



# Equine Breeding

Management and Artificial Insemination



# Artificial Insemination (AI)

Artificial insemination has made it possible for owners to get access to the best genetic material from around the world. Artificial insemination is the process of collecting semen from the stallion and manually placing it in the uterus of the mare.

Whilst natural cover is still required by certain governing bodies such as The Jockey Club, artificial insemination plays a big role in equine breeding, bringing with it a host of benefits to the mares, stallions and personnel involved:

- Reduced risk of disease transmission
- Reduced risk of injury to mare, stallion and personnel involved compared to natural cover
- Greater monitoring of semen quality
- Increased number of mares bred as each ejaculate can be split into multiple doses
- Ability to breed mares with stallions all over the world without the need to travel the mare
- Decreased physical demand on the stallion
- Allows stallions to continue competing without the need for a break for the breeding season
- Use of semen from deceased stallions

**Semen for AI can be either fresh, chilled or frozen:**

**Fresh semen** comes straight from the stallion and must be implanted into the mare immediately. As a result this is usually done with the mare and the stallion in the same location. Fresh semen has the highest conception rates in normal mares.

**Chilled semen** is the next best option, conception wise. It is mixed with an extender and antibiotics to increase its lifespan, then chilled. In this state it can last for 2-3 days. Mares are ideally inseminated with chilled semen 12-24 hours prior to ovulating.

**Frozen semen** is usually stored and transported in liquid nitrogen and thawed immediately prior to insemination. Mares must be inseminated within 6-8 hours of ovulation, meaning that close monitoring of their follicles is required to get the best conception rates. Frozen semen has slightly lower fertility rates as some of the sperm can lose viability in the freezing-thawing process, however advances in preservatives and veterinary input mean that they are only marginally less.

# Embryo Transfer

Embryo transfer is the collection of an embryo, around 7 days old, from the uterus of a donor mare and its transfer into the uterus of a recipient mare whose reproductive cycle has been synchronised to that of the donor.

The recipient mare then carries the pregnancy to term and nurtures the foal until weaning. This process allows donor mares to be bred from without interrupting their competition season or going through the risks of pregnancy. It also allows multiple foals to be produced from one mare in a single breeding season. It can be useful in mares with some uterine-based fertility issues to allow them to reproduce.

## Pre-breeding health tests



Prior to commencing the AI programme all mares should have a negative clitoral swab test for sexually transmitted diseases, such as Contagious Equine Metritis (CEM), and blood sample to test for EVA. If your mare doesn't show obvious signs of oestrus, then a prior examination at home, by your vet and a prostaglandin injection and/or course of Regumate, to bring her into season, may be required. A uterine swab is often taken as early as possible when the mare is in oestrus and is submitted for laboratory examination for signs of infection which could interfere with conception.

## Mare Infertility

Mares that have failed to conceive will need to undergo investigations to identify and hopefully rectify the problem. The following are standard procedures for assessing a barren mare:

- Assessment of vulval conformation
- Examination of the vagina and cervix
- Manual and ultrasonographic rectal examination of the uterus and ovaries
- Uterine swab sent to the laboratory for culture and sensitivity.
- Endometrial biopsy enables us to assess the health of the uterus lining
- Video endoscopy of the uterus to detect abnormalities not picked up on ultrasound or biopsy

# Preparing your mare for breeding

Breeding your own foal is a wonderful experience but there are many aspects to consider before you get started.

The most important consideration is whether your mare is suitable to breed from. How old is she and has she had foals before? Older maiden mares have much lower fertility rates than younger mares or those that have foaled before. If she has had previous foals, then a detailed history of the insemination and pregnancy can be helpful. Are there any undesirable genetic traits that could be passed on to the foal? Certain types of orthopaedic disease can be passed on so it's important to talk to your vet before making your decision.

