



Artificial Insemination

Introduction

Artificial insemination (AI) with canine semen holds many advantages over natural mating, however it is important to recognize the many factors that influence pregnancy rates following insemination.

Advantages of AI:

- **Assessment** of semen prior to insemination
- Shipment of semen (fresh or frozen) allows the stud to be located at a **significant distance** from the bitch
- Ideal **placement** of semen in the bitch's reproductive tract
- **Dilution** with **extender** to promote the length of sperm survival
- **Diversification** of breeding lines

Factors influencing success of insemination:

1. Type of semen: Fresh, chilled, frozen

Fresh semen describes an ejaculate collected at the time of insemination. It has the longest viability and can survive for up to 7-10 days in the bitch's reproductive tract!

Chilled shipped semen is semen collected and shipped to the location of insemination of the bitch. This technique involves the dilution of ejaculated semen in special extenders that protect the sperm as it is being cooled to the shipping temperature of 4°C. Semen treated in this way can remain viable for up to 4 days and allows a cost effective and efficient alternative for studs that are located at a distance from the bitch.



1 Semen shipment container

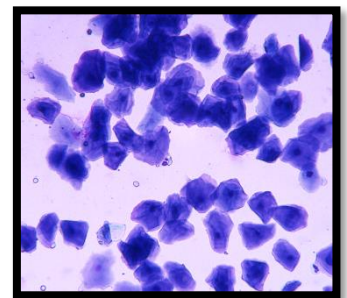
Frozen semen is stored in liquid nitrogen at -196°C. The freeze-thawing process is very rigorous and will cause some degree of sperm damage, reducing the lifespan of the sperm to only 12-24 hours in the bitch.

2. Timing of insemination

Incorrect timing of semen deposition is the most common cause of unsuccessful inseminations. Monitoring your bitch's heat via the following methods enables us to determine the optimal time to inseminate:

- **Progesterone testing:** The most accurate method for timing assessment, blood samples are sent to the laboratory for assessment of the level of the hormone progesterone. Blood tests should begin 5-7 days after the onset of heat with your regular veterinarian. Samples for frozen semen AIs must be sent to the laboratory **Vetnostics** as this is the only machine in NSW providing the required accuracy of results. A number of samples may be required (3 on average), with the date for next blood test determined after each test.
- **Vaginal cytology:** A vaginal smear will aid in determining the stage of the estrous cycle your bitch is in and also ensure no infectious or inflammatory processes are present.

Ideally, vaginal smears are taken at the time of each blood test. However many veterinarians are not comfortable assessing these samples. Since sending the smear to the lab for assessment is quite expensive, your vet can take the sample and email VRC images from the microscope for a small fee.



2 Microscopic assessment of vaginal cells

- **Vaginoscopy:** This describes visual assessment of the vagina using a specialised endoscope. Performed at the time of insemination, this allows us to assess appearance of the vaginal lining, which in turn correlates with stage of the oestrus cycle. Additionally it allowed us to examine maiden bitches for anatomical abnormalities in this region prior to breeding.



3. Site of semen deposition

When using compromised semen, deposition directly into the **uterus** is required to maximise chance of pregnancy. This is because it is as close as possible to where the eggs are waiting to be fertilised. At VRC we utilise **the transcervical insemination (TCI)** technique for intrauterine semen deposition.

TCI involves deposition of semen using a specifically designed scope that allows visualisation of the bitch's cervical opening. A soft catheter is passed through the cervix and into the uterus where the semen is then deposited.

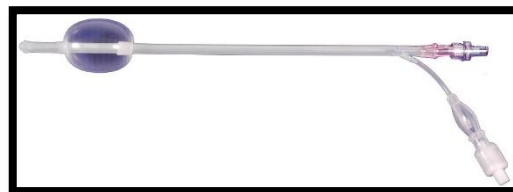
The alternative technique for intra-uterine semen deposition is surgical insemination. This is a much less technically demanding technique that requires the bitch to undergo a full general anaesthetic and open abdominal surgery. Whilst pregnancy rates via this method are equal to that of TCI, at VRC we do not perform inseminations via the surgical approach given the availability of TCI as a non-invasive and ethical alternative.

Advantages of TCI:

- **Anaesthetic risk-free:** TCI is performed on the conscious, standing bitch
- **Non-invasive and surgery-free:** Standing procedure not requiring abdominal surgery
- **Speed:** TCI is an outpatient procedure which, in most cases, is completed in 5 minutes
- **Low stress:** The speed of TCI allows you to be present for the procedure ensuring the insemination is as stress-free as possible.
- **Semen options:** TCI allows us to successfully inseminate with all types of semen including frozen
- **Consecutive inseminations:** Unlike surgical insemination, the nature of the technique allows us to perform inseminations on consecutive days. This is particularly advantageous when using poor-quality semen that is not expected to last more than 24 hours in the bitch.

Vaginal Insemination using a Mavic Catheter

When using fresh or chilled semen with adequate sperm numbers and quality, deposition of semen into the very end of the canine vagina can result in pregnancy and litter sizes equivalent to natural matings.



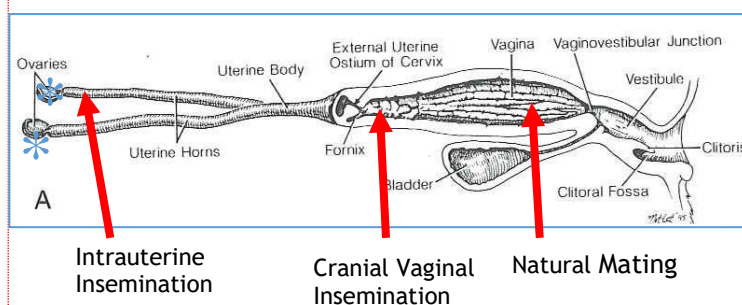
3 Mavic catheter (Minitube)

At VRC we perform vaginal inseminations using a special catheter called a **mavic catheter**. This catheter has distinct advantages including

- Deposition of semen at the very end of the vagina (closest to the uterus)
- The balloon has two purposes
 1. Prevent backflow of viable sperm
 2. Mimics the swelling of the dogs' penile glands to stimulate contractions and push the semen towards the waiting eggs.

Vaginal insemination is non-invasive and requires less skill than TCI, therefore being a more cost-effective method for insemination when using good quality semen.

*The diagram below helps to visualise the different locations for semen deposition. Remember, the eggs awaiting fertilisation will be located between the ovary and uterus at **



Please don't hesitate to contact us with any further questions.