

Care and Feeding of the Lactating Bitch

Martin Coffman, DVM

*Research and Development Division
The Iams Company, Lewisburg, Ohio*

INTRODUCTION

For eons, mother's milk has proven to be the best food for newborns. Studies in several species have documented the mechanisms that keep milk high in nutritional value regardless of the condition of the dam.¹ These studies verify that a lactating bitch will produce a sufficient quantity of nutritious milk to support her puppies even if her condition deteriorates. For conscientious dog breeders, the challenge is to provide nutrition for the dam that will allow her to not only feed her puppies, but also to maintain her own condition.

It is normal for a bitch to lose some bodyweight during lactation but, ideally, the amount lost should not exceed 10% of her original weight.⁴ It is much easier to attain this goal if the bitch is in good condition prior to whelping which usually reflects the fact that she was in good condition at mating.

Excellent nutrition, though crucial, is not the only step that breeders can take to insure a healthy dam after her puppies are whelped. Clean, dry facilities are important. Daily exercise and fresh air can make the

nursing process more pleasant for the dam, too. Daily examination of the dog's mammary glands allows early detection of infection in the breasts allowing prompt treatment.

Of course, a plentiful supply of clean water is very important to the well-being of the dam. Water consumed by the bitch is important to the puppies as well because water turnover is very high in the newborn puppy.⁵ This function of nursing is often overlooked by breeders. A consistent fluid intake by the puppy is required to maintain blood volume and this hydration function of milk is as important as the nutritional role.

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DOG MILK CHANGES OVER THE NURSING PERIOD

One of the fascinating features of the nursing process is the ability of milk to change over the lactation. For example, the energy content of dog milk increases steadily for the first 40 days of nursing then decreases by day 50, coinciding with the puppies' ability to eat solid food.¹ This allows an early start on shrinkage of mammary tissue to help the bitch end her milk production. Fat content in the milk varies over the lactation period as well. Early in lactation, the fat level is about 2.4%. By the middle of the nursing period, the fat level increases to about 5% then decreases to about 2.6% near weaning. Calcium is high in milk during the entire nursing period but continues to increase as weaning nears. Magnesium, iron, and zinc all vary over the lactation stage.

It is important to note that the dam's nutritional level must be very high in order to allow this normal variation of nutrients and to provide optimal nutrition for the puppies. A specific example is the so-called "toxic milk" syndrome, which can affect puppies between 3 and 14 days of age. This condition may be caused by uterine infection and/or mammary infection, but some cases respond to zinc supplements suggesting that the disorder may be due, in part, to inadequate zinc intake.² This example illustrates the necessity of a high nutritional plane to supply the various nutrients required by the nursing bitch.

Failure to consume colostrum during the critical period when the intestine is open to intact protein absorption seriously compromises the immune status of the neonatal puppy.⁵ This occurs either through the bitch's inability to produce colostrum or the puppies' inability to nurse properly. Suitable corrective action requires the manual collection of colostrum from another bitch

or a frozen source, then provision to the puppy via stomach tube.⁵

Although much less desirable, colostrum from another species (eg, bovine) may be used. The antibodies provided by cattle colostrum may not be protective for the puppy, but other nonspecific defenses may be utilized (lysosyme, lactoferrin, and oligosaccharides).⁵ These nutrients protect the puppy against bacteria by destroying the pathogen or protecting the puppies intestine against bacterial toxins.

MILK INTAKE OF PUPPIES

Most dog breeders are unaware of the large quantity of milk produced by lactating bitches. For example, milk intake of Beagle puppies is about 5.5 ounces per day each. With an average litter of pups, a Beagle bitch will need to produce about one quart of milk per day!³ Larger breeds will be required to produce substantially more milk each day. Milk production decreases as puppies begin eating solid food, but milk alone can support normal growth in puppies up to four weeks of age.¹ Regardless, the large amounts of healthy milk required by most litters necessitates a very high level of nutrition for a successful nursing process.

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This fact, plus the reality that puppies are totally dependent on their mother's milk for nutrition and hydration, makes the production of large quantities of high-quality milk even more poignant.

FEEDING THE BITCH DURING LACTATION

Milk production is an energy-consuming process and the energy level in the bitch's food is very important to the lactation process. It is recommended that, soon after whelping, the level of metabolizable energy (ME) intake by the bitch be increased to 200% of the maintenance amount normally utilized. In other words, the bitch must eat twice the food she ate before she was bred. The intake level of ME should be increased to 300% of the maintenance level during the peak lactation period 3–4 weeks post-whelping (For further information, see chapter by R.L. Kelley in this proceedings, pages 9 to 14.)

Many bitches cannot consume enough calories to insure adequate milk production and the maintenance of her body condition in one or two meals per day. Total food quantity should be divided into four or more servings per day to make the total ME more available to the female. In addition, dog foods with minimum levels of 430

kilocalories ME/cup should be utilized to insure energy density and adequate calories in small quantities of food.

