

MAXIMIZING CONCEPTION RATES

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On Friday, October 8, 2010 the ASTC was proud to host Dr. Robert Hutchison as he gave a delightful talk about how to maximize conception rates. The talk lasted at least two hours and covered a lot of informative topics. He kept it even more interesting & fun by sprinkling his talk with many entertaining anecdotes from his years of practice. He allowed plenty of time for questions, too.

He started out by stating that the #1 cause of losing puppies during delivery is lack of oxygen because the delivery took too long. His practice performs 400-500 Cesarean sections per year. He's very aggressive in preventing loss of puppies due to lack of oxygen. He went on to say that 25-30% of those pups who make it to term are not alive at 6 months of age for various reasons. Already a pup's eyes & ears continue to develop outside the womb. If it's premature, the lungs aren't totally developed. If it's 48 hours premature, the liver is not fully developed. Knowing the correct due date is critical. If the dam goes past the due date, the puppy can outgrow the placenta's ability to support it. During the last 12 days of pregnancy, the puppies double in size. Dr. Hutchison also mentioned a singleton puppy will not produce enough of a hormone to stimulate contractions.

Late date X-rays are still helpful. You want to know how many puppies to expect. In a study about to be published in England, 30% of bitches resorb some of the puppies. Also, with ultrasound, it is often difficult to see the number of puppies. An X-ray does not harm the puppies or bitch. Digital X-rays are really fast and can tell you the number of puppies, give you an idea of size, signs of abnormality & even if they're alive.

Studies have also shown if the mother has less than 3 or more than 8 puppies, the chances of free-whelping all of the pups is slim. If she has 12, the last two are small & often dead because they're crowded in the upper parts of the uterus. The uterus gets flaccid after birthing all the others in the litter.

Animal Clinic Northview, Inc. is a 17-vet practice & one of the top three noninvasive surgical practices in the country. It's open 24/7. They do laproscopic spaying. There are four full-time reproductive vets. Clients arrive from all over the country & even Japan. One of the services they provide is to bring a bitch into an ovulatory heat cycle using an implant. She will ovulate in 5-7 days & you can plan & bring her to a specialty show to breed her. I'll describe more about this later in the article.

Dr. Hutchison said that chilled semen can last for 30 days with any extender. Another thing he's done now that there are DNA tests for multiple sire litters is to use 3 to 4 sires

(frozen semen). Since frozen semen has more chance for failure and you don't want to waste any seasons when you plan to breed your bitch, this can be a good option. This could be also helpful if one of the sires is older with lower-quality semen. He later added that he's seen frozen semen last for 26 years.

He also stated that there's no advantage in the bitch in skipping a season for breeding. He had a Mastiff give birth to 18 live puppies. The next litter (next season), she had 13 live puppies. Expect any pup who is healthy genetically to survive.

Youth is a friend of reproduction. Statistically, once a bitch reaches 6 years old, her fertility drops 33.3% & continues to drop with age. Litter size also decreases with age. With every heat cycle, uterus health decreases. Pyometritis can be due to age & disease; infection is secondary.

People often assume the thyroid is a reason if a mating fails. Dr. Hutch says the thyroid has little if anything to do with reproduction. There was a study done at Michigan State University. Low thyroid had no affect on sperm count. He said you don't need to test beforehand. The body is lazy—if you give it thyroid pills, it will produce less thyroid, so you don't want to medicate if it's not actually low.

Another thing people often check is a vaginal culture. The vagina is not sterile. Do not automatically give antibiotics prior to breeding. It imbalances the tract: yeast & Pseudomonas can increase as a result. It's also a waste of money.

There are six causes of infertility:

- Poor semen quality
- Did not ovulate—split cycles, progesterone-producing cysts
- Incorrect timing
- Anatomical (obstruction in the vagina or uterus)
- Implantation [of the zygote] failure
- Resorption: was the body maintaining the progesterone? You need greater than 5 nanograms of progesterone. Many Mastiffs & Leonbergers now need supplementation.

He had a Dalmation that ovulated at day 32 & was successfully bred on day 35. A bitch will either ovulate or go out of season. There are silent seasons with no discharge.

The progesterone goes up and stays up for 9 or more days. Progesterone inflames the uterus. The bitch ovulates into a progesterone environment (all other species ovulate into an estrogen environment, then the progesterone later increases).

The cervix is located in the abdomen above the bladder. In a beagle, it's 6-8" from the outside of the vulva. Dr. Hutchison performs transcervical insemination because the cervix hangs and the opening is very small. It is difficult to do vaginal insemination when there are strictures or bands.

In the bitch, the eggs don't implant until day 17-18. Fertilization takes place in the oviducts and stays there. The zygotes communicate chemically so they distribute evenly

in the uterine horns. Then they communicate with the uterus & it swells. You feel that swelling during palpation.

