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Fetal Kitten Aging - What Stage of Cat Pregnancy Has My Female Cat Reached?

Unless a mature female cat is spayed early (prior to attaining puberty) or kept in a strict indoors environment well away from male cats, it is very likely that she will become pregnant at some stage in her life. Owners of suddenly-pregnant female cats often want to know how long there is to go in their cat's gestation period before the kittens are expected. If the feline pregnancy is unwanted, some pet owners also want to know whether the option for pregnancy termination still exists or whether the pregnancy is too far advanced to allow this. In order for these things to be determined, the stage of cat pregnancy needs to be accurately determined and the kitten fetuses accurately aged.

Registered cat breeders usually have a good idea of how long the cat gestation period is because they breed cats on a regular basis (the feline gestation period is assumed knowledge for cat breeders) and most cat breeders generally know how long there is to go before the kittens are born because of known feline mating dates. Cat breeders generally want to know information about the fetal stages of cat pregnancy so that they can troubleshoot problems associated with infertility, fetal loss (death of kittens in utero), congenital malformations and abortion in their breeding gueens.

This page contains detailed information about each foetal development stage of cat pregnancy, including: fetal sizes (crown-rump lengths), anatomical features, the development of the superficial body characteristics (e.g. claws, eyes, fur, skin and so on) and the size of the supporting uterine structures (e.g the size of the uterine "bulges" containing the fetal kittens). Each fetal kitten stage is presented in detail with full supporting photographs.

Fetal Aging and the Developmental Stages of Cat Pregnancy - Contents:

1) The cat gestation period - how long the cat pregnancy lasts.

2) The fetal development stages of cat pregnancy:

2a) Why is the stage of cat pregnancy important to know?

2b) How can we determine and diagnose the stage of cat pregnancy?

2c) The fetal development stages of cat pregnancy - a photographic guide to the week-by-week appearance of the feline uterus and fetal kittens throughout the cat gestation period.



An important letter to our readers regarding our fetal kitten images (they may shock sensitive viewers):

The desexing of pregnant cats is a surgical procedure that is commonly performed by veterinary clinics around the world. The spaying of female cats (a form of surgical abortion) is seen by many cat owners as a simple, immediate, quick-fix solution to unwanted feline pregnancy.

The truth of the matter, however, is that the desexing of pregnant cats is not 'simple' and nor is it kind on the mother cat or her unborn kittens. By the time most pet owners recognize that their cat is pregnant, the kittens inside are often very advanced in size and will almost certainly be capable of feeling some pain as a result of the blood-supply deprivation and oxygen starvation associated with uterine removal. Pet Informed does not actively promote the spaying of pregnant cats. Although we realise that there are times when such a procedure is necessary (e.g. if pregnancy is medically unsafe for the queen) and recognise that the surgery has a big role to play in feline population control (especially in cat shelters), the operation is never a replacement for pet owners being responsible and desexing their female cats early (well before they become pregnant).

Although this page is primarily educational in nature and designed to teach cat owners about the insand-outs of cat gestation, fetal aging and the stages of cat pregnancy, this page also has a secondary animal welfare aim: to illustrate and emphasize the importance of desexing female cats well *before* they come into heat and manage to become pregnant. For those of you who do manage to find yourselves with a pregnant cat (yes, accidents do happen), this page should illustrate to you the importance of getting the animal in question desexed *as soon as possible*. It is far better to have a pregnant cat desexed early on in the pregnancy than it is to have the cat desexed when she is almost full term. We have included images of all stages of fetal kitten development (early to late pregnancy) in the hope that you will be able to fully appreciate just how advanced and well-formed the kitten fetuses can be, even quite early on in the feline pregnancy. We hope that these images will shock as much as they educate and that they will be enough to encourage cat owners to desex their female cats early, rather than subject such amazingly-formed potential lives to the suffering of surgical abortion.

Finally, to those of you who take umbrage and offense at our showing of such fetal images, we apologise and we agree with you. Irresponsibly letting female cats get pregnant such that they then require such a surgery to "rectify" the situation is offensive to anyone who cares about the welfare of domestic animals. Please understand that none of these pregnant cat spay surgeries was performed in any way for the benefit of this website. The pregnant spay surgeries (surgical abortion surgeries) were all performed at the demand of the animals' owners for reasons of owner convenience (unwanted kittens) or for reasons of female cat health (e.g. pregnancy in underage female cats or pregnancy in female cats with diseases or deformities non-conducive to successful pregnancy or birthing). The surgeries would have been performed regardless of our involvement. We felt that the already-deceased fetuses would be of educational value (for fetal aging and staging) and that the pictures might also help to convince pet owners to spay their cats early. Please note that all later-stage fetal kittens were humanely destroyed immediately after leaving their mother's blood supply (they were not left to suffocate).



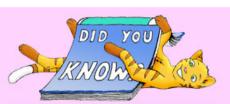
WARNING - IN THE INTERESTS OF PROVIDING YOU WITH COMPLETE AND DETAILED INFORMATION, THIS PAGE DOES CONTAIN EXPLICIT MEDICAL AND SURGICAL IMAGES, INCLUDING IMAGES OF SURGICAL ABORTION AND UNBORN KITTEN FETUSES, WHICH MAY DISTURB SENSITIVE READERS.



1) The cat gestation period.

The cat gestation period is generally defined in most textbooks as: the number of days between a "successful mating" and the birth or parturition of the fully developed kittens. A successful mating, also called a "fertile mating," is a mating (copulation) between male and female cats that results in the ovulation of eggs (ova) from the female cat's ovaries and their fertilization with male spermatozoa (sperm) within the oviducts of the uterine tract. Depending on which textbook you read, the cat gestation period is generally stated as being somewhere between 61 and 69 days long (NOTE - I have seen feline gestation figures as short as 56 days right through to as long as 72 days), with an average of 63 to 66 days.

The reason for the huge variation in the figures stated for the length of the cat gestation period is the nature of the feline reproductive cycle itself. Female cats are "induced ovulators," which means that they require the mating stimulus of a male cat (the friction associated with



Most female cats will ovulate after only four copulations, however, many female cats will mate many more times than this during their feline estrus ('in-heat') stage of the feline reproductive cycle.

Female cats have been known to mate repeatedly for hours on end, with over 20 copulations reported in a single day.

This, accompanied by the fact that repeat matings can take place over several days, can make it hard to pinpoint the start date of gestation and when birthing is to begin.

copulation) if they are to ovulate their ova (eggs) into their uterine tract for fertilisation (i.e. a "successful mating" or "fertile mating" as per the definition used in the paragraph above). Generally, several matings are required (8-12 copulations or more), often over a period of days, before the female cat becomes stimulated enough to ovulate her eggs. It is uncommon for a *single* mating between male and female cats to result in successful ovulation (less than half of female cats ovulate after a single copulation). Once enough mating stimulus has been provided, it generally takes the female cat a further 24-52 hours after the successful mating to release the eggs into the uterus tract.

It is because the cat gestation period is defined using a starting point of: "a successful mating" that the wide variation in stated feline gestation periods exists. Female cats often require several matings over several days in order to ovulate and become pregnant and the cat breeder or pet owner, unsure as to which of these witnessed matings is the so-called "successful one," often can not tell where to start the count from. Does s/he start the gestation period count from the first mating seen, which could have been many days ago, or from the most recent one? Hence the variation in the length quoted for cat gestation periods: people who start the count from the first witnessed mating will often find longer feline gestation periods and people who start the countdown from the most recent copulation witnessed may well have shorter gestation period figures.

If breeding conditions are more tightly controlled and the in-heat female cat is only allowed 1 or 2 days of copulation, then feline gestation periods will usually fall within a more refined timespan of about 63 to 68 days (i.e. more accurate). This kind of breeding control can be achieved when cat breeders deliberately limit the time that the in-heat queen can be in contact with an entire tom to a couple of days. The chances of a successful pregnancy may be reduced (a particular queen might not ovulate in only two days of mating), but the gestation start date is much more accurately known.

