

## MANAGEMENT OF THE BITCH AFTER ARTIFICIAL INSEMINATION

### Implantation & Pregnancy

Implantation of embryos occurs 16 - 18 days after the LH surge in dogs, which equates to 11-14 days after insemination. Uterine swellings at implantation sites are about 1cm in diameter about 3 weeks after insemination.

Placentation in the bitch is described as "zonary" as the point of contact or "invasion" of the lining of the uterus is in the shape of a band or "zone". The placenta of the bitch is also unique as it forms "marginal haematomas". These are green bands located at the edge of the placenta and is where blood from the bitch is converted by cells of the placenta into nutrients for the foetus. The green pigment from these marginal haematomas may be seen at parturition and signifies placental separation or detachment.

### Pregnancy Diagnosis

#### Palpation

Experienced veterinarians are able to feel the uterine swellings of pregnancy through the abdominal wall from around 21 days after insemination in most sizes of dog. From about day 35 the discreet round swellings increase in size resulting in a large swollen uterus that actually becomes more difficult to palpate. Therefore, the best time for determination of pregnancy via abdominal palpation is about 25 - 30 days post insemination. The main advantages of palpation are that it is quick and inexpensive. However it requires the bitch to be relaxed and not over weight. Also some breeds can be more difficult to palpate than others. It is also very difficult to determine the number of foetuses present and if the number of foetuses is low a false negative result can occur.

#### Ultrasonography

Ultrasound scanning is now widely available and a very useful tool in canine pregnancy diagnosis. The embryonic vesicle or sac is visible from about 18 days after A.I. However, to assess fetal viability (detection of foetal heart beats) it is best to scan 25-30 days after LH 0 or 25 days after AI. (See Fig 1)

Determination of the exact number of puppies in a litter by ultrasound is not 100% reliable, especially for large litters (>8 pups). It does however give a good idea as to the approximate litter size. Ultrasound has the added advantage of assessing foetal viability as foetal heartbeats can be detected from 25 days. "Resorption sites" can also be detected at this stage. This is very important information in regards to documentation of your bitch's fertility and determination of underlying causes for small litter size and failure to become pregnant. Gestational aging of the foetuses can also be carried out at this time.



Fig 1: This is a lateral X ray taken of a pregnant bitch 1 week prior to her predicted whelping date. The spinal column of each pup can be counted to determine the number of pups that will be born

### Relaxin Blood Test

Relaxin is a hormone produced by the placenta in pregnant bitches after 21 days of gestation. Measurement of relaxin concentrations for pregnancy determination is most accurate after 30 days of gestation. It does not give an indication of foetal numbers or foetal viability.

### Radiology

X-Ray examination in the last week of pregnancy (> 45 d of gestation) can be used to accurately determine foetal numbers which is very helpful information prior to whelping. It is important to determine if your bitch only has 1 puppy as she will require greater management and possibly an elective C- section (see below). (See Fig 2)



Fig 2: Fig 2: Ultrasound image of a 30 day old foetus.

## Care of the Pregnant Bitch

### Immunization

It is preferable to have bitches properly vaccinated prior to breeding. Vaccines (especially modified live vaccines) should be avoided during pregnancy and only be administered if there is substantial risk of an infectious disease.

It is important during the last 3-4 weeks of gestation that your bitch is housed in a familiar surrounding and to minimize exposure to pathogens (viruses, bacteria, parasites) that can be introduced from other dogs or humans and can cause abortion, stillbirths and neonatal death.

### Nutritional Requirements

The most common error is to overfeed bitches during early pregnancy and underfeed during lactation.

1 <sup>st</sup> month of gestation	Normal amount of a commercial maintenance diet.
Last month of gestation	Gradually increase food intake by 30-40% (depending on foetal numbers) and gradually introduce a "Complete nutrition for Growth, pregnancy and lactation" formulated commercial diet or puppy food. Don't suddenly change your bitch's diet. Multiple small meals are the best way for your bitch to get all of her nutritional requirements as her stomach capacity may be reduced.

It is not recommended to supplement your bitch with any additional nutrients, vitamins or minerals during pregnancy as this unbalances the nutrition provided by the commercial diet and may adversely affect your bitch and the pups. It is particularly important NOT to supplement your bitch's diet with calcium.



## Exercise

Moderate exercise is to be encouraged throughout gestation in order to maintain your bitch's body condition. It is important for a successful and complication free whelping that your bitch is fit and not fat.

## Drug Administration during Gestation

The optimal situation is to avoid any drug administration during your bitch's gestation period. If your bitch requires medication for a pre-existing condition or for an illness that arises during pregnancy please discuss this with us at Glenbred or your veterinarian.

