Time to grow on their own

Careful feeding practices and minimizing stress will help prevent erratic growth rates in weanlings

by Amy Gill, Ph.D.

ONE OF THE MOST crucial periods in a horse's life to manage occurs when a foal is weaned from its mother, but the transition can be made easier if the foal is prepared for the event well in advance.

From a nutritional standpoint, the most difficult aspect of weaning is preventing a depression in growth rate after the youngster is weaned followed by a rapid acceleration of growth once the weanling has adapted to its new lifestyle. An erratic growth rate can contribute to developmental orthopedic problems. Management procedures such as making sure the foal leads well, stands for the farrier and has had its feet trimmed, is properly vaccinated and dewormed, and is eating well prior to weaning make the process go much easier.

Avoiding stress that can result from too many abrupt changes in routine and making sure the weanling is well adapted to its environment will help prevent unnecessary injuries and lessen the post-weaning disruption of growth rate.

Age and individual

Methods of weaning foals vary and should be based on what will work best for each farm and its management. The smoothest transition will occur in foals that have been handled extensively, are accustomed to routine farm procedures, and are allowed to live in a low-stress environment.

Thoroughbred foals that are growing at a normal rate should be weaned about four months of age. Weaning at this time is preferred because it coincides with a decrease in the nutrient level of the milk the mare produces during this stage of lactation.

If the industry as a whole was not as concerned with having extremely large and muscular foals, it probably would be preferable for foals that are growing at moderate rates to remain with their dams longer and allow the mare and foal to gradually wean themselves after a year when the mare is preparing to foal again. Unfortunately, from a management standpoint and because many Thoroughbreds are sold as weanlings, keeping a mare and foal together this long is not feasible. Also, some mares, particularly older or incapacitated mares, lose body condition while nursing a foal and should be weaned early.

Nutritional changes

At birth, the foal is completely dependent on mare's milk for all its nutritional needs. Newborn foals cannot use forages well because their hindgut is not populated with the microbes needed to ferment fiber and produce volatile fatty acids, which mature horses use for energy production and other metabolic processes.

As the foal matures, it naturally begins to eat more solid feed and the hindgut becomes capable of fermenting limited amounts of high-quality fiber, such as alfalfa and beet pulp. About two months into lactation, the mare produces about 30 pounds of extremely nutrient-dense milk per day; this is the peak of her lactation. However, the milk she produces after about four months of nursing does not support the level of growth needed to produce the large, growthy foal the industry demands at sales and later on the racetrack.

Desired average daily weight gain for young horses

Age	Daily gain
Weanling at four months	2.5 to three pounds
Weanling at six months	Two to 2.5 pounds
Yearling at 12 months	One to 1.5 pounds
Yearling at 18 months	0.5 to 0.75 pounds
Two-year-old	0.25 to 0.5 pounds

In order to keep a four-month-old foal growing at a desired rate of 2.5 to three pounds per day after weaning (to achieve desired condition for weanling or yearling sales), controlled energy and nutrient-dense supplementation is needed, so weaning becomes a necessity.

Sometimes, certain conditions warrant weaning foals earlier than four months of age so their growth rates can be regulated even more tightly. For example, a smallish foal that is growing too slowly or a foal that is growing at a rapid rate with developmental problems can be removed from the dam at an age deemed appropriate (2½ to three months) to enable total control over what the foal consumes and achieve steady growth rate.

Eat well before weaning

As fetal development accelerates in the last trimester of pregnancy, the mare should be fed good-quality forages and a concentrate designed to provide the nutrients she and her fetus need.

Caloric intake, protein, vitamin, and mineral needs are high at this time. Once the mare foals and begins to lactate, her requirements will increase to about 80% over what she needs when not pregnant. Mare and foal should be maintained on that ration all the way through weaning.

Regardless of when weaning occurs, the foal must be aggressively eating a concentrate ration that supplies the majority of its nutrient requirements well before it is separated from its dam. Foals begin to pick at their dam's feed within a week or so after birth, so using products that meet the needs of mare and newborn foal work the best. That way, come weaning time, the foal is adjusted and eating these products well, and no changes are needed. This helps reduce the risk of dramatic shifts in average daily weight gain that could occur if the foal is asked to consume a new type of feed at this crucial time.

Feeding management

Once a foal is weaned, the youngster needs to be able to eat all its rations without interference from older or more aggressive weanlings. Feeding each weanling in a stall at least once a day will help ensure complete consumption of a meal and keep the weanling used to being handled.

Outside feeding can be accomplished by separating older and younger weanlings into groups and keeping the feed tubs well apart.

