

# UNDERSTANDING CANINE NEONATOLOGY

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The first few weeks of life for a newborn puppy are the most critical period they will ever encounter. They are born solely relying on their mother for survival. Neonates encounter high mortality rates during the first three weeks of life so it is essential that you can differentiate a normal from abnormal neonate in order to intervene if necessary to deliver the appropriate care. This can be especially challenging because puppies this young are difficult to examine due to their size and immaturity.

Spontaneous breathing and crying within the first 20 seconds after birth is an observation that correlates with survivability. Puppies are born with immature lungs so breathing early delivers oxygen to their system and support to the cardiac system which is also undeveloped and will undergo further maturation. Using a small bulb syringe to help clear uterine fluid from their nasal and oral cavity can help open airways. Gently rubbing their chest wall and tail head with a clean towel helps stimulate respirations and removes fluid that would otherwise act as a chilling effect. Cleaning and disinfecting the neonates' umbilicus supports the reduction of life threatening septicemia. It is imperative to observe early and effective nursing so that the newborn receives colostrum. Maternal milk is the only source of food during

FIGURE I

## Evolution of the Puppy's Eating Behaviors



**Did you know?**

Giving porridge or rehydrating the kibbles can help make weaning easier, and is even more effective if it is the same food as the mother eats (mimetic behavior).

\*Porridge = STARTER diets + STARTER MOUSSE OR STARTER diets + water

**Did you know?** DHA naturally present in maternal milk supports the development of cognitive functions.

the first weeks of a puppy's life. It provides all of the nutrients, water and energy required for healthy growth.

An excellent early indicator of healthy growth is daily weight gain. Recording the neonate's weight regularly will allow you to track daily progress. Daily weight gain is different for every breed so take that into consideration. It is normal for a puppy to lose a small amount of weight during the first 24 hours as a result of fluid loss. However, if a puppy loses more than 10 percent of his weight in the first 24 hours than the prognosis for a healthy life is poor. Puppies should gain around 10 to 15 percent of their weight each day; this weight gain is a direct correlation with survival. Using a digital scale to weigh each puppy in grams is more accurate than using another mechanism to weigh them in pounds. Most healthy puppies will double their birth weight by the tenth day of life.



FIGURE II

| APGAR SCORING SYSTEM | PARAMETER: | SCORE: | 0                  | 1                          | 2                   |
|----------------------|------------|--------|--------------------|----------------------------|---------------------|
|                      | Heart Rate |        |                    | < 180 bpm*                 | 180 bpm to 220 bpm* |
| Respiratory Effort   |            |        | No crying/ < 6 rr* | Mild crying/ < 6 to 15 rr* | Crying/> 15 rr*     |
| Reflex Irritability  |            |        | Absent             | Grimace                    | Vigorous            |
| Motility             |            |        | Flaccid            | Some Flexions              | Active Motion       |
| Mucous Color         |            |        | Cyanotic           | Pale                       | Pink                |

\*Beats per minute and respiratory rate

The canine APGAR scoring system can be used to assess the viability of neonate puppies and to aid in determining the survival prognosis. Five parameters are used in the evaluation for puppies. They include heart rate, respiratory effort, reflex irritability, motility and mucous membrane color. APGAR scores are then given to each puppy after assessing these parameters and a high score correlates well with survivability while a low score is associated with a higher risk of mortality. In summary, a heart rate above 200 beats per minute, crying and a respiratory rate above 15, a puppy that has vigorous reflexes, active motility and red mucous membranes all correlate with high survival rates.

During the second half of pregnancy not only are the puppies developing, but the mammary glands are preparing for the secretions that provide the nutrition for the newborn puppies. Toward the end of gestation the mammary cells start to trap the immunoglobulins from the mother's body and will play a crucial role in her colostrum and the health of the puppy. The first milk, called colostrum, is rich in these immune cells as well as lipids, lactose and proteins. Immunoglobulins are proteins that will provide the puppy with defenses against disease causing pathogens. In the canine species, there are four cell layers between the mother's and the puppy's blood supply in the placenta which limits the crossing of these immunoglobulins to the puppy. That is why it is imperative for the puppy to nurse and receive colostrum during the

first 18 hours of life because after this time they are unable to absorb immunoglobulins. Two main immunoglobulins are transferred to the puppies: Immunoglobulin G (IgG) provides systemic immunity while Immunoglobulin A (IgA) provides local protection to the linings of the respiratory and digestive tracts. They are present in different proportions at birth and in time change when the colostrum turns to milk. The immunoglobulin received by the puppies provides protection against disease but will start to decrease during what is called the immunity gap.

