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FELINE PREGNANCY AND PARTURITION

Breeding cats can be an extremely rewarding experience. However, before undertaking a breeding programme it is essential to understand what this involves; from the time of mating to the time of weaning. It is also important to consider the implications of selective breeding, since by replacing natural selection the breeder becomes responsible for the genetic characteristics of the offspring. It is essential to consider each mating carefully to reduce the risk of genetic disorder, since selective breeding can affect any aspect of a cat's make-up, from its health to its temperament. This effect can be seen in a recent survey of over 700 breeding queens (female cats) which found that cats with extremes of conformation, such as the Siamese and Persians, experienced much higher levels of dystocia (difficult births), than cats with normal conformation (10%, 7.1% and 2.3% of births being affected respectively).

What happens when my cat comes into "call"?

Queens come into 'heat' or 'call' (oestrus) many times a year. Each oestrus lasts ~1 week and if the cat is not mated she will usually return to oestrus 1-2 days to 2 weeks later. This cycle continues for several cycles or until the cat is mated. Exactly when a cat come into oestrus is controlled by the season of the year (day length), the cat's breed, and body weight. The signs of oestrus in the cat are mainly behavioural. They become very affectionate and vocal, demand attention and roll frequently. When stroked they raise their rear quarters and tread the ground with their back legs. These behavioural changes can confuse the inexperienced owner who may misinterpret them as pain or illness.

What will mating entail?

Queens are reflex ovulators i.e. they ovulate in response to mating. While the timing of mating is not therefore essential, for optimal results it is best to present the queen to the stud (male cat) on the second to third day of oestrus. The queen is normally taken to the stud since males perform more happily in familiar surroundings. Most queens require 3-4 matings within a 24 hour period for ovulation to occur. When mating, the male cat holds the queen's scruff in his teeth and on his ejaculation the queen cries out, swears and frequently becomes aggressive. This is normal. She will then wash herself, wait a while, then start again. Once ovulation has occurred, the queen will go out of heat in a few days. It should be ensured that the stud cat (and catbox) is clean, healthy and free of FIV, FeLV and Calicivirus infections.

How long will my cat be pregnant?

Pregnancy (gestation) ranges from 60-67 days; usually 63-65 days. The date of breeding should therefore be recorded, and the cat examined by a veterinary surgeon three weeks after mating to confirm pregnancy.

Will my cat's food supply need to be changed during pregnancy?

During pregnancy the queen's food consumption will reach 1.5 times her pre-pregnancy level. By the time of weaning it may exceed 2 times the pre-pregnancy level. It will therefore be necessary to increase the number of meals given and/or feed a diet formulated for kittens, since this provides the extra nutrients required for pregnancy and nursing.

Will my cat's behaviour change during pregnancy?

During pregnancy the cat's behaviour alters little, although some cats become more loving, and a few become aggressive. The cats continue to move freely. During the final week the search for a suitable kitting bed become the dominant drive, and two types of temperament tend to be seen; the independent cats will go to extreme lengths to hide away from human contact, while the dependent cats will go to equal lengths to seek the comfort of its owner and may well choose to kitten on the owner's bed. Cats should be confined from this time, since when hidden, parturition difficulties may incur unnecessary suffering.

What do I need to prepare before my cat has her kittens?

The kitting bed can take many forms, but a cardboard box lined with newspaper, old sheets or towels is ideal. The kitting area aims to achieve a happy medium between confinement, and relative freedom within the confined area. Ideally the bed should be warm, cosy, and private, but in emergency must be observable. If the box is too exposed the queen may become anxious and not settle when kitting, and once the kittens are born she may try to move them to a new area, or even kill them.

To predict when the cat is to kitten and so plan ahead the breeder must observe the degree of abdominal distension, movement of foetuses, slackening of pelvic muscles, etc. They should have a history of the cat's previous pregnancies and, if possible, know about earlier generations and related animals. Facilities for help or examination should be available if needed (convenient table, access to running warm water, soap and towel).

What can I expect to happen when my cat gives birth?

