

Ovulation Timing And Artificial Insemination

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The investment of time and money you make in planning and implementing a breeding is significant. Pregnancy and the delivery of a healthy litter are the goal. When factors beyond your control prevent successful mating your investment is at risk. Proper ovulation timing increases the chance of success for any breeding. Artificial insemination can make the seemingly impossible breeding a reality. This review provides an overview of current techniques and the technology available at Brittmoore Animal Hospital. Your increased understanding will enable us to help make your breeding program more successful.

Ovulation Timing

Ovulation timing (or the timing of the fertile period) should be undertaken in any costly or important breeding. In situations where variables are introduced which are not present in a natural breeding situation it is very important. Due to the fact that behavioral estrous and hormonal estrous do not always coincide in their onset or duration, it is important to determine the fertile period as precisely as possible. Behavioral estrous is the period of receptivity (or standing heat) the bitch displays to the stud dog. The fertile period is the actual period during which ova may be fertilized. The bitch's estrous cycle is a complex event and is dependent on the interaction of multiple hormones. Progesterone and Luteinizing Hormone (LH) figure prominently in the determination of ovulation. Normally, LH is present in the bitch's blood in very small quantities. Just prior to ovulation there is a significant increase in serum LH values. LH can return to baseline levels within a 24-hour period. It is this surge of LH that triggers ovulation and thus determines the fertile period of the bitch. Hormonal estrous is defined as the period between the LH peak and diestrus. All events subsequent to the LH surge are consistent between bitches, regardless of breed or age. Therefore, LH is the central event of the estrous cycle, and determination of the preovulatory LH surge is the most accurate diagnostic tool for timing breedings.

The LH surge can occur anywhere between 3 and 28 days after the first observable signs of heat, although the average is 8-12 days. Ovulation occurs 2 days after the LH surge. The eggs then take an additional 2 to 3 days to complete maturation. At that point they can support fertilization and live an additional 48-72 hours. Thus the fertile period of the bitch falls between days 4 and 7 after the LH surge. The most consistently fertile days are days 5 and 6 after the LH surge. (The first day of the LH surge is counted as day 0.)

Progesterone, another important reproductive hormone in the bitch, is present in low levels before the LH surge and then begins to rise around the time of the LH surge. LH causes the luteinization of the ovarian follicles after the eggs are released. These areas on the ovaries are where progesterone is produced in levels high enough to maintain pregnancy in the bitch. Ovulation timing can also be performed by detecting this rise in progesterone, although it is not as precise as measuring LH.

For most natural matings or artificial inseminations with fresh semen, breeding should begin 2-3 days after the LH surge, and continue every 2 or 3 days until the end of the calculated fertile period. When using chilled (extended) or frozen semen, or a stud dog with compromised semen quality, breedings should occur on the most fertile days (days 4,5 and 6 post LH surge).

Gestation length is also determined by the date of the LH surge. In the bitch, gestation is 65 days (plus or minus 1 day) from the LH surge. This will be true regardless of what days the bitch is bred. Therefore, the most accurate way to predict whelping date is to know the date of the LH surge. This may be determined by direct LH testing or calculated from the rise in progesterone detected by a series of progesterone tests. Whelping date may also be estimated by gauging the first day of diestrus, either behaviorally or more accurately by vaginal cytology. This information can be invaluable when planning an elective C-section, or when deciding if intervention in the pregnancy and whelping process is necessary.

LH can be measured by an in-clinic test that veterinarians can easily perform utilizing a small sample of blood. Testing must be performed daily since the duration of the LH surge can be as short as 24 hours. Once the LH surge is identified ovulation should be confirmed with a progesterone assay done 2-3 days later. Progesterone testing can be done with a number of in-clinic assays available. These in-clinic tests are semi-quantitative (estimations of actual levels of hormone). Quantitative assays can also be performed at outside medical laboratories. Quantitative assays provide the most accurate results. These tests are much more reliable and repeatable than in-clinic progesterone assays.

Vaginal cytology and Vaginoscopy are additional procedures that most veterinarians will utilize along with the bitches behavior to fine tune the timing process. Neither technique is accurate enough by itself to determine the fertile period.

Artificial Insemination

Artificial insemination (AI) can be performed by a number of different methods and utilizing sperm from fresh, extended or frozen sources. **Fresh AI** is indicated in situations where a natural breeding cannot or should not be completed due to physical problems, behavioral refusal to mate or other considerations. **Chilled or extended semen** offer the best chance of obtaining a long distance breeding without the risks and problems of shipping either the bitch or the stud dog. Planning these type breedings should be done well before the bitch comes into season. All parties involved (both dog owners and veterinarians) should be aware of their responsibilities and obligations well in advance. **Frozen semen** is the third type of semen utilized in artificial insemination. Frozen semen can be collected years prior to being used for insemination. Thus the process is valuable for preserving a dog's genetics beyond his death, sterilization or unexpected loss of fertility. It is also valuable for situations where the stud is unavailable due to shows or trials, overbooking or other conflicts. Long distance and international breedings can be accomplished by either frozen or extended semen. Frozen semen breedings like extended breedings should be planned well in advance. The semen can often be shipped to and stored in the inseminating veterinarians office before the bitch

begins her season. Frozen and extended semen breedings should utilize accurate ovulation timing and experienced veterinarians to maximize success.

Various insemination methods are currently being utilized in artificial insemination. The method used in any particular breeding will depend on several factors such as the equipment and experiences of the inseminating veterinarian. The quantity and quality of the semen sample is also a consideration. This should be known in advance for frozen semen, but will not be apparent until collection with fresh or chilled breedings. The reproductive history of the bitch is also taken into consideration. **Vaginal insemination** is the simplest and most common insemination technique. Semen is deposited into the cranial vagina using a rigid pipette. In general, vaginal insemination should only be considered when using fresh semen, high quality chilled semen or excellent quality frozen semen in high numbers. **Surgical insemination** is the most common method of insemination with frozen semen. It is also referred to as intra-uterine implantation of semen. Because the sperm is placed closer to the site of fertilization, this technique is associated with the greatest chance of conception. In addition this technique can be utilized when fresh semen of lower motility or concentration is used. Extended semen has been associated with very high conception rates when using intra-uterine insemination techniques. The other such technique is **Transcervical insemination**. This technique allows intra-uterine deposition of semen without a surgical procedure. It involves passage of a catheter through the cervix and into the uterine lumen. This may be accomplished by use of a special catheter and deep abdominal palpation or by visualization of the cervix using an endoscope. Endoscopic transcervical insemination requires a significant investment in equipment and training for a veterinarian. An experienced veterinarian should perform this procedure. It is associated with high conception rates and minimal risks to the female's reproductive tract.

Whatever methods you choose to complete your ovulation timing and insemination process, you and your veterinarian should discuss beforehand the risks, costs and chances of success associated with breeding.