The colostrum that puppies receive not only provides immune support but much needed energy supplies. Since puppies have very little fat stored and are limited in their ability to produce glucose, colostrum provides these very important and much needed nutrients. Colostrum also provides other nutrients that are important for the development of the gastrointestinal tract and its maturation. It also contains water to prevent dehydration. Since colostrum can only be ingested by the puppy during the first 16 to 24 hours after birth and early ingestion provides the highest quality, we as breeders need to focus on the mother's nutrition prior to whelping and then getting puppies to nurse early.

To improve the production and quality of colostrum we need to look at the mother's diet. The mother needs a high energy level during the third trimester and during lactation too, as do puppies during weaning. They share the same nutritional needs. It is during this time that the puppies are growing the fastest and colostrum is being produced.

## WEANING facts



### Changes in the puppy's digestive capacities

- As the weeks go by, the puppy's tolerance to lactose (the major milk sugar) decreases and the ability to digest starch increases.
- The puppy has a more sensitive digestive system than the adult. A food specially adapted for weaning can help support healthy digestion while his digestive system matures.

### The decline of maternal immunity

- From the fifth week of life, the puppy's own immune system starts to take over from the maternally transmitted antibodies.

### Changes in eating behavior

- The first teeth appear around three weeks of age: the puppy will begin to eat solid food between four and six weeks of age.
- At the same time the suckling reflex declines and is replaced by the ability to lick then chew.

A diet that has high energy and contains highly digestible proteins as well as vitamins in the correct balance will contribute to the quality of the colostrum. Ensuring that the mother continues to eat as she reaches the late stage of gestation is critical. We also need to realize that her water consumption will increase and need to provide a constant source of clean water. After all, healthy puppies begin with a healthy mother.

The immunity gap is the time in a puppy's life when the immunity that has been provided by the mother falls below protection levels and the immunity received from vaccinations begins to rise. This usually occurs between six to 16 weeks of age. Of course each puppy's time will be different depending on how much immunity was received from the mother. During the immunity gap is when the puppies are most susceptible to certain life threatening viruses. It is common in the early stage of the immunity gap to start protection by vaccinating the puppy. It is also common for these first vaccines to be blocked by the maternal antibodies. We do not know precisely when the maternal antibodies have decreased to a level that will allow the vaccine to be

effective, which is one reason puppies are given a series of vaccinations.

Vaccinations traditionally begin during the immunity gap because it's important to start the process of lifelong protection against canine diseases. A patented formulation of antioxidants including Vitamin C, Vitamin E, Lutein and Taurine have proven beneficial during this period. They allow for a faster and more vigorous response to vaccines allowing for a shortened immunity gap. A faster response to early vaccinations can shorten the immunity gap by decreasing the time that puppies are susceptible to disease. The beginning of the immunity gap also often overlaps with a very stressful time in a puppy's life - weaning.

Weaning is a significant time of transition for a puppy because they go from total reliance on maternal milk for nutrition to the reliance on solid puppy food as their singular source of nutrition. It is also a time when the gastrointestinal tract is maturing and faced with the effects of parasites and less than optimal digestive capabilities. The stages of weaning include the transition from suckling, then licking the food to chewing a hard kibble

(see figure I). Weaning also coincides with a period of rapid growth and continued maturation of body systems. During this period, you will typically see puppies' imitate their mother's eating behavior, their appetite change, high energy needs and digestive sensitivity. Weaning diarrhea is very common and can be reduced by offering meals more frequently, often from four to six times per day. Choosing a diet that can easily be made into a porridge-like consistency allows for the transition period to go more smoothly for the puppy. The presence of Antioxidants in a diet also supports gastrointestinal health and development by reducing cell damage. Once the weaning process is complete, your puppies are now successfully eating solid food and at eight weeks will transition to a growth formula that is best suited for the breed. Each breed has different needs and nutrition plays a critical role in the successful transition period from a growing puppy to a healthy adult.

Did you know?

### STARTER MOUSSE



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Dr. Kesler has nearly thirty years of experience as a practicing veterinarian and has a special interest in reproduction. As a former breeder and current Scientific Services Veterinarian at Royal Canin, he is actively engaged with the breeder community and continues to share his knowledge by speaking at education seminars across the country. Dr. Kesler works directly with breeders and pet owners on a daily basis to consult on kennel management, nutrition and reproduction techniques. His passions include neonatology and educating breeders on how to reduce the incidence of brucellosis.



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