



Canine Reproduction: A Basic Guide

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Thank you for reaching out to the Vets on Main Reproductive Department, located in Ottawa. Our dedicated team, led by a highly experienced professional, has been providing top-quality reproductive services in the area for nearly a decade. With a collaborative approach, we work closely with our clients to ensure the best possible outcomes for their pets' reproductive health. Our commitment to excellence, combined with our passion for what we do, makes us truly excited to assist you and your furry companions in achieving their reproductive goals. Whether you need assistance with timing a breeding, artificial insemination, pregnancy detection and care, or fertility workups, we are here to support you every step of the way.

This booklet is meant to act as a summary for breeders to reference when starting a breeding program – just the essentials. From here you can discuss in greater detail with your veterinarian any questions that are more specific to your needs.

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Characteristics of a High-Quality Breeding Dog

A breeding dog should represent the highest standards to enhance the health of the breed. Ensuring the dog has no health or behavioral issues is crucial. Often additional testing such as radiographs, blood screening (for both infectious disease and endocrine disorders), and specialist evaluations are required beyond a physical examination done by your veterinarian.

We strongly encourage you to look at the OFA's breed-specific recommendations (<https://www.ofa.org/browse-by-breed>) or the Canine Health Information Center (CHIC) database (<https://ofa.org/chic-programs/>) for more information about what tests your breed of dog should clear before use in a breeding program.

One example of further screening can be hip radiographs to evaluate for hip dysplasia. At our clinic, we will sedate for all hip screens and radiographs. Not only is this less stressful for the patient and safer for our staff from a radiation exposure perspective, but it also allows us to get more accurate results than a patient who is awake. Dogs that are not sedated often do not relax enough and we can get a falsely improved result (ie: saying normal when they are abnormal).

We offer two types of hip testing at Vets on Main – OFA or PennHIP. We recommend PennHIP testing, which looks at hip laxity (aka: looseness), for hip evaluation as it can be done at an earlier age, is unaffected by heat cycles and better predicts hip dysplasia in our patients. For more information about PennHIP please follow the link - (<https://antechimaging.com/antechweb/pennhip>). Always confirm with your kennel club(s) to ensure if PennHIP is recognized as not all clubs will accept a PennHIP in place of an OFA result.

Beyond physical health, temperament and the purpose of breeding should be carefully considered. Patients with dog/human reactivity, fearfulness or anxiety are not suitable breeding candidates. Selecting dogs that are healthy, confident, free from anxiety and cleared of health issues sets you up for success with your breeding program.

We are passionate about ethical breeding and we look forward to helping you with your breeding goals. There will always be a discussion about what makes a good breeding candidate for you specific breed and we look forward to that discussion. Should we feel that a specific dog is not a suitable candidate we do reserve the right to not participate in the breeding or offer reproductive services for that specific patient.

Note: If you plan to register your dog with local or national kennel clubs, check to see if they require the OFA hip certification. Consult with your veterinarian to discuss the advantages of both screening methods.

The Estrous Cycle

It is important to understand each phase of the female dog's reproductive cycle which consists of four stages:

Anestrus

This is the resting phase where the uterus is inactive – this happens between heat cycles. There are no visible signs of swelling or discharge from the vulva.

Proestrus

This is the initial phase of a heat. You will notice swelling of the vulva and may see red vaginal discharge. Males may start to show interest, but females are not yet receptive at this stage. This period lasts about 9 days, but duration may vary. Estrogen levels peak during this stage.

Estrus

Estrus begins with a surge in Luteinizing Hormone (LH) with a rapid increase in progesterone following. At this point, females become receptive to males. Ovulation occurs two days after the LH surge, with the fertile window being generally 2-4 days post-ovulation (4-6 days after the LH surge). For breeding, the optimal time is typically 2-3 days after ovulation but this can depend on how you plan to breed.

Diestrus

After the fertile window, the female is no longer receptive. Progesterone levels remain elevated, and will gradually decline over the next 2 months until it returns to baseline. This slow decline will occur whether or not pregnancy has taken.

