Intra-uterine and Laparoscopic insemination

Dr. Hayder Abdul-Kareem AL-Mutar

Department of Surgery and Obstetrics , College of Veterinary Medicine – University of Baghdad

almutar.haydar@gmail.com

Intra-uterine insemination

PROCEDURE:

1-Restrain the cow in a crate or Trevis.

2- Clean the vulva and adjacent parts with cotton dipped in normal saline or antiseptic solution.

3- Lubricate the sterilized **vaginal speculum** with liquid paraffin or soap water.

4- Insert the speculum through the vulva into vagina while keeping the jaws of speculum closed to avoid injury.

5- Turn the handle of vaginal speculum either downward or upward and open the jaws.

6- Use torch to observe the anterior part of vagina and outer part of cervix.

7- Note the finding like **discharge, vaginitis, abscess, tumor, cervix (open or closed), cervicitis etc**.

8 Remove the speculum in an open fashion

Technique of Intra-uterine insemination

OBJECTIVE: To introduce the semen into the uterus

PROCEDURE:

1- Clean vulva and perineal region with dry cotton.

2- Insert the left hand in the rectum and remove the fecal material by back racking.

4- Spread vulva apart and insert the instrument (catheter or gun apparatus) up to fornix.

5- Hold the cervix between two fingers through rectal wall and keep thumb on the external os.

6- The catheter is initially inserted pointing upwards at an angle of about 30^0 to avoid entering into the external urethral opening and is then moved horizontally until it is engaged in the external os of the cervix.

7- Entry into the external os is accompanied by a characteristic 'gritty‘ sensation.

8 There after, introduce the catheter through convoluted cervical canal by manipulation of the cervix through rectal wall.

9- Place one finger over the internal os of the cervix, so that the tip of the catheter can be palpated when it passes the cervical canal

10- As soon as, the catheter is passed, the semen should be pushed through syringe into the body of uterus not in uterine horn.

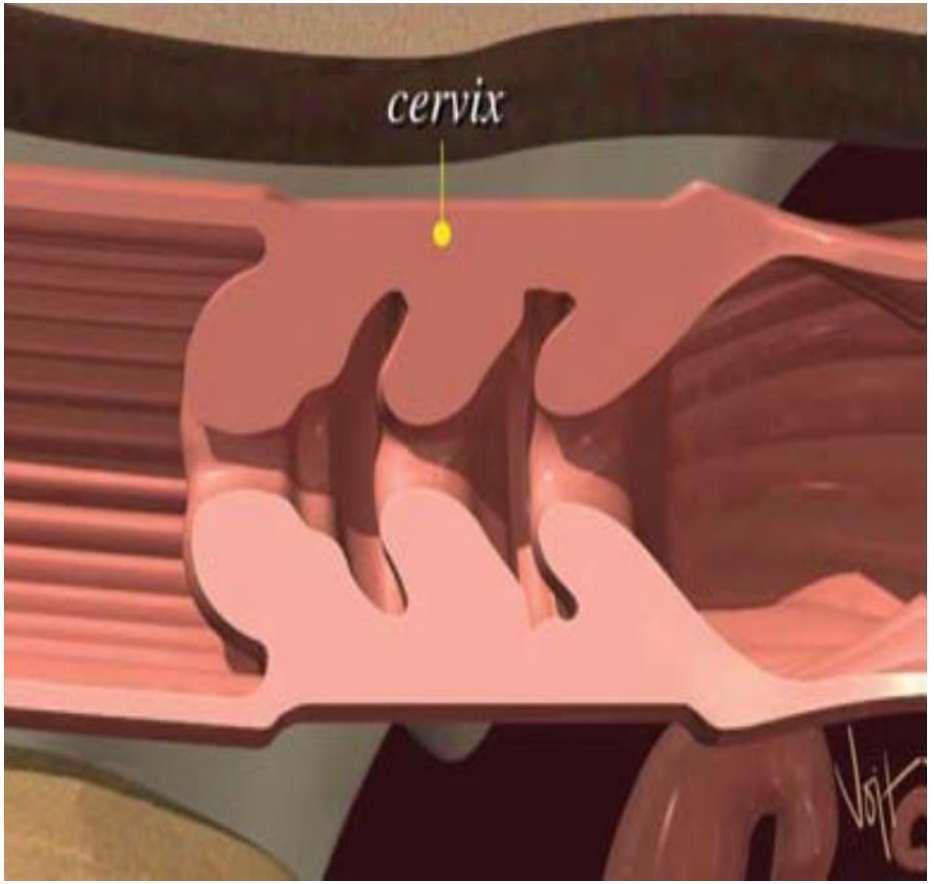
11- In this way, semen is equally distributed between the two uterine Horns.

Vaginal speculum to ewe vaginal examination

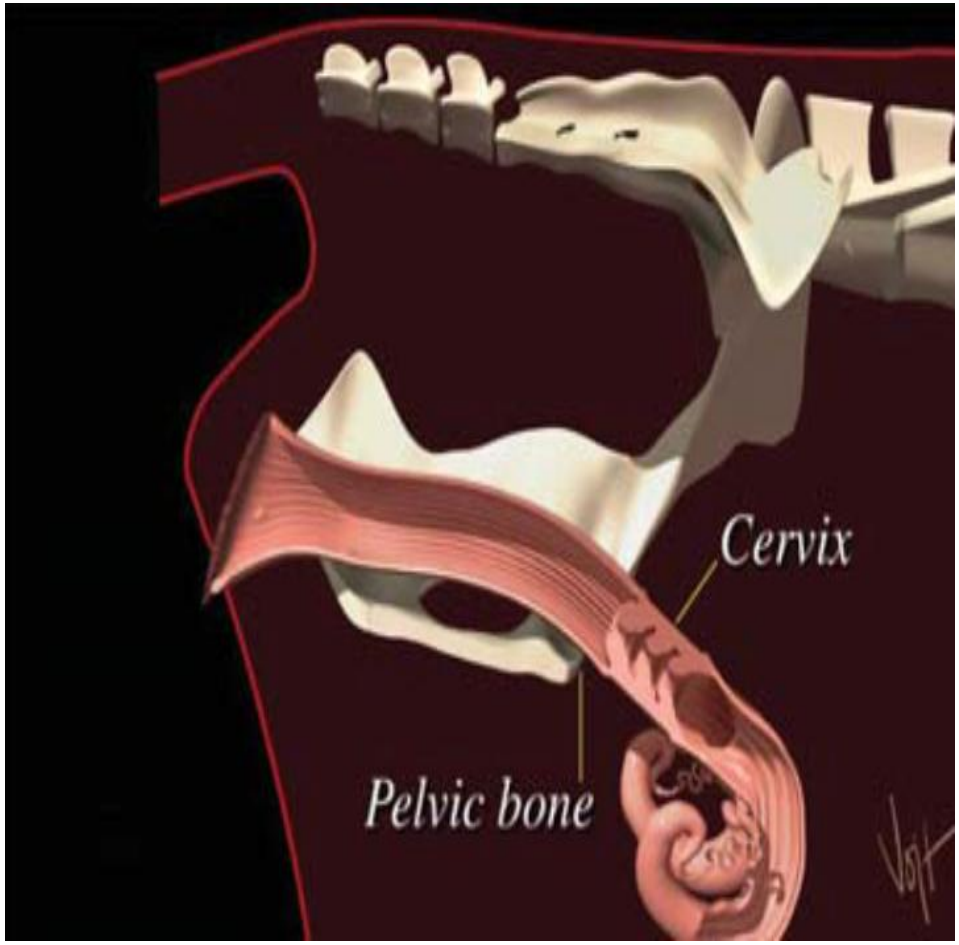
Vaginal scope to mare vaginal examination

Because the rumen displaces the reproductive tract to the right, it is much easier to locate and manipulate the tract with your left hand.

