

# MATERNAL BEHAVIOR

## I--Parturient & Postparturient Behavior

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Various aspects of maternal behavior occupy a central position in the life of a mother cat. For infant kittens, not only does maternal behavior hold a central position, but the experiences kittens receive as a result of maternal attention and stimulation from littermates has a critical influence on the behavior and health of kittens as they grow into adults. It is important that small animal practitioners be well acquainted with normal parturient and maternal behavior of cats, and in this article we shall consider some aspects of maternal behavior.

It is obvious, but probably still worth mentioning, that for many domestic mammals man has taken over several aspects of maternal care by providing food, water, and shelter to infant animals, and in some cases even assuming the responsibilities of grooming and cleaning the young. In some species this has allowed for a genetic relaxation of maternal behavior and the survival of a maternal-infant "system" not overly sensitive to human intervention. Of all domestic species this is the least true for cats.

Maternal behavior is pointed to by many as a striking example of instinctual or innate behavior. Primiparous females show a whole range of elaborate behavioral patterns for the first time in their lives - although such mothers may improve with the second litter. We are now finding, however, that certain important aspects of maternal behavior are indeed learned. Recent experiments have shown that in monkeys behavior can be severely disturbed in adult females by the experience of being isolated from a mother as an infant. Some aspects of licking behavior may be influenced by experimental factors. The amount of time a female cat spends licking her nipples and genital area increases during pregnancy. After parturition this licking behavior is switched to the anogenital area and other regions of the newborn. In rats the prevention of this preparturient licking reduces the licking directed towards the young after parturition.

Several aspects of preparturient and parturient behavior in cats are described by Schnerila, Rosenblatt, and Tobach (in E.L. Rheingold, "Maternal Behavior of Mammals", 1963). According to these authors as the time of parturition nears, pregnant females become less active. Licking of the abdominal and genital areas increases. Just before parturition the female typically seeks a dry, dark, and relatively undisturbed area in which to deliver the young. For domestic cats that are strongly attached to their owners, this does not necessarily mean a location isolated from the owners. In fact, there are reports of cats showing emotional disturbances during parturition, if the owners were not nearby. There are other cats that are reported to become irritable or actually aggressive as the time of parturition nears.

## BEHAVIOR DURING PARTURITION

In discussing the behavior of parturition, it is convenient to divide parturition or labor into four stages. These are the stages of contraction, stage of delivery of the fetus, stage of delivery of the placenta, and the stage or interval between deliveries. The interval between deliveries passes into the period of post-parturient maternal care. Some investigators have divided the stage of delivery to a phase where the fetus begins to emerge but pauses in the vulva, and a stage in which the fetus actually passes through the vulva.

In the first stage uterine contractions begin and there is a good deal of straining. Most cats lie down during this stage of labor although they may frequently get up to change positions. In the second stage contractions of the uterine and abdominal muscles become more intense, and the fetus moves rather rapidly through the birth canal. As the head or buttocks of the fetus appear at the vulva, the female often breaks the fetal membranes with her teeth. By tugging on the membranes she may actually pull the fetus through the birth canal. The female usually lies in lateral recumbency and bends her head to the hind quarters through her back legs. Once the newborn has passed through the birth canal the mother rapidly consumes the fetal membranes and begins licking the newborn vigorously. This usually causes the first respiratory movements of the newborn. In the third stage of placental delivery, the mother continues to lick and groom the newborn. As the placenta is passed it is usually eaten by the mother. While eating the placenta the mother generally bites off the umbilical cord. The pulling and stretching involved with eating the placenta and umbilical cord seem to have the effect of causing constriction of the vessels in the cord still attached to the kitten. Occasionally, movement of the newborn and mother causes breakage of the cord. In lions, it has been reported that mothers, especially primiparous females, may incidentally cannibalize neonate cubs by eating right into the abdominal wall after eating the afterbirth and cord. I have observed this in dogs also. It would appear to be a rather rare occurrence in the domestic cat. If the umbilical cord is not broken within a short period after birth, it may be necessary for a person to intervene at this point. As the mother licks and grooms the newborn she concentrates more on the anogenital region.

During the interval between deliveries, the mother not only continues to lick and groom the newborn animals as well as her own genital region, but she also cleans the bedding that has been soiled with amniotic fluids. According to actual observations, the mother may lick her own body more than that of the newborn. Licking behavior seems to be a response to the presence of fluids rather than a response to the newborn (Schnerila, et al).