Timing a Breeding

The timing of a breeding can depend on your resources and accuracy needs. For natural breeding - where generally semen quality is higher and it will survive for up to a week once implanted in the female – it may be sufficient to just detect when a bitch enters the Estrus stage. However, for frozen semen, testing to determine the LH surge is very important as this type of semen has lower quality and viability resulting in a more narrow breeding window.

Vaginal Cytology

Different shapes of vaginal cells appear at each stage of the cycle. We can help identify which generally which stage a female is in with just a swab and microscope. Cytology is a useful tool that some breeders even learn to do at home with the right training and equipment. There are some great resources on the internet that can help train you how to do this at home.

Progesterone Testing

Progesterone levels remain low until estrus begins, after the LH surge occurs. About 4-5 days after noticing vaginal blood-colored discharge the first blood sample should be taken to monitor progesterone. It is key to see a value near the baseline, and watch as it rises to estimate when a bitch ovulates. Most labs provide general ranges for progesterone values corresponding to LH surge and ovulation. While this test has a low margin of error, it is important to interpret progesterone results as a trend, as lab results can vary. There are many home-test kits available for this but few are reliable. For accurate readings, it is often best done through your veterinarian. We are happy to discuss which options are available to you.

Luteinizing Hormone (LH) Testing

LH testing increases the accuracy of breeding timing. With LH hormone only being detectable for a short window (about 12 hours), testing for this requires daily blood sampling. We will spin and freeze the serum, then continue with progesterone testing one every 2-3 samples. Once the progesterone looks to be high enough for ovulation, we will thaw the older samples and run LH tests on those days to determine which day LH occurred. Given the variability in progesterone tests, multiple samples are often needed for accurate results. If you plan to use LH testing, our team needs to be made aware to ensure we have enough kits in stock.

Recommended Plan for Breeding Timing

- 1. Contact the Vets on Main team and set up a reproductive consult well in advance of the heat. Inform us of your breeding plans and anticipated heat onset. Any necessary health testing will be discussed at this appointment and can be done prior to breeding.*
- 2. Once you detect signs of a heat, please schedule the first progesterone test about 4-5 days later. At this point we will have already done any health testing.*
- 3. Repeat blood draws for progesterone testing every 2-3 days (or daily if using LH testing) until progesterone levels rise sufficiently.*

4. *In the case of having frozen semen shipped to us from another clinic, please ensure that the stud owner coordinates its arrival 48 hours in advance. For chilled semen, please ensure it arrives to the clinic before the time of breeding. Contact the clinic if you have any questions about this process and we will do our best to help.*
5. *Your veterinarian will guide you on the best breeding days based on the progesterone or LH results, and whether you plan to use frozen, chilled or fresh semen.*

Semen Types

Semen can be collected and prepared in several ways for breeding:

1. **Fresh Semen**

This is collected at the clinic and has the highest motility. It can survive up to 5-7 days if inseminated immediately.

2. **Fresh-Chilled Semen**

This is typically collected at a clinic, processed with an extender to improve longevity, and shipped overnight. This semen can last up to 5 days in transit but only survives for about 2 days once inseminated.

3. **Frozen Semen**

Stored in liquid nitrogen, this semen has lower quality due to the freezing and thawing process. It typically lasts for 12 hours after thawing. Accurate timing is critical for success with frozen semen, and insemination into the uterus is required.

Insemination Methods

1. **Vaginal Artificial Insemination (AI)**

- Uses fresh or fresh-chilled semen.
- A MAVIC catheter is inserted, and semen is slowly injected into the vagina over 5 minutes.
- Traditionally, during this time dogs have been 'wheelbarrowed' to allow gravity to help but recent studies show this may not be of much benefit.

2. Surgical Artificial Insemination (AI)

- Requires a surgical approach and uses fresh, chilled, or frozen semen injected into the uterus.
- This method is no longer commonly used due to its invasiveness and pain, with Transcervical Insemination (TCI) now preferred.