PHYSIOLOGY OF THE MALE

The testicles are in the scrotum at 5 weeks of age. The pup is usually fertile at 9-10 months. The male has a 4 billion sperm reserve. A healthy male can be used 5-7 consecutive days without a drop in sperm count.

The left kidney is farther back than the right. The left testicle hangs lower than the right, so it takes longer to descend. An organ called the gubernaculum pulls them down into the scrotum. In some dogs, when the testicles descend, they can seem to bob up & down (not staying descended). The testicles reach maximum size by 10 months old, then they stay down in the scrotum. Having a testicle that does not descend is an autosomal recessive, sex-limited trait: each parent contributes 50%, but you can't tell if the dam has the gene until she has a male puppy. Mucopolysaccharide is a chemical produced by the testicle that causes the gubernaculum to retract. In the past, vets tried to give hormone injections to try to make them descend, but they didn't work. During neutering of a dog whose testicle(s) didn't descend, it's important to see why. The testicle can wrap around the bladder or twist (not genetic) or the cord is short (is genetic).

A male produces his maximum sperm count between the ages of 2 & 7 years old. It's best to collect when they're young (in this age range). It takes 5 ½ days to make a sperm. You can breed the bitch every 4-5 days because the sperm lives so long in her.

Dr. Hutchison mentioned that persistent frenulums are seen often in terriers—this can cause the penis to curve backward or to be connected to the sheath. This excess tissue can easily be corrected by a vet, under anesthesia, to allow breeding. It is a congenital defect.

Semen Collection: Use a clean collection sheath & calibrated tube. Avoid spermicidal agents: soap residue, KY jelly, tween 20, glove powder, urine, even tap water because it contains fluoride. Also things on the male's coat like flea spray or coat conditioner can kill sperm. Wash these off his abdomen ahead of time. A baby bottle liner or baggie works well for collection. Pull the male's sheath behind the bulb of the penis. Stimulate the male with a bitch in estrus or a vaginal smear of one (you can use cotton balls or Q-tips on a bitch in season ahead of time & store them in the freezer in foil. These can then be thawed and wiped on the back of a teaser bitch). The penis has cartilage at the base; you can twist it & turn it to the rear like a tie during collection. A couple of stimulations & the bulbs will swell. You grip the bulbs and twist it between his hind legs so you can see the ejaculate as it goes into the bag or tube. There will be three phases or fractions: prostatic fluid, sperm (milky) and watery prostatic fluid.

A tie is essential for conception—it stretches the vagina & releases oxytocin & causes contractions which pull the semen up toward the uterus. To simulate this in AI, the vet will stroke the roof of the vagina.

A Colorado State University study found live semen in a bitch 11 days after breeding. Semen has great longevity if handled properly. The semen is centrifuged (spun down) to get rid of the prostatic fluid. Its components have energy for sperm but it can interfere with preservation.

A shy breeder: it may be his environmental preferences, not a testosterone deficiency (if you give a testosterone injection, the brain senses overproduction & the body's own production will shut down, possibly forever). Use care in bitch selection for a young dog. Also, if you think you might plan to use a puppy in the future, don't raise him surrounded by females that pick on him.

Is he fertile? Semen characteristics:

- Volume about 2.5-6ml, depending upon breed size
- Color white
- Motility >80% motility
- pH 6.2-6.6
- total count .4 to 1.8 X 10⁹
- morphology (shape) < 20% abnormal

Males can have prostate problems with age. One symptom can be dripping blood. Prostatic diseases include benign prostatic hyperplasia (enlarged prostate), prostatitis (acute or chronic), cysts, abscess, neoplasia (cancer). Neutering does not prevent prostate cancer. Symptoms include severe back pain.

You can't feel the prostate rectally; you have to use an ultrasound. It looks similar to a peach.

Proscar (finasteride) is used to treat enlarged prostate. It cuts the enzyme that changes testosterone to dihydrotestosterone. It shrinks the prostate & gets rid of blood while preserving sperm count. People should be careful handling it since it can cause birth defects.

When assessing the sperm, the microscope slide should be warmed to body temperature, so it doesn't affect motility. Do not touch the surface of the slide; that can kill the sperm.

You can see different types of movement in sperm from different males:

- Side to side
- Occasional forward progression
- Slow steady forward progression
- Rapid steady forward progression

Morphology [shape] of the sperm:

- cap- for implantation in the egg
- head- contains DNA
- midsection – energy
- tail- motility

If a sperm is immature, it can move but is not fertile. This can happen if a male is overused or if something is shutting down sperm production.

The Briard has some sperm morphology problems: the head of the sperm can be too big, too small, pear-shaped, or the head can be on sideways or the sperm can have a crooked neck.

