

MANAGEMENT OF THE FOALING MARE & NEWBORN FOAL

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It is extremely difficult to compress so important and vast a subject as horse breeding into a small space and still more difficult to condense it into readable form. The evolution of the horse goes back 50 million years and the relationship between humans and horses can be traced back to 20,000 BC, to the last Ice Age. Said to have been fashioned by Allah from a handful of the Southwind, the Arab tap root is the worlds oldest bloodstock - passing to Europe via Egypt and North Africa and carried afar by the Arab seafaring traders long before the Christian era. Mentioned in the Koran, The Prophet stresses the importance of preserving the pure Arabian bloodlines, giving specific instructions on how this should be achieved. Following these precepts, in Middle Eastern countries today, a Moslem owner of an Arabian stallion will not charge service fees, so that even poorest owners of Arabian mares can upgrade their stock.

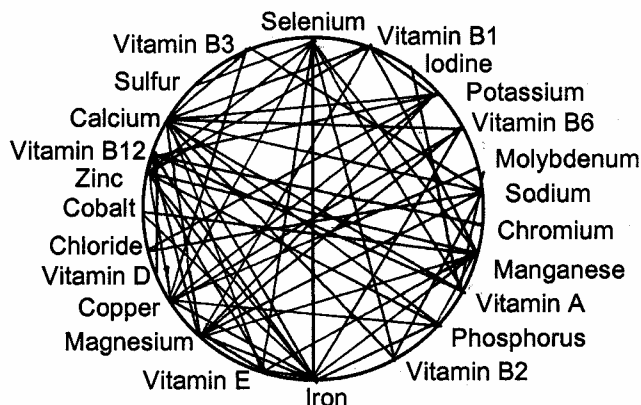
The Egyptians and Ancient Greeks were the first civilisations to practice selective breeding in horses. Over 300 different breeds of domestic horse were developed in the course of many centuries. The achievements have been impressive, but the basis for the large variety of breeds was created in the 50 million years that Equus evolved, created by nature before humans intervened. Because of the stresses imposed by modern living conditions, management practices should wherever possible respect and mimic nature.

There are many ways in which we inadvertently and with the noblest of intent, work against the very life processes we most sincerely wish to support and foster. While it is beyond the scope of this article to cover all aspects of mare and foal management, a working knowledge - based on the lore, wisdom and experience passed down through the ages - of best practice, what is normal and when to seek veterinary advice is presented.

Preparation for foaling: Three months before : Until the last 3 months of pregnancy, nutritional requirements do not differ from non-pregnant mares. From 8 months pregnancy onwards, correct nutrition is essential, but simply feeding more may not be adequate. The diet must be balanced and meet all nutrient requirements. The milk of all species is low in minerals. For this reason the fetal foal must store minerals - including copper, zinc, manganese, selenium and iodine. These reserves are built up in the liver and will supply the foal with minerals during the most rapid period of bone growth - the first 3 months after birth. If the mare's diet is lacking in these minerals, the foal will be unable to build reserves and bone and joint development will be affected.

If on good pasture, mares require only a vitamin and mineral supplement. Both the amount and the ratios of vitamins and minerals are critical. The graph below shows potential vitamin-mineral interactions.

MINERAL AND VITAMIN INTERACTIONS



Feeding several different supplements increases the risk of overlap, toxicities, deficiencies and imbalances. For this reason Mitavite has formulated Promita - a fully extruded, concentrate containing all recommended vitamins and minerals including protected, heat-stable chelated mineral proteinates. This prevents mineral-vitamin interactions and improves mineral uptake and absorption. Promita is used to balance both pasture and traditional diets. Where pasture is limited or of variable quality then it is a source of roughage only. A complete feed - balanced for energy, protein, essential amino acids, vitamins and minerals - is required. Extruded feeds offer significant advantages in terms of nutrient absorption and digestibility - reducing the weight of feed necessary to meet nutrient requirements. Gut overfill is a risk factor for peri-foaling colics.

One month before: Mares should be vaccinated against tetanus and brought to the foaling location at least one month before foaling. This allows the mare to produce antibodies to bacteria in the local environment and transfer this immunity to her foal. In one study, the incidence of diarrhoea was 63% higher in foals born to mares recently bought to farms for foaling than it was in resident mares.

One week before: If the mare has had a Caslicks operation, this should be opened a few days before foaling. Mares can be foaled in stables or on clean pasture. Stables should be scrubbed with phenolic or iodophore compounds to kill bacteria and rotavirus. Dirt or clay floors should be limed and rubber flooring should be cleaned and disinfected on both sides. Straw bedding is preferable to wood or peat shavings as the latter are abrasive, cause contamination of the umbilicus, are readily inhaled by the foal, are more easily drawn into the vagina during foaling and double the risk of foal diarrhoea.

Predicting foaling time: The following table summarises changes, which commonly occur, but may not be present in all mares.