Often, the easiest method of providing this large number of calories plus the high digestibility required of the lactating bitch is to offer a "performance" type dog food. Designed for hard-working dogs, these foods have very high energy levels in a dense, highly-digestible matrix. The best choice uses fat as the

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primary energy source. Since fat has over twice the calories per gram as carbohydrates, this allows the nursing mother to get large quantities of energy in a few bites of food. These "performance" foods also have a balanced formula that will supply the nutrients needed as the bitch's milk changes over the nursing period. Note that the best way to compare foods is based on this "percentage of calories method." Dogs eat to get calories so the most accurate measurement is via a percentage of the calories in a food.

When a highly-digestible, performance food (**Table**) is fed to a nursing bitch, no supplements will be required. Overall, this is the simplest, least expensive method of feeding the lactating bitch and provides optimal nutrition for the dam.

CHARACTERISTICS OF A PERFORMANCE FOOD SUITABLE FOR THE LACTATING BITCH

Energy Density	4500 kcal ME/kg or greater
Fat	50-65% of calories*
Protein	30-35% of calories, meat source*
Carbohydrate	10-15% of calories
Fiber	3% to 7% of a moderately fermentable fiber source
Fatty acid ratio (omega-6:omega-3)	Between 5:1 and 10:1

*Label values for guaranteed analysis will be a minimum of 20% fat and 30% protein

DISEASES OF THE LACTATING BITCH

Early detection of post-whelping disorders is very important and may save the life of the bitch and pups. There is a wide range of diseases and problems that can occur shortly after whelping, some of which resolve without treatment, while others require heroic surgery. In addition, these conditions can occur as early as several days

before whelping (eg, eclampsia) to several weeks after the pups are born (eg, uterine problems).

The astute and careful breeder is very observant of the bitch's demeanor and appetite. Although it is not unusual for a bitch with newborn pups to eat a scanty amount of food for the first week, failure to eat a normal amount of diet for longer than 7 days suggests problems. If the bitch fails to eat, even during that first week, the owner should carefully examine her for other problems such as fever, foul-smelling vaginal discharge, pale gums, or dehydration. Ideally, the bitch's temperature should be taken daily for the first week after birth. Elevated temperature may indicate uterine infection, mammary gland infection, or low blood calcium. The milk should be examined daily for abnormalities. If any question exists in the breeder's/owner's mind, the bitch should be presented to the veterinarian for evaluation.

Breeders often ask the veterinarian to administer an oxytocin injection after whelping as a "clean-out" shot. Normally, oxytocin need not be given if the bitch is nursing since nursing stimulates the pituitary gland to release oxytocin. However, it may be desirable to administer oxytocin to bitches whose pups were born dead or were removed from the mother at birth.⁶

UTERINE INFECTIONS

Bacterial infections of the bitch's uterus may be associated with retained afterbirths, decomposed pups in the uterus, or a prolonged whelping. Since the cervix is open during and after whelping, bacteria have access to the uterine vault

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and they flourish on the devitalized tissues therein. If left untreated, uterine infection can lead to septicemia and toxemia.

Typical signs of uterine infection are high fever (103.5° to 105° F), failure to care for the pups, and a foul-smelling reddish-brown discharge from the vulva. While it is normal to see a greenish discharge (lochia) for up to 3 weeks, this material is not malodorous nor is there a fever present. A veterinarian should examine bitches with suspected uterine infections as soon as possible.

MAMMARY GLAND INFECTIONS

Infections of the mammary gland (mastitis) can involve just one gland or several. Since the canine teat has several duct orifices (between 7 and 22),⁷ infections can be localized

in one area or spread from gland to gland. In addition, mastitis can be acute and life threatening or almost without symptoms, except for loss of a number of pups.

Normal canine milk, when expressed from the teat, may be yellowish to white. The yellow tint is apparent early in lactation, due to the high concentration of colostrum in that early milk. Owners should exercise immaculate hygiene when examining the milk since bacteria on the hands can enter the teat orifice and instigate the infection process.

Milk from bitches with mastitis can vary in color from white to greenish-yellow. Severe cases may even have a blood tinged appearance to the milk and the gland can become swollen, hot, and have a bruised appearance. Neglected cases can abscess, with open drainage of pus evident. Bitches that appear to have mammary gland infections should be presented to the veterinarian for appropriate antibiotic therapy.

