

## The Management of the Healthy Newborn Orphaned Puppy

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**Received:** February 22, 2021; **Published:** March 23, 2021

### Abstract

The management of the orphaned puppy is a very delicate matter. Increasing the newborn's survival chances requires dedication and it can't be led by any improvisation. Many aspects need to be taken into consideration, particularly in relation to the environment and nutrition. This review aims to underline the main aspects of rearing the unweaned healthy orphaned puppy during the first week of its life, with particular attention to the feeding methods, techniques and main risks.

**Keywords:** *Orphan Puppy; Husbandry; Management; Hand-Rearing Risks; Newborn; Bottle Feeding; Milk Replacement Formulaes*

### Introduction

Some puppies find themselves unable to receive maternal husbandry from the dam due to many reasons:

- Death of the dam
- Agalactia (absence of milk)
- Absence of maternal instinct/aggression
- Big litter size.

Although the best alternative to the bitch would be a foster mother, ideally at the same lactation stage as the biological dam, this is not always possible.

The risk of hypothermia, hypoglycemia and the inability to actively urinate and defecate, as well as the absence of the natural uptake of colostrum, are all factors that contribute to an increase in the neonatal mortality rate of up to 90% [1,3,5].

Therefore, many aspects need to be considered to increase the survival rate of the newborn puppy:

- Environmental temperature
- Humidity
- Hygiene

- Constant care
- Feeding.

### Temperature

In the newborn puppy the body temperature falls rapidly after birth, whilst the thermoregulation mechanisms are not fully operative yet (shivering and vasoconstriction absent in the chilled newborn, panting present in the overheated newborn). The neonate puppy has a lower body temperature compared to the adult dog, with a physiological rectal temperature of 35-36°C during the first week of age [1,4-6].

In normal circumstances, the dam's presence would prevent excessive heat loss. In her absence, however, the orphaned puppy needs to rely on higher environmental temperatures compared to those required for the adult dog. Studies suggest that an environmental temperature of 31 - 32 +/-2°C should be maintained during the first week after birth [1-6].

In order to provide an ideal environmental temperature, many sources of heat such as warm water bottles, boiled riced heated in a sock, warmed towels, heat lamps, oxygen cages and pediatric incubators can be used. However, heat sources need to be constantly monitored to prevent burns, under or overheating and dehydration of the pups [2-4].

### Humidity

Studies indicate an ideal environmental humidity of 55 - 65%, with peaks up to 85% in the immature or in the low-birth-weight newborn. However, care should be taken when using particularly high or low humidity levels. In fact, humidity level lower than 35% and higher than 95% could lead respectively to dehydration and to respiratory distress/increased environmental microbes [1-4].

### Hygiene

High environmental hygiene must be maintained. In normal circumstances, the dam would provide this nursing care. In her absence, however, faeces, urine and residual milk should always be promptly removed from the environment as well as from the newborn's body [1,5].

### Constant care

A first medical check is needed at birth, not just to resuscitate the pups if required but also to promptly spot medical conditions such as orofacial clefts. In fact, these conditions could lead to inappropriate management of the puppy and consequent increase in the morbidity/newborn mortality rate due to aspiration pneumonia, failure to thrive or euthanasia.

Following the first clinical examination performed straight after birth, regular monitoring of the newborn should be performed multiple times daily [1,7].

### Feeding

It is known that most of the passive immunity is passed to the puppy through the maternal colostrum during the first 24 hours of life. Therefore, when possible, pups should receive colostrum from the dam, from a foster mother or frozen colostrum within this period [1,2,4]. The gastrointestinal permeability to the colostrum immunoglobulins is much reduced between 24 and 36 hours after birth. However, the maternal antibodies will continue being protective by preventing infections that initiate from the newborn's oral and gastrointestinal membranes [2].