SIGNS OF IMPENDING FOALING

2 - 4 weeks	Udder distension
1 - 3 weeks	Abdomen drops, hollows in front of hips, relaxation of tail base
4 - 7 days	Teats have clear, watery secretion, mare may become 'clingy' and seek your company
1 - 4 days	Secretions become cloudy and wax-like, calcium levels rise

1/2 - 1 1/2 days ***Vulva becomes soft, no evening rise in rectal temperature***

Birth before 320 days is considered premature and before 300 or after 375 days is not usually compatible with life. Two tests which most reliably predict time of foaling are changes in rectal temperature and changes in calcium levels in udder secretions - rectal temperature indicating when foaling is likely and calcium levels indicating when she is not likely to foal. Rectal temperature between 10pm and midnight is usually 0.1°C higher than mid-morning. When evening temperature is equal to or lower than the morning temperature birth will usually occur within 24 hours.

Mammary secretions can be collected to measure calcium levels. A simple test-kit using colour change is available. Because calcium levels increase to a maximum for 5 to 16 days before foaling, this method most reliably indicates when foaling is not likely to occur. If calcium levels are low, the mare is not likely to foal soon, whereas if the level is high she will foal anytime in the following two weeks and most likely within the next 2 - 4 days.

Stages of Foaling:

STAGE 1: WATER BREAKS

2 - 5 hours before delivery and 2-3 hours before the membranes rupture (water breaks). Delivery must occur within 30 to 60 minutes after the water breaks.

Stops eating, restless, lying down and getting up (this helps position the foal for delivery through the birth canal), tail swishing, sweating frequent urination - if disturbed at this stage, the mare can delay birth for many hours. After the water breaks the mare cannot delay foaling.

STAGE 2: PRESENTATION

5 to 15 minutes after the water breaks the foal should be presenting at the vulva. If it has not appeared after 20 to 30 minutes urgent help is required

The bag containing the foal presents at the vulva. The two forefeet come first. One foot is 10-15 cm in front of the other (this prevents the elbows squashing the chest as they pass through the canal). The soles of the hooves should be facing down. The muzzle appears, resting on the forelegs. Most mares stand during this stage.

STAGE 3: DELIVERY

15 minutes or less to delivery

Most mares lie down and labour begins. If the foal is not delivered within 15 minutes, she should be kept standing and walked until veterinary assistance arrives.

STAGE 4: EXPULSION OF THE MEMBRANES

15 to 90 minutes after delivery

If the membranes are retained longer than 4 hours, the risk of infection and laminitis is high and veterinary assistance should be sought.

The desire to intervene in a normal delivery should be resisted for several reasons. Firstly, during natural unassisted delivery the passage of the foal forms an arch rather than a straight line. When assistants grasp the front legs to hasten the exit of the foal, the direction of pull is generally straight and this has effects on chest compression, internal organ damage and the passage of the hips. Second, the foal receives up to 1/3 (about 1500ml) of its blood volume after delivery, as the umbilical cord continues to pump blood into the foal. If the cord ruptures prematurely due to overzealous intervention or the mare standing rapidly after birth, the foal is denied this transfusion and will be compromised. The most important assistance at this stage is to ensure the membranes are not covering the nostrils.

Care of the Foal at Birth:

15 minutes	If the cord has not broken, twist at the natural constriction 2cm from the foal's abdomen. Soak stump in iodine preparation - avoid spilling on the skin. Reapply twice daily for 3 days.
1 - 20 minutes	Foal should show sucking reflex
15 - 165 minutes	Foals generally stand within 1 hour of birth
1/2 - 3 hours	The foal should begin nursing from the mare within 2 hours
3 - 24 hours	Passage of meconium - may be pellets or paste-like and is dark brown to black. A change in colour to lighter brown softer faeces indicates the meconium has been passed.
4 - 6 hours	Keep the placenta for veterinary examination.
6 - 48 hours	Monitor udder distension. If udder is full and tight foal may not be nursing or mastitis may be developing. If soft and flaccid milk production may be inadequate.
6 - 10 hours	Foal should be passing urine. Urine dribbling from umbilical stump requires veterinary advice.
10 - 12 hours	Routine blood test to determine immunity levels in foal.
12 - 24 hours	Observe gait, limbs and joints for signs of lameness, swelling or deviation.
24 hours	Worm mare with ivermectin to prevent worm transmission through the milk.
7 - 10 days	Foal-heat diarrhoea occurs. This also occurs in hand-reared foals with no dam on heat and is due to colonization of the foals gut with the normal inhabitants of the adult gut

Identification of the High-risk Foal:

1. *Mare conditions:* vaginal discharge before birth; fever; previous foal with problems; running milk prior to birth; prolonged transport prior to birth; maternal aggression towards the foal.
2. *Birth conditions:* premature birth; prolonged birth; difficult birth; early cord rupture or excessive bleeding from stump; adverse environmental conditions. The membranes should not be removed from the stable for at least 2 hours after foaling as the mare's examination of these is extremely important for her bonding with the foal.
3. *Foal conditions:* meconium staining of fluid or foal, placental disease; twins; orphan; delayed or lack of colostrum intake; immaturity, prematurity or small foal; failure to be up and nursing by 2 to 3 hours of age

If any of these factors are present, veterinary assessment is required and the foal should be observed for subtle changes. Some foals may be 'normal' at

birth but close observation will reveal slight changes, which are not specific for any particular disease or infection, but represent a need for evaluation. These changes include:

- *excessive sleepiness* - the difficult task of lying down is usually mastered following the first feed, although some foals fall asleep while standing and may fall down if they go into a deep sleep - rarely do they injure themselves. Within 3 hours of birth the foal will sleep for about 7 minutes before nursing again. Frisky play movements begin as early as 2 hours and galloping at about 6 hours. By the end of the first day the normal foal will be grooming itself, nibbling grass, fences and other mysterious objects it discovers in its explorations, galloping, urinating and passing faeces. The normal foal will feed for 1.5 to 2 minutes 18 to 24 times per day and sleep for 15 to 30 minutes 20 to 25 times per day. If the foal appears drowsy, excessively sleepy or is not feeding vigorously then a veterinary clinical assessment is indicated.
- *lack of recognition of the mare, apparent blindness:* By 1 to 3 hours of age, the foal should be nuzzling the mare's head and forequarters, follow her and take shelter beside or behind her. If the foal appears unaware of the mare's presence, urgent veterinary examination is essential.
- *infrequent urination:* colts generally urinate within 6 hours and fillies within 11 hours of birth and thereafter 4 to 10 times per day. Reduced urination usually indicates that the foal is not getting sufficient milk and requires investigation.
- *a full udder and/or milk on the foal's face:* examination of the udder and observing the foal at the teat are very important but can be misleading. A full udder may indicate a good milk supply, but it is also a common sign that the foal has gone off the suck - a critical sign that all is not well. Likewise, seeing a foal approach the udder and apparently suck is not conclusive evidence that it is drinking. Milk on the face and nose indicates that the foal is not actually attaching to the teat and ingesting milk. Such foals are often in the early stages of an impending illness. As an early warning sign this should not be ignored.

Other periods of risk: At 2 to 4 months of age the immunity the foal received from the mare is beginning to wane and it's own immune system must take over. If the foal received insufficient or poor quality colostrum or it's own immunity is not fully developed, this age can be a period of risk for many diseases - including diarrhoea, pneumonia (including 'rattles'), encephalitis and septicaemia. Routine monitoring of the foals immunity at 10 to 12 hours of age and daily observation of normal behaviour will allow early detection of the at risk youngster.

Reducing the risk of bone diseases: Overfeeding, lack of exercise and imbalanced diets are the major causes of bone, tendon and joint problems. The foal should not have access to the mares feed until at least 2 months of age. Under normal circumstances the mare's milk should be all that is required. Monitoring growth rate by fortnightly weighing or conditioning-scoring allows a great deal of control so that optimum growth rather than maximum growth occurs. For a stallion mature weight and height of 465kg

and 15h and mares of 445kg and 14.2h, the following weight gain should not be exceeded:

Age	kg/day	4 - 5 months	0. 9	9 - 10 months	0. 55
0 - 1 month	1. 5	5 - 6 months	0. 8	10 - 11 months	0. 5
1 - 2 months	1. 35	6 - 7 months	0. 7	11 - 12 months	0. 45
2 - 3 months	1. 2	7 - 8 months	0. 65	12 - 18 months	0. 35
3 - 4 months	1. 05	8 - 9 months	0. 6	18 - 24 months	0. 25

At these rates, the foal should reach 47% of mature weight and 86% of mature height by 6 months, 67% of weight and 92% of height by 12 months and 100% of weight and height by 3 years of age.

At weaning the provision of a balanced, readily digested, high quality feed is necessary to allow the attainment of genetic potential in terms of bone and muscle development. **Hard feed, concentrates and supplements must be digested in the small intestine.** If they are fermented in the caecum the nutrient value is destroyed. This is because when grains and proteins ferment glucose is converted to lactic acid and essential amino acids are degraded to ammonia. Both are major risk factors for colic, diarrhoea and laminitis.

Even when feedstuffs, percentage protein, lysine and methionine levels, mineral and protein supplements are selected with exacting care and the diet formulated to meet the precise requirements of the individual horse, the effort and attention to detail in formulating the diet is wasted if the feed is not digested in the small intestine. Extrusion processing improves digestion in the small intestine from 30 to 92%. Mitavite produces a range of extruded feeds to meet the varying individual requirements of studs and breeders.