Pin-pointing the feline gestation start-point (and hence the kitten due-dates) is much harder in female cats that have long "heat periods" (some female cats will show signs of being "in-heat" and will even stand to have a male cat mate with them for a period of up to 21 days). Some of these "longer-heat"

female cats may undergo repeated matings early on in their season and yet not ovulate (even though they are large enough in size to secrete enough estrogen to cause the cat to show signs of heat and to 'stand for mating,' the ovarian follicles are presumed to be "not ripe enough" yet to ovulate), but days later they will mate again and have a successful ovulation (because the follicle/s are now ripe). In such cases, unless progesterone levels are used to pin-point the time of ovulation (see next paragraph), the particular mating that induced the ovulation to occur is unknown and, thus, so is the start-date of the pregnancy also unknown.

Because ovulation in the female cat is accompanied by a rapid surge in blood progesterone levels (the ripe ovarian follicle that ovulated transforms into a progesterone-secreting nodule called a *corpus luteum* immediately after ovulation), some breeders and vets elect to measure blood progesterone levels daily or every second day during the feline mating period to increase their accuracy at determining the gestation start-date. An increase in blood progesterone levels over 2.5ng/ml is generally suggestive of ovulation having occurred and so the first day that progesterone levels top 2.5ng/ml is usually stated as being the first day of pregnancy (the first day of the cat gestation period). When progesterone levels are used to gauge ovulation, the feline gestation period usually falls within a more refined timespan of about 63 to 66 days (i.e. more accurate) from the time of the first progesterone level increase.

Author's note: For those of you who do not wish to measure serial progesterone levels, the female cat herself may give you a rough behavioral indication of when ovulation has occurred. Once a cat ovulates, she tends to go off heat (stop showing heat symptoms - see our feline estrus page for information on cat heat signs) within 24-48 hours. If the change in behavior is very obvious, then a cat owner or breeder might be able to make an approximate guess that ovulation occurred 1-2 days ago and use that date (the 2-days-ago date) as the estimated start point for the cat gestation period. It is not as accurate as progesterone mapping, but it might be useful for those of you who just want a rough approximation.

For more on the estrus behaviour of the female cat and how the symptoms of heat are hormonally induced (how it all works), please see our informative "female cat in heat" page.



2a) Why is the stage of cat pregnancy important to know?

There are many reasons why people want to know the fetal age of the unborn kittens and therefore the stage of pregnancy that their female cat has reached. These are as follows:

A) Knowing the fetal age can help cat owners to predict what day or, at least, what week the kittens will be born:

People who make a profession or a living out of breeding cats generally have a good idea of when their female cat's mating occurred and, thus, when the kittens should arrive. This is particularly the case if the female cat was only allowed to copulate with a male cat over a restricted period of time (1-2 days only) or if serial progesterone measurements were used to pinpoint the exact timing of ovulation (and fertilisation). Because of their intimate knowledge of their cats' mating dates, cat breeders generally do not use fetal aging as a means of predicting when kittens are to be born. They already have this knowledge because they know when the day of conception was.

Pet owners who somehow "discover their cat is pregnant," however, generally have no such idea of when the mating and impregnation occurred. Their female cat has "grown fatter" and this is how they usually find out about her pregnancy. Determining an approximate estimation of fetal age in these pregnant animals can help such cat owners to know when these cats may be due to give birth and to, subsequently, prepare a place for their cat's litter to be born and raised.

Knowing when a litter of kittens is to be born is an important part of cat breeding management. If you know when a litter is expected you can:

- a) make sure that you will be home to monitor the birth just in case the cat gets into trouble during whelping (birthing);
- b) make sure that your cat is at home so that she can give birth in a familiar, comfortable environment (this is not the time to put the cat into a cattery or kennels for boarding!);
- c) tell prospective clients (people who want to buy the kittens) when they will be able to adopt their new pets and
- d) recognise if there is a gestation-length problem (i.e. kittens born too early or held onto too late overcooked) and have the problem worked up by your vet.

B) If a non-deliberate termination of the pregnancy (i.e. a spontaneous abortion or failure of pregnancy) occurs prior to full-term gestation being reached, knowing the fetal age (stage of cat pregnancy) at which the termination occurred can give the vet an important clue as to the cause of the problem:

Certain disease processes, toxins, drugs and infectious organisms kill fetal kittens (producing miscarriage and pregnancy failure) at *all stages* of the feline pregnancy. Such a problem in a breeding cattery would cause embryonic and fetal kittens to be aborted or reabsorbed at all different stages of fetal growth and development. It would therefore be expected that fetal kittens of all sizes and stages of fetal development would be discovered aborted (terminated) throughout the cat breeding facility. Conversely, many other disease processes, toxins, drugs and infectious organisms will only kill or deform fetal kittens (producing miscarriage and pregnancy failure) at certain, *specific stages in the feline pregnancy*. In these situations, the feline pregnancies will appear to progress normally throughout

the cattery until the queens reach a certain point (age) in their gestation, whereupon abortion and miscarriage will occur. Knowing the fetal age at which the miscarriage occurred can help the veterinarian to determine what kind of insult may have caused the problem (after all, certain infectious organisms, toxins and birth defects may only cause abortion to occur at particular, defined stages of fetal life).

C) Knowing the stage of cat pregnancy can help the vet and owner to decide if deliberate pregnancy termination (in the case of unwanted feline pregnancy) is an option:

There are two main ways of deliberately terminating pregnancy in cats: the induction of fetal death and expulsion from the uterus through the use of abortifacient drugs and the surgical termination of the pregnancy via pregnant-cat spay surgery (removing the fetus-bearing uterus from the female cat's body).

If the fetal kittens are very advanced in size and developmental state, their expulsion from the uterus through the use of abortifacient drugs can be very distressing for pet owners to witness. Finding blood-smeared, pink, hairless, kitten fetuses (+/- hemorrhagic placental membranes) all over the house is never a good thing, particularly if they are quite large in size and well-formed. It is for this reason that vets tend to only use abortifacient drugs to terminate pregnancies that are in their very early stages (first third to half of pregnancy and no later). Very early stage embryos and fetuses, once "terminated" and killed through the use of drugs, tend to reabsorb into the female cat's body without ever being obvious to the cat owner (i.e. they are not expelled). If they are expelled, they are usually very small and the female cat tends to discretely consume them away from the cat owner's sight.

Author's note: By the time most cat owners actually notice that their female cat is pregnant, it is usually too late to induce abortion with drugs. In order for a pregnant cat to "look pregnant" (i.e. appear fat and full in the tummy), she is usually well-advanced in her pregnancy with very large, well-developed fetuses inside of her.

If the stage of cat pregnancy is more advanced (i.e. up to about 2/3rds of the way through the cat gestation period) and the ongoing fertility of the female cat is not of concern, then surgical abortion is generally a better option for pregnancy termination than abortifacient drugs. The surgical procedure is unseen by the cat owner and it gives the female cat no further options for falling pregnant (unlike drug-induced termination where the female cat is still capable of becoming pregnant in the future). Beyond a certain stage of cat pregnancy, however, the kitten fetuses are very large and well-developed (see the 7-week, 8-week and 9-week fetal kitten pictures in section 2c). Many vets will refuse to surgically desex female cats at this stage because of the distress inflicted upon veterinary staff-members and because of the surgical risk to the mother cat and the likelihood of suffering being felt by the fetal kittens.

Author's note: Although many vets will spay pregnant cats right up to the time of birthing (they euthanase the fetal kittens), as per a cat owner's request, most vets that I know really do not like to spay pregnant cats which are in the "third trimester" of their pregnancy. Those vets that do spay late-pregnant cats generally do so because they, at least, can ensure a humane death for the fetal kittens (a humane euthanasia). This is often far better than the fate that awaits some unwanted kittens at the hands of their owners after their birth (being drowned in buckets or buried alive and worse).

D) Knowledge of fetal sizes can aid with the timing of an elective Caesarian section:

There are some female cats who are unable to give birth by natural means and who require caesarean section (C-section) in order to bear live kittens. This inability to give birth by natural means can be for many reasons, including: neurological defects (e.g. female cats with nerve defects that preclude effective contractions from occurring during parturition); advanced age; immature age (e.g. pregnant cats under 7 months of age); pelvic canal narrowing (e.g. female cats who have previously suffered fractured pelvises or who have been born with pelvic deformities) and cats who are expecting overlylarge kittens. Knowing when the kittens are expected to be mature enough to survive outside of the womb is vital if an elective caesarean section is to be performed in such cats. Cutting these cats too early can be a disaster for kitten survival.

