



Issue 1 2010

Talking Breeding

From the editor...

Welcome to our inaugural issue of Talking Breeding which we plan to publish at 3 month intervals to provide you with reviews on a number of issues related to breeding and growing horses.

Talking Breeding is available in colour by email and you can register your interest by emailing Gary at newsletters@kohnkesown.com. Please state that you are interested in breeding horses to ensure that you are added to the appropriate Talking Horses newsletter email list and add your postcode for our email transmission check code.

In this issue we discuss some of the early signs of joint disease in foals, as well as nutrition of pregnant mares during the last 3 months before foaling.

We hope that you enjoy our 'Talking Breeding' newsletter and we trust that your horse breeding venture is successful.

All the best,

Dr John Kohnke
BVSc, RDA

Research Round Up

Twin births account for 1-2% of the equine population, with abortions due to twins causing up to 30% of total abortions in mares. About 8% of pregnant mares abort ('slip') their foals during the 11 months of pregnancy from a variety of causes, with a high proportion being twins in mid to late pregnancy. Surveys reveal that 64% of twins are aborted or are 'still born' after 8 months of pregnancy, with only 14% of surviving foals reaching 2 weeks of age. The biggest loss due to twin pregnancy is the reduction of subsequent breeding, with only 11% of mares aborting late term twins producing viable foals when bred in the following year. Natural twin reduction does not occur before day 11, and if twins are detected by an ultrasound scan between 9-20 days of pregnancy, 'pinching' or manual crushing of the smaller embryo is effective, with up to 90% of remaining embryos surviving to continue the pregnancy.

Natural reduction becomes less successful after day 40 of pregnancy. It is best to have a twin pregnancy detected before 21 days of pregnancy, with manual reduction between 16-40 days of pregnancy if abortion in later stages of gestation is to be avoided. One method is to reduce the energy intake in the mare carrying twins between 21 to 49 days of pregnancy by 30% (not starvation) over 2-4 week period, which can result in a natural 60% loss of the smaller embryo. Ref. Wolfsdorf KE et al (2009) AAEP Proc 55 page 259-261.

In this Issue...

- **Early signs of joint disease in foals**
– monitor foals every 7-10 days
- **Feeding during late pregnancy**
– a balanced adequate ration

Plus Handy Hints and lots more...

Handy Hint 1 Prepare a Mare for Foaling

A heavily pregnant 500kg mare carries up to 65-70kg of additional weight as she nears full term due to the combined weight of her unborn foal, membranes and fluids or 'the waters'.

This can make the mare uncomfortable during hoof trimming when standing on one hind limb. Plan to have the mare's hooves trimmed about one month before her due foaling date, worm her out to help reduce environmental contamination with Small Strongyles during the last month before foaling and administer a tetanus booster (toxoid injection) to help ensure she has optimum immunity at foaling against tetanus. Plan a follow-up hoof trim about a month after foaling once the mare becomes less 'foal proud' and anxious when handled.

It is also essential to remove Caslick's seal on the vulva before foaling. Check any mares bred away from your property or stud and arrange for your vet to remove the Caslick's seal at least 4-6 weeks before due foaling date, just in case the mare foals earlier than expected. If you don't remove the Caslick it may result in severe damage to the vulva during foaling.

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Early Signs of Joint Disease in Foals

- Monitor Foals Every 7-10 days

Foals may be born with limb deviations or 'bent' legs due to an inherited risk, excess energy intake in the mare and poor mineral and trace-mineral nutrition in late pregnancy or Uterine Distortion Syndrome (UDS) in an overweight mare (refer to Handy Hint 2). Calcium and trace-mineral nutritional deficiencies may also delay normal bone and cartilage development in the unborn foal in late pregnancy.

An excessive growth rate during the first 4-6 months as the foal grows quickly and virtually becomes 'too heavy' for its legs to support its weight, can compress joint cartilage before it fully matures by 5 months of age. It is important to regularly monitor a foal's joints for signs of early joint disease, bone developmental problems and abnormalities in limb growth and acquired conformation problems, such as turned-out limbs or upright pasterns as a result of over-feeding or a poorly balanced or inadequate diet.

