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Artificial Insemination in the Dog

by Larry Renze, Vet. Med. III

A. REASONS FOR ARTIFICIAL INSEMINATION IN THE DOG

Artificial insemination means the collecting of semen from a male and its subsequent introduction into the genital passage of a female. The first recorded artificial insemination of dogs was done by Abbe Spallanzani in 1780. The reasons for artificial insemination in dogs may be listed as:

1. Psychological reason
 - a. the female is a shy breeder, or she may be frigid or too aggressive
 - b. the male may be inexperienced and not know how or he may be a shy breeder
 - c. both male and female are raised together and know each other so they won't mate
2. Physiological reason—vaginal hyperplasia
female shows pain when male enters
3. To replace natural mating when this is impossible due to geographical distance between stud and bitch, or to bypass quarantine regulations in the movement of animals
4. To increase and extend the usefulness of any valuable proven stud
5. To aid in disease control

B. PROCEDURES IN ARTIFICIAL INSEMINATION

1. Collection of Semen

The first step in artificial insemination involves the collection of semen from the stud. There are three methods to do this—

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manual manipulation, artificial vagina and electrical stimulation.

In manual manipulation a bitch in estrum is placed in front of the male. When the male exhibits sexual interest the preputial skin is pushed caudally, exposing one to two inches of the glans penis. The base of the penis behind the bulbus glandis is grasped through the prepuce and slight pressure is applied by the fingers (see Fig. 1). Dogs can be made to ejaculate by ma-



Figure 1. Digital manipulation of the penis.

nipulation of the base of the penis until erection is induced. Semen is then collected in a test tube (see Figs. 2 and 3).

Some dogs are unwilling to ejaculate under normal conditions as above. A relatively simple method of electroejaculation is of value in these cases. The procedure used to cause ejaculation is as follows. The dog is given an enema and is then anesthetized with pentobarbital sodium. Although not essential, it is preferable to clip the third and fourth lumbar vertebral spines.

An electrode jelly is applied freely over this area and also to the free ends of the rodlike electrode, which is inserted approximately four inches into the rectum. The other electrode (copper clip) is attached to the jelly-covered skin of the lumbar region. The current involves the hypogastric nerves. The plug from the apparatus is plugged into the usual 60 cycle AC current. Thirty volts and 140 milliamperes are given intermittently, 10 seconds on and 10 seconds off, for three or more times. The current used may vary from 26 volts, 70 ma., to 46 volts, 248 ma., depending upon the size of the dog.

Harrop's canine artificial vagina is the third means of collecting semen. This is



Figure 2. Funnel and graduated test tube in position for collection of semen.

used with a bitch in estrus to tease the male and digital manipulation. As soon as an erection is obtained the penis is thrust into the artificial vagina, where the pulsations of the liner provide the remainder of the stimulation necessary to obtain a full ejaculate. The size of the artificial vaginal lumen and the pulsations of the liner are produced by the pumping action of air bulbs and shut off valve.

2. Characteristics of Dog Semen

The appearance of whole semen from a normal dog is grey to milky white in color, depending on the sperm concentration; the higher the sperm concentration, the whit-

er the semen. Fresh dog semen has no odor, and the whole semen is liquid and rather watery in consistency. When left standing, the semen tends to separate out, the sperm going to the bottom of the tube and the top of the tube becoming watery and transparent.

The total volume of semen ejaculated at a single emission varies according to the breed and size of the dog, and it will also vary considerably in the same dog on different occasions. The difference in volume is chiefly associated with the third fraction of the ejaculate.