E) Knowledge of fetal sizes at the various stages of cat pregnancy can tell cat breeders whether the unborn kittens are growing normally:

Just like in human obstetrics, the size of the fetal kittens in the uterus can be an important marker of whether the pregnancy is advancing healthily and normally. Kittens that are undersize for their stage of gestation (e.g. a kitten that has a crown-rump length of 5cm at 6 weeks gestation, when it should be 7cm long at this stage of cat pregnancy) may indicate that there is a problem with the pregnancy. The kittens may be overcrowded (i.e. a large litter of kittens will often be smaller in fetal size due to overcrowding and competition for nutrients); the mother cat may not be getting the right nutrition; the kitten/s might have a congenital defect; there might be a uterine defect (e.g. a defect limiting the supply of nutrients getting to the fetuses); there might be an infection and so on.

Please note that in order for fetal sizing to be used to determine the health of a pregnancy, the date of pregnancy conception needs to be accurate. Knowing the mating dates and/or the date that the first progesterone surge occurred is essential if accurate kitten aging and sizing is to be of use down the track. Sizing as a means of establishing the health of a pregnancy is of no use if the date of pregnancy conception is unknown.

F) Knowing the stage of cat pregnancy can tell vets whether certain drugs and medications are safe to use in pregnant queens:

Some drugs and medications are toxic to unborn kittens at certain gestational ages, but safe to use at other times in the pregnancy. Knowing the fetal age can help the vet to know when such drugs are able to be used in the pregnant cat. Likewise, certain drugs are *teratogenic* (cause fetal birth deformities) if

they are given to pregnant cats during the time that certain fetal structures are developing and forming. Once the fetal structures have formed, then the drugs may no longer pose the risk of causing a deformity. Knowing when the structures are forming (at what fetal age) can help the vet to determine whether such drugs are likely to be of risk to the developing fetus.



2b) How can we determine and diagnose the stage of cat pregnancy?

There are a number of ways of determining the foetal age and thus the stage of pregnancy, both in the pregnant cat and in the aborted (terminated) fetus. These are as follows:

A) Knowing the mating date or dates:

The best indicator of the stage of gestation of any feline pregnancy is the mating date/s of the female cat, particularly the date at which ovulation occurred (as diagnosed through the use of restricted copulation periods or through the serial measurement of progesterone levels during the mating period). Once this ovulation date is known, the fetal age (in days or weeks) is easy to calculate with high accuracy. No other form of fetal aging and pregnancy staging, which will be discussed in this section, is anywhere near as accurate at determining the exact fetal age as knowing the mating dates is (all other forms of fetal aging, though somewhat accurate, have their short-falls and limitations).

B) Abdominal palpation:

Experienced veterinarians who regularly palpate the abdomens of pregnant cats can often get a rough idea of how advanced a pregnancy is by the size of the uterine swellings that accompany the pregnancy (early to mid pregnancy) and/or by the size of the kittens that can be felt (generally late pregnancy). Generally the first, spherical, uterine swellings associated with fetal development in the uterus can be palpated at around 17-25 days of gestation.

Please note: Kitten sizes and uterine-swelling sizes can vary somewhat with the number of kittens in the litter. Larger litters tend to have smaller kittens and smaller uterine swellings than might be expected for the stage of feline pregnancy that they are at.

C) Abdominal ultrasound:

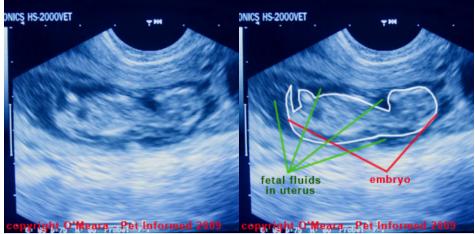
A useful way of diagnosing pregnancy, abdominal ultrasound can also be used in order to estimate fetal age and the stage of cat pregnancy. Embryonic kittens position themselves along the uterine horns as discrete spherical swellings at around 13-14 days after conception and can be apparently be detected by ultrasound from about 11-15 days of gestation, although it generally takes a very good ultrasound machine and an experienced ultrasonographer to detect them this early on (particularly as the kitten fetuses only "implant" or officially attach to the uterine wall at about day 15 of gestation). More reliable pregnancy diagnosis and fetal aging is generally achieved by ultrasound machine if the feline pregnancy is around 3 weeks old or more.

The detection of a fetal heart beat is normally only possible from about 22 days of age, so if the heartbeat can be seen, you know that the kitten must have a fetal age of at least 3 weeks.

The *crown-rump length* (the distance from the head to the bottom of the pelvis) of the kitten is also able to be detected on ultrasound. As kittens grow in utero, their bodies become longer. The crown-rump length of the body can help to determine the approximate age of the fetus (the stage of cat pregnancy). Fetal lengths are described in section 2c (next section) of this web page.

The main trouble with fetal kitten crown-rump-length estimations on ultrasound is the fact that fetal kittens do not always position themselves neatly in a straight line. They curl up into balls, mould themselves around other nearby kittens or abdominal organs and, in later stages, they move about. This can make it very difficult to determine their lengths with any accuracy. For this reason, many ultrasonographers choose to measure the *cross-sectional diameter of the kittens' heads and chests*, rather than their crown-rump lengths, as a more accurate marker of fetal age. For example, kittens with a head diameter of 1.6cm have about 3 weeks of uterine growth left to go before they are born. In the second and third trimesters of pregnancy (i.e. a gestation age of 3 weeks onwards), each subsequent week of fetal growth, either way, seems to involve a change of approximately 0.3cm in the head diameter (e.g. a kitten with a head diameter of 1.9cm has about 2 weeks to go, a kitten with a head diameter of 2.2cm has about a week to go and so on).

Please note: Kitten sizes and uterine-swelling sizes can vary somewhat with the number of kittens in the litter. Larger litters tend to have smaller kittens and smaller uterine swellings than might be expected for the stage of feline pregnancy that they are at. This can add an element of inaccuracy to the use of fetal crown-rump lengths and fetal head and chest diameters as a means of gauging fetal age and the stage of cat pregnancy.



Dog pregnancy images: These are images of a puppy fetus as seen on an ultrasound scan (note fetal kittens look very similar to fetal puppies). The fetus floats within a cavity of uterine fluid and fetal membranes (marked "fluid" on the second image). I have outlined the fetus (labeled as 'embryo') in white in the second image and you should be able to recognise the shape as being puppy-like: the head and muzzle are visible (right of image), as is the tail and back leg (left of image). The crown-rump length is the distance from the head to the base of the tail.

D) Abdominal radiography (taking x-rays):

The bones of fetal kittens become mineralized at around day 40-45 of gestation. If radiographs taken of the pregnant cat reveal the skeletons of the kittens, then we can say that the fetal age of those kittens is at least 40-45 days or more. The radiographs can also be used to get an estimate of the fetal crown-rump length of the kittens, thereby providing more clue as to the age of the kittens in the uterus.

Take a look at the image opposite (right). It is an abdominal radiograph of a pregnant dog (the same image would apply to a pregnant cat, however). You can see several tiny skeletons within this abdominal image. These are the calcified skeletons of the fetal puppies. This tells us that the fetal age of the unborn animals is at least 40-45 days.



E) Relaxin assays:

Relaxin is a hormone that is secreted by the placental unit of the pregnant uterus after about the 20-25 day stage of cat pregnancy. It is "pregnancy specific" (the presence of Relaxin tells you that the animal is pregnant) and its presence indicates that the kitten fetuses are at least 20-25 days old (fetal age).

Please note that Relaxin assays can be difficult to access. Many labs do not perform this test. If you can source a lab that will run the test, however, this can be very useful.

F) Examination of the fetuses - crown rump lengths, surface structures and developmental completion:

Although not generally possible or practical to do in the healthily-pregnant animal, the stage of fetal development and fetal age can be determined by examination of the fetus itself. Such examination is commonly performed in order to determine the age and the stage of pregnancy of freshly aborted fetuses. Fetal age can be determined by examining the fetus for such features as:

- a) fetal crown-rump length;
- b) the structure and pigmentation of the eyes;
- c) the presence of eyelids and ear flaps;
- d) the presence of whiskers and other sensory hairs;
- e) the presence of body hairs;
- f) the development of the feet, toes and claws;
- g) the presence of colored hairs and body markings.