A rapid growth rate can be fueled by high milk intake by a young foal (up to 20 litres a day can be produced by a 500kg mare) during the peak of lactation (4-10 weeks after foaling), resulting in the overloading of joints due to excessive bodyweight, with restricted or uncontrolled excessive exercise.

In more severe cases, devitalisation of joint cartilage and overloading of the subchondral bone (the layer of bone directly under the layer of joint cartilage) can occur due to excess bodyweight and the 'shearing' forces on the less resilient cartilage. This can result in cartilage death and lifting of the cartilage off the underlying subchondral base on the bone cap within a joint as it is loaded. When combined with subchondral bone collapse due to poor calcification, poor cartilage quality and reduced weight bearing capacity, as well as decreased blood supply as a result of excessive loading or trauma from exercise, the lifting of the devitalised cartilage and shearing off the underlying bone on the bone cap can result in Osteochondritis dessicans or OCD. Joint cartilage does not have a nerve or blood supply and relies on drawing in nutrients from the joint fluid as the cartilage compresses with loading and rebounds during each step or limb cycle. Young horses which are overweight also tend to not exercise adequately and 'stand on' and compress on their joint cartilage layers, which increases the risk of OCD.

Did you know that...

Orphaned foals which are fostered onto older, quiet, large breeds of mares, such as Draft mares and their Crossbreeds, or Warmblood mares, are at a high risk of developing growth plate and joint surface abnormalities because they are able to consume large quantities of milk. These mares are also often less active and the rapidly growing nursing foals do not exercise enough to facilitate joint cartilage growth and development. In this case, either foster two foals onto the one high producing mare, or milk the mare out 3-4 times daily, especially where foals are showing early signs of joint disease and confine the foal to a yard to avoid joint overload and exercise trauma.

Facts and Stats

- About 60% of newly born foals have minor limb deviations. Over 50% of these could be corrected in the first week after birth if the foals are confined to prevent paddock exercise and the risk of overloading their soft, easily distorted joint cartilage and the soft bone growth plates and subchondral bone.
- Foals are born with only 16% of the calcium content in their lower limb bones as compared to a mature adult bone, with 60% calcification occurring by weaning and 80% by 12 months of age. This requires that the diet must contain adequate calcium, initially from milk, but also from pasture and hard feed intake prior to and after weaning.
- Cartilage in the joints starts to develop at 6 months of pregnancy. During the last 3 months before foaling, the limbs and joints undergo a rapid increase in size by 47% during this period and a doubling of the foal's bodyweight to birth.
- Cartilage in joints and collagen in tendons continue to develop up until 5 month of age in a young foal. A diet low in trace-minerals, particularly an inadequate or imbalanced intake of copper, zinc, manganese and iron, or even a diet high in iodine, can delay cartilage maturation and optimum weight bearing function. If healthy, fully developed cartilage is not matured by 5 months of age, it is likely that the young horse will have lower strength and less resilient cartilage and tendons for the remainder of its life.
- Early signs of joint abnormalities affect the growth plates on the ends of the long bones of the lower limb, with the development of 'apple joints' in the fetlock (physitis) at 6 months of age and 'open knees' in the knees (epiphysitis) by 10-12 months in rapidly growing, overweight young horses.

Handy Hint 2

Identify 'Good Doers' in a Foal Group

Some foals are simply born to be 'good doers', often inheriting the 'thrifty gene' and thereby tending to eat more and put on condition easily, especially when nursing on a heavily producing mare or being supplemented with high energy "cow pastures" or hard feed co-shared with the mare, or a creep feed. If you notice that one or more young foals are beginning to rise up on their front pasterns, (often referred to as 'upright' pasterns) or the foal appears to 'rock' forward on its knees when standing, then the affected foal(s) should ideally be separated out of the group and the feeding and exercise managed to reduce the rate of growth and development. However, if you are feeding a commercial foal feed and you cut back on the amount to reduce the energy intake, ensure that you maintain an adequate intake of calcium and trace-minerals, such as by adding a daily supplement of **Kohnke's Own Cell-Grow**, to help make up the shortfalls in the reduced ration intake. This is important to help ensure cartilage and bone growth is maintained as the young horse reduces in condition to take the excess loading off its joints, or naturally exercises more and overloads its already devitalised cartilage and subchondral bone.