The semen of the dog is ejaculated in three distinct fractions, and these may be collected separately. This is carried out by

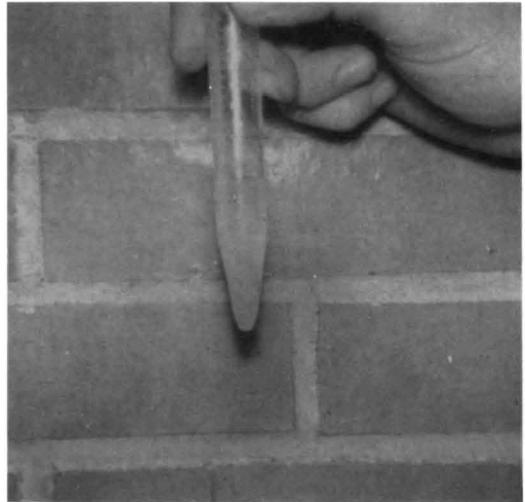


Figure 3. Test tube containing semen.

quickly changing the graduated glass tubes on the rubber collecting cone of the artificial vagina between fractions. The interval between the end of one fraction and the commencement of the next gives the operator's assistant time to do this.

1. First fraction: this varied in volume from 0.25–5 ml., larger quantities usually being secreted if the dog is sexually stimulated by the presence of a bitch in estrus. This fraction consists of a clear watery fluid containing no spermatozoa, and it is suggested that it is probably the secretion of the urethral mucous glands, the glands of Littre.
2. Second fraction: this is almost white

in color and more viscous in consistency. It is the testicular secretion and is the sperm-bearing fraction of the ejaculate. It varies in volume from 0.5–3.5 ml.

3. Third fraction: this is again clear and watery in appearance and thin in consistency. It is the secretion of the prostate gland and contains no spermatozoa. It varies in volume tremendously from 2–30 ml.

While visual examination of density will give fairly reliable information regarding the quality of the semen to an experienced observer, an exact expression of density can be made only by defining the concentration of sperm per unit volume. The technique of sperm counting is similar to that employed for counting bovine spermatozoa—using a Neubauer hemocytometer. Dilution of the samples is 1:200 in formolsaline. Two or three dilutions from a sample should be made, each counted, and an average taken.

Immediately after collection an examination for motility should be made. A drop of semen is lightly spread on a warm slide with a glass rod. Normal semen will present a picture of tremendous activity, the whole mass appearing to have a rippling movement (unlike the wave-motion of bovine semen). Individual movements of spermatozoa are intense in fresh semen, and are best studied under a cover-slip.

A simple and effective method of staining for morphological examinations is to mix a drop of semen with a drop of India Ink (see Fig. 4). From this a thin smear is made and examined microscopically.

It must be remembered that frequency of ejaculation has an effect on the general picture of morphology of semen. Ejaculates examined after a long period of abstinence may contain an abnormally large number of spermatozoa which have been stored in the epididymis beyond the optimum period and may show degeneration or be dead, while samples taken from a dog that has been too frequently used may show immature forms of spermatozoa. It is suggested that a dog be used as a stud two or three times a week with appropriate rest periods between services.

3. Preservation of Semen

Up to date the most successful diluent and preservative is heat-treated pasteurized milk, the method of preparing it being as follows:

A small quantity of pasteurized milk is slowly heated to 92°–94° C for ten minutes. It is then allowed to cool to room temperature and a sufficient quantity for use is gently poured into a test-tube. If the second fraction of the ejaculate is diluted 1:8 with this heat-treated milk and the final mixture stored at 4° C it will keep and remain fertile for several days.

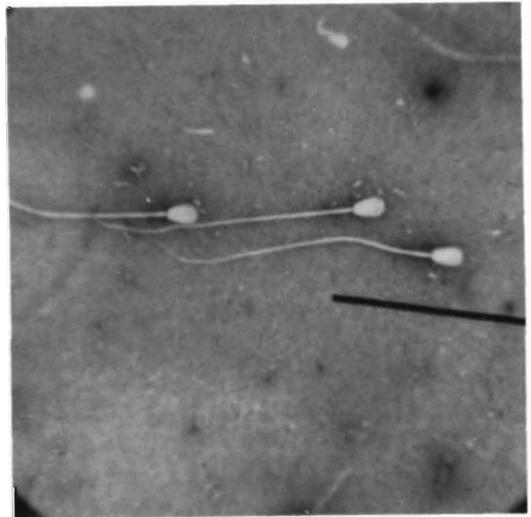


Figure 4. India ink stain. x900

4. Equipment Required for Insemination

This is a very simple list, and comprises a 1 ml. glass pipette (diam. 6mm.), a glass syringe and a piece of rubber tubing to connect the two. Some operators prefer to work with a vaginal speculum, and a cheap form of speculum for this purpose can be made by blowing a hole in the end of a 6 in. \times $\frac{5}{8}$ in. test-tube sufficient to allow passage of the pipette. More elaborate specula are of course to be purchased, and are very easy to work with (see Fig. 5 for a complete inseminating kit).

