



## Canine Reproduction

What's new in 2015 ?

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When you are a scientific communication officer, one day or another, you will have to do lectures. I am not complaining here since, in my current position, this is something I really enjoy! It gives me the opportunity to connect with our clients and discuss their questions and concerns. No better way to stay in touch with the field!

When you lecture so often, you tend to become perfectionist. I now focus on many little details I really did not care about when I first started. In 2015, one I will particularly pay attention to: providing our attendees with written notes.

It makes total sense: our lectures usually contain lots of information and, as shown by several studies on human cognitive psychology, we only retain 10% of the content that was presented.

In the past I was sharing a copy of my slides but more and more, these only display pictures: no text, so hard to remember what the message was, especially when you review the slides few days or weeks after the event took place.

All my new presentations will now come with lecture notes in an e-book format. Here is the one from the talk I did during the 2015 International Working Dog Breeding Conference:

### **“ Canine reproduction : what's new in 2015? “**

As much as I like lecturing, I like writing even more. I hope this document will be helpful for you guys, and if you have any comment/idea on how to make the content part of our seminars even better, don't hesitate to let me know, I'm always open to constructive suggestions! You'll find my contact info at the end of this e-book! Good reading then!



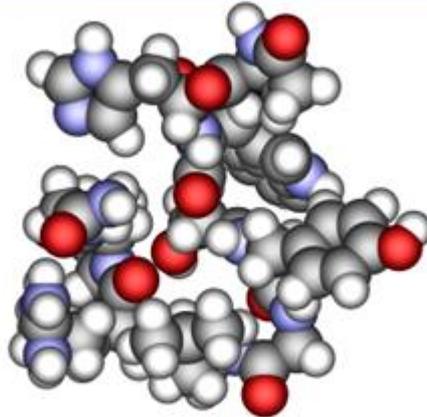
One of the things I really enjoy doing in my current position is discussing clinical cases of canine & feline reproduction with veterinarians who reach out to our consult line. Two reasons for that: 1/ obviously, I am board-certified in small animal reproduction so hard to stop me talking on this topic ! 2/ it gives me hope for the future. Why? Give it some thoughts: for a long time, canine reproduction was not really considered as a discipline by itself. “Dogs don’t suffer from fertility problems and if they do, well, it is just not meant to be so we fix them. And by the way, the same goes for any disorder affecting the genital tract. No need to think too much, it is just about spaying & neutering.” That is something I heard quite a bit back in the days. That was quite a bummer for sure.

Canine and feline reproduction is indeed so much more than this. It is a frequent cause of consultation in veterinary medicine (just think about the number of spaying & neuter procedures veterinary clinics have to perform often on a daily basis!). It is also a very dynamic area of veterinary research, that is permanently evolving. When I left the veterinary school of Alfort in 2011, the way we were approaching many clinical disorders had completely changed compared to when I first got there.

Canine reproduction is made of three main functional areas:

- Contraception is indeed a big one ;
- Pathology of reproduction : disorders of ovaries, testes, uterus, prostate, vagina, penis & mammary glands;
- Assisted Reproductive Techniques (ART): artificial insemination, semen freezing, semen chilling,...

These last few years, real breakthroughs occur in this discipline, many of them working dogs and working dog breeding selection programs can definitely benefit from. Let’s focus on 3 of them: GnRH agonists implants, Genital ultrasounds & Genital endoscopy.



