

Integrating canine semen freezing into your practice

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Introduction

As breedings using frozen canine semen have gained popularity among dog breeders, the need for reputable freezing centers has also increased. Veterinarians are uniquely positioned and easily trained to be able to offer this service in a general practice setting with a relatively modest investment of time, finances, and personnel. This review will identify and discuss the principal aspects involved in successfully setting up and integrating canine semen freezing into practice.

Keywords: Canine, semen, cryopreservation, artificial insemination, extender

Practice setting

Canine semen freezing is a technique that can easily be incorporated into a wide variety of practice settings ranging from a general mixed practice in a rural setting to an exclusive canine reproduction specialty practice in a metropolitan area. Factors to consider in the evaluation of whether or not this service would contribute in a positive way to your current practice environment include having a clear understanding of the fact that providing clients with the opportunity to freeze their dog's semen will likely increase the eventual need and demand for additional reproductive services. As a manager in our practice accurately stated recently, "With reproduction, if you're not all in, this may not be for you." Although the techniques themselves may not require extensive training or certifications to be able to accurately perform, the timing precision required when breeding with canine frozen semen may require increased doctor/staff availability in order to be able to meet the client's need in a timely fashion. Because of the shortened longevity of frozen/thawed semen, weekend/holiday office hours are often necessary in order to obtain optimal conception rates and litter sizes. Awareness of and sensitivity to the needs of clients investing large amounts of time, effort, and finances in order to achieve a particular breeding will result in minimized frustration for all parties involved.

Services offered

Canine semen freezing centers are found throughout the United States and abroad in a wide variety of settings ranging from compact mobile freezing stations temporarily set up at dog shows to large canine theriogenology specialty practices in metropolitan areas. Having a good working relationship among colleagues offering similar services is critical to maintaining open lines of communication with clients, particularly due to the fact that shipping semen from one freezing center to another is often necessary in order to minimize travel and resulting stress for the bitch. Veterinarians have the added benefit of being able to offer medical and surgical services when required, making their practices an appealing referral alternative for non-veterinarian staffed freezing centers for dogs needing further diagnostic or surgical options than they are equipped to provide.

The actual methods used to freeze canine semen vary widely. The basic premise involves taking a fresh semen sample (initially at body temperature) gradually through progressive decreases in temperature until freezing in liquid nitrogen is finally achieved. Semen can be frozen in pellets or straws and stored indefinitely in liquid nitrogen in tanks that are typically maintained at a constant temperature (independently of an exterior power supply) through a regular supply of nitrogen from an outside source. The most important difference among the more commonly used freezing methods resides in the extenders used, some of them with proprietary recipes and others compounded in-house by independent freezing centers.

Costs involved

The costs involved in setting up a canine semen freezing center will vary according to the freezing method chosen by a practitioner and will be limited only by the speed at which the center subsequently grows. Initial investment costs can be divided up into four general categories: 1) semen collection/evaluation laboratory equipment and supplies; 2) semen freezing equipment; 3) liquid nitrogen dewars; and 4) semen shipping tanks. Franchising fees if applicable will depend on the parent organization and may be individually determined.

Semen freezing

The initial step in freezing canine semen involves obtaining a sample of acceptable quality in order to ensure adequate semen viability once thawed, as conception rates and litter sizes will be directly affected. Semen collection and evaluation processes described in detail in earlier proceedings include basic assessments of progressive motility, sperm concentration, and sperm morphology, with recommended minimum standards for each parameter pre-established by the Society for Theriogenology. Adherence to these standards is critical to the success of frozen semen breedings. Accurate documentation of semen analysis results obtained when semen is initially processed and frozen allows owners to later make informed decisions regarding potential breedings using these same collections.

Semen freezing can be done in pellets or straws, with minor variations in methodology used to obtain the final breeding units. Following evaluation of the ejaculate, the sample is taken through a series of steps that include refrigeration and eventual freezing using extenders that include cryoprotective agents to help buffer the extreme temperature changes to which the sperm will be exposed. Proper identification of breeding units including stud dog identification (ideally via permanent identification such as a microchip or tattoo), breed, date of freezing, registration number(s), and freezing center identification is critical to ensure accuracy in parentage of offspring from litters produced by breedings using said semen. Documentation of the semen collection process and inseminations using frozen semen is required by the American Kennel Club. Registration of litters born from frozen canine semen will also require proper identification of breeding units used as well as DNA identification of the stud dog.