When needed, substitutes to maternal colostrum can be found in the commercial formulae ColoBoost and PuppyBoost (Raizup Nutrition Care by Le Gouessant<sup>1</sup>). These formulae can be given within the first 2 days of life in conjunction with a newborn puppy formula [1].

When no colostrum nor Puppy Boost are available, the administration of pooled adult serum can be considered to increase the immunoglobulin concentrations (22 ml/kg) [2]. However, this puppy will show significantly lower blood levels of immunoglobulins compared to a newborn that has received maternal colostrum [4].

During the first 2 weeks of its life, the puppy needs to be fed every 2 - 4 hours, depending on the method. The bottle-fed puppy requires fewer feeds than a tube-fed pup (the gradual distention of the stomach allows the bottle-fed newborn to eat more) [1,2].

The hand-reared puppy can be fed by nipple bottles, by dosing syringes or by feeding tubes, using species-specific high quality replacement formula [1,4]. A healthy pup shouldn't require tube feeding [1], therefore this method will not be illustrated further in this article.

To reduce the risk of nutritional and microbiome imbalance, commercial formulae are preferred to homemade ones [1].

A homemade formula is acceptable in the absence of another adequate option, but only as an emergency short-term solution [1]. For this purpose, Farabolini, *et al.* suggest different recipes for short-term handmade puppy feeding formulae:

- $\frac{3}{4}$  of concentrated whole milk +  $\frac{1}{4}$  water, or
- 120 ml whole milk + 5 ml vegetable oil + 1 drop of multivitamin oral solution, or
- 120 ml whole milk + 120 ml water + 1 - 2 egg yolks + 5 ml vegetable oil, or
- 240 ml whole milk + 15 ml vegetable oil + pinch of salt + 3 egg yolks.

Farabolini, *et al.* report that the orphan puppy should be fed 22 - 26 kcal/100g body weight daily; a good quality commercial puppy formula should contain an average of 1 - 1.24 kcal/ml. However, the right amount to be administered has to be gradually reached during the first three days, if the puppy was orphaned since birth.

A hand-reared puppy should show an average increase of the 10 - 15% in its body weight during the first 15 - 20 days of life. Therefore, regular body weight checks three times a day are paramount and should be started from the day of birth. A hand-reared puppy shows a slower increase in their body weight, when compared to a puppy nursed by the dam. This discrepancy should start decreasing around 3 weeks of age [1-3].

The orphaned puppy should be fed *ad libitum*, despite the charts on the commercial formulae pack saying otherwise. The reason is related to the ability of the newborn to self-regulate its food intake needs, despite its early age. However, continual monitoring of daily weight gain is paramount. A well fed puppy should be plump, vigorous when awake, sleep peacefully when resting and cry for less than 20 minutes when unsettled (for example, in response to cold, pain or hunger) [1,3].

A puppy that doesn't show a strong sucking reflex or that is cold should be warmed before feeding it, in order to reduce the risk of aspiration pneumonia, gastrointestinal ileus and diarrhoea [1,3,4]. Even in a healthy vigorous puppy, the sucking reflex should be stimulated before starting feeding it by gently inserting a clean finger in the pup's mouth, to reduce the risk of milk aspiration [1].

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<sup>1</sup>Raizup Nutrition Care, 1 rue des Frères Piéto Saint-Aaron, BP 40228, 22402 LAMBALLE ARMOR CEDEX FRANCE

Before feeding the puppy with a nipple bottle, it's important to check that the hole in the nipple is not too small or too big. When inverting the bottle, the milk should ooze from the nipple without any pressure being applied on the bottle itself [1,3].

To reduce the risk of air ingestion, the milk replacer should be squeezed into the nipple before starting to feed the newborn. However, the bottle should not be squeezed while feeding the puppy to prevent aspiration of the milk into the lungs [1,3].

To further prevent milk aspiration into the lungs, the puppy should be fed in a natural sternal recumbency. The neck and the head of the puppy shouldn't be held back too far or flexed ventrally [1,5].