## Predicting the Onset of Labour

Being prepared and well organised prior to your bitch's whelping will help predict, reduce and efficiently and successfully manage any complications that may arise. This is especially important if your bitch has a history of "dystocia" or problems at whelping. Prediction of your bitch's whelping date plays an important role in this pre-whelping planning and organisation.

## Behaviour and Lactation

Bitches can start 'nesting' 5-7 days prior to giving birth. The onset of lactation can occur anytime from 2 weeks to just prior OR after whelping.

## Breeding Dates

Labour may begin anywhere from 57 to 72 days from the 1<sup>st</sup> day of mating.

## LH Surge (LH 0)

Labour begins after 65 +/- 1 days from the LH 0 date in most breeds. (If we have undertaken accurate ovulation timing we will predict the whelping date using this information.)

## Rectal Temperature

Taking the rectal temperatures twice daily at the same time everyday for the week prior the expected parturition date will allow detection of a significant and abrupt temperature drop of at least 0.5°C or below 37.5°C in 80% of pregnant bitches. This temperature drop is associated with "luteolysis" (demise of the corpus luteum) and is usually followed by the onset of labour 12-24 hours later.

## Serum Progesterone

Progesterone concentration acutely drops to <2ng/ml 24 hours prior to the onset of parturition.

## Radiography

The presence of certain anatomical parts in the foetus can be detected via radiographs which can give us an approximate age of the foetus and when the bitch might whelp. Radiographs are not able to tell us if the foetuses are viable (alive) or not. Ultrasound of foetal heart beats is required for determination of foetal viability and stress.

## Recommendation

- 1 It is important to know whether the bitch is carrying only 1 - 2 pups as a single pup often does not initiate parturition and can be carried over term and die, so taking a conscious lateral radiograph at this time is highly recommended. This information is important for the management of your bitch's whelping and in the case of a single pup, help to ensure a live puppy is born. In these cases an elective C-section may need to be carried out.
- 2 Routinely take your bitch's rectal temperatures twice daily at the same time each day for the week prior to her due date and record accurately. This information is useful in predicting onset of labour and in decision making on veterinary intervention.

## The Whelping Area

- A familiar environment
- Free from draft, moisture, excessive cold or heat
- Clean & disinfected
- Minimal traffic
- Minimize any contact with visitors or other dogs
- Introduce pregnant bitch to the whelping area 7-10 days prior to her predicted whelping due date

Tip: A child's plastic swimming pool can make a good whelping box. Construction of a "pig rail" around the inside edge of the pool or box prevents pups from getting crushed. (See Fig 3)



Fig 3: Photograph of a 'whelping box'. Note the "pig rails" around the edge to prevent crushing of pups. Courtesy of Kim Malcolm, NZ Guide Dogs.

It is very important that the bitch has minimal disturbance prior to and during whelping as interference can delay the delivery of pups and result in an increased number of “stillbirths” .

## Managing Parturition & Labour

Maintenance of pregnancy depends on the secretion of the hormone “progesterone” by the ovaries. The foetuses decide when they are due to be born and at this time initiate a cascade of hormonal and molecular changes which ultimately results in an acute drop in progesterone concentration (<2ng/ml) and triggers the onset of labour. It is important to be familiar with the normal events/stages of whelping so that you are then able to recognise the early signs of “dystocia” (see below) and seek immediate veterinary advice/assistance so as to prevent loss of neonates.

- Stage 1      The cervix starts to dilate and synchronous uterine contractions move the pups into the birth canal. These uterine contractions are not visible externally but can be detected by Doppler ultrasound. This stage may be associated with restlessness, panting, shivering, apprehension (especially in a maiden bitch) not eating and nesting behaviour. The duration of this stage is approximately 12 hours.
- Stage 2      The cervix is fully dilated and strong visible abdominal contractions/straining results in the passage of pups through the birth canal and rupture of the “allantoic sac” or foetal fluids which are clear. The first pup is usually delivered within 15 minutes after the onset of strong abdominal contractions. On average 1 pup is delivered every ½ to 1 hour but there is significant variation between breeds and individual bitches. 40% of pups are born backwards which is normal.
- Stage 3      The placenta is usually expelled 5-15 minutes after the delivery of each pup. Sometimes 2 or 3 pups will be delivered before the placentas are passed. It is important to account for each placenta as a retained placenta can make the bitch very sick.