Experimental observations have revealed that there is a wide (normal) range of variation in the duration of stages in kitten birth. Schnerila et al. cite a range for the stage of contraction of from 12 seconds to 1 1/2 hours and a range in the stage of delivery of from 32 seconds to 50 minutes. There seems to be no relationship between duration of individual kitten births and their order in the birth sequence.

Differences in parturient behavior between primiparous and multiparous females are apparently minor in most cases. Experienced mothers appear to respond more readily to the neonates in licking, grooming and retrieving and are less disturbed by

the physiological changes during birth. **Immediately** after birth of the last kitten there ensues a period of about 12 hours in which the female lies almost continuously with her young. The onset of this quiescent period seems to be slower to appear in **primiparous** than multiparous females.

#### IMMEDIATE POSTPARTURIENT BEHAVIOR

Most of the newborn kittens begin to nurse within an hour or two after delivery of the last fetus. For about the first two days after parturition the mother cat remains almost constantly with her litter. She only leaves the nest for very **short** periods to move about and feed. After these first two days she takes breaks away from the nest **more** frequently.

Retrieving behavior, which is so characteristically associated with maternal behavior in cats, apparently is at its peak in terms of responsiveness to the young and retrieving technique about one week after parturition (Schnerila et al.) **Mother** cats typically do not retrieve their young on sight, but rather respond to vocalizations of the young. Very often retrieving occurs only when the sound reaches a rather high intensity. Thus the kittens that are marooned several feet from the nest and emit stress vocalizations are the most likely to be retrieved. Almost everyone is familiar with the tendency for a mother cat to shift her litter from one spot to another in response to environmental disturbances. Schnerila, et al. **state** that the tendency to move a litter is strongest between 25 and 35 days after birth.

For the first three weeks the mother cat continues to lick and groom the newborn, especially the anogenital region. This of course evokes elimination, and the urine and fecal material are **consumed** by the mother. The nest is kept clean in **this** manner. As the young are able to leave the nest area the anogenital licking subsides and the young deposit feces and urine on one side of the nest box or in part of the room away from the nest. The nest area is still cleaned by the mother, however.

#### HORMONES AND MATERNAL BEHAVIOR

Although our understanding of hormonal conditions and changes during birth are very limited, it is **known** that the placenta produces appreciable amounts of **progesterone** during pregnancy. In addition to its effects on body tissues and endocrine systems, progesterone has been shown to act as a general anesthetic in large doses and is probably a kind of tranquilizer in smaller doses. Thus with the detachment and expulsion of the placenta, there is a marked fall in progesterone right at the time of parturition. It is quite surprising that animals pass through this period of marked **hormonal** change with as little emotional disturbance as does occur. In humans, post-parturient depression (reaching the point of psychotic disturbance) does occur, and is apparently related to the parturient fall of progesterone. In cats it may be that the occasional rejection of newborn kittens by a mother or aggressive attacks on kittens, might reflect this physiological hormonal change in combination with a stressful environmental disturbance. The injection of a long-acting progestin may be of value in inducing adequate maternal behavior in a **mother** cat who shows this type of abnormal behavior.

#### ADOPTION OF OTHER ANIMALS

We will consider some details of the **nursing-suckling relationship** in the next article. It would be appropriate here to mention that like **most ani-**



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**mals** that give birth to several offspring rather than **just** one or two young, mother cats will readily adopt other young. In fact, a mother may attempt to add to her own litter from that of another mother cat in the same house or colony. This **"open-arms"** adoption system may even extend to different species.

Cross-fostering is one way to raise orphaned cats or of balancing litter sizes in a cat colony. As we shall see later **from** the psychological standpoint, this would be more desirable than **raising** a kitten alone by bottle. In the event that one may wish to cross-foster a kitten after having isolated it from a **mother** cat for a week or more, some experiments reported by Schnerila et al. should be kept in mind. They removed kittens from their **mothers** for periods ranging from 6 to 20 days. Upon being returned to the litter the kittens took a considerable period to resume normal sucking behavior. For example, it took **20** hours for kittens isolated from the 6th to the 23rd day to begin sucking when returned to the nest. This delay did not represent any rejection by the mother but rather a deficiency on the part of the neonate to orient on the mother and make specific sucking adjustments. In a practical sense this means that attempts at cross-fostering such orphans may require close attention and possibly a bit of help in adapting the foster kitten to nursing and obtaining adequate nutrition.

(In our next issue: "Maternal Behavior 11 - The Nursing-Suckling Relationship and the Effects of Maternal Deprivation.")

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