5. Optimum Time to Inseminate Bitch

(Refer to Diagram 1, next page)

DIAGRAM I

AIDS FOR DETERMINING WHEN TO INSEMINATE	WHEN		At the time the ova are ripe 24-48 hours after ovulation
	VULVAR SIGNS	Size	Maximum swelling
		Firmness	Soft-Moist
		Discharge	Straw or yellowish color
	Behavior		Three to four days after first acceptance of the male
	Vaginal Smear		Disintegrating cornified epithelial cells and RBC
	Calendar Date		Ten to fourteen days after first bleeding date

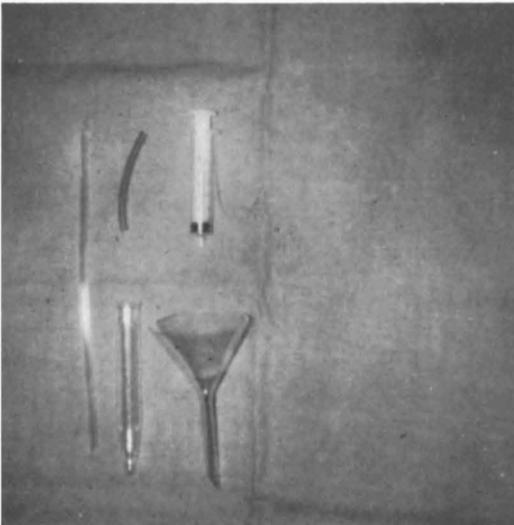


Figure 5. Complete inseminating kit.

6. Technique of Insemination

The bitch is placed on a table of convenient height and is held by an assistant. The external genitalia of the bitch are then washed and thoroughly dried. The speculum, lightly lubricated, is then inserted un-

til the cervix is reached. The inseminating pipette is then pushed through the speculum and its tip introduced into, or as near as possible to, the cervix. The glass syringe containing the semen is now connected to the inseminating pipette by means of the rubber tubing and the semen slowly injected. Some operators prefer to infiltrate the semen by gravity rather than subject it to possible damage by forcing it through a syringe. The hind-quarters of the bitch are then elevated and held in that position for some minutes in order to prevent the semen running out as otherwise may happen especially if the bitch immediately sits down.

C. AMERICAN KENNEL CLUBS POSITION ON ARTIFICIAL INSEMINATION OF DOGS

The regulations of the Kennel Club on this subject are found under Rule 28, which deals with disqualification and forfeit of prizes. Section K states that "the progeny resulting from the artificial fertilization of a bitch may be disqualified un-

AFFIDAVIT OF CANINE ARTIFICIAL INSEMINATION

Submitted to: The American Kennel Club
51 Madison Avenue
New York, New York 10010

Sire: Breed _____ Dam: Breed _____
Registered name _____
Registration number _____
Owner _____

Reason for artificial mating _____

Both the prospective sire and dam were present at the artificial mating(s), which occurred on
(dates) _____
at (place) _____

Veterinarian's certification: I hereby certify that on the above date(s) and at the above place, I
performed both the artificial extraction of semen and insemination of the aforementioned ani-
mals.

_____, D.V.M.
Veterinary Clinic
Iowa State University
Ames, Iowa 50010

No attempts were made to breed the above bitch to any other stud during this breeding season.

Owner of Bitch

Artificial insemination procedure witnessed by: ALL STATEMENTS CONTAINED IN THIS
Name _____ AFFIDAVIT ARE ACCURATE AND TRUE.
Address _____

Name _____
Address _____

Notary Public

Date _____

Affidavit submitted by _____

less prior permission was obtained from the Committee of the Kennel Club." The following duplicated sheets are the forms necessary to be filled out to register the breeding. The first sheet is the issuance of an affidavit by the sire's owner certifying that he witnessed the collection of semen and the insemination by a licensed veterinarian. The second sheet is for the

veterinarian certifying that he performed the collection and insemination in the presence of the sire's owner.