These features are all illustrated in section 2c - our fetal kitten pictures section.



2c) The fetal development stages of cat pregnancy: A photographic guide to the week-by-week appearance of the feline uterus and fetal kittens throughout the cat gestation period.

The 2-week old embryo:

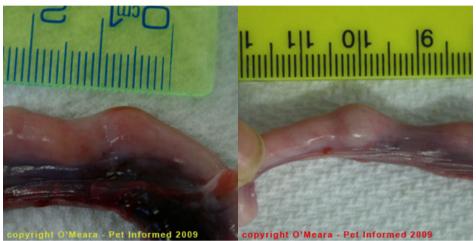
A developing baby animal in the uterus is not technically termed a "fetus" (also spelled foetus) until it has developed some of the body features that are typical of its particular animal species (i.e. until it

has some of the features that make it look like a kitten, rather than a dog or a human baby or a piglet and so on). Until this stage of development is reached (generally at about 4-weeks gestation for the developing kitten), the developing kitten looks pretty much like any other early stage of unborn life (it could be a person or a piglet for all we know) and is, as such, termed an "embryo".

It takes around 14 days for embryonic kittens to space themselves out along the uterine horns and for their associated membranous support structures (the developing fetal support membranes and placental attachments) to be recognized visibly as enlarged, spherical, fluid-filled swellings.

A two-week cat pregnancy can be diagnosed using ultrasound if the vet performing the procedure is very good at ultrasonography and has a good machine. The 2-week pregnancy is, however, much more commonly discovered and diagnosed by complete accident during routine cat spay surgery (the cat herself will not usually appear outwardly pregnant). A 2-week cat pregnancy looks like a series of small, circular lumps spaced out along the length of the cat's uterus. Opening the fluidy circles with a scalpel blade reveals clear fluid and a jelly-like blob of embryonic tissues and no more (I tried, but was unable to get any distinctive photos of the 2-week-old embryo - they disintegrate into mush the second they are handled).

Author's note: Because death of the embryo at this stage of cat pregnancy is most likely to result in the reabsorption of the embryo back into the mother's body, cat owners are never likely to see or recognise these embryos as being aborted.



Stage of cat pregnancy pictures 1 and 2: These are images of the uterus of a pregnant cat at 2-weeks gestation. Small (about 8-9mm diameter), round swellings are visible, spaced out along the length of the female cat's uterine horns.

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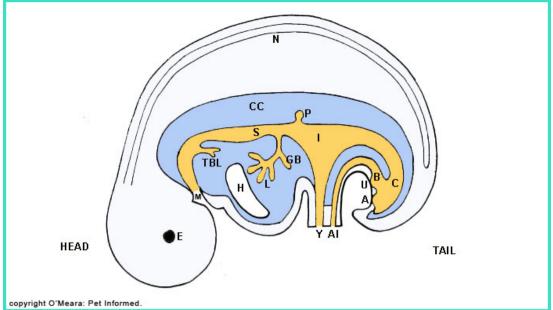
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The almost 3-week old embryo:

From 2-3 weeks of gestation, the embryonic kitten is clearly visible to the naked eye and looks a bit like a large, clear tadpole. It is about 5-8mm long from head to breech when it is in its curled "fetal position" (pictured below), but longer (just over 10mm) when it is stretched out and measured from head to tail-tip.

The embryo pictured in this section is about 16-19 days old (we would need super-close-up images of the embryo's surface anatomy to fine-tune its age more narrowly within this age range). Its body is in the process of forming all of the internal organ structures (see the embryo diagram - image 3). The embryo has a non-pigmented optic cup (labeled E on diagram 3) on each side of its head, which will become its eyes. It has an opening at the front of its head, which will become its mouth. It has very small protuberances (limb buds) starting on the sides of its body, which will become its four limbs.

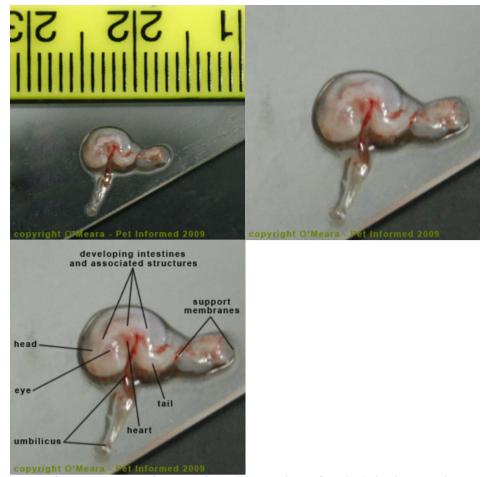


Stage of cat pregnancy diagram 3: This is a simple, diagrammatical image of the very early cat embryo. HEAD: head of embryo; TAIL: tail and pelvic region of embryo; N: neural tube (later becomes the spine and nervous system); E: eye; CC: coelomic cavity (a space that becomes the abdominal and thoracic cavities); M: mouth region; TBL: an outgrowth from the main body tube that becomes the trachea, bronchi and lungs; H: heart; S: region of the body tube that later becomes the stomach; GB: an outgrowth from the main body tube that later becomes the gall bladder; L: an outgrowth from the main body tube that later becomes the liver; P: an outgrowth from the main body tube that later becomes the pancreas; I: intestines; C: colon and rectum; B: region where bladder will form; Y: yolk sac opening; AI: allantoic cavity opening; U: region where the urethra will eventually open out (currently sealed closed); A: region where the anus will eventually open out (currently sealed closed). (Hand-drawn image interpreted and extrapolated from Dyce, Sack, Wensing - reference 5).

Basically, the early, developing embryo has a head, a body and a tail. It has a body cavity: a space inside it (colored in blue and marked with CC - which stands for coelomic cavity, its proper name) that will later become the chest cavity and abdominal cavity spaces of the mature animal. Hanging from the roof of this body cavity by fine membranes called mesenteries is a tube-like, rudimentary intestinal-like structure (marked in orange) that will later become the bladder, intestines, stomach, liver, pancreas, oesophagus, lungs and trachea of the mature animal. This tube structure is continuous with the world outside of the embryo in three places. The first, marked M, will become the mouth of the animal. The second opening, marked Y, is continuous with the fetal *yolk sac*: the first source of nutrition for the early embryo prior to the maturation of the placenta and umbilical cord connections that will bring nutrients to the embryo/foetus directly from the mother's own blood. This opening (marked Y) will regress during embryonic life, once the nutrients in the yolk sac are gone, and gradually cease to be an opening at all. The third opening, marked Al, opens out into the *allantoic sac*: a thin, bag-like structure that holds the waste products (essentially the urine and feces) produced by the rudimentary gut and kidneys of the embryo. This opening (Al) will regress during fetal life and gradually cease to be an opening at all.



Stage of cat pregnancy photograph 4: This is an image of the pregnant uterus of a female cat at 16-19 days gestation (2-3 weeks gestation). Small (15-18mm diameter), globoid, spherical swellings are clearly visible, spaced out along the length of the female cat's uterine horns. These uterine swellings may even be able to be palpated by an experienced veterinarian in order to diagnose the pregnancy.



Stage of cat pregnancy photograph 5: This is a photo of a 16-19 day kitten embryo outside of its uterine surroundings. It is tiny (about 5-6mm long), featureless and colorless (aside from its umbilical cord blood vessels and its newly-developing heart, which are both red). It does not yet look like a cat and could, at this stage, be the embryo of almost any other mammalian animal.

Stage of cat pregnancy photographs 6 and 7: These are close-up images of the kitten embryo at 16-19 days gestation. It looks a lot like the diagram image of the embryo shown earlier (image 3) and is of a similar developmental stage. The 16-19 day embryo contains an early, developing, non-pigmented *optic cup*, which will later become the kitten's eye (marked "eye"). It contains a long, central "core" of white, convoluted, tube-like structures, which run throughout its interior (these are the developing intestines, lungs and associated organ structures like the liver, pancreas and gall bladder). It also has a red "spot" in its chest region, which is the newly developing heart (the heart is only just starting to form and so is not yet capable of beating).