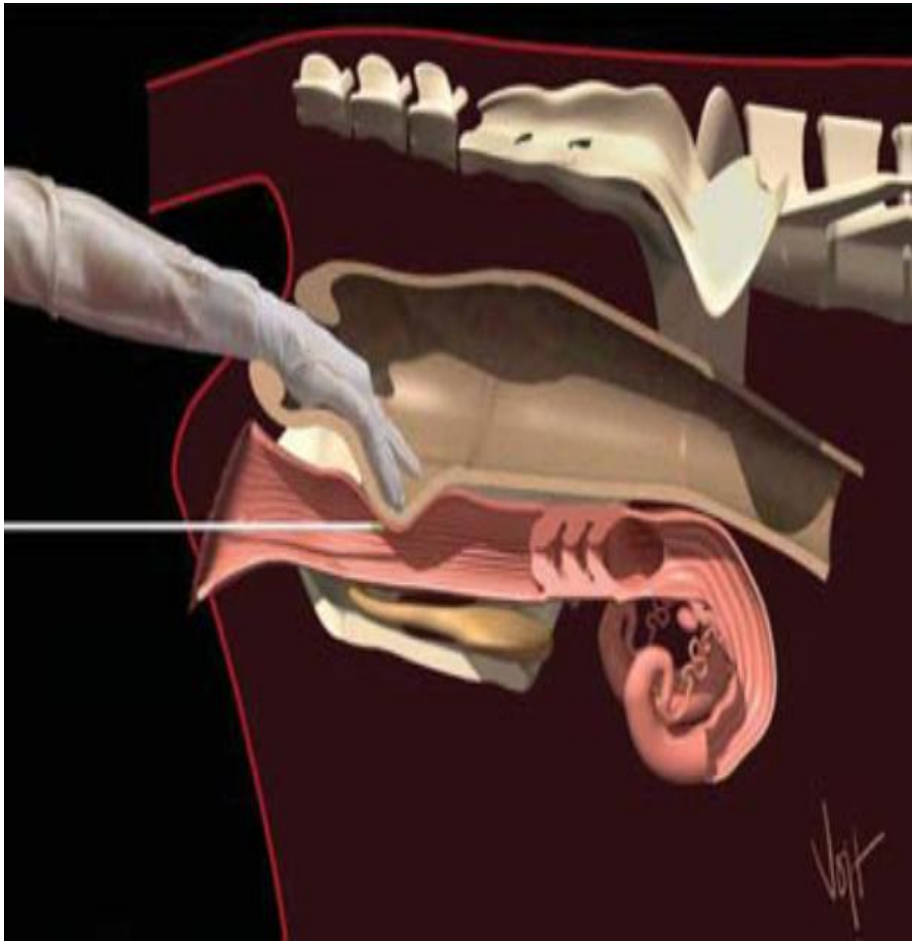
The opening into the cervix protrudes back into the vagina



The cervix is located on the floor of the pelvic cavity near the anterior end of the pelvic bone.

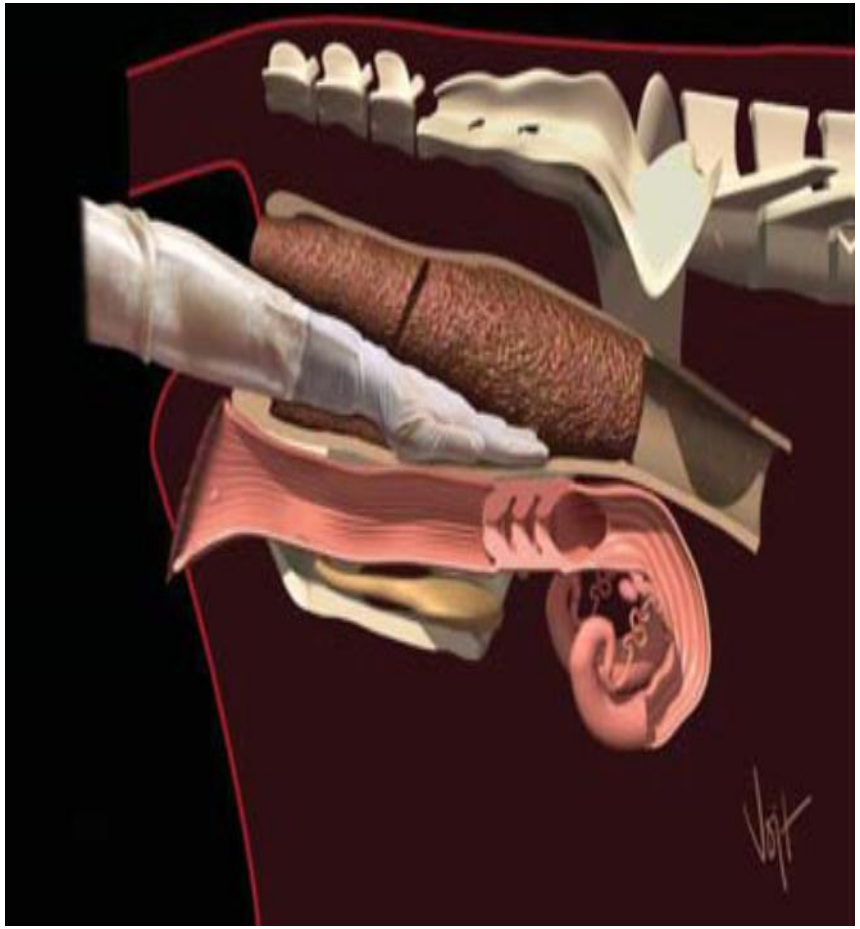


As you insert the breeding gun into the vagina, keep your gloved hand even with the gun tip.