On commencement of a breeding programme it is helpful to understand the normal anatomy and mechanics of parturition. The uterus or womb of the cat is divided into two long horns or cornua, one on each side. These lead back, one from each ovary, to join together into a short body which is closed during pregnancy by the cervix (a strong muscular ring). From here, the birth canal, or vagina, leads through the pelvis and out at the vulva. In pregnancy, the foetuses (kittens to be) are spaced along each horn. Each foetus is contained within its own membranes and has its own placenta.

The uterus may be considered as a muscular, sausage-shaped bag, capable of contracting both around its diameter and along its length. By relaxing in front of the foetus and squeezing behind it, the uterus propels it along. To help in its passage, each foetus is contained within a fairly tough double-layered bag; the foetal membranes, which are filled with slippery fluid in which the foetus floats. This serves as both protection and lubrication, and provides a distending, stretching and dilating force.

First Stage Labour

This is essentially the relaxation of the cervix and vagina, and the start of intermittent contraction in the uterus. Uterine contractions must always be interrupted by periods of relaxation, otherwise the foetal blood supply is cut off. The pelvic muscles slacken and the perineum (the area between the anus and the vulva) becomes looser and longer. At this stage the uterine contractions are not yet visible as straining, although movement of the foetuses may be seen and felt through the abdominal wall. There is little to see at this stage except repeated visits to the prospective kitting bed, and in the dependent type cat, an apparent desire for reassurance from the owner. Some scratching up and bed-making may be evident and some cats may pant. The queen usually stop eating during the last 24 hours before labour, and her temperature will drop below 37.8°C. A temperature fall may occur intermittently for a few days prior to kitting, but is usually only consistent in the last 24 hours. Vaginal discharge is rarely seen since it is licked away promptly by the cat. **In the cat kitting for the first time, this first stage of labour can be very prolonged; even lasting up to 36 hours without being abnormal.**

Second and Third Stages

In second stage labour the uterine muscle begins stronger and more frequent contractions. As each foetus enters the pelvis, the outer layer of its membranes appears briefly at the vulva as the "water bag", which bursts and is cleared up by the cat. The inner membranes remain on the foetus and act as a lubricant to assist its passage.

As the foetal head passes into the pelvis, its pressure causes the commencement of voluntary straining using the abdominal muscles. This "bearing down" helps to move the foetus through the pelvis. **This is usually the point at which the attendant can see that the cat is actually straining. Normally, delivery of a kitten from the commencement of the second stage may take from 5 to 30 minutes.** Once the head is out of the vulva, one or two more strains should complete the passage of the narrower remainder of the kitten's body.

Third stage follows immediately and is seen simply as the passage of the membranes, complete with the greenish black mass of separated placenta (the after-birth). Each set of membranes is normally passed immediately after the kitten itself, although sometimes a second kitten will follow so quickly that the membranes from the first will be tapped temporarily. As each kitten is born the cat will tear open the

membranes and clear the mouth and nose area of the kitten, bite off the umbilical cord and subsequently eat the after-birth. **Intervals between kitten births are variable; in the average case from as little as ten minutes up to an hour.**

Interrupted Labour

So-called interrupted labour is sufficiently common in the cat to be considered a normal occurrence. **In this case the queen ceases straining, rests happily, suckles those kittens already born and accepts food, despite still having more kittens inside. This resting stage may last up to 24 or even 36 hours**, after which straining recommences and the remainder of the litter is born normally.

Over all delivery times vary, with short haired cats generally taking less time than long-haired cats, especially Persians. During parturition the breeder should provide either moral support or remain unobtrusive as dictated by events. They should observe the process closely, but should not upset the queen by interfering any more than absolutely necessary. Most cats deliver their kittens without complications, however, first time mothers should be attended by their owners until at least 1-2 kittens are born. If these are born quickly and without assistance, further attendance may not be necessary, although it is desirable. Once all of the kittens have been born soiled bedding can be removed and replaced.

What problems can arise during parturition?

Most cats give birth to their kittens without difficulty. However, dystocia (difficult birth) is seen fairly frequently in pedigree cats (~ 6% of litters).