Once you're happy you have a suitable mare the next thing to choose is the stallion. As well as his type and credentials, it is important to consider the type of semen that is available from the stallion. Is it by natural cover? In which case it is likely your mare will have to travel to him, or is it by artificial insemination? In which case your vet will need to know whether it is frozen or chilled semen and how many days it will take to order. Clear communication with the stallion's manager is essential so that we can get the timings right.



**“It is important to consider the type of semen that is available from the stallion”**

# Preparing your mare for breeding

## The equine reproductive cycle

Mares are seasonally polyoestrous, which means they have multiple cycles but only during the breeding season. Mares cycle when the length of daylight is long, so in this hemisphere that is generally between March and September. During the winter when the daylight is short they are in anoestrus - where their ovaries are inactive. During the transitional period as the daylight increases, their ovaries become active and start producing follicles. The transitional period finishes when they have a surge of luteinizing hormone causing ovulation. After that they establish a regular cycle of ovulation generally every 21 days. During these cycles the ovaries will produce waves of follicles and usually one follicle will become dominant, getting close to ovulation (when the egg is released from the follicle into oviduct, ready for fertilisation) when it reaches a certain size. The time around ovulation is called oestrus, during this time they are receptive to breeding and usually display signs of being "in season". This generally lasts 3-6 days.

## Pregnancy Diagnosis

The first scan to check for pregnancy is 14-16 days post ovulation. The timing of this scan is important not only to check for a pregnancy but also to detect twins. Unfortunately, the equine uterus is not well designed to carry twins, one foetus needs the entire endometrial surface (uterus lining) to fulfil its nutritional requirements. As a result, twins usually result in the abortion of one or both foetuses in mid to late gestation and if a live foetus is delivered they are rarely viable. If twins are discovered at this early stage we would normally squeeze one embryo so that only one continues. The next landmark is the heartbeat scan which is normally done around days 25-28. Placentation (the formation, type and structure of the placenta) begins around day 32-35, after which the pregnancy should be well established, so we recommend a third scan around days 42-45. This confirms the pregnancy is still viable after the highest risk period has passed.

### Signs of oestrus:

- Frequent urination
- Raised tail
- Squatting and winking
- Standing still



In most mares you'll be able to track their cycles by monitoring their oestrus behaviour but we can also accurately pinpoint where they are in their cycle via trans rectal ultrasonography. The cycle can then be managed using hormones, which is hugely beneficial when getting the timing of insemination right.



# Management of the expectant foaling mare

## How should I manage my mare during the first 7-8 months of her pregnancy?

Through her pregnancy your mare will continue to require the same care and attention as a ridden horse. Suitable exercise, correct nutrition, feet regularly trimmed, routine dentistry, de-worming and vaccinations will all help to ensure a healthy pregnancy, enabling you to look forward to the birth of your foal with greater confidence.

It is during the last 3 months of pregnancy that she may need an increased calorie intake if her body condition score drops - this is usually made up using forage.



## Vaccinations

Brood mares should be up to date with tetanus and equine influenza vaccinations prior to conceiving. A booster is then given during the last 3 months of pregnancy, which will result in antibodies being transferred to the foal via the colostrum that it drinks during the first few hours of life. Equine herpes virus can cause many different types of disease (respiratory infections, neurological symptoms and abortions). Pregnant mares are therefore usually vaccinated for equine herpes at 5, 7, and 9 months of gestation.



## De-worming

It is important that near to the time of foaling, faeces are regularly picked up and that within the last few weeks of pregnancy the mare is de-wormed as she will be the main source of worms to the foal.

Not all drugs are safe to use in pregnant mares so check the product information carefully or contact your vet for advice.

# Management of the expectant foaling mare

## How long is equine gestation?

The average length of pregnancy in the mare is 338 to 343 days.

If your mare still hasn't foaled by 360 days we would suggest a veterinary examination to confirm that she is still pregnant.

## What should I do if I suspect my mare has aborted?

Sadly abortions do occur. If you notice a vaginal discharge, or the mare drips milk during pregnancy she should be examined by your vet.