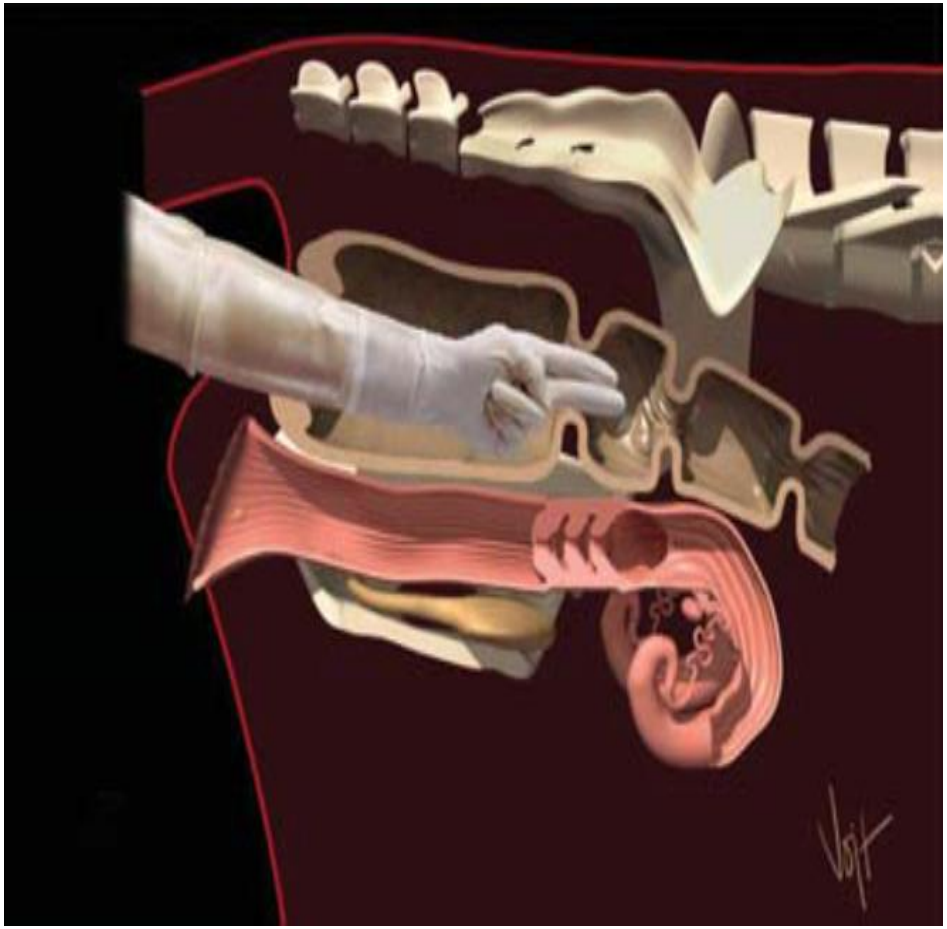


Keep your open hand flat against the floor of the rectum,

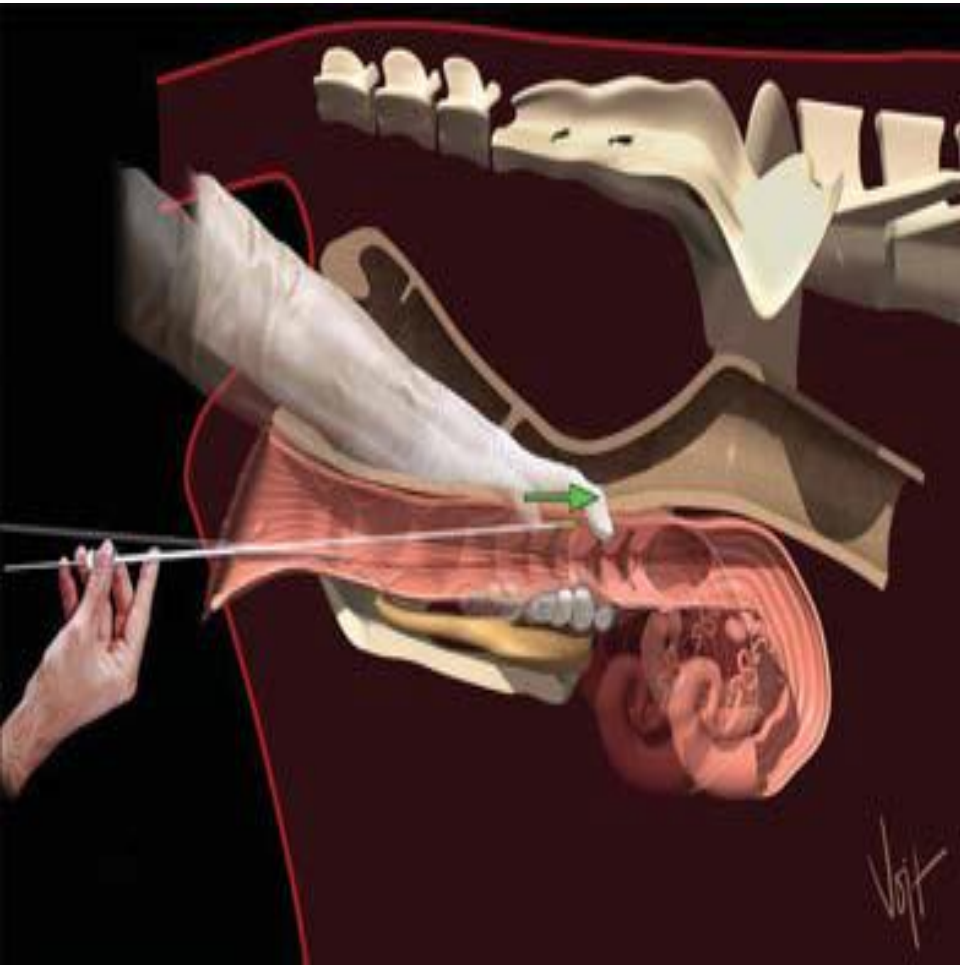
allowing manure to pass over the top of your hand and arm



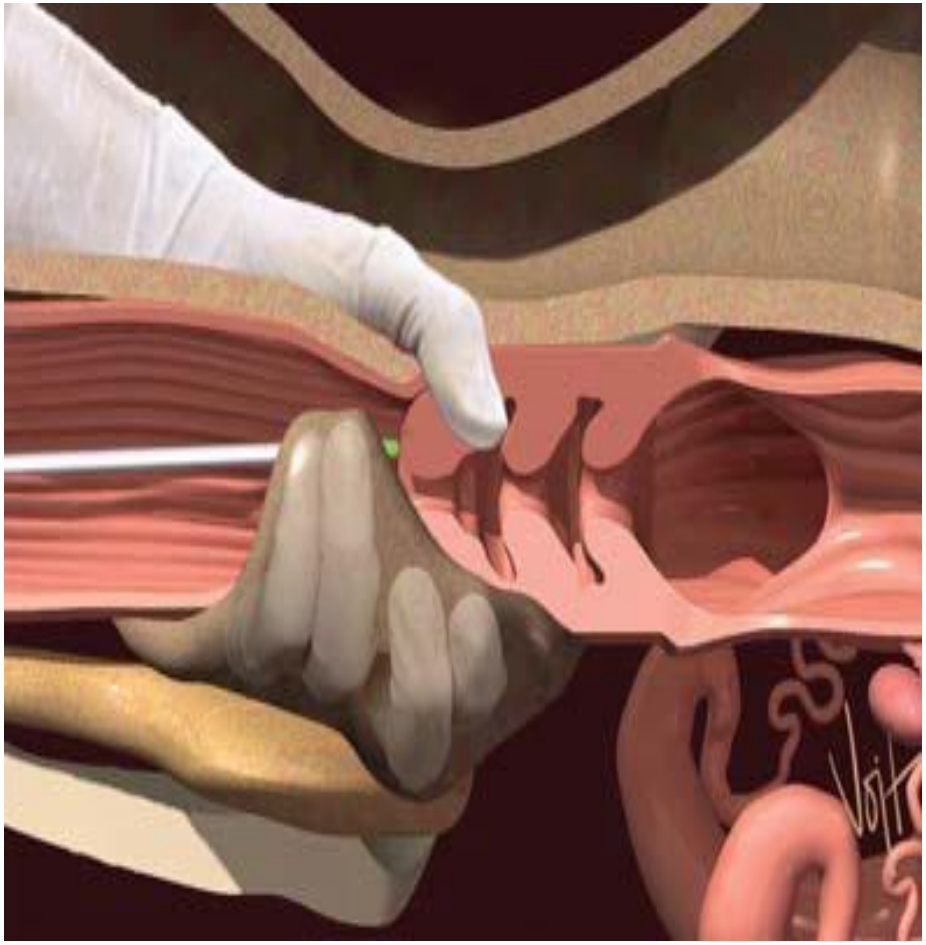
To relax rectal constriction rings, insert two fingers through the center of the ring and massage back and forth