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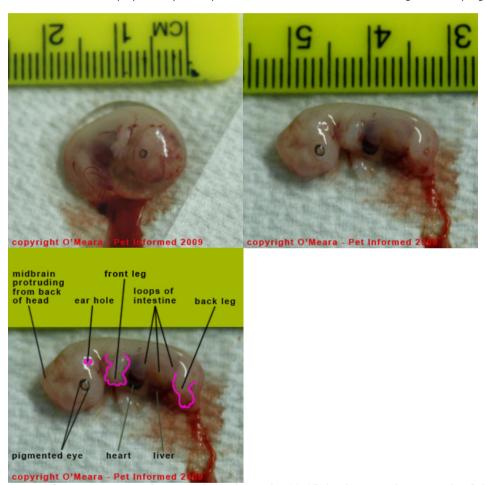
The just over 3-week old embryo:

From 3 weeks of gestation, the embryonic kitten is very clearly visible to the naked eye and now looks a lot more like a quadruped animal; having four, distinctly obvious limbs. The embryo is clear and glass-like (see-through) with well-formed internal organ structures visible through its skin.

The embryo pictured below is about 23-25 days old. The crown-rump length of embryos in this age group ranges from 17-34mm. The embryo's skin is clear and glass-like (see-through) with well-formed internal organ structures visible through the skin (the red heart and liver are particularly obvious in the images below). The embryo has four distinctly obvious limbs. The forelegs, in particular, are starting to become well-developed with obvious shoulder, humerus (upper arm), antebrachial (lower arm), wrist and foot segments now apparent. The toes of the front feet (fingertips) are just starting to split apart to become individual digits. Because the connective tissue structures that will form the foundations of the skull are soft and only just starting to develop, the midbrain bulges freely from the back of the embryo's head, giving the animal's head a pointed, "cone-head" appearance. The embryo's jaw (mandible) is now forming, such that it has a mouth. The eyes have continued to develop and are now pigmented (black in color). The external ear canal is also developing (the animal has a hole in the side of its head), but there is, as yet, no obvious ear flap (pinna).



Stage of cat pregnancy photograph 8: This is an image of the uterus of a female cat at 23-25 days gestation (just over 3 weeks gestation). Larger (30mm diameter), globoid, spherical swellings are clearly visible, spaced out along the length of the female cat's uterine horns. These uterine swellings are often able to be palpated by an experienced veterinarian in order to diagnose the pregnancy.



Stage of cat pregnancy photograph 9: This is the 23-25 day kitten embryo outside of the uterus, but still encased within its amnionic membrane. Out of the optic cup, the eye is forming and it is now darkly pigmented. The front foot of the embryo is clearly visible in this image and you can see that the foot is starting to indent and to form discrete toes. There are no claws present as yet. Looking very closely, you can also see that the kitten embryo has a formed back leg as well as a tail.

Stage of cat pregnancy pictures 10 and 11: These are close-up images of the kitten embryo at 23-25 days gestation. It now looks a lot more like a four-legged animal than the previous embryo pictured on this page (the 16-19 day embryo) did. The forelegs are starting to become well-developed and typical of the cat, with obvious shoulder, humerus (upper arm), antebrachial (lower arm), wrist and foot segments now becoming apparent. The toes of the front feet (fingertips) are just starting to split apart to become individual digits. Because the connective tissue structures that will form the foundations of the skull are soft and only just starting to develop, the midbrain bulges freely from the back of the embryo's head, giving the animal's head a pointed, "cone-head" appearance (labeled in image 11). The animal's jaw (mandible) is now forming, such that it has a mouth, but its facial features (muzzle and cheeks) are still a bit amorphous and indistinct. The embryo has a pigmented eye now, but no eyelids. The external ear canal is also developing (the animal has a hole in the side of its head - labeled in photo 11), but there is, as yet, no obvious ear flap (pinna). Internally, the embryo now has a well-formed, beating heart as well as looping, tubular intestinal structures and a large liver.

The 25-28 day fetus:

At four weeks, the embryo takes on the features that are characteristic and typical of its particular animal species and, as such, is termed a "fetus" (or foetus).

The fetus pictured below is about 25-28 days old. The crown-rump length of fetuses in this age group ranges from 21-40mm. The fetus's skin is still fairly clear and glass-like (see-through) with well-formed internal organ structures visible through the skin (the red heart and liver are particularly obvious in the images below). The limbs have continued to grow and develop and elongate and the toes have now almost fully separated from one another (there are still webs of connective tissue linking adjacent toes). The connective tissues that form the foundations of the skull are stronger now and they completely encase the brain such that the head is now evenly rounded and "skull-shaped" with no pointy brain tissue poking from the back. The fetus now has facial features and a facial shape that is typical of its species (i.e. a muzzle, an early cat-like nose, cheek bones) and it is just starting to develop eyelids and pointy ear tips (the new pinnas).



Stage of cat pregnancy photograph 12: This is an image of the pregnant uterus of a female cat at 25-28 days gestation (4 weeks gestation). The uterine swellings have continued to grow and they are now about 40-50mm long. The swellings are still spaced out along the length of the female cat's uterine horns, but as you can see, those that are positioned closer together are now starting to touch. These uterine swellings are often able to be palpated by a veterinarian in order to diagnose the pregnancy and, if they are not able to be clearly palpated, they are usually very easy to spot using ultrasound.

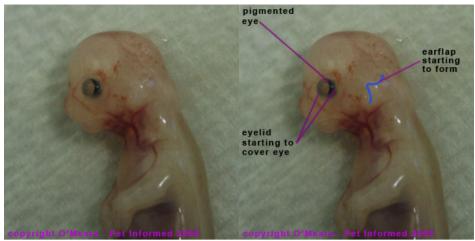
Stage of cat pregnancy photograph 13: This is an image of the fetal kitten at 25-28 days gestation (4 weeks gestation). Its crown rump length is about 2.8cm (28mm). The fetal kitten's liver (large red patch in lower abdomen) is large and well-formed.

Notice how the fetal kitten's abdominal contents (loops of pale intestine and liver) are spilling out from its umbilical cord region? This herniation occurs commonly when fetuses of this gestational age are manipulated because the fusion of the abdominal midline (the line of connective tissue running down the front of the belly that joins the right and left sides of the abdomen and keeps the abdominal contents "inside") has not yet been completed around the umbilical cord region. There is still an opening between the abdominal cavity and the outside world in the 4-week fetus and it takes little for the intestines and other abdominal contents to spill out.



Stage of cat pregnancy photographs 14 and 15: These are close-up images of the head and trunk of the 4-week old kitten fetus. The kitten fetus now has a face with a distinctly cat-like muzzle and nose. The fetus's bottom jaw is now forming well, such that it has a distinctly formed mouth. Large, blood-filled veins and arteries have now formed along the neck, face and legs (red lines) of the fetus. In image 15, you can see that the toes are now distinctly obvious and individual, but that thin flaps or

folds of connective tissue still link them one to the next (they are called 'webs'). These foot webs will later regress such that the toes become separate.

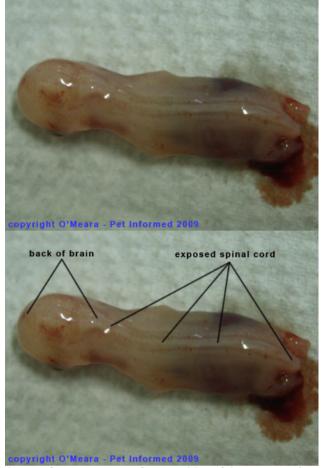


Stage of cat pregnancy photograph 16 and 17: These are close-up images of the head and trunk of the 4-week old kitten foetus. The kitten fetus now has a face with a distinctly cat-like muzzle and nose. Its bottom jaw is now forming well, such that it has a distinctly formed mouth. The fetal kitten's eyelids are now just starting to grow and cover the eyeball (see how the lower edge of the eyeball is blurry and indistinct? - this is because it is being obscured by a rising ridge of translucent tissue, which is the new eyelid). The ear flap (pinna) is just starting to form.