Other than when being fed, weanlings should spend the majority of the day and night outside in a group with other weanlings similar in age to lower their stress levels and avoid development of stereotypic behaviors such as aggression, cribbing, stall walking, weaving, pawing, and digging.

Additionally, young, growing horses must have the ability to run at high speeds for short periods of time to help increase bone mineralization and strengthen connective tissues such as tendons and ligaments. Growing horses kept in stalls without the benefit of turnout will have bone that is porous and demineralized, making it more susceptible to injury.

Weigh-in time

A Thoroughbred foal at four months of age will weigh on average 400 to 450 pounds. At this point, it is extremely important to

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begin tracking the growth of the weanling to make sure weight gain proceeds at a moderate and steady rate. Weanlings at this age should gain approximately 2½ to three pounds per day.

At six months of age, weight gain begins to taper off as growth rate slows (see box) until skeletal growth ceases about 36 months of age. By weighing the weanling every two weeks, the manager easily can see if an individual is growing too slowly or too quickly and adjust feeding and management regimes to regulate growth.

If scales are not available, weight tapes or a weight calculation devised by Texas A&M University can be used to determine a weanling's weight. Weight tapes might not be as accurate as scales in determining the exact weight of the weanling, but they are useful in measuring the change in weight between each weighing, which is actually more important than the actual weight of the weanling. For example, if during a two-week period, a four-month-old weanling has gained 45 pounds, the youngster is gaining too fast and the ration being fed needs to be adjusted to slow down rate of growth. Likewise, if the weanling has gained only 20 pounds, increasing feed intake is indicated.

The most effective way to use a weight tape is to measure the horse at the same time of day in the same location for each weighing with the weanling standing squarely. It is best to have the same person use the weight tape each time so little variation occurs in technique.

In the 2003 Equine Nutrition and Physiology Society proceedings, Kris Wilson, M.S., and Pete Gibbs, Ph.D., et al., from Texas A&M published a regression equation that can be used to accurately assess weight in growing horses. Using a simple seamstress tape measure, the measurements for a weanling are as follows:

Heart girth in inches^2
X
length of horse in inches
÷
280

The length of the weanling is measured from the point of shoulder to the middle of the muscle at the rear of the hindquarters. Heart girth is measured around the horse's barrel with the tape measure placed at the last hairs on the withers.

This calculation gives a remarkably accurate assessment of a weanling's weight. The equation can be used for adult horses by dividing by 330 instead of 280. Knowing the correct weight of all classes of horses is imperative for maintaining peak body condition and for ensuring correct dosing of medications.

What and how to feed

Once a weanling has made the transition to life without its mother, managers must focus on providing each individual with all the nutrients it needs to achieve full growth potential. At this stage, the foal will require high-quality forages and concentrates. In general, an alfalfa and grass mixed hay works well because the balance of nutrients compliments the needs of the rapidly growing weanling (see sidebar for sample of forage analysis suitable for a growing horse).

Horses at this age will eat about three to four pounds of high-quality forage daily in addition to all the pasture they can consume, but the pasture should not be expected to provide much more than calories. Concentrate consumption will be higher than forage in this category of growing horse because most digestion and absorption of nutrients must occur in the small intestine because the hindgut still is developing the capacity for fermentation.

Newly weaned foals should be able to consume five to seven pounds of concentrates daily, preferably split into three feedings. The concentrate the mare was eating when lactating still is correct for the weanling at this age and should contain high-quality ingredients. An example of a feed formulated to meet the nutrient requirements of weanlings is as follows:

- Crude protein minimum—16%;
- Guaranteed amino acids such as lysine (0.8%) and methionine (0.35%);
- Crude fat—7%;
- Crude fiber—10%;
- Calcium—0.8%;
- Phosphorus—0.7%;
- Copper—60 ppm (parts per million);
- Zinc—180 ppm;
- Selenium—0.5 ppm;
- Vitamin A—5,000 IU (international units) per pound;
- Vitamin D_3—500 IU per pound; and
- Vitamin E—65 IU per pound.

Other added-value ingredients for weanlings are yeast culture to aid in the digestion of fiber and increase the uptake of phosphorus to stabilize the pH of the hindgut; direct-fed microbials to help populate the hindgut with beneficial microbes; and chelated, proteinated, or organic minerals (look for minerals such as zinc-methionine listed) that are more biologically available to the horse than inorganic minerals (such as zinc oxide or zinc sulfate).

When using a preformulated product designed for a specific category of horse, do not mix in any other feed or cut the feed with oats; this completely unbalances the feed and deprives the horse of the correct amount and ratio of nutrients. Certain supplements such as silicon, glucosamine, chondroitin sulfate, and hyaluronic acid may be added without disturbing the balance of the feed. However, adding vitamins, proteins, and minerals will change the nutrient content of the prepared ration.