It's possible to prepare the milk replacer and store it at 4°C up to 24 hours, warming it up to 37°C just before feeding. At the end of each feeding session, both the nipple and the bottle or the dosing syringe should be washed and rinsed [1,3].

### Neonate's main activities

When hand-rearing a healthy newborn pup, it is important to remember that during its first three weeks of life, its four main activities are:

- Eating: A balanced and regular puppy feeding schedule is paramount to obtain a progressive healthy growth.
- Sleeping: It is recommended not to wake the puppy up, but instead allow a spontaneous awakening. Alternatively, if needed, a gentle touch is preferred over a vigorous awakening.
- Defecating
- Urinating: The newborn puppy is unable to urinate and defecate autonomously. Therefore, the gentle stimulation of the anogenital area with a warm wet cloth or cotton wool is needed after every feeding, to simulate the dam's nursing care (circular movements are preferred). This will elicit the anogenital reflex and will cause the puppy to urinate and defecate [1,4,5].

The orphaned puppy is more predisposed to develop intestinal colic and constipation, characteristics that could re-present during the rest of the animal's life. This seems to be related to the lack of colostrum as well as the diet-related increased gastrointestinal fermentation processes. However, further studies are needed to confirm if it is true [1].

### Main risks of hand-rearing

Despite the experience of the carer, hand-rearing a puppy always carries a high risk of aspiration pneumonia. In fact, a puppy younger than 10 days of age hasn't developed the gag reflex yet [2,3]. Common symptoms of aspiration pneumonia include milk discharge from the nostrils, cough and crackles in the lungs. These symptoms require further supportive therapy and are usually rapidly followed by death due to bronchopneumonia [1,5].

As previously stated in this article, the low or absent intake of maternal immunoglobulins can lead to reduced protection against potential pathogens.

"[...]Even when pups are no longer able to absorb immunoglobulins through the intestinal tract, a bitch's milk can continue to provide important factors for protecting against potential pathogens: lymphocytes, neutrophils, macrophages, locally secreted immunoglobulin A, proteins, and epidermal growth factors[...]."

(Citation Johnston SD., *et al.* "Canine and Feline Theriogenology". Philadelphia: WB Saunders Company, 1<sup>st</sup> edition. 2001).

Also, in unpublished research from the Colorado State University (Chandler ML., *et al.* 1989), formula-fed puppies showed an increased risk of diarrhoea and consequent dehydration, when compared to puppies nursed from their dams (85% vs 52%) [4]. If this occurs, an option is to dilute the feeding formula with a balanced electrolyte solution at a 1:2 ratio until the diarrhoea resolves [3].

### Conclusion

Hand-rearing the orphan newborn puppy is challenging and the increase of its survival chances requires dedication, time and a sound structured approach.

Both the environmental conditions and nutrition are determining factors for the survival chances of the newborn puppy: temperature, humidity, hygiene and constant care are required, as well as scheduled feeds with balanced colostrum and milk replacer. It is highly recommended that milk replacement or ration changes be gradually introduced in order to allow the newborn's system to adapt. Besides such aspects, constant care and the correct feeding technique are also required for preventing possible complications such as diarrhoea and aspiration pneumonia.

Despite the correct management of the puppy, complications may still occur. However, a prompt action such as the change of the milk replacement formula or the introduction of a further supporting therapy may be a determining factor for the survival chances of the newborn puppy.

### Acknowledgements

I am grateful to Dr. Christopher Probert for the invaluable support and attention to details, and to RVN Lily Radcliffe for the thoughtful comments and patience in reviewing every version of this manuscript. I thank all my Team at Medivet Frimley Green for the enthusiasm and for believing in me. Last but not least, I am grateful to my colleague Emma Green for the precious encouragement and for always being there for me.

### Conflict of Interest

The author declares no conflict of interest in publishing this manuscript.

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**Volume 6 Issue 4 April 2021**

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