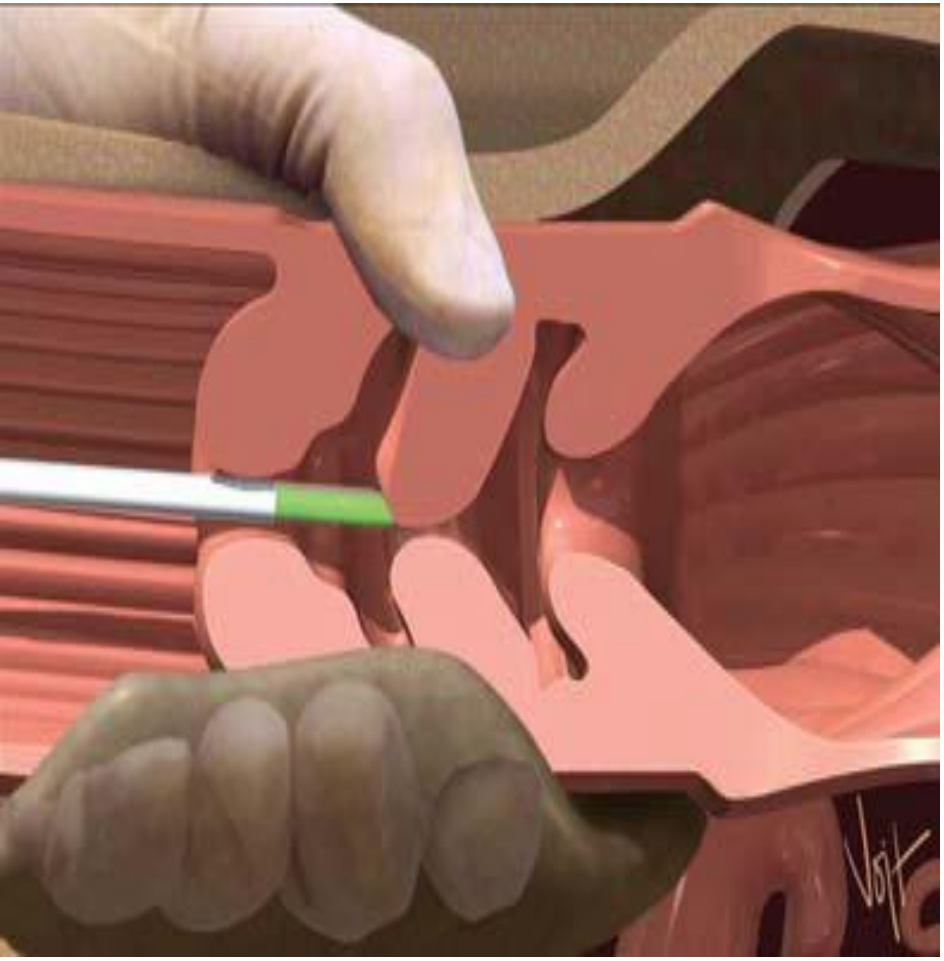
Grasp the cervix and push it forward to straighten vaginal folds.



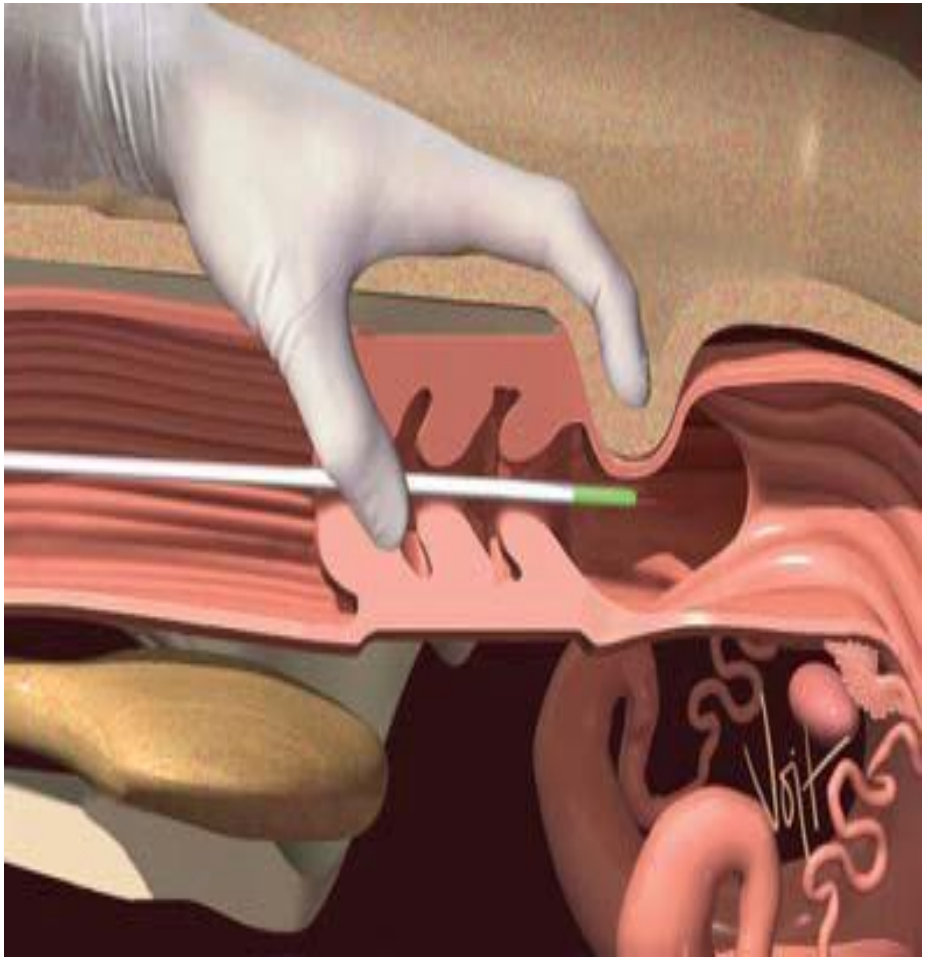
Grasp the external opening to the cervix with the thumb on top and the forefingers underneath to close the fornix and guide the gun tip into the cervix



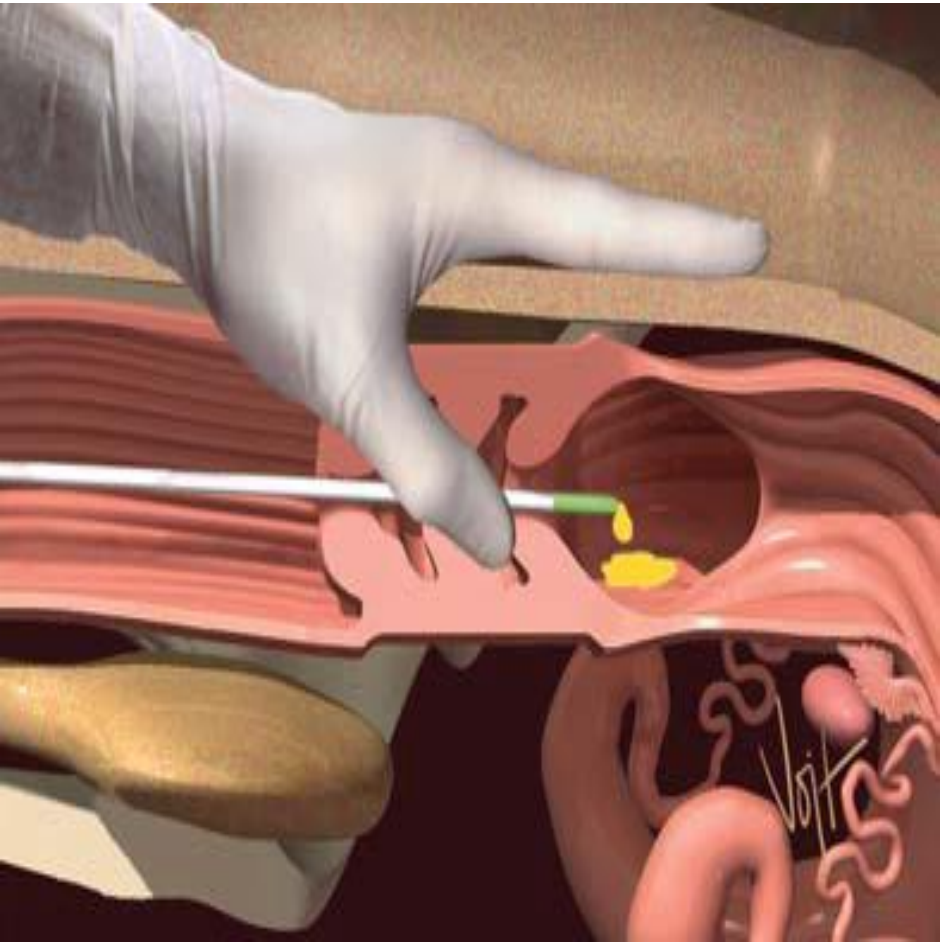
Using the flexibility of your wrist, twist and bend the cervix until you feel the second ring slide over the gun tip