One difficult decision concerning mastitis involves letting the pups continue to nurse while the mother's mammary glands are infected. Ideally, pups should be removed from bitches with infected mammary glands, but since most cases of mastitis occur when the pups are less than two weeks of age, to remove the pups and begin hand rearing may require the litter to be fed every 2 to 4 hours. This requires a substantial commitment on the part of the owner/breeder. If mastitis is diagnosed after the pups are two weeks old, hand feeding frequency can be reduced to every 4 to 6 hours and the commencement of feeding solid food can begin as early as 3 weeks.⁶

Chronic mastitis in the bitch can occur, even if the only symptom exhibited is that the puppies are not

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thriving. The incidence of this condition in the dog is currently unknown. Regardless, bitches diagnosed with chronic mastitis require aggressive antibiotic therapy. Unlike acute mastitis, chronic cases may require the use of special medicines that will cross the barrier between the blood and milk.

GALACTOSTASIS

This condition occurs when milk is not removed from the mammary gland promptly. Galactostasis normally occurs in bitches with small litters or when pups utilize only one or two teats. The condition can also occur as a result of a false pregnancy. As long as there is no inflammation and infection, galactostasis is not usually serious.⁶ However, a bitch with this condition is often very uncomfortable. The breeder/owner can provide her some relief by applying cool towel compresses. The veterinarian may prescribe diuretics or pain alleviating drugs. Reduction in food can lead to lowered milk production and aid the bitch with galactostasis. Milking the affected glands may actually lead to increased milk production.

AGALACTIA (LACK OF MILK)

Agalactia is the condition where the mammary glands do not produce sufficient milk. Most cases are secondary to inadequate nutrition, stress, mastitis, uterine infection, psychological problems, or other diseases.⁶ Rarely, bitches suffer from a genetic primary agalactia, which will not respond to therapy. These bitches have a defect in their ability to respond to the hormones of milk production or a congenital defect in the mammary gland itself.

A young, nervous bitch may suffer from psychological agalactia. She will often respond if the breeder/owner spends time trying to reassure and calm her; in some cases, tranquilization may be necessary.⁶ An

oxytocin nasal spray has been used in these anxious bitches to encourage milk letdown.

Other causes of failure to produce milk may be yet determined. For example, some infections, especially those due to the mycoplasma group of organisms, may be implicated. Research done to evaluate causes of agalactia in other species, such as swine and goats, may offer evidence to help bitches overcome the condition in the future.

FAILURE OF THE UTERUS TO INVOLUTE

Subinvolution of the placental sites (SIPS) is often implicated when the uterus fails to return to its normal size and shape by 15 weeks after whelping. More common in the young bitch, often the only evidence of SIPS is a bloody discharge from the vagina for several weeks after whelping. Since it is normal for a greenish discharge to be present for up to 3 weeks after whelping, the blood-tinged portion may be obscured for that period of time. The presence of a blood-tinged discharge along with the ability to still feel an enlarged uterus at 12 weeks after whelping is suggestive of SIPS. Since many cases eventually result in spontaneous remission, many of these bitches will not require therapy.⁶ However, if the amount of blood is substantial or the veterinarian determines other problems (perforation of the uterine wall) ovariohysterectomy may be required.

ECLAMPSIA


Low blood calcium is the result of reduction of calcium levels outside the cells of the bitch's body. Signs of eclampsia are nervousness, fever, dry mouth, panting, restlessness, tremors, staggering, stiff gait, and eventually, collapse with seizures and labored breathing. Death can occur if eclampsia is left untreated. While the condition can occur prior to whelping, it is much more common after the birth of the pups. As the demand for milk increases, the likelihood of eclampsia escalates. Normally, by 40 days after whelping, the danger of eclampsia has passed. Small breeds are more likely to have eclampsia, but litter size does not affect the incidence of the disease.⁶ Treatment involves intravenous injection of a calcium solution and should begin as soon as possible after the diagnosis has been determined.

Prevention of eclampsia is based on solid nutrition

Prevention of eclampsia is based on solid nutrition using a diet suitable for the pregnant and lactating bitch.

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using a diet suitable for the pregnant and lactating bitch (see also chapter by R.L. Kelley, *Factors Influencing Canine Reproduction and Nutritional Management of the Pregnant Bitch*). The addition of calcium supplements or diets excessively high in calcium may exert a negative biofeedback on the secretion of hormones by the parathyroid glands that control calcium metabolism. This effect can cause a decrease in both the body's capabilities to mobilize calcium stores from bone and its ability to increase calcium absorption in the intestine. When calcium is suddenly needed for lactation, the body's regulatory mechanisms are unable to adapt quickly enough to the sudden calcium loss. Since calcium is diverted to milk production, the bitch's blood calcium levels decrease. Although a direct link between high dietary calcium and resultant eclampsia has not been made in the bitch, it seems prudent to avoid calcium supplements in pregnant bitches.⁸

CONCLUSIONS

The complexity of diseases that affect the bitch soon after whelping makes it imperative that the veterinarian be aware of even subtle changes in the new mother's condition. It is better to contact the professional about a minor problem than to delay and court catastrophe.