A breeder should suspect that something may be wrong if:-

1. Twenty minutes of intense labour does not produce a kitten.
2. Ten minutes of intense labour does not expel a kitten seen at the queen's vulva.
3. If gentle traction on the trapped foetus causes the queen pain.
4. The queen is depressed, lethargic or has a fever (rectal temperature $>39.4^{\circ}\text{C}$).
5. The queen losses fresh blood from her vulva for more than ten minutes.

Dystocia may arise because of abnormalities on the part of the mother, i.e. maternal dystocia, or on the part of the foetus, i.e. foetal dystocia.

Maternal Dystocia may be caused by:-

1. Physical obstructions, such as narrowing of the maternal pelvis due to fracture or bone disease
2. Uterine inertia or failure of the uterus to contract, or
3. Voluntary nervous or hysterical inhibition of labour by a disturbed cat.

Foetal Dystocia may be caused by:-

1. Relative oversize
2. Malformation, or
3. Malpresentation of the foetus.

Abnormalities of First Stage Labour

True primary uterine inertia (complete failure of uterine contractions from the start of labour) is rare in the cat. However, a **nervous inhibition of labour** is relatively more common, especially in oriental breeds. Extreme apprehension occurs during the first stage of labour and all progress ceases. In this situation the cat is markedly and vocally distressed, crying constantly and not letting the owner out of her sight. The cat may become hysterical, and in such cases immediate relief may be gained by the use of tranquillisers. In an emergency this can be administered by a veterinary surgeon by injection, but if the cat in question is known to behave in this fashion, the breeder may be equipped with tablets which can be given by mouth at the start of labour. However, it is not advisable to continue to breed from queens who are known to become hysterical.

Uterine torsion or rupture are major emergencies which can arise in late pregnancy or first stage labour. Torsion implies a twisting of the uterus, cutting off its blood supply, making delivery of the contained foetus or foetuses impossible. It also causes an acute emergency with a very ill and shocked cat. Torsion is usually presumed to have occurred during jumping or some violent movement which imparts a swinging motion to the heavily pregnant uterus. Rupture is more usually the result of an accidental blow from a vehicle or other

violent trauma, or can occur from violent straining on a complete obstruction. A rupture occurring at the time of parturition will give rise to the same signs of emergency as a torsion. It has been known for rupture to occur early in pregnancy and for the foetus(es) to continue to develop outside the uterus in the maternal abdominal cavity. In these cases the placenta becomes attached to one of the abdominal organs but it is unusual for such foetuses to develop to full term, and impossible for them to be born. Sometimes these foetuses become mummified.

Abnormalities of the Second Stage

Secondary inertia (uterine tiredness) occurs when the failure of the uterus to contract follows a prolonged delay. The interrupted type of labour already described is definitely not an inertia, since the cat is content, labour recommences normally, and kittens are born alive and well. An important point of difference between the two is that secondary inertia follows previous difficulty or delay and the cat is often restless or exhausted.

Obstructive dystocia may occur for various reasons. Abnormalities of the soft tissues of the mother are rare, but a misshapen pelvis, usually following a pelvic fracture, is a fairly common situation and can cause complete obstruction, necessitating a Caesarean operation. Any queen with a narrowed pelvis should be spayed to prevent breeding. Simple foetal oversize can occur, although it is rare in the cat, since cats are not nearly so diverse in size and shape as dogs. Foetal monstrosities, such as hydrocephalus or Siamese twins may occur and lead to dystocia, but are rare.

Foetal malpresentations, malpositions and malpostures may all lead to dystocia. Presentation indicates which way round the foetus is coming (i.e. head or tail first), position indicates which way up it is (i.e. rotated or unrotated) and posture indicates the placing of the head and limbs (i.e. extended or flexed).

Malpresentation: Posteriorly presented, or tail first kittens occur quite frequently, so this is considered a normal presentation, and usually causes no delay. If however, the first kitten comes tail first there may be a delay since the absence of the wedge-shaped head pushing behind the fluid-filled membranes means the cervix is slower to open. The kitten is usually passed eventually, but from the moment that the maternal blood supply is cut off by the separation of the placenta and before the kitten's nose is free from its membranes, it is at risk of foetal asphyxia.