Semen freezing contracts offer both freezing centers and semen owners the opportunity to clearly understand the terms and conditions under which semen is frozen and potentially stored and/or shipped to another destination. Ownership or transfer of ownership of frozen semen is also a critical piece that requires definition in order to avoid potential mishandling of frozen semen and/or potentially litigious circumstances.

Inseminations with frozen canine semen

Due to the increased fragility and shortened lifespan of frozen semen compared to fresh or chilled semen, breedings involving frozen semen require increased precision regarding ovulation timing in order to obtain optimal results. Commonly used methods for defining the most fertile period (discussed in previous editions of *Theriogenology*) include vaginoscopy, vaginal cytology, and luteinizing hormone (LH) and progesterone testing. Once the most fertile time frame is identified, intrauterine inseminations (as opposed to intravaginal inseminations) result in the highest conception rates and optimal litter sizes per breed. Intrauterine insemination is achieved via transcervical or surgical insemination, with the former quickly gaining popularity among breeders in the United States, particularly when anesthesia or other surgical risks such as increased scar tissue or adhesions, or multiple inseminations on a particular heat cycle are considered. Familiarity with and expertise in the different forms of artificial insemination are critical to the utilization of frozen semen. Offering clients the ability to not only freeze and store canine semen will greatly enhance the rate at which this service becomes a significant profit center for a practice.

Transport of frozen semen

Frozen semen is often transferred from one facility to another in order to facilitate breedings without transporting the bitch long distances. Semen release forms are typically used by storage facilities to grant semen owners the opportunity to move semen from one location or owner to another. Specialized

liquid nitrogen tanks known as “dry shippers” allow frozen semen to be maintained at the proper temperature during shipping over a longer period of time (up to 7-10 days if needed) through continued exposure to liquid nitrogen vapors. Dry shippers range in size, configuration, and quality from inexpensive/disposable to heavy duty, rechargeable tanks that are made to withstand harsh handling conditions often encountered in air cargo travel. Domestic and international transport is common and appropriate documentation is critical to ensure proper handling of semen in a timely fashion once it reaches the desired destination, particularly in the case of international shipping. Importation regulations established by individual countries must be obtained prior to freezing in order to allow for special considerations regarding blood testing or proper semen identification. Clear identification of all shipper contents (including thaw media) and accompanying health certificates based on the importation requirements of the recipient country is critical to ensure efficient processing through customs and timely arrival of semen shipments at their final destination. Upon arrival, frozen semen is quickly transferred into semi-permanent storage tanks and dry shippers returned to their original location when applicable. Insurance costs and coverage of frozen semen during transport vary depending on the stated value of the semen, insurance policies in place at each facility, or the shipping company involved, with limitations of coverage ideally defined and clearly communicated to all parties involved in advance.

Semen storage

Some freezing centers store frozen semen at their facility while others ship newly frozen semen to larger, more centrally located storage facilities for long-term storage and subsequent distribution. The wide variety of available options allows practitioners to custom design a system that works well for their particular organization and clientele. Semen can be stored in larger liquid nitrogen tanks (available in different sizes) that provide a stable temperature of -196°C independently of an external power source with regular replenishing of liquid nitrogen from a local supplier. Proper maintenance and monitoring of tank integrity and liquid nitrogen supply is critical to avoid potential damage to stored semen that would result in devastating consequences for all parties involved. Proper identification and accompanying documentation of all stored semen is also paramount to minimize confusion or errors once the semen is utilized. Annual storage fees are usually required by semen storage facilities in order to cover the costs of liquid nitrogen and tank maintenance, and may vary among centers based on the number of stud dogs or the number of breeding units stored.

Risks/benefits

When considering the possibility of integrating canine semen freezing into a practice setting, it is necessary to account for the benefits and risks this service can potentially create for both veterinarians and staff. Increased demands on time required for training in the methodology selected will exist initially, added to the accompanying staff demands involved in ensuring that the required documentation for collection, distribution, and eventual utilization of frozen semen is executed accurately. Registration of litters obtained from frozen semen breedings depends on information obtained at times decades earlier, with obviously devastating results for breeders when such information is unobtainable retroactively due to death of a stud dog or lack of clearly identifiable parentage.

Freezing centers that are equipped to receive and store semen from other facilities create an additional opportunity for increased revenue, both from storage fees once the semen is transferred from the shippers into the semi-permanent larger storage tanks, as well as for services required for ovulation timing and insemination services once the semen is eventually utilized. Increased awareness by colleagues in the industry of the services offered will likely translate into increased demand by the tightly knit and well connected breeder community for freezing, storage, and breedings services that will translate into increased revenue for the practice.

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