD

- Genetics 20-25% (Dutch / German research)
- Movement (Dutch)
  - Natural movement (+++)
  - "Unnatural movement" (+)
  - Boxrest (-)
- Feeding (UK, USA, NZ, Germ, Dutch)
  - Starch "overload"
  - Mineral supply: Ca / P / Mg
  - Trace elements: Cu / Zn / Manganese
  - Vitamins: Vitamin D and Vitamin K

Some practical implications
What have we (humans) done with our selection / breeding of (warmblood)horses?

- Size of the horses
- Growth of the young foals
- Housing conditions
- Feeding

Pavo
Size of the horse

Growth of the young horse: 1000 gr/day

Feeding

What happens in the roughages that we feed our horses?

Energy Value in roughages 2011 in Netherlands and Germany

- 25% has a low energy value
- 9% has energy value of straw

Digestible Crude Protein in roughages 2011 in Netherlands and Germany

- < 42 gr/kg = protein shortage!!
Monitor the mineral content in roughages

So what’s happening

• Energy value and Digestible Crude protein content of Roughages are decreasing
• Big spread between high – normal and low values
• Mineral content (P and Mg) have tendency to go down (also as consequence of Phosphorus – legislation)

Other factors in feed that are related to development of OC/OCD

• Starch overload -> careful with high starch diets
• Use of extra Copper (in feed for mare/foal)
• Vitamin D (is used to absorb Ca and P for bone development) -> should levels be higher?
• Trace elements (Copper, Zink, Manganese) -> all modern “breeding feeds” change to organic bound trace elements -> increased digestibility

Bone tissue in the horse

4% bodyweight = minerals
20 - 25 kg / horse
In fixed ratio
Ca : P : Mg = 30 : 14 : 1

1% of all bone tissue is renewed each day

In case a horse has a mineral shortage, what happens?

1 gram Ca shortage?
= 1.5 g bone breakdown

1 gram Mg shortage?
= 45 g bone breakdown
Mineral demand in the first 3 years

To sum up
- Mineral content in roughages going down, especially P and Mg
- Mineral demand is the highest in the first months of life
- Mineral shortage can have big effect
- For us -> Macro minerals were key to look at in the last years

Research in 2009 – 2011

2 trials
- Trial I: 63 KWPN Foals 0 – 5 months
  - 2 groups: Placebo / Supplement
  - Measured: in blood CTx, Osteocalcine, blood and milk: Ca / P / Mg
  - Each foal (5 months) a set of 8 X-ray pictures
- Trial II: 52 KWPN Foals 5 – 12 months
  - 2 groups: Placebo / Supplement
  - Measured: in blood CTx, Osteocalcine, Ca / P / Mg
  - Each foal (5 and 12 months) a set of 14 X-ray pictures

What is in the supplement?
- 2 most important components in our supplement
  - Extra Magnesium with a high digestibility
  - Extra Phosphate with a high digestibility
- And NO CALCIUM !!!

Results: Milk
- Calcium, Phosphate and Magnesium content
Conclusion

- Mineral content (Ca/P/Mg) in mare milk is very stable, decreases in time, hard/impossible to influence composition
- Bone activity of young foal is very high in the first few months
- At the age of 1 year, breaking down bone has reached the adult level
- Bone activity (OC/CTx) is going down after birth. The level at 12 months is only slightly higher then in adult horses

Conclusions

- Adding the supplement to the foals diet significantly decreases the OC incidence at 5 and 12 months
- The effect is the strongest in the first 5 months
- To lower the OC incidence it is clear that we need to add highly digestible Mg and P to the foals diet at a young age
- Foals that received the supplement have a 4 times bigger change to be OC-free at 12 months

What’s next

- Breeders have to become more aware what they are feeding (roughages / concentrates)
- At KWPN stallion show 2012 we will organize an English symposium for horse vets on the topic of OC
- Pavo will launch a new range of breeding products in february 2012 based on the new findings
- Patent is pending

Take home message

- Horse feed composition is an important factor influencing incidence of OC/OCD
- The timeframe most important is before birth up to the age of 6-12 months.
- We have looked at the macro minerals Ca / P / Mg, where P and Mg seem to be more important then Ca in preventing OC in young horses

Thank you very much for your attention

Sheets will come available at the WBFSH website
Or leave me your business card, and I will sent them