



The welfare of broodmares and foals continues to be an extensively researched area in equine health

Facilitating a Smooth Pregnancy

RESEARCH REMAINS ROBUST ON MARE & FOAL HEALTH

By AMANDA DUCKWORTH

THE BEGINNING OF a new year is also the start of new dreams for anyone who has a pregnant broodmare. The effort and research that went into planning the mating, the time spent keeping her happy and healthy during her pregnancy, and the hopes that she is carrying a future champion keep many going during the cold winter nights.

The Thoroughbred industry is well-versed in providing high-level broodmare care throughout the 11-month gestation period, but there is always more

to learn. Because of the importance of every step of a mare's pregnancy and foaling experience, the health and welfare of broodmares and foals continue to be highly studied and researched areas.

The first hurdle, of course, is getting the mare in foal to begin with. However, sometimes pregnancies are lost early in the process. In November 2022, *Reproduction and Fertility* published the study "Multivariable analysis to determine risk factors associated with abortion in mares."

"Risk factors associated with equine reproductive efficiency have been identified along with those associated specifically with early pregnancy loss (EPL)," explained researchers. "In contrast, no studies have reported risk factors associated with abortion (loss between day 70 and 300 post-cover). Given the causes of abortion differ to those of EPL, likely too will the risk factors."

Researchers conducted a retrospective cohort study by collecting data from five breeding seasons that lasted between 2013-17. Thoroughbred mares covered by stallions based in the United Kingdom and Ireland were included if they were pregnant at day 70 following the mating. According to those working on the study, that time point was chosen to exclude losses diagnosed at the day 65 scans, which were likely a result of pathologies established early in the pregnancy period. Taking the data, they used statistical models to account for the interactions between 20 different factors.

In total, the pregnancy outcome was available on 4,439 pregnancies from 2,510 mares. Researchers concluded that having had two or more prior abortions, conceiving on the second or subsequent covered estrous cycle, and conceiving multiple conceptuses were associated with an increased risk of abortion compared to nulliparous, first estrous cycle covers and singleton conceptions, respectively. However, increasing paternal age was associated with a decreasing risk of abortion.

"This study found no association with mare age, status, parity or number of previous live foals with abortion," concluded researchers. "Increasing stallion age was associated with a decreasing risk of abortion in this study; whilst this is contradictory to human and breeding efficiency studies, it likely reflects a healthy worker effect as opposed to a physiological reasoning. Mares who have suffered two or more losses warrant increased monitoring by

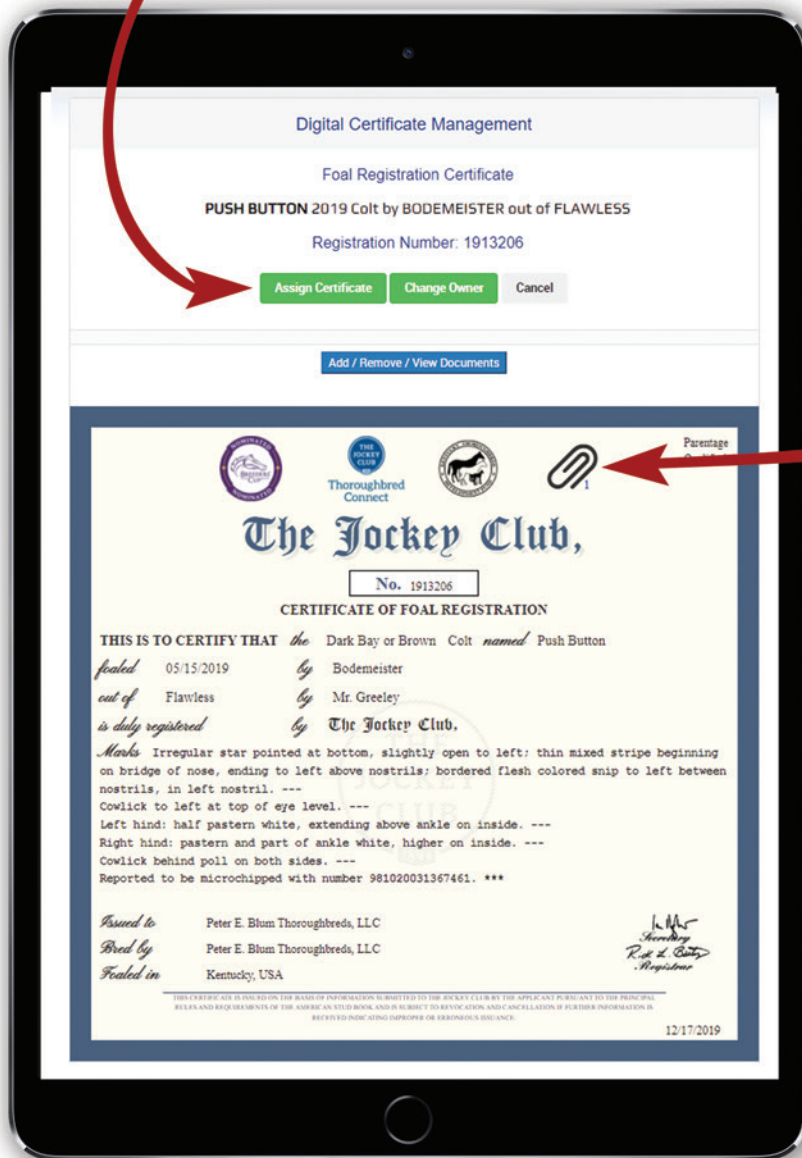
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Mare and Foal Health