### GnRH: the pace-maker of the reproductive system ?

*A better world for pets.*

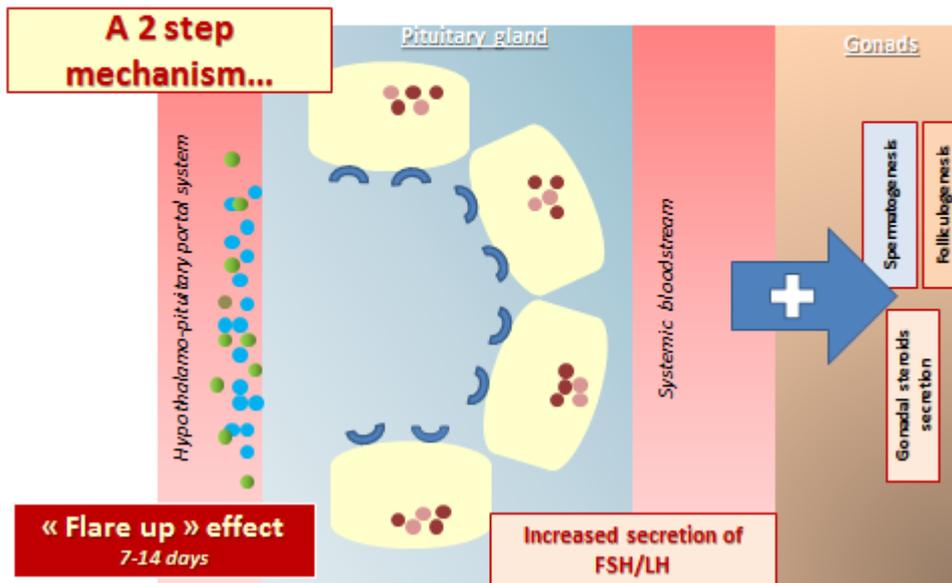
GnRH is a neurohormone secreted by the hypothalamus and is often considered as the pace-maker of the reproductive function. Indeed, its pulsatile secretion controls the secretion of the pituitary, which gonadotropin secretion of FSH (Follicle Stimulating Hormone) and LH (Luteinizing Hormone) controls in return the hormonal secretion of the gonads, ovaries & testes.

GnRH agonists (=molecules which have similar biological effects like the natural GnRH but more potent) have been used in human and veterinary medicine for decades but they first came as short half-lived injectables. In the 2000s, sustained-release GnRH agonist implants were developed for veterinary use, initially for chemical castration in the male dog.

Their two-step mechanism of action immediately raised lots of interest among the veterinary scientific community.

## GnRH agonist implants

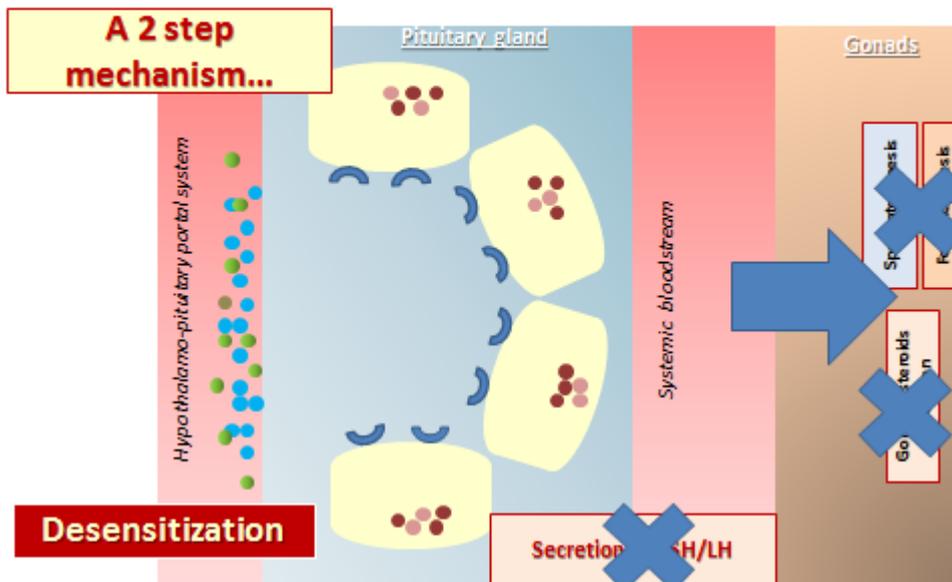
ROYAL CANIN



When the implant is administered indeed, the agonist effect will initially stimulate the gonadotropin secretion of the pituitary: this “flare up” effect usually lasts in average 7-14 days and will stimulate the ovarian and testicular function

## GnRH agonist implants

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Since it is a sustained-release implant, the prolonged stimulation of the pituitary will lead to a secondary desensitization of the gland. Secretion of gonadotropins will cease, and since those hormones are required for proper functioning of the gonads, their absence will lead to a chemical sterilization.

# Multiple applications !

*A better world for pets.*

From a clinical standpoint therefore, using these two different mechanisms opens a world of possibilities, possibilities that again can benefit working dogs and working dog breeding centers as well.