Sometimes, the heads & tails of sperm pop apart. This can be caused by the male laying on something warm (heats the testicles too much), hot blow dryer, frostbite on the testicles, infections.

Most breeders don't select for reproductive health.

Advantages of fresh chilled semen: no need to ship the bitch, semen can be sent for freezing with DNA testing, allows breeding when the male is not available, lasts easily 2-3 weeks (can spin down & change the extender to prolong life). You can use it internationally. Many countries have a lot of rules in place for frozen semen but not yet for fresh chilled semen.

When you use the chilled semen, do not warm the sample. That way you conserve the sperm's energy until it gets in the bitch. Use the sample 48 hours post-ovulation (48 hours after the progesterone is over 5 ng/ml).

MANAGING THE BITCH

She will have her first heat cycle before 24 months of age. The average time between cycles is 7 months. The bitch is born with 500,000 potential ova. Progesterone is the major hormone. Some breeds cycle too often, like the Corgi & the Newfoundland. You need at least 4 ½ months between cycles (135 days) because the progesterone inflames the uterus. Ovaries never give out, but the uterus does. Dr. Hutchison said that someday, we may have the technology to harvest & use eggs in a foster mother. [They commonly do this in show horses now.] The Great Pyrenees & Newfoundland can have a septum in the middle of the uterine wall. This is a dominant gene. One client bred a Pyrenees with this problem, but did so because it had perfect hips. Dr. Hutchison performed a C-section when the litter was due. It's wise to check for any obstructions like this before breeding, using a lubricated gloved hand.

The main hormones at work here are follicle stimulating hormone (FSH) and leutinizing hormone (LH), produced in the pituitary gland and progesterone & estrogen. FSH maintains the placenta. There are blips of LH before the bitch's season.

Proestrus is estrogen-dominated. There is swelling, bleeding... Then the cells around the follicles produce progesterone. This corresponds with LH being released. Flagging begins 5 days before ovulation. After ovulation, it takes the egg 48 hours to mature. Ovulation date is the date to calculate the due date. In a study in Japan, they found that the egg needs to go through that next division. If sperm are present, the egg will just ride along until it matures and splits. If you breed 72 hours after ovulation, you will get the largest litter the bitch is capable of.

Litter size is dependent upon:

- Age of the bitch
- Genetics (breeding too close—produces lethal genes)
- timing

The only way to accurately time a breeding is with progesterone levels, *not* physiological signs, estrogen testing or LH spike.

Sperm survival times: fresh lives 4-6 days in the bitch, chilled three days, frozen 12 hours.

Progesterone rise begins before or correlates with LH release. Stress produces cortisol and this can affect progesterone. In one bitch, the progesterone went up to 3ng/ml & leveled off for a week then went back down. In 4-6 weeks, she came into season again & then ovulated. This was a split season.

If you're shipping the bitch, do it the day after she ovulates. Don't do it early so she can "settle in;" she might be stressed & not ovulate. Breed the next day.

One study showed that breeders were guessing the breeding date and were wrong 4/5 of the time.

ESTRUS INDUCTION

Cabergoline: removes inhibition to heat cycle; has antiprolactin effects. It is given orally for 14-30 days, 5ug/kg body weight. It is 70% effective and works in 2-3 weeks.

Deslorelin: injectable gonadotrophin-releasing hormone super-agonist. It stops the production of testosterone & estrogen. It is used to inhibit LH & FSH. It was developed for mares to prevent seasons (they come into season, then stay out). It's from Australia. It's an implant (called Ovuplant for mares, Suprelorin in dogs. See peptech.com) that's injected into the lip of the vulva like a microchip. It must be removed when no longer needed. It is 94% effective in inducing a season in 5-7 days. It is also good for a silent season.

Estrus postponement: Why waste a season while she's performing? Postponing it will protect the uterine lining. Progestational drugs used in the '80's are now known to not be good choices (Ovaban, Megace, Promone).

Mibolerone (Cheque Drops) is a male hormone (androgen) derivative. Give every day, starting at least 30 days before her season. The bitch must have had one season beforehand or the drug will affect her growth plates. She will cycle again about 70 days after stopping the drug, then you can breed her on that first season. Side effects include clitoral enlargement & vaginal mucous (puppy vaginitis), masculinization (muscling), excess tear production. Do not give to bitches with a risk of liver or kidney problems. It's wise to do a blood panel first.

Dr. Hutchison gave a lively & incredibly informative talk. I was glad to be able to see it in person & share it with those of you who couldn't make it. I hope those who did attend came away with some valuable insights that they can use in their future breeding. He has DVD's available to buy that can be purchased on both of the following websites:

http://www.northviewvet.com/site/view/102098_DrHutchisonsDVDs.pml

http://www.northviewvet.com/site/view/51530_ICSB.pml

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