veterinary surgeons. These mares may benefit from breeding to older stallions.

“Whilst the results of this study have raised questions for future avenues of research, it also provides tangible data to be implemented to modify clinical and management decisions to improve breeding efficiency and welfare.”

For all of the best efforts put into helping a mare have a successful pregnancy, things can still go wrong for both mare and foal when it is time to deliver. If something goes amiss during parturition (the action of giving birth), having a trained staff who can aid her but also knows when it is time to call for veterinarian assistance is important.

One of the most basic but important steps is being alert to when the mare is ready to give birth. There are a number



A winter's night in the foaling barn

of indicators that foaling is imminent, which the American Association of Equine Practitioners goes over in detail in its “Foaling Mare & Newborn: Preparing for a Safe & Successful Foal Delivery” by Dr. Ben Espy.

“Mares provide clues that they will

soon give birth,” he explained. “However, the timetable is far from absolute. Some mares may show all the signs like clockwork, others show practically none. Most mares foal without difficulty. It usually is best to allow the mare to foal undisturbed and unassisted. If

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a problem becomes apparent, contact your veterinarian immediately.

“Nature has provided an efficient system for the mare to deliver and care for her young. Be a prepared and informed owner so you can enjoy the miracle of birth, keep your anxiety in check, and help the new mother and foal get off to a great start.”

Some of the normal clues that a mare will foal soon include the fact that her udder begins filling with milk two to four weeks prior to foaling; the muscles of the vulva and croup relax; the teats become engorged four to six days prior to foaling, ‘waxing’ of the teats occurs one to four days prior to foaling; and the mare becomes anxious and restless.

Those are the most common signs, but for those who have been involved with many foalings, there are also other indicators that they have become attuned to, which can help keep everyone alert. In September 2022, Theriogenology examined one in particular in the study “Increase of skin temperature prior to parturition in mares.”

“In 90% of foalings in domestic mares, no human intervention is necessary,” explained researchers. “However, when problems at this time point arise the consequences may result in the death of the mare or the foal. Besides ethical and emotional aspects, this is also associated with a large financial risk. Early intervention may improve mare and foal outcomes.

“Monitoring the peripartum mare is a time-consuming challenge for breeders and many foaling prediction systems have limitations. ‘Heating up’ of the mare is empirically used by breeders as a sign of upcoming parturition in mares. The purpose of this study was to investigate if an increase in skin temperature shortly before parturition is detectable and to determine whether such physiological changes could be an additional valuable parameter to predict foaling.”

During the two-year study, which took place in 2020 and 2021, 56



A foal just a few hours after birth



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—DR. BEN ESPY, AMERICAN ASSOCIATION OF EQUINE PRACTITIONERS

foalings were analyzed. A total of 27 Thoroughbreds were included, as well as 14 Warmbloods, five Arabians, and two mares of other breeds. Eight mares were used in both years, and they were all between the ages of 4 and 22. Researchers

found that on average there was a rise in skin temperature starting around 90 minutes prior to giving birth and continuing throughout the process.

“In this study, we found a rise in measured skin temperature in the last 90 min prepartum in foaling mares,” concluded researchers. “Compared to the average of the five nights before the foaling night, this observation was significant from around 50 minutes before parturition until five minutes before the rupture of the allantochorion.

“Using new biomechanical and digital technologies, this finding could generate an additional potential parameter for the detection of impending parturition. However, skin temperature cannot be used as the only predictive diagnostic of impending parturition in the absence of other parameters.”

One of the most traumatic experiences a mare can face during foaling is a dystocia, which is when it becomes a difficult delivery due to a variety of possible issues such as premature placental separation (a red bag delivery) or foal position, size, or malformation.