3. Transcervical Insemination (Non-Surgical)

- Can be used with fresh, frozen, or chilled semen.
- A rigid endoscope is used to pass a catheter through the cervix to deposit semen into the uterus.
- Typically performed with mild oral sedatives given in advance for dogs with situational stress or difficulty standing for a period of time.
- Studies show this has a higher rate of success than its surgical predecessor

Monitoring Pregnancy

There are several methods for monitoring pregnancy:

Ultrasound

- Detects pregnancy as early as 3 weeks after ovulation (best at 24-28 days post-ovulation).
- Provides an estimate of litter size and checks for resorbed fetuses.

Radiographs (X-Rays)

- Taken around day 54 after ovulation when fetal skeletons mineralize.
- Useful for determining litter size before whelping.

Relaxin Test

- Helpful for determining whether a dog is pregnant or not but does not indicate numbers of puppies, or identify if any fetuses resorb/do not come to term.

Accidental Breeding and Pregnancy Termination

Accidents do happen, even with the most careful planning. In this case, please contact your veterinarian to discuss available options. Several of these accidental ties will not result in a successful pregnancy so often we will wait until pregnancy is confirmed before exploring any treatments. Medical termination, or an abortion, may be possible depending on the situation but may come with side effects. Other options, such as spaying, may also be considered depending on the situation.

Gestational Care

Pregnancy typically lasts about 63 days, with some variability based on things like breed or size. During this time, making certain adjustments for your pet's care will help ensure the safety of her, and her puppies.

Diet

- First half of the pregnancy –feed their regular, balanced diet.
 - This should be an 'all life stages' or 'puppy' food to help meet their nutritional needs.
- After day 35 - her calorie needs will double and you will need to increase the volume of food being fed.
- Avoid raw diets due to bacterial contamination risks.

Vaccinations and Deworming

- Ensure vaccinations are up to date before breeding to ensure immunity is passed on to the litter (via colostrum, or first milk).
- Discuss with your veterinarian about vaccines that will become due during the time of pregnancy before breeding to establish the safest plan
- Deworm the dog before breeding, but check with your veterinarian for safe products during pregnancy.
 - Note that it is possible for dogs to pass intestinal parasites to their litters even with a negative fecal test, and occasional deworming. Regular deworming is an important part of raising puppies.

Medications

- Only use medications deemed safe for pregnant dogs should be used. Few medications are studied thoroughly so be sure to consult your veterinarian about any treatments or supplements before their use.

Whelping (Parturition)

Labor occurs in three stages:

- **Stage I:** The female may show signs of discomfort and nesting. This is the start of uterine contractions.
- **Stage II:** Active delivery of puppies, with visible contractions, which should occur within 4 hours of pushing. My note various colours of discharge.
- **Stage III:** The passage of the placenta after each puppy.

If no puppy is delivered after 4 hours of pushing or if there's more than a 2-hour gap between puppies, veterinary intervention is required.

Dystocia (Difficult Birth)

If the female experiences difficulties during delivery, immediate veterinary care is necessary. This may include issues such as obstruction (due to large or mispositioned puppy) or metabolic problems (such as hypocalcemia). If the dog has strong contractions but no puppy after 4 hours or more than 2 hours between deliveries, seek veterinary help.

Set yourself up for success and have an emergency plan in case this occurs overnight or on a weekend. This plan could be as simple as knowing which hospitals are available to help after hours and to ensure all of your documentation (such as progesterone timing) is available for discussion with the after-hours veterinarian.

Cesarian Section (C-Section)

Some breeds may require a planned C-section due to their high risk of dystocia. If this applies to your dog, consult with your veterinarian before the dog's heat cycle begins.

Rearing Puppies

Prepare a whelping box with clean bedding and ensure proper temperature regulation for the puppies. During the first few days, puppies should be kept warm and fed regularly. Monitor for signs of dehydration or poor weight gain. Tracking puppies weight gain through a chart on a twice daily basis is a great way to monitor their progress.

For more information about rearing puppies, you can see our Newborn Care resource on the Vets on Main website.

If you require further details or assistance regarding specific stages, feel free to reach out.