- The initial flare-up is used for estrus induction with the bitch. When the implant is administered to an anestrus bitch, this one will start her season in the 4 days following the treatment. More than that, ovulation usually occurs  $12 \pm 2$  days post-treatment, with a subsequent 80% fertility rate. The fact that the events are so well synchronized offers great alternatives when it comes to scheduling the reproductive career of a breeding bitch;
- The desensitization that follows the initial flare up leads to chemical sterilization, which is reversible as soon as the effect of the implant vanishes. Initially, this is why those implants were marketed for, since they were not associated with the side effects encountered with previous medical sterilization alternatives. I did my PhD on the use of those implants in order to provide chemical sterilization in the bitch. There is no consensus yet on how to use them in such indication because of the initial flare-up effect that might induce heats in the treated bitch. However, this would open interesting alternatives for working bitches. Indeed, anytime one would like to test the effect of sterilization (on a given working trait for instance), this would definitely be a way to do so. The fact that it is totally reversible would then allow to decide whether or not surgical sterilization should be opted for or not.
- GnRH agonists also have therapeutic effects by direct effects on GnRH receptors that are spread all across the animal's body. It has been described as a therapeutic alternative for urinary incontinence in bitches. There is also a growing body of literature documenting their anti-mitogenic effects, and therefore their potential use in cancer therapy. Those last ones remain to be investigated in canines, but it does offer great alternatives for the future for sure.

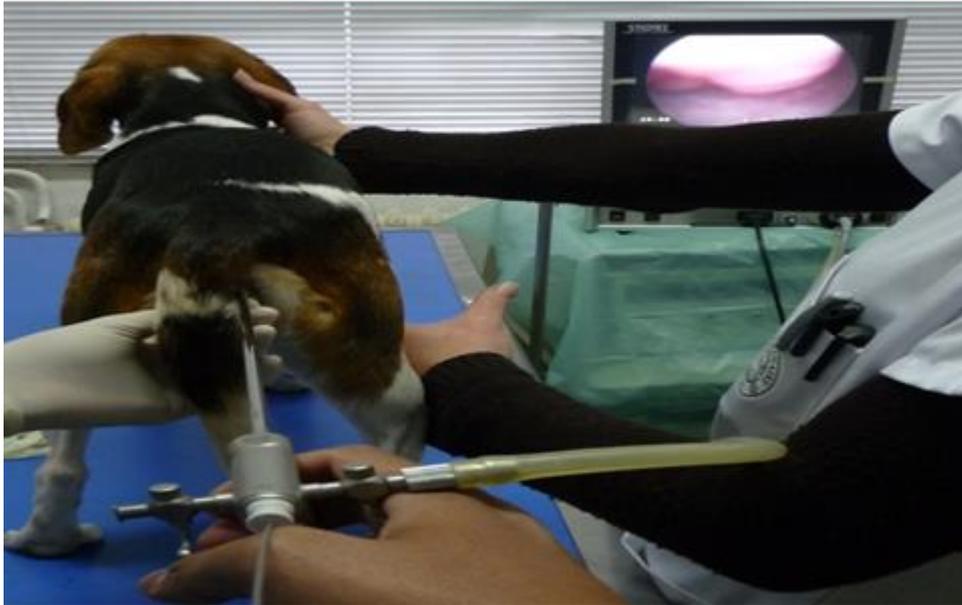


The second thing I wanted to tell you about concerns the benefits genital ultrasounds can provide in the management of the animal's reproductive career.

Infertility is something breeding centers will have to deal with in certain individuals of high genetic value. One thing for sure: infertility cases can sometimes be frustrating. Usually, there is no other clinical sign reported. In the past, very often, we used to hear the "Well, there is nothing we can do about it." The diagnostic approach was somehow limited.

Beginning of the 2000s, my former boss Alain Fontbonne started working on the use of ultrasounds in canine reproduction. He taught us it could be integrated in many different ways in our daily routine activities. Technology was a limiting factor at this time since it was not common to work with high-definition ultrasounds machines (maybe some of you remember those mechanical probes we used to have, with a frequency usually between 2-5 Mhz. With those it was sometimes even hard to make a pregnancy diagnosis...). Fortunately today, most veterinary clinics have access to high-end ultrasounds machines, most of them with numerical probes of 7.5-10Mhz and even linear probes of 12-14Mhz (which are great for superficial structures). This makes the use of genital ultrasounds way more accessible than it had been in the past.