Whatever the cause, dystocias are emergency situations that can have life-threatening consequences for both the mare and foal. In May 2023, the Equine Veterinary Journal published “Recumbency decreases mare and foal survival following in-hospital dystocia management.”

“Mare and foal survival are increased with prompt dystocia management,” explained researchers. “Data regarding mortality outcomes in mares and foals, when mares are recumbent at admission for dystocia resolution, are scarce.”

During the retrospective study, researchers evaluated recumbency, or lying down, at hospital admission as a risk factor for survival of mares and foals following dystocia management. Additionally, they also examined the future fertility of the mare. They collected data from the medical records of mares presenting with dystocia

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The bond between a mare and her foal is anecdotally a precious one, but researchers have also been examining how deep that attachment may really be



at Rood & Riddle Equine Hospital between 1995 and 2018, and information that was gathered included mare signalment, ambulation status, survival data, and foaling records.

In total, there were records for 1,038 ambulatory mares and 41 recumbent mares. Researchers found that survival rates after dystocia resolution were 90.5% in mares and 37.3% in foals.

“Mare and foal survival was significantly decreased when mares with dystocia were recumbent at hospital admission,” concluded researchers. “Ambulatory mares had higher odds of survival than recumbent mares. Foals delivered from ambulatory mares had higher odds of survival compared with foals delivered from recumbent mares. Fertility was not statistically different for surviving Thoroughbred mares within three years following dystocia resolution between ambulatory and recumbent mares.”

Once a foal is safely born, examining its physical state and conformation can reveal a good deal about its future well-being. While many issues can be improved with time, if something is obviously wrong with the foal, it can become complicated quickly. In October 2023, the

Journal of Equine Veterinary Science published “Gestation Length is Associated With Early-Life Limb Deformities in Thoroughbred Foals.”

“Flexural and angular limb deformities are an important cause of early-life morbidity and mortality/euthanasia in Thoroughbred foals,” explained researchers. “The majority are congenital in origin but, to date, their precise etiology is poorly understood. We hypothesized that maternal- and pregnancy-level factors, particularly those with potential to influence in-utero growth and development, could play an important role. The aim of this study was therefore to investigate associations between such factors and early-life limb deformities in Thoroughbred foals.”



One of the clues a mare is getting close to foaling is when her udder begins filling with milk, around two to four weeks before birth

Researchers established a birth cohort on seven farms in the United Kingdom and Ireland and collected details of veterinary interventions for foals with limb deformities in their first six months. They also examined details of the mares’ signalment, breeding history, and reproductive and veterinary history in the breeding season of interest. Overall, the study examined records for 275 pregnancies in 235 mares, over two breeding seasons.

“Pregnancies resulted in the birth of 272 live foals, 21% of which required veterinary intervention for limb deformities in the first six months of life,” concluded researchers. “Odds of limb deformities decreased by 4% per day increase in gestation length between 314 and 381 days.

“Longer gestation length appears to reduce the odds of early-life limb deformities, including within the normal range of gestation length for Thoroughbred foals. Further work is required to elucidate biological mechanisms behind this association.”

The bond between a mare and her foal is anecdotally a precious one, but researchers have also been examining how deep that attachment may really be. In October 2022, Animal published “Weaned horses, especially females, still prefer their dam after five months of separation.”

“Under natural conditions, foals stop nursing from their dam at approximately 9 months old, but their bond persists until 1.5-2.5 years of age,” reported researchers. “In contrast, in horse breeding, foals are generally artificially weaned and totally separated from their dam at 5-7 months. However, it is not known whether the bond between the dam and her foal is maintained after artificial weaning.”

Researchers wanted to assess whether foals still recognize and prefer their dam over other familiar mares several months after

weaning. For the study, 15 fillies and 19 colts were weaned at 7 months old. When they were yearlings, following five months of separation, they were tested to see if they still had a preference for their dams.

“Significantly more foals first approached their dam,” concluded researchers. “They also sniffed and tended to look more often at her. This finding indicates that artificially weaned horses remember and still exhibit a preference for their dam, suggesting that the bond persists even after five months of separation.



Researchers have found that the skin temperature in mares becomes elevated about 90 minutes prior to foaling



Those first wobbly steps

“Moreover, fillies exhibited a stronger preference for both mares than colts: they looked at them more frequently, sniffed them for a longer duration and

spent more time in proximity to both mares than colts. This suggests that fillies generally have an even stronger attachment to their dam as well as to other mares from their natal group.”

Years of thought and work go into producing a Thoroughbred foal, and ideally, both the mare and her baby will have an easy time during the entire pregnancy, birthing, and raising process.

When that is not possible, however, taking lessons from previous unfortunate situations can help foster a more positive outcome. **BH**

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