Stage of cat pregnancy images 18 and 19: These are images of the top of the head (crown) of the 4-week old kitten fetus. The fetus is facing towards the right of the image (the eyeballs are labeled in image 19). At this stage of fetal development, the connective tissue structures, which will soon develop further to form the bony skull, are already present and are completely encasing the brain (as a skull should). This is why the top of the head is now nicely rounded and "skull-like" in shape.

Not all skull tissues form and develop at the exact same rate. Whilst the large 'frontal plates' that make up the front portion of the brain case are already well-progressed in their development and formed of opaque, white cartilage, the 'parietal' and 'occipital plates' that make up the rear portion of the brain case are still in an earlier, non-cartilaginous stage of formation. The occipital and parietal plates that make up the rear portion of the brain case are, in these images, comprised of a firm, strong, clear (see-through) connective tissue. This hardy connective tissue is the base foundation over which cartilage will be initially laid (as seen already in the large, cartilaginous front plates, which have been outlined in blue on image 19), before later on being replaced by hard bone. The rear occipital and parietal plates are see-through at 4-weeks, which is why you can still see the back of the kitten's brain through its skull.



Stage of cat pregnancy images 20 and 21: At 4-weeks of gestation, the back of the kitten's brain is still visible through the skin, as is its newly-forming spinal cord. When the kitten is laid on its chest and belly, the kitten's neural cord (newly-forming spinal cord and spine) is clearly visible, running down the length of its back.

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The 28-32 day fetus:

The cat fetus pictured below is about 28-32 days old. The crown-rump length of fetuses in this age group ranges from 25-50mm. The fetus's skin is still quite gelatinous in appearance, but no longer quite as see-through as before. You can still make out the appearance of the large, red internal organ structures through the fetus's skin (the large, red liver is still quite obvious and in image 23 - below - there is still a faint blur of red in the mid chest region, which is the fetal heart). The limbs have continued to grow and develop and elongate and they now take on the bulky, three-dimensional shape of fully-formed limbs, thanks to the formation of supporting limb muscles (the muscular forelimb shape is particularly obvious in image 24 - below). The toes are widely spaced and fully separated and they now contain the first visible foot pads and nails (claws). The animal's eyelids have completely grown across the eyeballs and they are now fused shut. The kitten-like forehead is now domed and prominent and the triangular ear flap (pinna) has continued to enlarge (though it is still quite short).

Author's note: The fetal skeleton has continued to grow and mature through this stage of the cat gestation period. The ribs (clearly visible in image 23) are now formed of firm cartilage and are starting to ossify into bone. The 'frontal' section of the skull (discussed in detail in images 18 and 19) is now ossifying and turning into bone. The rear parietal and occipital regions of the skull are now completely cartilaginous and no longer see-through (the parietal region has even advanced rapidly to the stage of early bone formation).



Stage of cat pregnancy photograph 22: This is an image of the pregnant uterus of a female cat at 28-32 days gestation (4.5 weeks gestation). The uterine swellings have continued to grow. They are still spaced out along the length of the female cat's uterine horns, but as you can see, those that are positioned closer together are now starting to touch. The fluid content of each uterine swelling is now so voluminous that it bulges at each end. This gives each uterine swelling a "pointy-ended" rugby-ball shape. The dark-coloured fluid visible at each pole of every uterine swelling also helps to highlight the circumferential "band" or "ring" of placental tissue that encircles each fetal kitten sac like a belt.



Stage of cat pregnancy photograph 23: This is a photo of a 4.5 week-old fetal kitten. The fetal kitten has been left connected to the placenta (the rectangular band of red, knobbly, vascular tissue that it is laying on) and it is still enclosed within its clear amniotic fluid sac (amnion). You can see the umbilical cord running from the abdomen of the kitten to the placenta that was its life-support-system during the period of uterine development.

The kitten's ribcage (now turning into bone) is clearly visible in this image. If you look at the kitten's feet, you should be able to see that the kitten's toes are now separated from one another and that they have tiny claws and pads forming on them. The umbilical cord of the kitten is still quite large and wide in diameter. This wide umbilicus is typical of the 4-4.5 week old fetus, but it should rapidly shrink down in diameter and size by 5 weeks gestation.

Stage of cat pregnancy photograph 24: This is a photo of the same 4.5 week-old fetal kitten, now free of its supportive placental and amniotic sac structures. The fetus's skin is still quite gelatinous in appearance, but no longer quite as see-through as before. The foetal kitten's limbs have continued to grow and develop and elongate and they now take on the bulky, three-dimensional shape of fully-formed limbs, thanks to the formation of supporting limb muscles. The kitten's toes are widely spaced and fully separated and now contain the first visible foot pads and nails (claws). The animal's eyelids have completely grown across the eyeballs and they are now fused shut. The kitten-like forehead is now domed and prominent and the triangular ear flap (pinna) has continued to enlarge (though it is still quite short).



Stage of cat pregnancy photograph 25: This is a close-up photo of the head and trunk of the same 4.5 week-old fetal kitten, now free of its supportive placental and amniotic sac structures. The kitten's eyelids are fused and its ear flaps are increased in size. There is no hair yet present on its body. The blood vessels in the skin have continued to mature and branch out (you can see more blood vessel branches in the skin of this kitten than in the skin of the previous kitten fetuses).

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The 32-38 day fetus (5-week old fetus):

The fetus pictured below is about 32-38 days old. The crown-rump length of fetuses in this age group ranges from 35-60mm.

The fetus's skin is still semi-gelatinous in appearance, but does appear visibly thickened and more substantial now, compared to previous fetal and embryonic kitten images. The animal's eyelids have thickened somewhat, such that the pigmented eyeball is no longer so clearly visible through the eyelid skin. There are no hairs or developing hair-follicles on the fetus's skin (apart from the eyebrow and muzzle regions of the face where the sensory "whisker" hairs (vibrissae) are just starting form follicles) and so the skin of the 5-week old fetal kitten still appears shiny and unblemished (like plastic). The blood vessels in the kitten's skin have continued to mature and branch out more and more finely (you can see many more fine, branching blood vessels in the skin of this kitten than in the skin of previous kitten fetuses) and the supporting umbilical cord has now narrowed and is thinner in appearance than in previous images

The foetal kitten's limbs have continued to grow and elongate. The toes are widely spaced and more well-formed and the foot pads and nails (claws) have become much more obvious. The claws are now starting to appear whitish in colour due to the formation of keratin on the claws' surfaces. The kitten-like head is still domed and prominent and appears over-large because of a narrowing of the chest (thoracic) size of the kitten. The ear flap of the kitten is now very evident and the external genitalia of the kitten is now becoming visible and obvious.



Stage of cat pregnancy photograph 26: This is an image of the uterus of a female cat at 32-38 days of pregnancy (5 weeks gestation). The uterine swellings have continued to grow and are now starting to contact those adjacent to them. They range in length from 6-7.5cm long in this individual.



Stage of cat pregnancy photograph 27: This is a photo of a 5 week-old fetal kitten, now free of its supportive placental and amniotic sac structures. The fetus's skin is semi- gelatinous in appearance, but does appear visibly thickened compared to previous fetal and embryonic kitten images. There are no hairs or developing hair-follicles on the fetus's body and so its skin still appears shiny and unblemished. The foetal kitten's limbs have continued to grow and elongate. The toes are widely spaced and more well-formed and the foot pads and nails (claws) have become more obvious. The animal's eyelids have thickened somewhat, such that the pigmented eyeball is no longer so clearly visible through the eyelid skin. The umbilical cord has now narrowed and is thinner in appearance than in previous images.



Stage of cat pregnancy photographs 28 and 29: These are close-up photos of the head and trunk of the same 5 week-old fetal kitten, now free of its supportive placental and amniotic sac structures. The fetus's skin is semi- gelatinous in appearance, but does appear visibly thickened compared to previous fetal and embryonic kitten images. The animal's eyelids have thickened somewhat, such that the pigmented eyeball is no longer so clearly visible through the eyelid skin. Although there are no hairs or developing hair-follicles yet present on the fetus's body, there are some newly developing hair follicles on the fetus's face in the regions where the sensory "whisker" hairs will be (indicated in image 29). The kitten's ear flaps are much more prominent and well-formed. The blood vessels in the kitten's skin have continued to mature and branch out more and more finely (you can see many more fine, branching blood vessels in the skin of this kitten than in the skin of previous kitten fetuses).