**D. IOWA STATE UNIVERSITY
VETERINARY CLINIC AND
ARTIFICIAL INSEMINATION
IN THE DOG**

Artificial insemination of the dog is

VETERINARIAN'S STATEMENT

American Kennel Club
51 Madison Avenue
New York, New York 10010

Date _____

Re: Artificial insemination involving:

Sire:

Dam:

Breed: _____

Registered Name _____

Registration Number _____

Owner _____

Dear Sirs:

I do hereby certify that I performed the artificial extraction of semen and insemination in the above dogs on (dates) _____

at (place) _____

Artificial insemination was used because _____

Respectfully submitted

_____, D.V.M.

Veterinary Clinic
Iowa State University
Ames, Iowa 50010

done at the ISU Veterinary Clinic. This operation is done on the average of six to eight times a year.

The entire process is much like that explained above with minor variations as explained below.

The ejaculation is gotten by digital manipulation in the presence of a bitch in estrus. The semen is collected by means of a 4-6 inch funnel leading to a graduated centrifuge tube. Both the funnel and centrifuge tube are pre-warmed to aid in preservation of sperm. The plunger is then removed from a six cc. syringe to be used in injecting the semen and the semen poured in, saving a sample for semen evaluation for motility and density. A pipette, connected to the syringe by means of a

rubber tube, is then inserted into the vulva. It is first inserted one to two inches in a dorsal inclination. After this it is gently shoved straight in for four to six inches until the cervix is reached—detected by resistance to forward insertion. No lubricant is used on the theory it may be spermicidal. The semen is then deposited by gently pushing in on the syringe plunger. The rubber tubing is then kinked and the syringe removed to aspirate app. 2cc. of air. The syringe is then hooked back on the rubber tubing, tubing straightened out, and flushed with air. The pipette is then removed. The hind quarters of the bitch are then elevated for 10-15 minutes.

(Continued on page 30)

ALUMNI NEWS



1943 CLASS REUNION AT IOWA STATE UNIVERSITY HOMECOMING

for

the March Veterinary Graduates of 1943
25 YEARS

Plans are being made for an informal evening together on October 25 to catch up on the happenings of 25 years.

We need current addresses for everyone in the class. Please advise if you have moved recently or if you know of a classmate who has changed location. By drop-

ping us a note, we'll know for sure where you are.

More to come on specific plans.

SAVE THE WEEKEND OF OCTOBER
25 and 26, 1968.

Join with us in making this a memorable occasion.

1943 Reunion Co-Chairmen

Bill Calhoun	Bob Kirkpatrick
Riceville	3900 River Oaks Dr.
Iowa 50466	Des Moines,
A/C 515 985-2951	Iowa 50312
	A/C 515 279-6685

Artificial Insemination in the Dog. Cont. from page 22.

The charge for this is as follows:

Blanket charge for all vaginal smears	\$4.00
Collection of semen-\$2.00-done 3 times	\$6.00
Inseminating bitch-\$2.00-done 3 times	\$6.00
Room and board \$1.50/day for 3 days	\$4.50
Total charge	\$20.50

This charge covers insemination on three consecutive days. This does not cover the stud fee which may range from the pick of the litter to a \$200 stud fee. The average range is from \$25-\$30. Also it costs \$2.00 to register the litter.

Antibiotics are not used as a rule unless problems arise such as metritis.

E. SUMMARY

From the above it is seen that artificial insemination in dogs is done and is practical. In a small animal practice a knowledge of this is essential for one never knows what logical or ridiculous reason a client may come up with to call for artificial insemination of a bitch. And of course, the client is always right—if you want to keep that person as a client.

The use of artificial insemination over natural mating is not to be encouraged. The percent conception in artificial insemination is quite variable, ranging from 50%-70%. Natural mating under controlled conditions may have as high as 80% conception.

But as stated in the first part of this report—artificial insemination does have its place when for some reason natural mating can not be done.

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