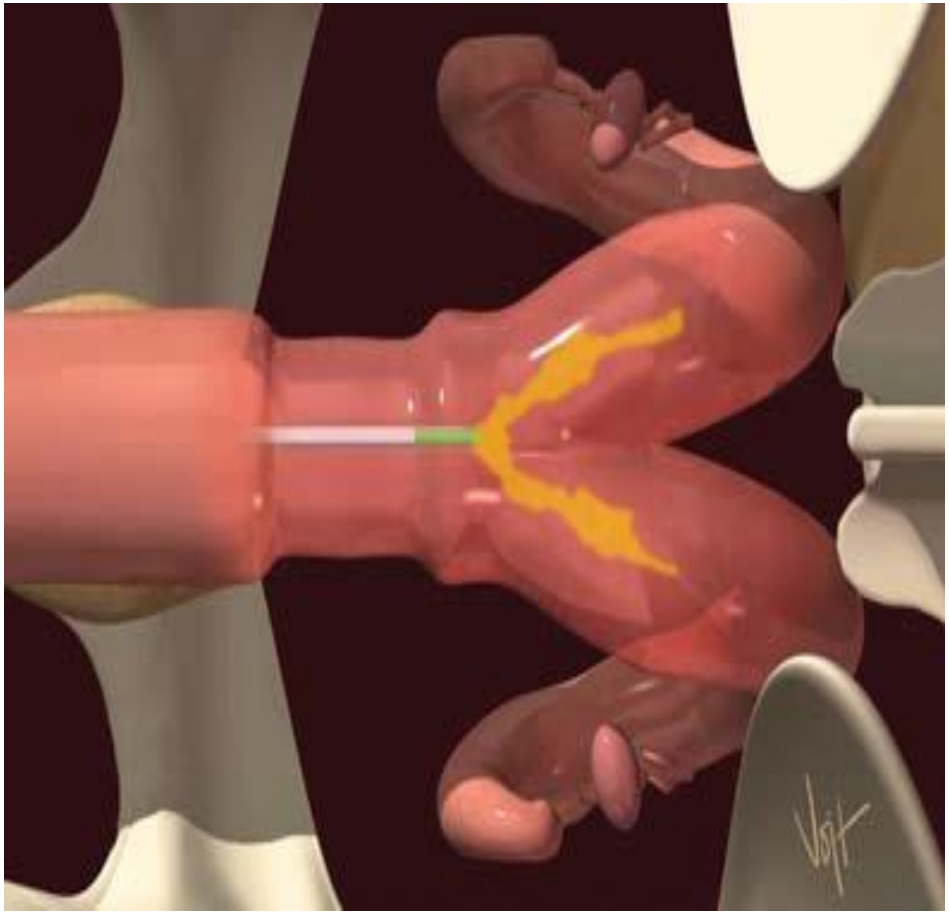
Use your index finger to check gun placement (1/4 inch past the end of the cervix) before depositing semen.



Push the plunger slowly so that drops of semen fall directly into the uterine body.