If you find the remains of a placenta or foetus these should be saved for laboratory analysis.

## Where should my mare foal?

Ideally your mare will deliver her foal in an environment that she is used to that is clean and safe. If she is to be stabled we suggest it is at least 14ft x 14ft, with plenty of straw bedding (shavings tend to stick to newborn foals!) and a floor that can be disinfected just prior to expected delivery, or in-between different mares foaling.



## Preparing for the birth

Being well prepared and having a good knowledge of what to expect during a normal birth will mean you can remain calm and enjoy the experience. Suggestions for preparation include:

- Save our emergency number on your mobile phone and write it next to the landline in case you need to contact us
- A clock, pen and paper near the stable if she is to deliver inside is useful to time the stages of labour as you can lose perception of time in times of stress
- When the first stage of labour is suspected, the mare's tail should be wrapped with a clean tail bandage (ensure it is not too tight nor left on too long)
- Wash the mare's udder, vulva and hindquarters with water if she has faecal material present
- Ensure there is sufficient straw bedding if she is to foal in a stable

**Most mares will deliver their foals without any complications but we advise that foaling is observed so that you can contact us if you have any concerns. Foaling alarms or video cameras can be used to help you monitor the mare's activity as most tend to foal at night.**

# Management of the expectant foaling mare



## How will I know when the birth is impending?

Maiden mares (those that have not had a foal before) tend to be more difficult to assess, while those who have had previous foals often follow a similar pattern of presentation in the days leading up to delivery. Subtle signs that delivery is imminent are softening and flattening of the muscles in the croup, relaxation of the vulva, the tailhead appearing more prominent and visible changes in the position of the foal.

The most obvious and reliable signs are:

- The mare's udder may begin to fill up with milk 2-4 weeks before foaling
- Distension of the teats – this tends to happen in the later stages and most mares will foal during the following week
- Waxing of the teats – a discoloured, waxy discharge is normally noticeable 1-4 days prior to delivery
- Dripping of milk
- Mares will often become anxious and restless, even appearing colicky – kicking at her tummy, pacing, lying down and getting up, frequently urinating and passing droppings, flank watching and sweating for an hour or so before delivery. This is most likely to be the first stage of labour, but if it is violent or continues for more than an hour you should contact your vet as it may be due to another cause



# Management of the expectant foaling mare

Knowing what to expect during a normal delivery is the key to staying calm during this exciting period, but we would encourage you to contact us sooner rather than later if you have any concerns.

## The 3 stages of labour:

**Stage one** begins when uterine contractions start and usually lasts 1-2 hours. This often involves restlessness, lying down, getting up and even rolling. During this stage the foal is moved through the cervix and into position in the birth canal – you may be able to see some foetal membranes at the vulva. This stage ends when the foetal membranes break, signalled by a rush of fluid, but this can be difficult to differentiate from urination.

**Stage two** is the actual delivery of the foal and can happen quite quickly, usually lasting no more than 30 minutes. If you think this stage has been ongoing for more than half an hour, or if there is no significant progress within 15 minutes of the membranes rupturing, you should contact us immediately. Normal presentation of foals is in a diving position with front feet coming first, one slightly ahead of the other (like Superman), hooves pointing down and followed by the nose, head (which should be on top of the legs), neck, shoulders and hindquarters. If you notice that the hoof soles are pointing up, the foal may be backwards or upside down, or if the foal is in any position other than the diving position, you should contact us immediately.

If at any time during stage 2 you see a velvet-like red/maroon membrane covering the foal as it emerges, you must act immediately as you may need to tear the membrane. This is called a “red bag delivery”. You should **CALL THE VET STRAIGHT AWAY** for advice, as the red membrane may be the mare’s inverted bladder. If you push the bag firmly and feel the foal’s bones inside the membrane you must immediately tear through the membrane as the foal has become detached from its blood and oxygen supply. By tearing the membrane you expose the foal’s head to the air so that it can breathe.