Malposition: When this occurs it is usually because the kitten has died in the uterus before rotation and is uncommon, except in cases of illness, infection or prolonged delay in a late-coming foetus.

Malposture: This is of most importance in relation to the position of the head. The short-faced Persian types may have difficulty at the point where the foetal head first engages in the opening of the maternal pelvis. The head may become deflected to one side, or downwards between the forelegs, or on to the breast. Occasionally one or both forelegs may lie back along the body and in tail-first presentation one or both hind legs may be retained forwards along-side the body to give the Breech posture. All of these situations may give rise to temporary delay and necessitate extra propulsive efforts by the queen. In extreme cases they can cause complete obstruction.

Inhibitory behaviour: A late manifestation of inhibitory hysterical behaviour may cause delay when the kitten is already through the maternal pelvis and half protruding through the vulva. This causes pain, so the cat gives up trying and becomes distressed. If help is not immediately forthcoming, the trapped kitten will die, especially if it is coming tail first.

How can these problems be treated?

The foregoing rather daunting list is of what can, but rarely does go wrong. However, although these things occur rarely veterinarians still need to know how to recognise them, and how they can best be managed. The first step is avoidance of problems, which lies in breeding from a suitable queen and providing of an adequate environment. Much also depends on the breeder's powers of observation. **The secret lies in the recognition of delay.** The hysterical dependent cat is obvious, and easy enough to deal with, provided the necessary tranquilliser is at hand. **In the case of interrupted labour it will be evident that the cat is in no distress, has a normal appetite and is happy with the kittens already born.** Straining in the course of a normal parturition, while it may or may not be vigorous, is clearly productive in moving the kittens along and does not appear to give rise to pain. Obstruction, on the other hand, causes the cat to strain without

producing any results. The queen may pant, cry, or appear exhausted, she may be restless and unsettled, and will eventually cease trying to strain in an attempt to recover sufficient strength for a further, although decreased effort. This is the cat that needs help.

Feeling from the outside around the perianal area under the tail will indicate if a kitten is already through the pelvis, and a view of a nose, or feet and tail indicates that birth must be imminent if the kitten is to survive. If no progress is being made and the kitten is clearly visible, it is up to the breeder to give immediate help, since veterinary help may not arrive in time for that kitten. If nothing can be felt at the vulva and the hold-up is evidently further forward, then it is time to send for professional help. Internal examination is resented by most unsedated cats and should not be undertaken by the unskilled.

Diagnosis and treatment of most dystocia is in the hands of the veterinary surgeon. Because of the small size of the cat, manipulative correction of malpostures from within the vagina is rarely possible and is a job for the skilled expert. To compensate for this, manipulation from outside the abdomen can often correct a malposture such as a laterally deflected head; again professional skill is needed. **Often, in any real hold-up, a Caesarean operation is the preferred method of treatment and provided that the cat is neither desperately ill nor very exhausted, it is a safe and routine procedure.** Present-day methods of anaesthesia are much less likely to depress respiration in the kittens than was once the case, and even in major crises the cat's ability to survive abdominal surgery is exceedingly good.

The case where the breeder has to help is that of the cat who gives up trying with a kitten hanging from her vulva. If it is coming head first, the first urgency is to clear the membranes away from its nose and mouth, to allow breathing to take place. This is best achieved using a small piece of cotton cloth or flannel. The kitten must then be eased out gently, alternating the direction of traction, first freeing one side then the other, and always directing the pull slightly downwards (towards the queen's feet). Kittens are slippery and wet at birth so have clean pieces of towelling or soft paper towels available to help to get a grip. If the kitten has only the tail and hind-legs showing, delivery is even more urgent and gripping the kitten is even more difficult, but the same principles apply. Hold the hind-legs above the hocks, ease gently to alternate sides, and if progress is not made with the aid of a strain or two on the cat's part, try gentle rotation through a few degrees before continuing the easing-out process alternating the direction of pull. "Pull" and "traction" are misleading words to use to convey the sensitivity required. It is important to co-operate with the cat as she strains and rests, so that progress continues without injury to cat or kitten. Make haste slowly. Immediately the kitten is out of the queen, clear the mouth and nose of all membranes and fluid.

