



Fact sheet

Feeding the Rapidly Growing Foal

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Large foals that are growing rapidly are often considered to be at increased risk of developmental orthopedic disease (DOD). A multifactorial problem, DOD includes problems such as osteochondrosis dessicans (defective bone and cartilage at the joint surface), epiphysitis (enlarged, painful growth plates), flexure and angular limb deformities, and perhaps wobblers syndrome. Genetics, nutrition and exercise all play a role in the incidence of DOD in horses.

Hereditary predisposition to at least OCD is well documented in Standardbred and Swedish warmblood horses, with the incidence as high as 45% in some bloodlines. However, the genetic defect that causes the growth-associated problems in the horses has not been identified. Breeds selected for rapid growth are at increased risk of developing problems, but it is not growth rate alone that causes the problem. It is not always the most rapidly growing foal that develops DOD, but often the one with the most erratic growth rate.

Trauma due to excessive concussion, due either to severe obesity or forced exercise, may increase the incidence of DOD. Other reports, however, revealed that restriction of exercise adversely impacts bone growth and development in young horses. Turning the foals out in as large an area (either pasture or paddock) as possible for as long as possible is highly recommended. Ideally they should get 24-hour turnout. However, strenuous forced exercise, especially lunging in circles, should be avoided. Foals should not be allowed to become obese.

Mineral imbalances have been well documented to cause DOD. Deficiencies of calcium, phosphorus and/or copper all result in defective bone maturation. Zinc toxicity and perhaps deficiency also have resulted in lesions, though the effects of simple zinc deficiency are not well documented. The optimal intakes of copper and zinc for young horses have not been well defined. Current recommendations for mineral content of rations for

foals less than 1 year of age are given in Table 1.

Excessive protein (greater than 16%) was incriminated as a cause of DOD in the 1970s but subsequent studies have not revealed a direct relationship between high protein rations and DOD. Weanlings fed rations deficient in protein (less than 12%) had reduced growth rates and poor bone mineralization compared to weanlings fed rations which were higher in protein. Restricting protein in a rapidly growing foal's ration will not result in improved bone growth and may actually be detrimental to the animal.

Rations providing over 100% of the National Research Council's recommended amounts of energy for rapid growth in foals may cause an increased incidence of DOD, especially if the ration contains more than 50% sweet feed (grain mix plus molasses) or other high sugar concentrate by weight. High carbohydrate rations such as sweet feeds may contribute to the appearance of DOD, possibly related to the high blood glucose and insulin and low blood pH they cause for up to 4 hours after feeding. Pelleted and extruded feeds tend to have lower molasses

Table 1: Recommended concentrations of minerals* in rations fed to rapidly growing young horses.

Mineral	Range
Calcium	0.8 to 1.0%
Phosphorus	0.4 to 0.6%
Copper	10 to 15 mg/kg feed
Zinc	40 to 60 mg/kg feed

* Other minerals such as manganese, magnesium, selenium and iron are probably important, but there are no data available on requirements of young horses for these nutrients. There are no data on vitamin requirements either, though over 10 times the recommended vitamin A resulted in weakened bones in ponies.

contents and higher fiber concentrations have a lesser effect on glucose and insulin. Pelleting appears to affect the availability of carbohydrates and pelleted concentrates may cause lower glucose and insulin changes than textured feeds with the same basic formulation (Ralston, 1992). There may be a correlation between OCD and glucose intolerance (abnormally high blood glucose and insulin after a meal of sweet feed) in foals that are genetically predisposed to the problem.

Recommendations

1 Nursing foals should be introduced to concentrates when they are 1 to 2 months of age. The concentrate should contain 14 to 18% protein and have added calcium, phosphorus, copper and zinc (see Table 1) in a formulation designed specifically for growing horses. The higher percentages of protein and calcium should be used if only grass hay is available. The lower percentages can be used with legume or legume/grass mix hays. Concentrates should be fed at the rate of 0.25% to 1.0% of body weight, with the emphasis on maintaining lean body condition (ribs not visible but can be felt with mild pressure over the flank; loin, croup and neck have smooth outlines without creases or visible bony structures). If the lower amounts are fed (less than 0.5% body weight), addition of a balanced calcium/phosphorus mix might be necessary to maintain the proper mineral intake. Ideally the foals should be fed regulated amounts that are inaccessible to their dams or other foals at least once, preferably twice, a day. The dams also should be fed the same concentrate if the foal has access to the mare's feed.

2 Don't let the foal get obese (obvious crease down the back, ribs can not be easily felt) or excessively thin (ribs easily visible, hip bones prominent, hair coat dull and shaggy). If group feeding foals and mares, monitor their condition daily and feed any excessively thin or fat foals separately. Since pelleted and extruded feeds cause lower glucose and insulin responses than do sweet feeds, the former two types of concentrate may be preferable to textured sweet feed mixes, especially in foals from bloodlines potentially predisposed to OCD.

3 Weanlings should be fed the same type of concentrate as when they were nursing and at the same rate as above and monitored carefully for signs of excessive weight gain or loss and DOD. Between 0.25 to 1.0% body weight of a properly formulated concentrate divided into two or three meals a day, with free choice access to good quality mixed legume/grass hay or pasture will maintain

optimal growth rates of most light horse breeds while reducing the risk of DOD. The goal is to maintain steady growth, avoiding sudden increases or decreases, and to maintain good but not fat or thin body condition. Plain white or trace mineral salt and a good, clean source of water should be available free choice at all times.

4 If signs of epiphysitis (enlargement at the growth plates above the fetlocks and/or knees associated with lameness and reluctance to exercise) or other deformities (contracted tendons, angular deformities) appear, the ration is probably not properly balanced. The amount of concentrate fed should be **temporarily** reduced while the total ration's nutrient content is assessed. Any deficits or excesses should be corrected and a properly balanced ration reintroduced as soon as possible. Starving foals (feeding only grass hay and oats for a prolonged period of time, resulting in weight loss, poor growth and rough-looking hair coats) will not correct the problem on a long-term basis.

5 Yearlings' rations can be reduced to 12%-14% protein with lesser concentrations of minerals, but still above that usually found in mixes formulated for adult horses. Maintaining yearlings on the weaning rations will not hurt and may help, especially if horses are still growing fairly rapidly.

Selected References

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