The concentrate should contain a low inclusion rate of grain products such as corn, wheat, oats, and barley, which in contemporary feeds are being replaced by higher levels of fat and soluble fiber to keep the digestible energy content of the feed high. Traditional sweet feeds are no longer recommended for growing horses because of the high level of starch, which appears to be directly linked to colic and the development of OCD (osteochondritis dissecans) lesions in the growing horse.

When a weanling eats a grain meal, the starch in the grain should be metabolized to glucose in the small intestine and absorbed into the bloodstream. If too much grain is fed at one meal, starch digestion is incomplete in the small intestine and undigested starch can pass into the hindgut. In the hindgut, it is rapidly fermented, and the resulting production of lactic acid causes a shift in the microbial population of the hindgut. This is particularly tough on a young horse that is just developing a healthy population of microbes in the cecum and colon. Often this leads to a digestive upset, such as gas colic, and could occur in some sensitive individuals that do not show outward symptoms each time they are fed a large grain meal.

If higher fat and fiber concentrate is fed to weanlings, less starch is available to enter into the hindgut. As a result, these feeds are safer to use especially when weanlings are fed large quantities of concentrated feed in preparation for sale.

Of equal importance is that in response to higher than normal blood levels of glucose after a starch meal, insulin is secreted from the horse's pancreas. Insulin is the hormone that facilitates the uptake of glucose into the tissues for storage as glycogen (stored form of glucose for energy) or adipose (fat, also used as an energy source). However, many foals between the ages of three and 12 months have been found to resist the effects of insulin.

Therefore, blood glucose and insulin levels remain elevated for four hours post feeding in these weanlings. The three- to 12-month age bracket also coincides with the appearance of many OCD lesions in growing horses. Research in young horses being fed high-starch rations has shown that elevated glucose/insulin affects blood levels of growth and thyroid hormones, both of which are directly involved in the maturation of cartilage into bone at the growth plates of long bones. When high-starch rations are fed to weanlings, the hormonal changes appear to cause a temporary suspension of cartilage

Sample of hay analysis suitable for weanlings

Alfalfa/grass mix

Dry matter: 90%
Crude protein: 16%
Acid detergent fiber (ADF): 31.7%
Neutral detergent fiber (NDF): 48.4%
Calcium: 1%
Phosphorus: 0.3%
Magnesium: 0.2%
Potassium: 2.3%
Zinc: 19 ppm (parts per million)
Copper: 8 ppm
Digestible energy (calories): 9,500 per pound
Note: ADF and NDF measure the amount of digestible and indigestible fiber in the forage.

into bone, which may lead to the development of the OCD lesions.

In addition to feeding less starch and more fat and fiber, increasing the frequency of feeding helps avoid overloading the digestive tract with too much feed at one time. Avoiding sweet feed and the "sugar buzz" it produces by using higher fat/fiber rations also might help produce a less fractious youngster.

Remember, the horse is a grazing herbivore with a digestive tract designed to process small amounts of fibrous feeds on a nearly continuous basis, not two large grain meals loaded with starch. Interestingly, mares fed high-fiber and high-fat rations as opposed to sweet feeds might produce foals with a lower incidence of developmental problems and could produce colostrum with a higher content of IgG (immunoglobulin G), which is responsible for providing immunity to the foal through passive transfer.

Correct rate of gain

If a weanling is growing too quickly, it is best to change the forage to all grass and discontinue feeding concentrate. However, protein, vitamins, and minerals must be supplied to the weanling, just without extra calories so the growth rate slows. This program also would be applicable to foals that have developmental problems.

A supplement that contains about 30% excellent quality protein (preferably from soybean meal or milk sources), vitamin, and mineral supplement can be fed according to the manufacturer's directions to provide all the nutrients in the correct amount and ratios needed by the growing horse. Weanlings growing too slowly or doing poorly should be examined by a veterinarian to determine if there is a systemic reason for the poor performance. If nothing appears to be wrong with the weanling, a gradual increase in excellent quality forage and concentrate is the best way to increase weight gain.

If this does not appear to be working effectively, higher calorie supplements such as rice brown oil or flaxseed oil and a well-balanced vitamin and mineral supplement can be added. Always make all changes to the feeding program gradually.

Weaning is a stressful time for mares, weanlings, and their handlers. Many problems can be avoided by preparing the foals for weaning well in advance of weaning day. By taking care of routine farm procedures and getting the foals to consume a good-quality ration before weaning, the possibility of injuries and erratic growth rates detrimental to the growing horse can be prevented.

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