How do I revive a non-responsive new born kitten?

The normal mother cat will generally make a much better job of cleaning and drying her kittens than any human agency, so **no meddlesome midwifery is indicated if all appears well.** If, however, a kitten has had to be helped out and is not breathing, or on those few occasions when the maternal instinct appears to be lacking and the kitten is ignored, reviving it becomes a matter of urgency. Observation of the cat's own methods show the order in which to imitate them to the best advantage. The cat's first act is to see that the kitten's nose and mouth are clear. Next with a nipping/licking action the cat picks up, then chews through, the umbilical cord and in the process provides a stimulation to the abdominal navel area, getting respiration going. If this is not sufficient, a vigorous licking massage of this area follows. Finally a more general drying lick and some attention to the posterior part of the abdomen and anal area is given to start the bowel and bladder movement going. Then, if it is needed, a nudge towards the maternal nipples. The human imitation can follow much the same plan.

1. Tear the membranes from the nose, wipe the nose and open the mouth, tilt the kitten head down and clear away any fluid.
 2. If the cord has not broken on delivery, tear it a good inch from the kitten and remove the wet, sloppy bulk of the membranes. Complicated cutting and tying of the cord are not necessary. The cat would chew it through, providing a blunt crushing action to prevent bleeding; the midwife can tear it between their first two fingers and thumb, which does much the same thing.
 3. If the kitten is not breathing, or if it has come tail first and possibly inhaled fluid, it is necessary to clear debris and fluid from the air passages. Take the kitten lying in the palm of the hand, its back towards the palm and neck between forefinger and third finger, its head protruding between the fingers. Enclose the kitten in the fingers and, turning the hand palm downwards with the arm extended, give a sharp swing several times; make quite sure first that you are not
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too near the table or other protruding edge or disaster will follow. The swing will have the effect of forcing fluids out of the air passages and a further wipe of nose and mouth will clear it away. The swing will also serve to stimulate respiration. The kitten's tongue is a reliable indicator of respiration. If the kitten is receiving sufficient oxygen the tongue will be pink, if not it will have a bluish tint.

4. The next move imitates the licking of the abdominal wall and stimulates respiration. It comprises a stroking, rubbing movement with a clean towel. Follow this by a brisk, general rub dry, assuming that the kitten is by now showing regular breathing. If it is not, some further form of artificial respiration may be necessary. Of these, mouth to mouth resuscitation is probably the most useful if carried out carefully. There are several essential points to remember. Firstly, it is no use blowing fluids and debris further down the respiratory tract; these must be cleared by the swing method and/or gentle shaking of the kitten in the head-down position. Secondly, the capacity of kitten lungs compared to the human is quite minute. Blow very gently and allow a pause for expiration. Repeat this cycle every three to five seconds. Ideally, use a short drinking straw to blow through since this is more hygienic and reduces the risk of damaging the kitten's lungs by over-inflation. Various other methods have been used to make the new-born animal breathe. These include the use of the drug doxapram (Dopram V), flicking the chest sharply but gently with a fingertip, and alternate hot and cold water applications. In general it must be said that if the new-born does not start obvious breathing within 5-10 minutes, it is probable that brain damage from lack of oxygen will have occurred and it is both unwise and inhumane to persist further and risk rearing a blind or mentally retarded animal.

Warmth is a primary essential for the new-born. The kitten cannot react to cold by shivering and cannot control its own body temperature. In nature, warmth is obtained by direct body contact with the mother and conserved by the enclosed kittening bed. The first point to remember if help is required is that a new-born wet kitten loses heat very rapidly, hence the brisk rub dry. Follow this, if the mother is ill or not co-operative, by contact with a warm, well-covered hot water bottle and conserve heat with a covering blanket. Great care must be taken not to inflict contact burns by having the bottle too hot. An acceptable alternative is the infra-red lamp widely used for pigs and puppies and readily obtainable. Its disadvantages are that many cats dislike the open bed required for its use, and that it may make both mother and kittens too hot and lessen the close normal nursing contact. Ideally the temperature in the box should be maintained at 29-32°C, but the box should be large enough for the kittens to move away from the heat if they become too hot. The temperature can be gradually reduced to 26°C by 7-10 days and to 22°C by the end of the first month.

