Growth and Development

STAGES OF FOALING

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Approximately eleven months have passed since conception and the miracle of a new life is about to begin. This is a very exciting time as we wait to see the foal for the first time, however, there is a chance that a problem could develop where knowledge and proper preparations could save the life of both mare and foal. Most mares foal without complication, however, it is important that they are monitored regularly as foaling progresses. Mares prefer to foal when all is quiet so any checks on the mare should be done with as little light and disruption as possible.

If the mare has a caslick vulvoplasty it should be reversed to prevent tearing of the vulva and anus during foaling. This is usually done during a pre-foaling veterinary visit two to three weeks prior the expected date of delivery.

The mare may begin to show the first signs of parturition (the birthing process) up to six weeks prior to foaling as the numerous physiological changes begin to take place. Some of the first signs may be: the mare's development of an udder; distended teats; a day or two prior to foaling the mare may wax or begin to leak colostrum; one to three days preceding foaling the area around the tail head will start to soften and become spongy; frequent urination; the vulva will become noticeable elongated and show some signs of edema; within a few hours of foaling you may notice a change in the mare's profile when looking at her from the rear as the foal may "drop" making the mare appear narrow and deep.

Calcium levels can be analysed using test strips that are made for measuring water hardness to help determine when foaling will occur. The strip consists of five zones of increasing sensitivity for both calcium and magnesium. An increase in calcium causes the colour to change on the strip. Testing should be done on a daily basis. When four out of five zones have changed there is an 80% probability that the mare will foal within 12 hours and when all five zones have changed the probability increases to 95%.

A laboratory can measure the levels of sodium and potassium in the colostrum. As foaling approaches, the sodium level begins to fall rapidly while the potassium level rises. At the time they cross over, foaling will occur within 12 hours.

Stage One Labor:

In the year 600 BC, Hippocrates stated that is was the foal that controlled the time of birth. It took scientists until the early 1960's to gather enough evidence to support his claim. The pituitary gland, located at the base of the brain is the main endocrine gland in the body, which produces hormones that are released into circulation, targeting other endocrine glands throughout the body. The main endocrine gland under pituitary control is the adrenal gland, located just behind the kidney. The pituitary gland produces Adrenocorticotropin (ACTH), which targets the adrenal gland, instructing it to release Cortisol. Scientists have been able to demonstrate a steady rise in the level of foetal cortisol as foaling approaches. This increase appears to be the signal for the foetus that it

is fully mature and ready for birth. Because the foetus and the mare share the same circulation, the foetal cortisol passes into the mare, triggering a chain of biochemical events that starts the birthing process. It appears the foal will decide what day it is born, where the mare will decide the time of day.

The first stage is a preparation phase and can be difficult to identify as some mares may show very little sign, while others may exhibit symptoms similar to colic. Restlessness, walking, sweating, having an anxious behaviour, getting up and laying down, rolling and possibly looking at her abdomen or even kicking at her sides are some common actions you may witness. The mare during the first stage of labor has the ability to delay it if she feels the time is not right for the foal to be born. The mare will then restart labor when she feels the time is right. Four to six weeks prior to delivery the mare should be slowly introduced to the foaling area so that she is familiar not to incur any unnecessary stress.

Labor will begin when the placenta increases the levels of estrogen and progesterone levels decrease (the opposite of gestation) allowing myometrial (contractions of the uterine muscle) activity to begin. This increase is linked to the increase in the levels of oxytocin and prostaglandins F2a that may be controlled by the mare. Studies are showing that oxytocin levels may be directly linked to light, which may explain why the majority of foals are born between 10p.m. and 2a.m. Relaxin may have a role in the relaxation and softening of the pelvic ligaments and cervix as parturition approaches.

The foal takes on an active role and will rotate from a position of lying on his back with forelimbs and head tucked towards his tail to a position where his head and forelimbs are extended, one forelimb stretched out further than the other toward the mare's vulva. It is believed that the movement of the mare during these initial contractions assists the foal in moving into the correct birthing position.

The muscles in the uterine wall will begin to contract rhythmically starting at the anterior end of the uterus and becoming stronger as they move toward the cervix. It is the increasing intensity in the contractions that cause the mare to become anxious. As the contractions continue the foal moves up the birth canal, the mare's cervix relaxes and the chorio-allantois is pushed into the cervical canal while the vagina increases the pressure at the cervical star. This is the end of stage one labor.

There are many opinions on the expected timeframe for this first part of labor, likely due to the fact that it is very difficult to know exactly when the first stage has actually began. MCG Davies Morel allows 4 hours for this stage, The Birthing Wheel states 1-2 hours, Debra Hagstrom, University of Illinois states a few minutes to several hours and Dr. LeBlanc comments that this stage lasts from 15 to 90 minutes if even noticed.