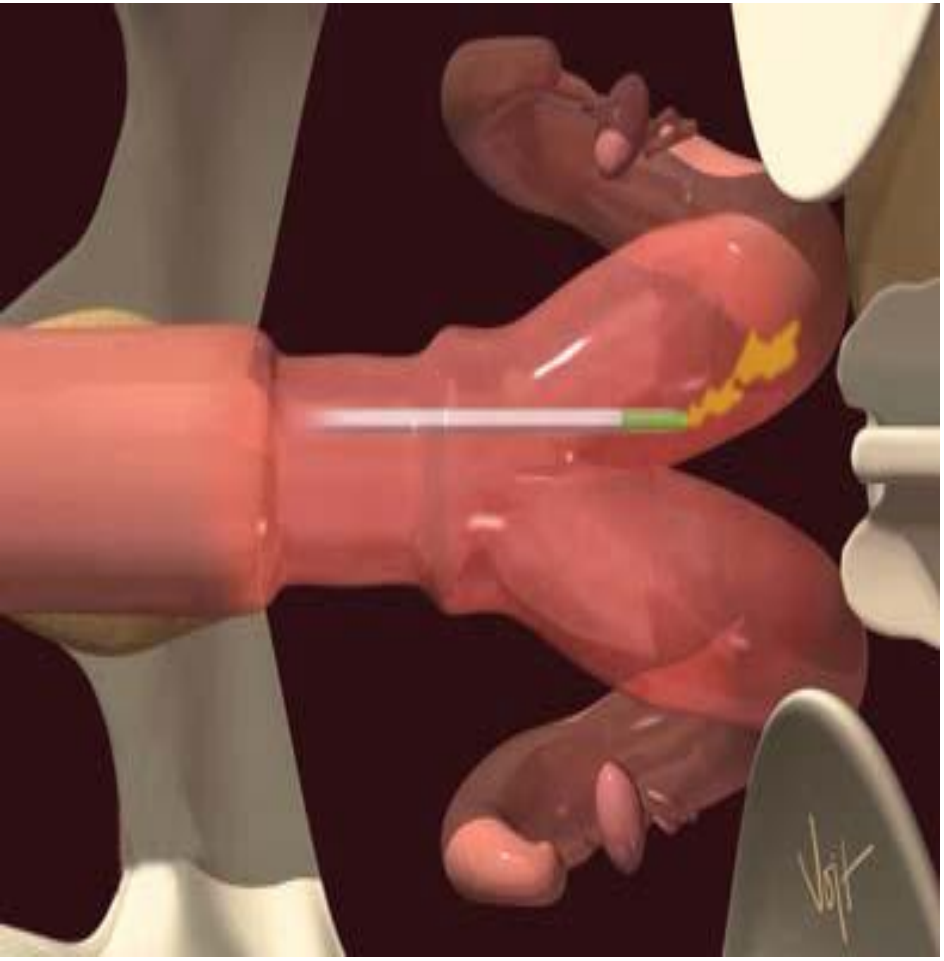


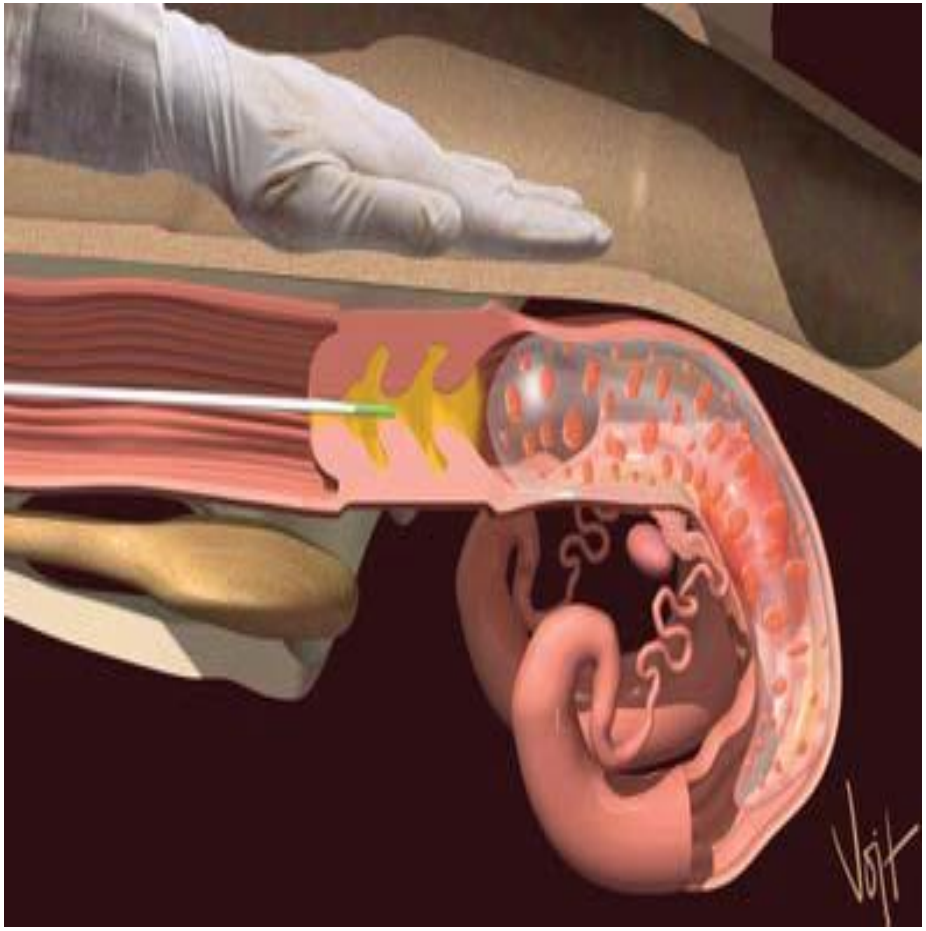
With proper A.I. technique and gun placement, semen will be deposited in the uterine body and contractions will transport spermatozoa forward to the horns and oviducts



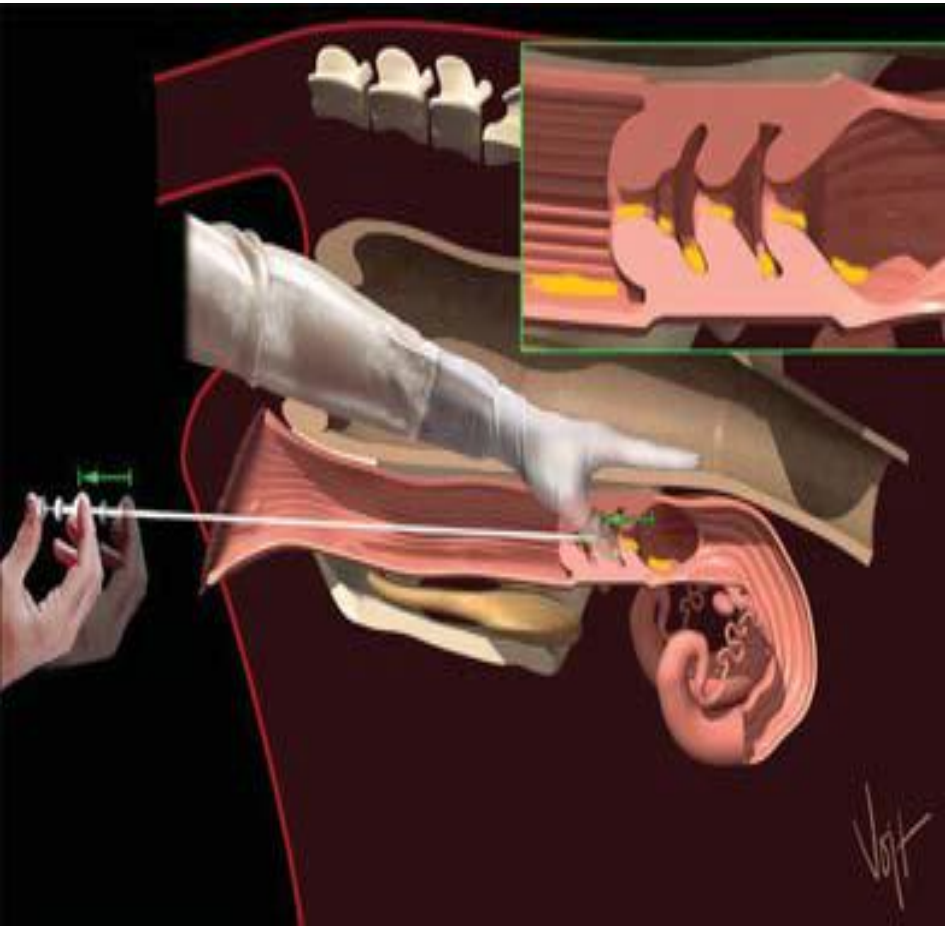
If the gun is more than 1 inch through the cervix, all the semen will be deposited into only one horn.

If you encounter cervical mucous which feels thick and sticky on the gun in a cow that has been previously inseminated, she may be pregnant. In this case, deposit the semen halfway through the cervix





Make sure you push in with the plunger and do not pull back on the gun. Pulling back may result in much of the semen dose being deposited in the cervix and vagina



After 21 days rectal examination this cow after not return to estrous to confirmation pregnancy

Laparoscopic Insemination

- The word laparoscopy originated from the Greek word (Laparo-abdomen or flank, skopein or scorpion-to examine). Laparoscopy is the art of examining the abdominal cavity and its contents using illuminated telescope .
- The advantages of surgical laparoscopy compared with conventional open surgical exploratory laparotomy are very important in veterinary medicine, through improved early recovery due to smaller surgical sites, lower post operative morbidity, lower infection rate , less postoperative pain and the early return to activity .

- Laparoscopy in the veterinary medicine take place a different purposes such as, ovariectomy in goats, **hepatectomy** in goat, cholecystectomy in goats, pregnancy diagnosis in swine, pregnancy diagnosis in dog and cat, ovine and caprine urolithiasis, Cystostomy in goat, laparoscopic studies of ovulation, pregnancy diagnosis in sheep, embryo transfer in sheep, laparoscopic hernioplasty in recumbent horses, removal of ovarian tumors in mares.
- The A.I. by laparoscope effected by The time of estrus and ovulation as well as insemination time, semen quality (fresh, dilution, refrigerated or frozen semen). The LAI equipment and specialized personnel , which would be a restrictive factor to its use only selected herds. Another concern would be in relation to animal welfare .

The complex anatomy of the cervix limits the passage of an inseminating pipette into the cervical canal and causes difficulty with transport of spermatozoa through the cervix. The difficulty of cervical passage can be overcome by direct uterine insemination using laparoscopy. Semen is deposited directly into the uterus through the uterine wall with the aid of a laparoscope. Sedation and local anesthesia are required. Fertility and pregnancy rates are high with either fresh or frozen-thawed semen. A lower number of spermatozoa can be used, typically 40 to 80 million spermatozoa per insemination. Even though there has been a lot of research attempting to improve these AI results following cervical insemination, there are only two general commercial categories that have been used in sheep AI: 1) using refrigerated semen (150C) with superficial intra-cervical insemination and 2) using frozen-thawed semen with laparoscopic insemination.

- **Laparoscopic System:** The Apparatus consist of:
- **Laparoscopic trolley (Cart):** Laparoscopic cart has four drawers and four shelves. These trolley shelves support the laparoscopic system units (Fig.3).

Fig.1: Laparoscopic trolley (A), LCD monitor (B), insufflators (C), Electrocutary (D), camera unit (E), Light source (F), DVD recorder (G) and suction irrigation (H).

- **Video Monitor and DVD Recorder:**
- In the present study an LCD monitor of 32 inches (Fig.1 B) was used. In addition to a rewritable DVD recorder manufactured by Dolty laboratories Inc. (Fig.3 G).
- **Video- Camera System: it consists of**
- **Laparoscopic Camera:** which consists of two parts; the head of the camera (Fig.2,A) which is attached with the eye piece of telescope, and the camera control unit (Fig.2,B). In the present study a single chip camera was used.
- **Light Source:** Xenon nova (175 W) light source (Fig.2,C).