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The 38-44 day fetus (6-week old fetus):

There are two kitten fetuses pictured in this section. The first fetal kitten is in the early to mid stage of the 38-44 day gestation age range and the second kitten pictured is right at the back edge of the age group (about 44-45 days old), perhaps just tipping over into the next age bracket. The crown-rump length of fetuses in this age group ranges from 50-80mm (the second fetus is about 80-85mm).

At 6 weeks, the fetus's skin is no longer see-through or gelatinous in appearance and appears visibly thickened and substantial compared to previous fetal and embryonic kitten images. In later stages (nearer the 44 day mark), the skin has grown so much that it even develops wrinkling around the flank, groin and armpit (axilla) regions of the body. The animal's eyelids are greatly thickened, such that the pigmented eyeball is now barely visible through the eyelid skin (just a dark shadow remains). Reference 3 (see reference section) describes the eye as being marked out by a "transverse furrow" where the eyelids meet and this is a pretty accurate descriptor.

The hair follicles are now forming all across the foetus's skin, giving the surface of the animal's body a granular, roughened appearance. The sensory hair follicles (whiskers or vibrissae) in the muzzle and eyebrow regions of the face have now fully developed and the first whiskers are now sprouting. These spiky whiskers are easy to spot (see cat pregnancy images 36 and 37). The blood vessels in the

kitten's skin have continued to mature and branch out more and more finely (you can see many more fine, branching blood vessels in the skin of this kitten than in the skin of previous kitten fetuses pictured so far). A fine spider-web of red blood vessels covers the entire surface area of the skin, including the ear flap of the kitten.

The foetal kitten's limbs have continued to grow and elongate. The toes are widely spaced and more well-formed and the foot pads and nails (claws) have become even more obvious. The claws are now bright white in colour due to the formation of keratin on the claws' surfaces. The ear flap of the kitten is now even more evident and elongated and the external genitalia and tail of the kitten are now very obvious and prominent. The kitten also has open nostrils at this stage, but generally no nasal pigmentation.

KITTEN FETUS 1:



Stage of cat pregnancy photograph 30: This is an image of the entire uterus of a female cat at 38-44 days gestation (6 weeks gestation). The four uterine swellings have continued to grow and are now contacting those adjacent to them. They range in length from 8.5-9cm long in this individual. The fluid content of each uterine swelling is now so voluminous that it bulges at each end. This gives each uterine swelling a "pointy-ended" rugby-ball shape. The dark-coloured fluid visible at each pole of every uterine swelling also helps to highlight the circumferential "band" or "ring" of placental tissue that encircles each fetal kitten sac like a belt.

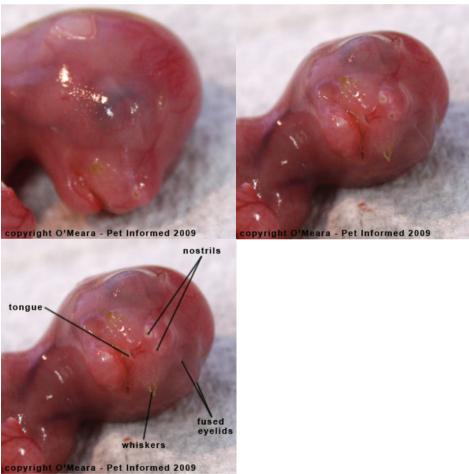
Stage of cat pregnancy photograph 31: This is a close-up image of one of the uterine swellings of the female cat at 38-44 days of pregnancy (6 weeks gestation). The swelling is about 8.5cm long. You should just be able to make out a 4cm-wide, circumferential "band" or "ring" of paler-pink tissue, which encircles the fetal kitten sac like a belt - this is the placental attachment of the fetal kitten (it runs in a belt along the inside wall of the entire circumference of the uterine horn).



Stage of cat pregnancy photograph 32: This is an image of a fetal kitten after 6 weeks of pregnancy. Its crown rump length is about 65-70mm.



Stage of cat pregnancy photographs 33 and 34: These are close-up photos of the head and trunk of the same 6 week-old fetal kitten, now free of its supportive placental and amniotic sac structures. The fetus's skin is non-gelatinous in appearance and appears visibly thickened compared to previous fetal images. The animal's eyelids are thickened, such that the pigmented eyeball is barely visible through the eyelid skin (just a dark shadow remains). Hair follicles are now forming all across the foetus's skin, giving the surface of the kitten's body (even the eyelids - see image 34) a granular, roughened, "dotty" appearance. The blood vessels in the kitten's skin have continued to mature and branch out more and more finely (you can see many more fine, branching blood vessels in the skin of this kitten than in the skin of previous kitten fetuses) and a fine spider-web of red blood vessels covers the entire surface area of the skin. The kitten's ear flaps are longer and more well-formed and even have their own distinct blood vessels. This image shows off the kitten's front feet very nicely: the claws are well developed and bright white in colour due to the formation of keratin on the claws' surfaces.



Stages of cat pregnancy photographs 35, 36 and 37: These are close-up photos of the head and trunk of the same 6 week-old fetal kitten. The kitten's whiskers (coated in green/yellow amniotic slime) are now visible in the muzzle and eyebrow regions. The nostrils of the kitten are now open (visible nasal holes) and obvious. The tongue of the kitten is also visible inside of the mouth, but does not yet protrude beyond the margins of the lips (as is seen in the next stage of fetal development).

KITTEN FETUS 2:

This fetus's age is right on the junction of the 38-44 days gestation range and the next stage of gestation (the 44-48 day age range) and so contains structural elements of each. I am not 100% sure whether this is a late, 38-44 days stage fetus (e.g. a 43-44 day gestation) or an early 44-48 days stage fetus (e.g. a 45-46 day gestation) because it has certain body features characteristic of *each* of these two gestational age ranges. Because of this, I have chosen to call it a 43-47 day old fetus (6.5



Stage of cat pregnancy photograph 38: This is a close-up image of one of the uterine swellings of the pregnant female cat at around 43-47 days gestation (6.5 weeks gestation). The swelling is about 9-9.5cm long.



Stage of cat pregnancy picture 39: This is a photograph of the 6.5 week-old fetal kitten, still enclosed inside of its placental and amniotic sac support structures. The fetus's skin is non-gelatinous in appearance and appears visibly thickened. As is typical of a later 38-44-day gestation fetus, there is skin wrinkling around the flank, groin and armpit (axilla) regions of the body. The animal's eyelids are even more thickened, such that the pigmented eyeball is now barely visible at all through the eyelid skin (just a dark shadow remains). The blood vessels in the kitten's skin are slightly less visible than those of previous fetal kitten images because the skin is thickening (obscuring them and making them less visible). This image shows off the kitten's front feet very nicely: the claws are well developed and bright white in colour due to the formation of keratin on the claws' surfaces. The footpads are also well-formed and have taken on their mature feline shape.



Stage of cat pregnancy images 40: This is a photo of the same 6.5 week-old fetal kitten, now free of its supportive placental and amniotic sac structures. The crown-rump length is about 8.5cm, which makes it slightly too long for the 38-44 day gestational age range (hence why I have aged it at about 44-46 days).

Stage of cat pregnancy images 41: These are close-up photos of the head and trunk of the same 6.5 week-old fetal kitten. The kitten's whiskers (coated in green/yellow amniotic slime) are now clearly visible in the muzzle and eyebrow regions. The nostrils of the kitten are now open (visible nasal holes) and obvious. The tongue of the kitten is also visible inside of the mouth, but it does not yet protrude beyond the margins of the kitten's lips (as should usually be seen in the next, 44-48 day stage of fetal

development). The skin around the nostrils is heavily pigmented (grey), which is more suggestive of the next stage of gestational development (the 44-48 day stage), however, the kitten fetus lacks the fine body hairs, which are typical of the 44-48 day stage (hence why I have aged the kitten as being on the margins of each of the gestational stages).