Stage Two Labor: "The Expulsion of the Fetus"

The pressure of the placenta at the cervical star will cause it to rupture releasing two to five gallons of amniotic fluid representing the start of stage two labor. After the placenta ruptures the contractions continue. Once this stage begins the mare is no longer able to defer labor. The mare will now likely take on a recumbent position or lay down for her own comfort and to prevent injury to the foal. The foal is presented in the intact

amnion, and appears as a white membrane (or a red "velvet" membrane: that is an emergency situation that I will discuss later) bulging through the mare's vulva. The foal should present itself with one foreleg slightly ahead of the other with the soles down, and then the nose will appear next, resting between the front feet. The foal should be left with its hind legs still within in its mother and the umbilical cord intact. This provides a tranquillizing effect on the mare and should be encouraged, as it allows initial recovery while reducing inspiration of air and reducing bacteria through the still relaxed vulva. This period will mark the beginning of the bonding between mare and foal as she begins to lick and dry the foal. Once the foal is delivered the second stage of labor is ended.

Stage two labor consists of strong contractions that are triggered mainly by the two hormones prostaglandins and oxytocin.

This expulsive stage should normally consist of 15 to 30 minutes. If this stage is not complete within 30 minutes of strong contractions a veterinarian should be called to assess the situation.

Mares seldom experience dysotcia, however, if problems are to occur it is usually during the second stage of labor and very fast actions are required. Typical problems of foetal dystocia are caused almost exclusively by malpresentations in utero, making a normal birth impossible. Malpresentations that occur include: "dog sitting"; hind leg present with foreleg; forelegs bent back at the knee; head bent backward towards the chest; one foreleg bent backward; head bent to the side; head and neck bent backward; buttocks presented first; hocks flexed with hind legs under the body or the back against the cervix. Foals that are not in correct positioning can still be successfully born if a trained person can push the foetus back and reposition it with the forelegs and muzzle in the birth canal. An inexperienced person can make the conditions worse; therefore, veterinary assistance is preferable.

Maternal dystocia is the failure of natural delivery as a result of a maternal complication. If a red membrane presents itself placenta praevia is occurring, which is when the intact red allanto-chorionic membrane pushes through the mare's vulva, usually due to the failure to rupture at the cervical star. This may also happen due to premature separation of the placenta from the maternal epithelium, or from placentitis. Often an extra thick placental membrane will cause this problem. If the allanto-chorionic is manually broken parturition can progress normally. This situation is an emergency that must be dealt with immediately without taking the time to call the veterinary as the oxygen supply to the foal is cut and the foal is at risk of death. The placenta needs to be carefully cut open with great care not to injure the foal and the foal removed. Once the amnion is opened the foal should take its first breath.

Small pelvic openings, uterine torsion, rupture of the uterine artery and uterine inertia are some of the less common problems that can occur. Often the only solution for these problems is a Caesarean section.

Stage Three Labor: "The Expulsion of the placenta"

Stage three labor begins after the foal is completely delivered and ends after the placenta is completely expelled.

After delivery of the foal the mare should lie undisturbed for as long as she desires. The foal will begin to struggle to stand or the mare will stand and the umbilical cord will break (cutting the cord can prevent natures rapid clotting). The umbilical cord has a natural stricture where it is designed to break. Once the umbilical cord is broken it should be treated with an iodine solution to prevent infection to the foal. If the mare stands and the placenta is hanging from the vulva it should be tied up in a ball at hock height to prevent the mare from stepping on it and tearing it off. Premature tearing can result in part of the placenta not being expelled and remaining within the uterus. The uterus will continue to receive chemical messages from the oxytocin hormones that will maintain the contractions of the uterus to expel the placenta. The blood supply will shutdown to the placenta causing it to gradually deteriorate in size and separate from the uterus to complete the delivery. If anything happens to alter these circumstances that upsets the sequence the normal shedding of the placenta will breakdown. Once the placenta is expelled, spread it for examination to ensure that it is intact. Retained placenta, even in small portions, can cause serious infection; endometritis, infertility or laminitis and if left untreated some complications could cause the death of the mare.

Different sources specify various timeframes in which are deemed safe for the final expulsion of the placenta. Times range from three hours to twelve hours. My own veterinarian advises that likes to be contacted after three hours for an initial assessment and that I should never wait longer than six hours. He advises that often an injection of oxytocin in the early stages can intensify the contractions of a tired mare by boosting the hormone level and the placenta will pass normally and quite quickly.

Prevention of Problems:

Statistics show that most mares foal without any complications versus the deliveries that do have complications. Knowing your mare, her normal behaviours, regular vital signs and having her history properly documented for quick reference are imperative in assessing if things are progressing properly. Once the first stage of labor begins very close watch must be kept on the time that the different stages are taking for making proper decisions and assessing if a true emergency is arising.

Providing the mare with a safe, quiet foaling area with as little human interaction as possible is preferable. A proper foaling kit as outlined on page 190 of the course text is crucial should any type of complication arise. To know the normal process of parturition gives you the knowledge required to know when to call your veterinarian for assistance.