You should also assist the delivery by pulling the foal out as soon as possible. The normal membrane that cover foals is a white, yellow or translucent colour.

**Stage three** involves the expulsion of the placenta. This usually happens within the first few hours, after the birth. If the membranes have not been passed in 4 hours you should contact us immediately as a retained placenta can cause serious problems including infection and laminitis.

# Care of the new born foal

The equine species has adapted to develop as soon as possible after birth, and to exhibit few outward signs of disease to cope with life surrounded by potential predators. This makes close monitoring of foals essential for the first 24 hours of life and early veterinary intervention important if there is any concern.

## How soon should a newborn foal stand?

It is important that during this initial period intervention is kept to a minimum to encourage the essential mare-foal bond.

After delivery, the foal's hind legs will often remain in the mare for a few minutes. When the mare or foal moves, the umbilical cord will naturally break at its weakest point – it should never be clamped or cut. The umbilicus should be dipped in a 0.5% chlorhexidine and alcohol solution, and this should be repeated twice daily for a few days until the cord is dry. If the mare is still lying down, the foal should be moved to her head for her to lick and bond with – the foal should be able to maintain itself on its chest. The mare's licking should stimulate the foal to extend its front legs and after a few failed attempts they should be able to stand within 2 hours of delivery.



## When will the foal have his first drink of milk?

Once standing, foals are very quick to search for milk and they should feed within 4 hours of birth. Most foals have a suckle response immediately after delivery, but it can take several attempts to find the udder and latch on to a teat. Sometimes they may need gentle guidance in the right direction, or the mare may need to be encouraged to stand still. The foal's initial feeds contains the very important colostrum (as long as the mare hasn't been running milk prior to delivery) containing essential components for immunity. It is therefore vital that if the foal has not fed in the first 4 hours of life, veterinary assistance is given – this may be by milking the mare and feeding the foal by stomach tube.

The small intestine's absorption of antibodies (that convey immunity) from the colostrum reduces with time so it is important that they feed within this short window.

A vet can check the foal's immunity levels via a blood test taken when they are over 12 hours old.

# Care of the new-born foal

## How often will the foal feed and when will it pass faeces and urine?

Most foals feed up to 7 times an hour (when they are awake) and gain up to 2Kg of weight daily in their first week of life.

When foals first pass faeces it is called meconium and is dark brown/black and very firm. The most common cause of colic in newborn foals is when this material is impacted and it can't be passed easily. If the meconium has not been passed within 8 hours of delivery, or if any colic signs are shown, such as straining with no faeces being produced, veterinary attention should be sought as the foal may need an enema. The faeces will become gradually softer as the foal continues to feed.

Urination should also be observed during the first 8 hours of life.

## Normal foal behaviour

Most foals are inquisitive of humans and interact with the mare. An under-developed foal is cause for concern – they often have a domed forehead, low body weight, are weak, have limb deformities and a silky coat. If you are concerned you should contact your vet to discuss the foal and its delivery.

## The foal's first vet check

If we did not have to attend the delivery, we encourage all owners to have their newborn foal checked before they are 12 hours old. This enables us to check that the mare has sufficient milk and that she has not sustained damage during delivery. It is also important that we check that the entire placenta has been delivered, so please save it for us in a bucket!

Taking a blood sample from the foal will enable us to check it's immune status – if this is low we may advise a plasma transfusion. During this first clinical examination we will also assess the umbilicus and advise on its care, and check the heart, eyes and limbs.

Administration of tetanus anti-toxin gives short term protection and can be repeated if necessary up to a point when vaccinations can be started, usually from 5-6 months of age.

**Foaling a mare at home can be a joyous experience as long as you are well prepared and are aware of what is normal. We encourage you to talk to your vet if you have any concerns – even if it is just for reassurance we would always rather you contacted us sooner rather than later.**





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