Do I need to help my cat to rear her kittens?

Occasionally kittens will be born **prematurely**. They will be small, thin, and have little or no hair. To keep such kittens alive requires intensive nursing care. Premature kittens often fail to nurse, and hence may need to be fed with a syringe, bottle or stomach tube. They also need to be kept warm if the queen rejects them (see later).

A normal vigorous kitten, when warm and dry, needs no assistance in finding its mother's teat and commencing to suck. Occasionally an exhausted, restless, nervous or ill queen may fail to assist. Failure on the part of the cat to nurse its kittens should be checked by a veterinary surgeon since if the mother cannot care for the kittens they may need to be hand reared. (For further information on raising kittens please see separate leaflet).

Are there any post-kittening complications I may need to know about?

Yes, but as with problems arising during parturition, they are not to be overly emphasised since they occur only rarely.

1. Retention of Foetal Membranes

Occasionally a cat may fail to pass the final set of foetal membranes after parturition appears to be complete. She will probably show some signs of restlessness and abdominal discomfort, and may be unwilling to settle with her kittens during the 24-72 hours after parturition. Her appetite may be poor and a brownish vaginal discharge may be seen. Examination will show a raised temperature and palpation of the abdomen will disclose a thickened lumpy area of womb. Veterinary treatment

is required. Antibiotic cover is necessary and oxytocin may be necessary to cause the expulsion of the retained membranes. Occasionally it is possible by gentle palpation to cause the cat to strain and pass them.

2.Metritis

Metritis (inflammation of the womb), usually occurs within three days of parturition. The cat is much more obviously ill than with simple retention of foetal membranes. She will be dull and lethargic, completely ignore her kittens and refuse food. She may have an increased thirst and may vomit. A purulent, foul-smelling discharge is present coming from her vagina and she will have a fever. On palpation the abdomen is tender and the uterus is thickened. Veterinary treatment is required, usually consisting of antibiotics.

3.Uterine Prolapse

Uterine prolapse is seen only rarely but may occur as an acute post-parturient emergency, such that telescoping of the uterus results in it protruding from the vulva. The appearance of the uterus at the vulva is self-evident. Initially the cat is noticed to be straining and uncomfortable despite the completion of parturition. If treatment is delayed the cat will rapidly become dull, shocked and lethargic, in a similar manner to the animal with a uterine rupture. Uterine prolapse constitutes an emergency requiring immediate surgical treatment.

4.Mastitis

Mastitis in its acute suppurative form sometimes occurs during early lactation. It is usually confined to one gland and may follow a simple congestion or overstocking. The affected gland will be tense, hot, painful and enlarged. If it is only congested, the application of gentle heat and subsequent gentle massage will bring normal milk out of the teat orifice, and the situation may be speedily relieved by milking the gland concerned. If an abscess is present, the cat will be off her food, dull and feverish, and in addition to pain and swelling in the gland, a pointing, or purplish area of accumulated pus will be seen. Veterinary treatment is needed.

5.Lactation Tetany

In the cat lactation tetany tends to be seen two days to eight weeks post kittening. The condition involves a sudden drop in the amount of calcium circulating in the bloodstream, associated with the demands of milk production. The affected cat usually has a fairly large litter to suckle. The first signs of the onset of the condition include inco-ordination and tetanic muscular spasms, with later collapse and coma. Treatment by the intravenous injection of calcium preparations leads to a spectacular reversal of the condition. A later subcutaneous injection may be required to maintain the recovery. Kittens should be removed from the cat if old enough, otherwise their numbers must be reduced or supplementary feeding given. Usually this condition can be prevented by feeding a high calcium diet in the first 2/3 of pregnancy, and during lactation.