Handy Hint 3

Avoid Galloping Young Foals to Holding Yards

It is unwise to allow young foals with a mare group to gallop to a holding yard for routine worming or hoof trimming, over distances of more than 500-700 metres. The sudden increase in cartilage and subchondral loading, especially in the heavier foals, can result in overloading of joint cartilage, as well as a risk of inhaling aerosol 'rattles' organisms in dust as foals gallop in behind mares up race-ways and in the holding yards during dry weather. Observe a young foal after it gallops with its mother and watch for attempts to lay down immediately after it has galloped. It is likely that joint cartilage or subchondral pain is present and joint damage has been caused by the high loading of fast, extended exercise on the immature cartilage and bones.

Early signs of Joint Pain in Young Foals

It is important to regularly observe young foals which are growing rapidly on high producing lactating mares for signs of developing joint disease, before the joints themselves become enlarged or the growth plate spreads ('squashing' due to excess weight bearing or exercise) or becomes reactive or inflamed, referred to as **physitis** (fetlocks) or **epiphysitis** (knees, shoulder joints, hocks and stifle joints).

You should observe all foals on a daily, or at least at 3-4 day intervals, for the early signs of developing joint disease, particularly 'good doers' which can become "too big, too early"

Signs include:

- **More time spent lying down**, especially after paddock exercise, as compared to other foals - this is often the earliest sign of discomfort due to joint cartilage inflammation and subchondral bone overload, with development of OCD or a devitalised cartilage flap as it detaches from the underlying subchondral bone in the front fetlock joints in particular.
- **Minor joint fluid swelling** in the front fetlocks, combined with stiffness and difficulty in keeping up with the mare or other foals in the paddock.
- **Tendency to stand with the front limbs slightly bent forward at the knee** ('rocking at the knees') when standing or just after exercise, with a straighter pastern and more upright conformation (often described as "contracted tendons") in the front limbs, because of low grade joint pain resulting from a developing cartilage defect. There is a genetically influenced form of tendon contraction in Thoroughbred foals which is exhibited at birth, but may correct within the first 4 weeks of age.
- **Attempts to lie down instead of standing still after activity**, with bending forward at the knees and difficulty in lying down comfortably.
- **Progressive development of upright conformation** - straight pasterns, 'up on the fetlocks', as fetlock osteochondrosis and early OCD is frequently seen in young, rapidly growing foals up to 6 months of age.

'Wobbler' Syndrome

Careful observation of young foals during the first month of age can also help to determine foals which are at risk of developing 'wobbler syndrome'. This syndrome is considered to be due to the abnormal formation of cartilage in the cervical 5-6 junction in the neck vertebrae. It is most common in rapidly growing foals or possibly those with a genetic risk of developing the syndrome. It is considered to be a skeletal developmental problem (SDP) and related to Developmental Orthopaedic Disease (DOD).

The syndrome causes malformation of the cervical vertebral canal and cartilage discs at the cervical articulation, which can 'pinch' the spinal cord and result in nerve damage and partial paralysis and incoordination of hind limb movement. Although it is often not manifested until 9-12 months of age, with up to a 2% incidence in Thoroughbred foals, the early signs in susceptible young foals between 2-6 weeks of age include:

- Inability to learn to trot - affected foals either walk, canter or pace.
- Standing with the front legs wide apart to balance the hindquarters, instead of standing with one front leg forward when feeding.

- Problems with coordination and balance when the body is pulled to one side by grasping the tail as a foal walks.
- Lack of coordination when attempting to feed from a ground feed bin - bumping into the bin with the nose before feeding.

If you observe any of these signs, it would be advisable to have the foal examined for neurological damage by your veterinarian.

Early cases can be managed to improve nerve function to prevent further cartilage and bone malformation by supplementing with additional trace-minerals and restrict energy intake, but in most cases, the symptoms are progressive and the foal becomes severely incoordinated and incapacitated.

Management to Avoid Cartilage and Subchondral Bone Weakness

Joint cartilage does not have its own blood or nerve supply and relies on exercise to compress and rebound to draw in joint fluid to fuel its development and resilience. If a young horse develops joint pain, it signifies that the cartilage is diseased or poorly developed, or a dying OCD cartilage flap has lifted off the highly sensitive subchondral bone at the end of the bone shaft before the growth plate and is carrying excess loading or is worn away by over-exercise.