Stage of cat pregnancy images 42 and 43: These are close-up photos of the breech of the same 6.5 week-old fetal kitten. The genitals and tail are very obvious and prominent and the scrotal sac is well-formed, making this fetus a male.

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The 44-48 day fetus (7-week old fetus):

The fetus pictured in this section is at the 44-48 day stage of the cat gestation period. The crown-rump length of fetuses in this age group ranges from 59-94mm long.

At almost 7 weeks, the fetus's skin appears visibly thickened and substantial compared to previous fetal and embryonic kitten images pictured so far. Skin folds are present in the armpit and groin regions of the kitten, just behind the elbow and ahead of the thigh respectively. The animal's eyelids have continued to thicken and the pigmented eyeball is now no longer visible through the eyelid skin.



Across the animal's body skin, the hair follicles have all sprouted hairs. These hairs are short, fine and colourless (pale grey or white) and lend the surface of the embryo's skin a fine white sheen, which makes the skin appear shiny and velvety. The whisker hairs (vibrissae) in the regions of the muzzle and eyebrows have grown and are now longer and thicker. These whiskers are very easy to spot now.

The foetal kitten's limbs have continued to grow and elongate. The toes are well-formed with foot pads and nails (claws) in advanced stages of development. The claws are bright white in colour due to the formation of keratin on the claws' surfaces. The ear flap of the kitten is now even more evident and well-developed than previously seen. The kitten has nasal pigmentation at this stage. Due to a period of rapid growth, the kitten's tongue is now so large that it protrudes outwards beyond the level of the kitten's lips (i.e. the kitten is poking its tongue out).



Stage of cat pregnancy photograph 44: This is an image of the entire uterus of a female cat at 44-48 days of gestation (6.5-7 weeks gestation). The four uterine swellings have continued to grow and are now contacting those adjacent to them. They range in length from 11-11.5cm long in this

individual. The fluid content of each uterine swelling is now so voluminous that it bulges at each end. This gives each uterine swelling a "pointy-ended" rugby-ball shape. The dark-coloured fluid visible at each pole of each uterine swelling also helps to highlight the pale grey, circumferential "band" or "ring" of placental tissue that encircles each fetal kitten sac like a belt.

Stage of cat pregnancy photograph 45: This is a close-up image of one of the uterine swellings of the female cat at 44-48 days of pregnancy (6.5-7 weeks gestation). The swelling is about 11cm long.



Stage of cat pregnancy picture 46: This is a photo of a fetal kitten at 44-48 days of gestation. The crown-rump length is about 9-9.5cm. The hair follicles across the kitten's body have now all sprouted hairs. The hairs that have sprouted are fine and colourless (pale grey or white) and they make the skin shimmer and shine like velvet. You can appreciate the velvet shine particularly on this kitten's head and neck regions.



Stages of cat pregnancy pictures 47 and 48: This is a close up picture of the head of the fetal kitten at 44-48 days gestation (just under 7 weeks). The hair follicles of the kitten's body have now all sprouted short, fine, colourless (pale grey or white) hairs, which lend the surface of the embryo's skin a pale sheen. This makes the skin surface appear shiny and velvety. The fetus in image 48 looks particularly velvety. The whisker hairs (vibrissae) in the regions of the muzzle and eyebrows have grown and are now longer and thicker. These whiskers are very easy to spot now. The kitten has nasal pigmentation at this stage (i.e. a grey nose). Due to a period of rapid growth, the kitten's tongue is now so large that it protrudes outwards beyond the level of the kitten's lips (i.e. the kitten is poking its tongue out). This "protruding tongue" seems to be a particular feature of this stage of the cat gestation period.





Stages of cat pregnancy pictures 49 and 50: These are close-up images of the skin overlying this kitten's thorax and belly. The skin is covered in fine hairs and is velvety in appearance. Also notice the skin folds that are present in the crook of the kitten's armpit (behind the elbow region) and groin (just ahead of the kitten's thigh).

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The 48-60 day fetus (8-week old fetus):

The fetal kitten increases in size very rapidly during the last trimester, reaching a crown-rump length of around 65-125mm long (generally greater than 95mm long) by the 48-60 day (8 week) stage of cat pregnancy.

At this 8-week stage, the fetal kitten is almost completely formed and looks similar to a newborn kitten. The haircoat is longer than before, but still short, and it has thickened greatly, covering the entire surface of the body. This hair is pigmented now and the fur colors and markings (e.g. tabby stripes, patches) that the kitten will have in life are now quite evident. Due to a period of rapid skin growth, the skin covering the surface of the fetus is quite wrinkled, particularly in the neck region.



Stage of cat pregnancy photograph 51: This is an image of the entire uterus of a female cat at 48-60 days gestation (8 weeks gestation). The uterine swellings have continued to grow and are now pretty much continuous with those adjacent to them. It is not possible to determine the length of any one individual uterine swelling as they all seem to morph into one another. You should be able to see five paler-pink bands running circumferentially around the uterine horns at intervals. These are the circumferential "bands" or "rings" of placental tissue that encircle each of the fetal kittens like a belt. Because each kitten has its own "placental band," you can tell that this cat would have had 5 kittens had she gone to term. (Note - this advanced pregnancy was terminated for medical reasons).



Stage of cat pregnancy photograph 52: This is a picture of a fetal kitten at 8 weeks gestation. The crown-rump length is about 120mm (12cm). The haircoat is longer than before and has thickened greatly, covering the entire surface of the body. This hair is pigmented now and the fur colour that the kitten would have had in life is now quite evident (grey). You can see that the skin covering the surface of the fetus is quite wrinkled, particularly in the neck, armpit and jawline regions.

Stage of cat pregnancy photograph 53: This is a picture of the foot of the fetal kitten at 8 weeks gestation. The foot is now fully formed with thick toes, pigmented pads and white claws.

The 58-66 day fetus (9-week old, full term fetus):
The fetal kitten increases in size very rapidly during the last trimester, reaching a crown-rump length of around 100-180mm long by the 58-66 day (9 week) stage of cat pregnancy.

At this 9-week stage of cat pregnancy, the fetal kitten is completely formed and ready to be born. The haircoat is longer than before and has thickened greatly, covering the entire surface of the body. This hair is well pigmented and the fur colours and markings (e.g. tabby stripes, patches) that the kitten will have in life are now quite evident. The eyelids are still fused (they do not open until several weeks after birth).



Stage of cat pregnancy picture 54: This is an image of the entire uterus of a pregnant female cat at 58-66 days gestation (9 weeks, full term gestation). The four uterine swellings are large and each one is in close contact with the ones adjacent to them. The uterine horn swellings are quite thick (wide) and the kittens inside of them tend to be curled up in the "fetal position", due to a restriction on the amount of space available. It is this stress of "running out of space" and "outgrowing the nutrient supply" that causes the kittens to trigger the mother cat to give birth. It is the kittens and not the mother who determine when birth will occur.

Stage of cat pregnancy photograph 55: This is a close-up image of one of the uterine swellings of the female cat at 58-66 days of pregnancy (9 weeks, full term gestation). The swelling is about 12cm long and very wide.



Stage of cat pregnancy image 56: This is a picture of a fetal kitten at 9 weeks gestation. The fetus is now a fully-formed kitten. The crown-rump length is about 130mm - 140mm (13-14 cm). The haircoat is longer than before and has thickened greatly, covering the entire surface of the body. This hair is pigmented now and the fur colour that the kitten would have had in life is now quite evident (greytabby and white).



Stage of cat pregnancy image 57: This is a picture of the inside of the mouth of the fetal kitten at 9 weeks of cat gestation. The tongue is large and broad and the roof of the mouth is thrown into transverse folds or waves called rugae.



Stage of cat pregnancy images 58 and 59: This is a picture of the head and chest of the fetal kitten at 9 weeks of gestation. The face is fully furred, with clear markings. The eyelids are fused and there are radiating skin folds on the inside aspect of the pinna base, which is where the external ear canal opens out.



Stage of cat pregnancy images 60 and 61: This is a picture of the front leg and foot of a fetal kitten at 9 weeks of gestation. The foot is fully formed with thick toes, pigmented pads and white claws.



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To go to our photographic, step-by-step, pregnant cat spay page, click here.



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