- **Light Cable:** The light cable (Fig. 2,D), is made up of a bundle of optical fiber glass. The light inside these fibers travels on the principle of total internal reflection.

Fig.2: Laparoscopic video-camera system: head of camera(A),camera control unit(B),light source (C), light cable(D).

- **Insufflator Unit:**
- It consist of electronic endoflator or generator, conducting rubber tube (Fig.3 A and B) respectively. In the present study 8-10 mm Hg pressure, flow rate 3.5 liter / minute was depended .

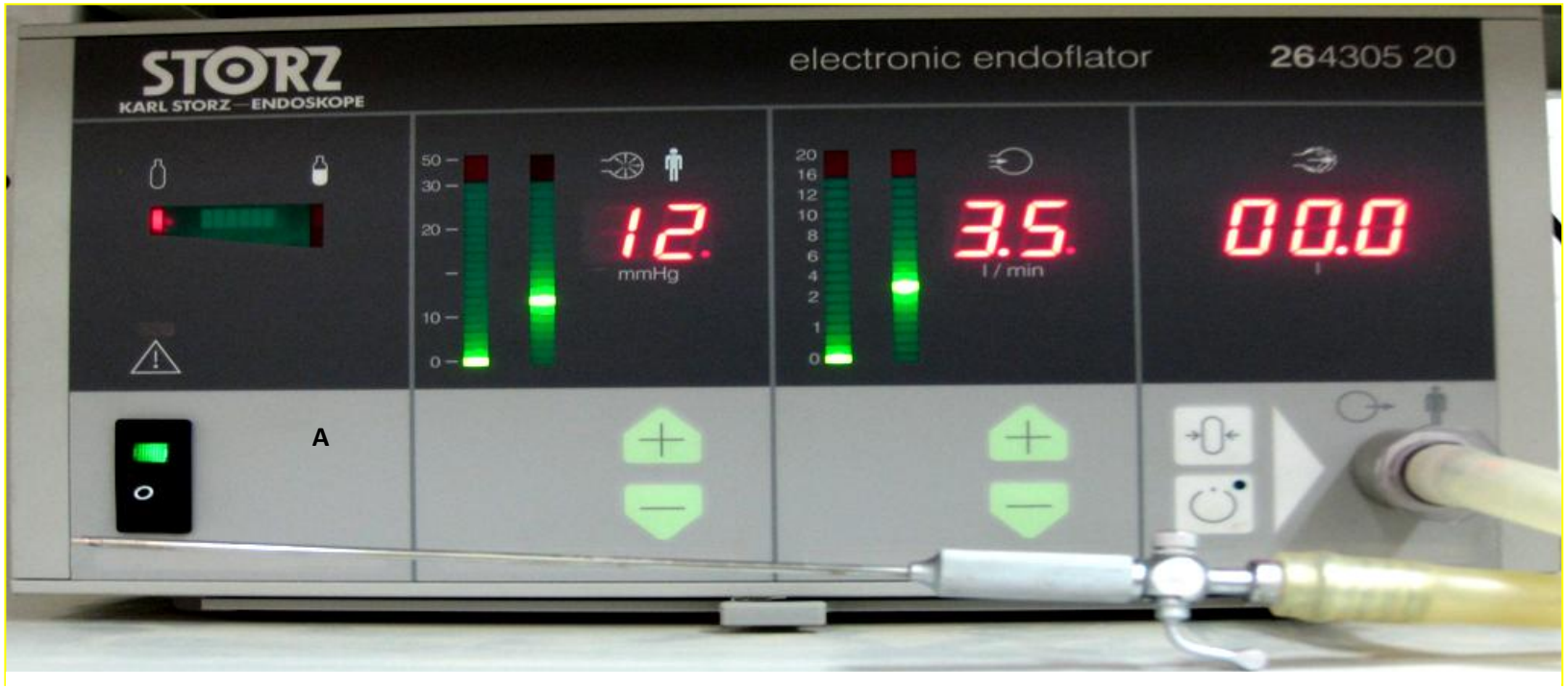


Fig.3: Laparoscopic insufflator unit: electronic endoflator (A), conducting rubber tube (B).

- **Telescope:** Hopkins telescope was used in this study, it was forward oblique telescope 30 degree, 10 mm in diameter and 33 cm in length and it was autoclavable (Fig.4,B).
- **Laparoscopic Instruments:**
- The laparoscopic instruments are the same surgical instruments of traditional surgery, but with some modification for use in laparoscopic surgery. laparoscopic instruments were used in this study, (Fig.4).

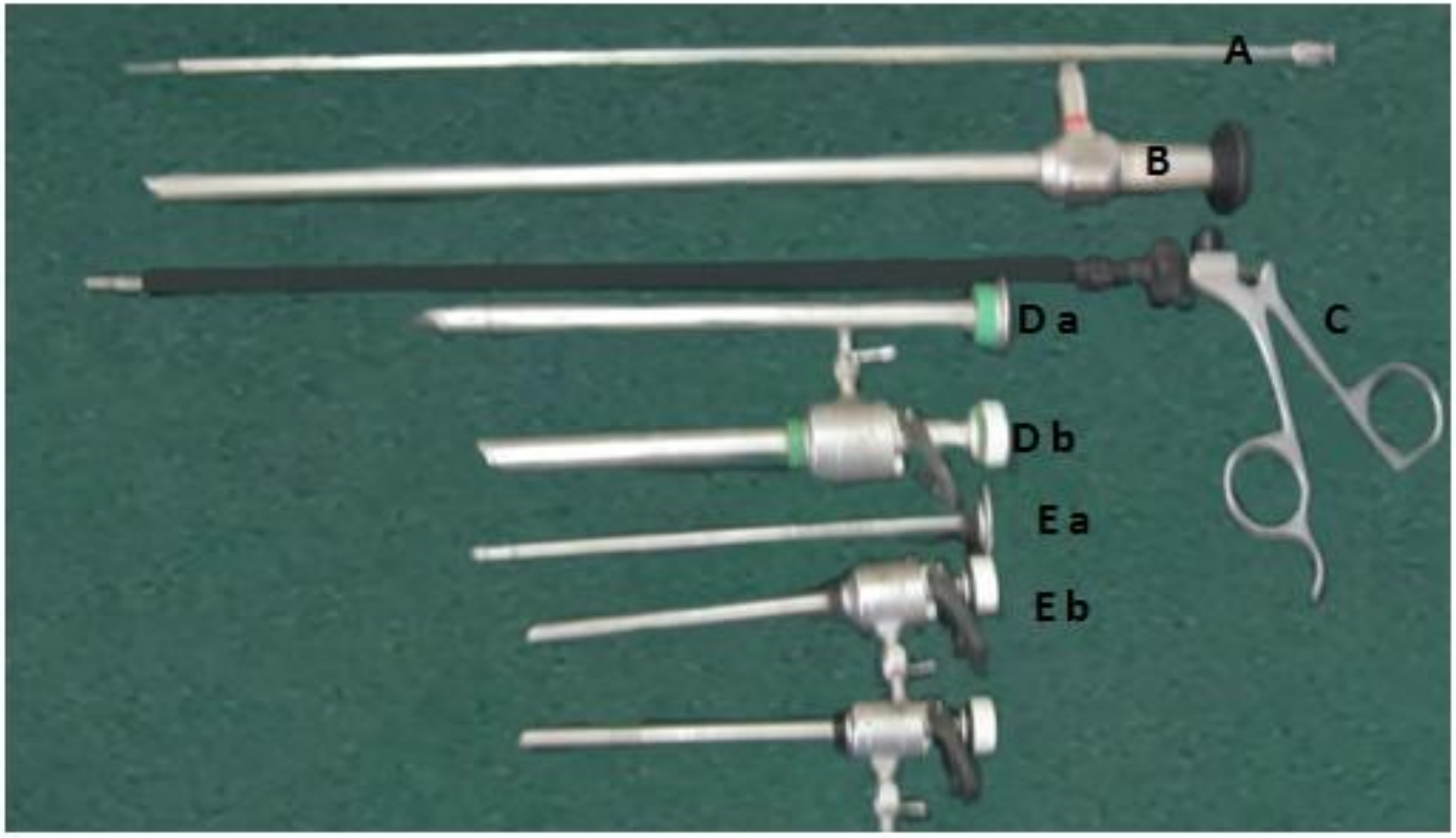


Fig.4: Laparoscopic instruments, A- Needle for insertion of semen, B-Telescope. C-grasper forceps. D (a- trocar and b- canula) port (10 mm). E (a- trocar and b- canula) port (5 mm).