1. It is essential that the diet contains adequate bone minerals for bone development (calcium, phosphorus and magnesium), trace-minerals, especially copper, zinc and manganese, as well as selenium and iodine, which are widely deficient in Australian soils and pastures (refer to map of soil deficiencies in Australia Page 4), as well as vitamins A, D, E and K.
2. Feeding a well formulated pellet or mixed ration during the last 3 months of pregnancy, during lactation and after weaning will help to avoid joint cartilage defects when combined with adequate, but not forced or excessive paddock exercise. If the full recommended amount of a prepared mare and weanling feed is not being fed due to good spring pastures and risk of over energy supply and body weight gain, then a daily supplement of a product such as **Kohnke's Own Cell-Grow™** should be feed to make up shortfalls of these important nutrients.
3. Aim for medium growth rates in a young foal to roughly double its birth weight by one month of age, (to 100kg for a foal of 50kg birth weight), double it again by 4 months of age (to 200kg body weight) and double it again by 16-18 months of age (maximum 400kg). Monitor growing foals every 7-10 days and if early signs of joint pain are present, confine the young foal to a yard with the mare to prevent it exercising excessively and traumatising the devitalised joint cartilage. Check the mare's ration to ensure that it provides adequate nutrients for bone and cartilage development. You may wish to email simone@kohnkesown.com for ration analysis using the FeedXL ration analysis program- this is a free service.

Note: Factsheet No. 10 Preventative Management to Avoid Limb Growth Abnormalities in Young Horses, which includes underlying causes and management to correct and prevent further joint deterioration, is available by emailing Gary at newsletters@kohnkesown.com

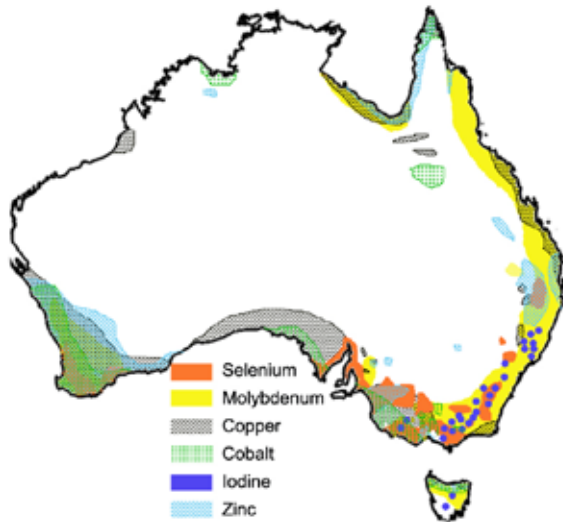
Feeding During Late Pregnancy

- a balanced adequate ration

Most mares in Australia are bred in the spring to midsummer period when mares cycle more frequently and fertility is at its optimum. This means that most mares, allowing for their 11 month period of pregnancy, are in the last trimester of pregnancy (last 3 months or 8-11 month of pregnancy) in the mid winter to mid spring season. Early foaling mares therefore pass through their last 3 month of pregnancy during the colder winter months, often with less available pasture and hence energy, protein and mineral intake, unless they are supplemented with hard feed, hay and calcium and phosphorus and a range of trace-minerals to make up shortfalls in their diet.

Nutritional needs of late pregnancy

Studies have shown that the unborn foal must be able to receive adequate energy, protein, bone minerals, trace-minerals and vitamins through the placenta to fuel its rapid growth of doubling its weight and a 47% gain in size during the last trimester of pregnancy. The young foal also needs to store reserves of calcium, copper, zinc, iron and vitamin A in its liver to supplement the relatively low level in mare's milk during early lactation after foaling. Many grass based pastures are unable to provide adequate bone minerals and soil deficiencies of trace-minerals including copper, zinc, manganese, selenium and iodine are widespread in the major horse raising areas in Australia.