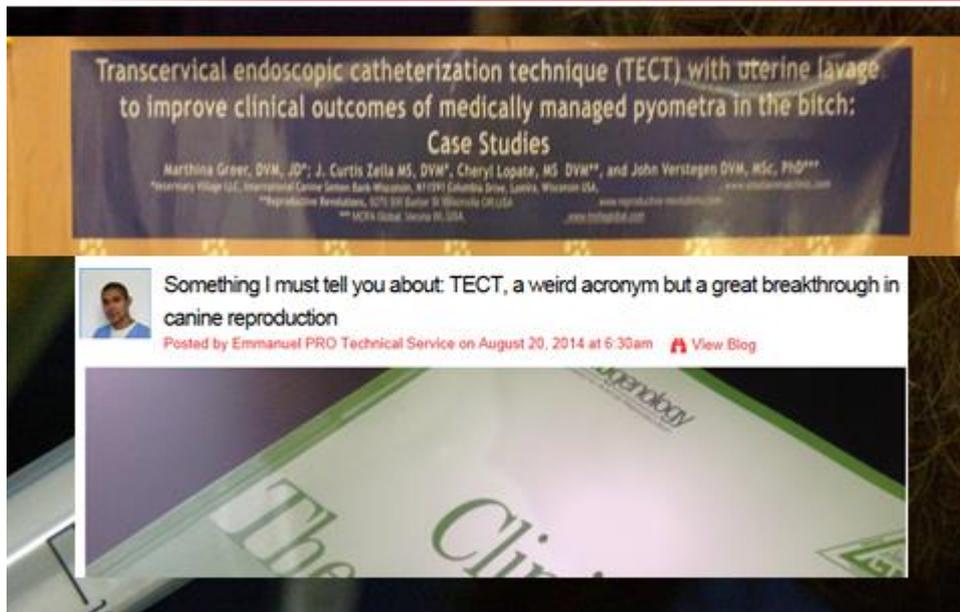
Timing of ovulation can now be realized under ultrasounds, ovarian cysts can be diagnosed and even treated following aspiration of their content. Same goes for the uterus: ultrasounds allow visualization of diseases like cystic endometrial hyperplasia or mucometra (=mucus in the uterus), which usually go totally asymptomatic. In the male, ultrasounds allow visualization of the prostate, which is the sole accessory gland of the male genital tract. Prostatic diseases are often asymptomatic in breeding dogs, and can impair the semen quality and therefore lead to infertility. Aspiration of cystic structures or prostatic biopsies can then be realised, providing us with the most accurate diagnosis. Always a first pre-requisite in order to determine the best treatment option. For instance, few years ago, we were able to diagnose a case of prostatitis caused by leishmaniosis, which is something we could not have done without those kinds of diagnostic techniques.



The very last update I would like to share with you is definitely, in my opinion, the biggest revolution of the moment in canine reproduction. When I started at the vet school, we did not have access to endoscopy. When we did finally, I am glad to say that this changed forever the way we would approach canine reproduction.

Genital endoscopy is essentially used today for artificial insemination purposes. It allows us to do intra-uterine insemination (in North-America they often refer to this technique as TCI for Trans-Cervical Insemination). The cervix is indeed a big filter on the sperm way to the oocytes, and bypassing it thanks to this technique allows greater amount of sperm to reach the uterus, and as a matter of consequence, the fecundation sites in the uterine tubes. Great tool when you work with a processed semen which has limited life-span (frozen semen usually survives in average 6 hours in the genital tract) or lower-quality semen. It is also always something we would recommend when dealing with infertility cases in the bitch in order to optimize the chances of success.

Two years ago when I did a presentation on canine reproduction at the previous conference of this association, I was asked if I could comment on the difference between TCI and surgical insemination, which is a technique that is still used a lot in North America when it comes to frozen semen insemination. You will find here a comparison between the two techniques <http://royalcaninbreedersclub.ning.com/profiles/blogs/tci-vs-surgical-ai-some-elements-here> . A scientific publication was recently published as well comparing the two techniques: the conclusions of the study were that fertility rates were higher when using TCI versus surgical insemination. More info on this here <http://royalcaninbreedersclub.ning.com/profiles/blogs/2014-sft-meeting-news-i-need-to-share-with-you-part-ii>



Genital endoscopy can also be used as a therapeutic alternative in the treatment of certain uterine diseases, like pyometra and mucometra, diseases which are not uncommon in breeding bitches.