- **laparoscopic insemination**
- Doe was fasted for at least 24 hrs prior to insemination. Ventral abdominal area was prepared aseptically, xylazine hydrochloride 2% at a dose of 0.05 mg / kg. B.W intramuscularly as a sedative and 1ml of 2% lidocaine hydrocholoride, was administered subcutaneously for each three sites. Doe was restrained in dorsal recumbence. One centimeter of skin incisions at the umbilical area was made, the lateral sides of incision was lift by hands and port (10mm) was introduced, then connected with CO2 (conducting rubber tube) to insufflate the abdominal cavity with a pressure of (8-10 mm Hg). Telescope (10mm) was inserted in order to examine of abdominal , and pelvic cavity, specially the uterus and ovary

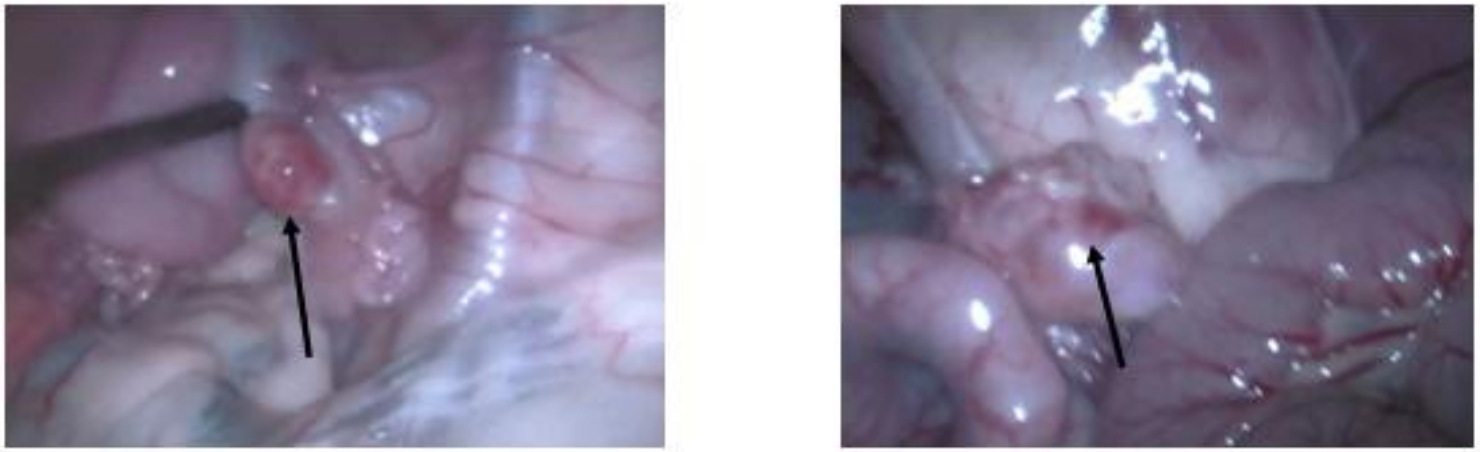
Under vision two ports (5mm) were inserted on left and right of ventral midline, to facilitate of introducing of grasper in left port and inseminated needle on the right port (Fig.5). The position of animals was change which become the tail of doe semi upward and the head down ward as show in (Fig.6).The uterine body was intraluminally inseminated approximately 4 cm cranial to the cornual bifurcation with 100 million sperm (Fig.7). The instruments were removed from the abdomen and incisions closed with simple continuous for closure of muscle and simple interrupted for closure skin. The insemination time by laparoscopic technique was, approximately 20 minute per/animal which was counted from the moment of application of local anesthesia to skin closure.

- **Pregnancy diagnosis**
- All experimental does were checked by male, abdominal palpation, and ultrasound and laparoscopically

Fig.5:laparoscopic shows, Telescope inserted in port (10 mm) (A), Needle for injection of semen in port (5 mm) (B), and grasper for fixe of uterine body port (5 mm) (C).

Fig.6: position of animal during inserted of semen interlay minor of uterus laparoscopically.

Fig. 7: laparoscopically insemination inserted of needle in the doe uterus.



A B

Fig.8: laparoscopic shows multiple follicles during estrous

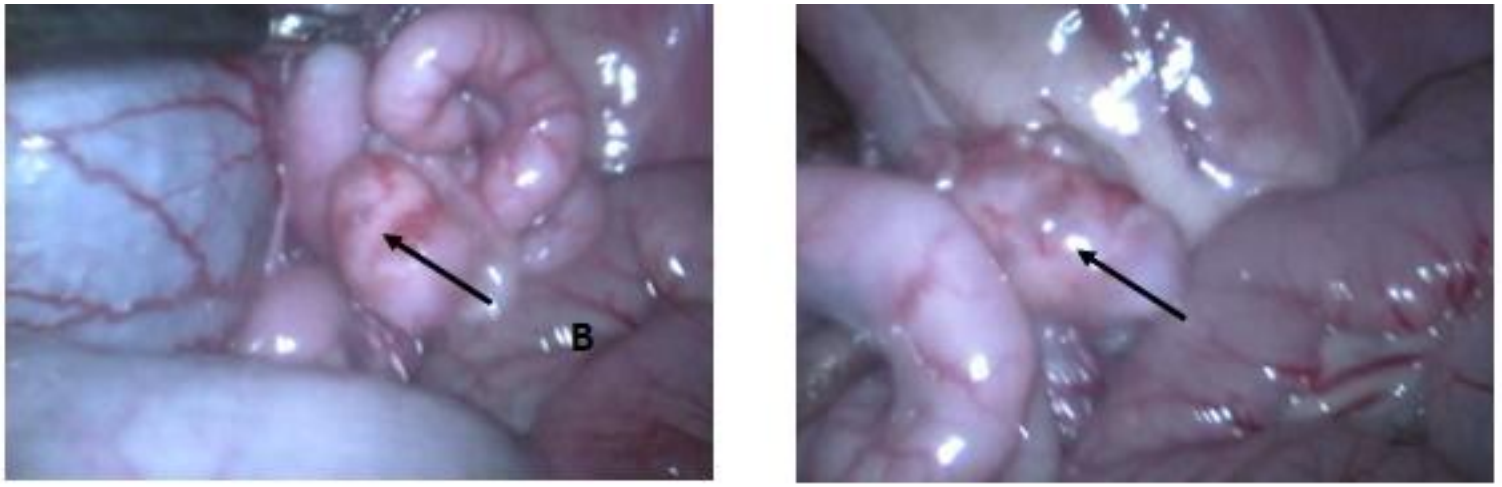


Fig.9: Shows the number of C.L. on right (A) and left (B) ovary

Fig.10: Laparoscopic examination at 30 day post insemination

Fig.11: Laparoscopically non pregnant uterus, the size, color of normal uterus.

THANK YOU