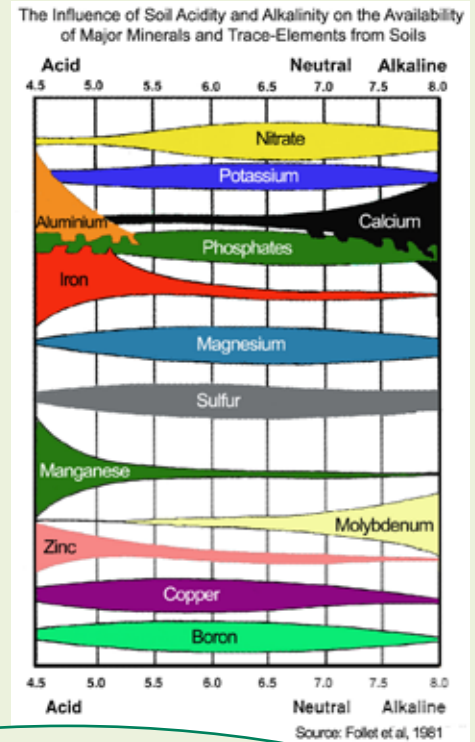


Note: It might be hard to see all of the colours on the map in the south-western corner of Western Australia. This area is deficient in most trace-minerals, with selenium deficiency being a particularly significant problem.

Handy Hint 4

Avoid Excessive Liming of Pastures

Many horse owners believe that applying powdered limestone (Ag-lime) to 'lime' pastures helps to destroy L3 stage infective Strongyle larvae. There is no scientific basis for this practice as L3 stage larvae have a thick protective sheath to shield them against dehydration and chemical reactions. Liming does help to neutralise "horse sick" pastures due to urine saturation. However, excessive liming to 'sweeten' the soil to make it more alkaline for growth of grass rather than weeds can significantly reduce the availability of many trace-elements including copper, zinc, molybdenum and manganese as the alkaline micro-environment created limits plant uptake. As these are trace-elements which are already widely deficient in Australian soils, supplements of these in prepared feeds or additives are required to make up shortfalls for mares in late pregnancy, lactating mares and young foals. **Kohnke's Own Cell-Grow®**, containing a 3 Supplet® pellet blend, is formulated to top-up prepared feed where the full recommended feeding level is not provided, and it's ideal for home-mixed hard feeds as it contains the latest recommended (NRC 2007) levels of copper, zinc, iodine and all other nutrients in a mixed pellet form.



Handy Hint 5

Locate Pregnant Mares in a Well Drained Paddock

Pregnant mares require exercise to maintain some degree of natural fitness. This can be facilitated by locating feeds and the water source at the opposite ends of the paddock to encourage them to walk for food and water. It is important to provide heavily pregnant mares with a well drained area such as a small rise or mound, with trees or a windbreak sheltered from the prevailing wind. It is important for them to seek dry areas to keep them away from wet muddy conditions. Excess moisture uptake in their hooves can result in softening of their hind hooves and lameness as they carry an additional 12-15% of bodyweight over their lower back and hind limbs. Twice weekly applications of **Kohnke's Own Hoof-Seal®** will help to maintain natural moisture control within the hoof walls and soles so as to keep the hooves strong and resilient for weight bearing.

Handy Hint 6

Beware of Uterine Distortion Syndrome on Hilly Country

Studies have observed that overweight mares confined to hilly country have a higher incidence of foals being born with deviated and bent legs. It is thought that Uterine Distortion Syndrome (UDS) is caused by the abnormally high compression forces on the unborn foal in the womb during the last two months before foaling as fat mares graze on hilly country. It is recommended that these mares be moved to an undulating or a flat, but well drained, paddock to minimise this physical compaction and restriction on the rapidly growing unborn foal. Avoid allowing a mare to become too fat prior to foaling as it may increase the risk of limb deviations and complications during foaling, as well as reduce the volume and protein content of milk produced to feed her foal, resulting in a slower growth rate in her foal.

Products of the Month

CELL-GROW® Cell-Grow is a comprehensive vitamin and mineral supplement for optimum body, bone and skeletal development of the growing foetus

The Perfect Pair for Pregnancy

E-Se Supplets helps ensure optimum fertility in your mare by providing a superior organic selenium and vitamin E supplement

E-Se Supplets