One can argue that medical alternatives do exist for pyometra. That is true, and be aware that those medical treatments are greatly effective.

Techniques like TransCervical Endoscopic Catheterization Technique (TECT) however allows to flush the uterine content, which leads to shorter treatment time and faster recovery. This is always a plus when it comes to pyometra, and a real bonus for mucometras which often do not respond to medical alternatives.

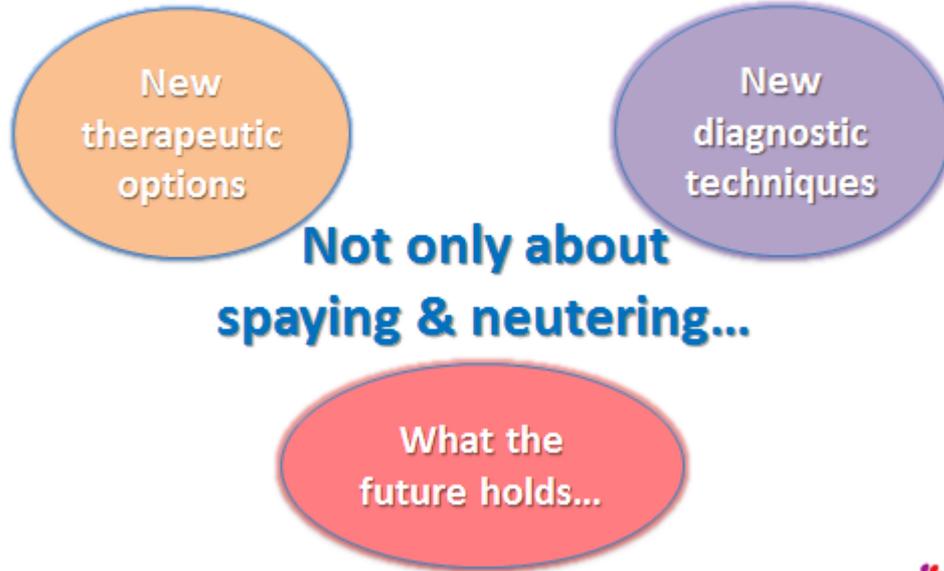
More info on this technique here <http://royalcaninbreedersclub.ning.com/profiles/blogs/something-i-must-tell-you-about-tect-a-weird-acronym-but-a-great>



Last but not least, genital endoscopy is also a great diagnostic technique. It allows us to visualize the inside of the genital tract, but not only the vaginal cavity. It is also possible to reach the uterus as you can see on the picture above and therefore realize what we call hysteroscopy.

This allows us to collect samples for histology and bacteriology without performing surgery (a mild sedation is however needed). This is important in breeding bitches since endometritis (=pure inflammation of the uterus) is now believed to play a huge role in cases of infertility. In fact a recent study showed that 42.6% bitches suffering from unexplained infertility were suffering from endometritis. We now have the tools to make a proper diagnosis.

There are still lots of question on how to treat this disease since very often they seem to be of pure inflammatory origin. A recent study from the veterinary school of Alfort investigated the use of anti-inflammatory drugs in bitches suffering from this disease. They achieved a 72% fertility rate while treating these bitches with anti-inflammatory drugs during the 5 days following the second TCI insemination. These results definitely open great perspectives for the future.



Canine reproduction is so much more than just “spaying and neutering”. In all its different field of application, there are new therapeutic options and new diagnostic alternatives.

They offer us new ways to approach reproductive cases as well as to maintain the genetic potential of selected individuals in working dog breeding programs.

And let’s be optimistic: there might be a bright future ahead with the development of new assisted reproductive techniques like embryo transfer or even the use of stem cell therapy. That is however a totally different story!

This is the end of our presentation and I hope you learned a few things that will help you on your day to day activities at the breeding center. I hope this document was helpful, as usual do not hesitate if you have any question or comments, feel free to contact me and send me your questions, I’ll be glad to help if I can !

## Thank you for your attention !



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# Suggested Readings

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