## Guidelines for Seeking Veterinary Attention During Parturition

- 1 The bitch has reached her due date for whelping without any signs of labour or temperature drop. This is particularly important if she is pregnant with only 1-2 pups (determined by X-ray or ultrasound).
- 2 The first pup should be born within 20-30 minutes after the onset of strong and forceful abdominal contractions (i.e the onset of Stage 2 of labour)

- 3 If strong and frequent abdominal contractions occur but fail to result in expulsion of a pup within 15-30 minutes.
- 4 Weak or intermittent abdominal straining that fails to result in the birth of the first puppy within 2 hours or when the interval between the delivery of two pups is greater than 2 hours.
- 5 A green-blood tinged vulval discharge without the birth of a pup or at any stage of pregnancy.

### Postnatal Management - Care of the Bitch

Normal suckling by the pups causes the bitch to produce the hormone "oxytocin" which stimulates uterine contractions and involution. In some cases exogenous oxytocin administration may be indicated. However, this should be done under veterinary advice and supervision.

Take the bitch's temperature daily for 1 - 2 weeks following birth. An increased temperature may indicate an inflammatory or infectious process occurring in the mammary glands, uterus or can also be associated with the condition, "eclampsia".

It is important to check your bitch's mammary glands daily for any heat, pain, skin discolouration or the production of brown-pus like material from a teat or teats. Also check daily for any purulent or pungent vulval discharge. Contact your veterinarian immediately if you find any of these clinical signs or if your bitch goes off her food or appears unwell.

It is normal for a bloody-brown, non purulent discharge to be present from the vulva for 3 weeks post partum. However, in some cases this discharge can continue for longer (up to 3 months!). It is important to contact your veterinarian or Glenbred if this occurs.

The suckling bitch may need to eat three times her normal food intake to provide enough energy for milk production. She should be fed a "Complete nutrition for Growth, pregnancy and lactation" formulated commercial diet or puppy food ad lib or at least 3 - 4 times daily until the puppies are weaned.

Weigh the bitch weekly and observe closely for excessive weight loss.

### Postnatal Management - Care of the Neonates

A healthy neonate should be fat and sleek and sleep contentedly when not nursing. Puppies that are frequently crying and crawling around constantly indicates there may be a problem.

## Weight

Body weights should be accurately measured and recorded at birth, daily for 2 weeks then every 3 days until 1 month of age. Puppies less than 6 weeks old are very prone to dehydration and one of the first indicators is weight loss. Puppies should increase their body weight by 5-10 % per day and double their birth weight by 10-12 days of age.

## Temperature

Care must be used in the provision of a heat source. In the first 3 weeks of life pups cannot regulate their own body temperature so they rely on the bitch and the environment for sufficient warmth.

A good mother will provide most of the required heat by presenting the skin of the mammary area against which the pups huddle. If the bitch doesn't leave the pups for long and they are strong and feeding well, the room temperature only needs to be about 22°C - 24°C.

External heat source is needed in cooler weather, if the mother does not stay with the pups enough or if the pups are orphaned. For orphan pups in the first week of life, temperature should be kept at 30°C - 32°C. This can then be reduced to 22°C - 24°C over the next couple of weeks. The best heat sources are a pet electric blanket or a heat lamp (see Fig 4). Hot water bottles cool easily and need to be changed often. When they are hot they need to be heavily wrapped to prevent skin burns, and on cooling it can lower the pup's body temperature further. Care must be taken when heating pups - always check the temperature with a thermometer placed at pup level in the box and allow the pups space to move away from the heat source.

Pups that get too cold will die, but pups that get overheated will not thrive either.



Fig 4: Photograph of a whelping "pool" with a heat lamp above.

## **Hypothermia and Hypoglycaemia**

If puppies become depressed or comatose rapid intervention is essential. External warming must be provided. The best option is to provide a warmed atmosphere to 32°C and radiant heat from a heat lamp. It is obviously important to not overheat the neonate. Once the puppy is warmed and if still depressed give oral glucose (1 - 2ml of 10% solution) or supplementary feed.

Neonates have minimal fat reserves and limited metabolic capability to generate glucose and are therefore susceptible to developing hypoglycemia.

### **Nutrition**

Of course in most instances, the bitch will take care of this for you. However some bitches or large litters may require supplementary feeding or in some situations if the bitch becomes unwell entire litters may need to be hand raised which is very intensive and hard work especially in the first 2 weeks.

Underfed puppies:

- Cry & whimper a lot
- Are restless & not sleeping
- Lose weight
- Become hypothermic easily
- Can develop low blood glucose leading to depression & coma
- Become dehydrated

When supplementary feeding, use a commercial puppy milk replacer or formula and strictly follow label instructions.

Newborn puppies should be fed about 10ml every 4 - 6 hours gradually increasing by about 1ml per feed. Most puppies will suckle from a bottle with a human neonatal teat. Great care must be taken when feeding a puppy stomach tube as many complications can result from doing this and ultimately loss of pups can occur. We recommend this be done only under veterinary supervision.