Techniques for Spaying Heifers

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Over the past 80-90 years a number of techniques have evolved for spaying heifers. Such techniques include the following:

1. Flank spaying, lateral recumbency.
2. Flank spaying, standing in a branding chute.
3. Vaginal spaying, using a Kimberling-Rupp (KR) instrument.
4. Vaginal spaying, using a Willis instrument.
5. Flank spaying, using an ovarian auto graft.

Flank Spaying, Lateral Recumbency

For a highly skilled individual this is the most rapid method. For maximum efficiency a large crew is required. The cattle are penned in a holding corral and fed into a roping pen (preferably a round corral). Two or three ropers can be used. The roper catches a heifer by a hind foot (preferably right) and drags her through a gate to the spaying area. While the heifer is dragged she is pulled by the tail and against the rope to throw her into lateral recumbency, left side up, by a team of 2 wrestlers. One of the wrestlers controls the top front leg and the other controls both hind legs. If there are 3 ropers both hind legs can be fastened in the rope and the horse controls the hind legs. For maximum speed the spaying crew includes the following people:

1. A clipper who uses a shearing head on a Stewart Clipper to clip an area in the left paralumbar fossa.
2. A scrubber who washes and scrubs the clipped area.
3. The operator who removes the ovaries. A short (1-1½ inch) incision is made through the skin. The right index finger is used to tear through the abdominal musculature and peritoneum. Only 2 fingers are extended into the peritoneal cavity. The leading edge of the broad ligament of the uterus is used to locate the near ovary which is brought to the surface between the 2 fingers. This ovary is placed between the thumb and forefingers of the left hand. The forefingers of the right hand are reinserted into the peritoneal cavity. They follow down the left horn to the right ovary which is also brought to the surface between the fingers. Considerable strength in the fingers is required for a smooth efficient operation. The right ovary is also placed between the thumb and forefingers of the left hand. They are then cut off with a knife or scissors.
4. The suturer then puts in 1 stitch. A disinfectant powder can be used in the opening before sewing. Wettable furacin powder is a suggested agent.

A minimum crew includes 1 roper, 1 team of wrestlers and an operator. Two people to feed the cattle into the roping corral will help.

The foremost proponent of this method was Dr. Rodney Port of Sundance, Wyoming. Given an efficient crew and set up, Dr. Port could spay more than 60 heifers per hour with this system.

The advantage of the system is speed. Disadvantages include the following:

1. Considerable skill and strength of fingers is necessary unless the whole hand is used to remove the ovaries. If the whole hand is used, more suturing will be required and time expended.
2. Dust can be a problem.
3. Good weather is a must. Rain and/or wind cause significant problems.
4. The position of the operator is relatively uncomfortable.
5. A large and skillful crew is required.

Flank Spaying Standing

Two branding chutes in tandem are required for maximum efficiency. The heifer is restrained in the rear chute first. Here she is clipped and scrubbed. The area of operation is the left paralumbar fossa. Ear implanting, any immunization procedures and/or chemotherapeutic administrations are also applied in the rear chute. When the heifer has been prepared for surgery, she is moved to the forward chute. A hands breadth skin incision is made in the prepared area. The fingers of the left hand are forced through the abdominal musculature into the abdominal cavity. Some experience is required to quickly find the ovaries but this is not a difficult procedure to learn. Minimum contamination occurs if both ovaries are severed before the hand is withdrawn. Various kinds of scissors are used to sever the ovaries. We like a curved blunt-blunt scissors with handles that have been extended by welding on extension pieces to make the total length about 10 inches.

The Use of Ovarian Autografts

There is some evidence that a positive feed conversion effect will result from grafting a small piece of ovary under the ruminal serosa. In this operation the procedure to remove the ovaries is identical to the procedure described above. The graft is small and can be inserted by an alligator forceps or a compudose applicator.

Advantages of the Flank System Standing include the following:

1. The system is easy to learn.
2. The position of the operator is relatively comfortable.
3. The approach is convenient for placing autografts.
4. The incision identifies the heifers.

There are some apparent disadvantages including the following:

1. A larger crew is required relative to vaginal spaying.
2. The system is relatively slow especially if autografts are used.
3. Inclement weather may prohibit the procedure.

Vaginal Spaying

Removing ovaries via the vagina is not a new concept. An old and still commonly used technique in mares is to punch a hole in the vagina above the cervix that will admit 1 hand. The ovaries are retrieved into the vagina where they are severed by an ecraseur. A similar method has been used in adult cows but the ovaries are severed by a tool resembling a cut out spoon. The method has been used to insure that aged cows could graze for a season unencumbered by pregnancy or lactation and thus be well fleshed when it was time for salvage.

In 1978 Kimberling and Rupp at Colorado State University patented an instrument that enables vaginal spaying with a minimum of damage to the vagina. The ovaries are severed in the abdominal cavity. They are manipulated into the cutting portion of the instrument by a hand that has been inserted into the rectum. Essentially the instrument consists of a pipe inside of a pipe. Each pipe has a cut out area. The cutouts can be matched by turning the inside pipe. Special features include the following:

1. A spring loaded trocar end that can be retrieved into the outside pipe.
2. A spring operated plunger that is used to sweep the ovaries forward in the chamber of the inner pipe after they have been severed.

A cut away model of the instrument and the step by step procedure of the operation are demonstrated in figures 1-5.

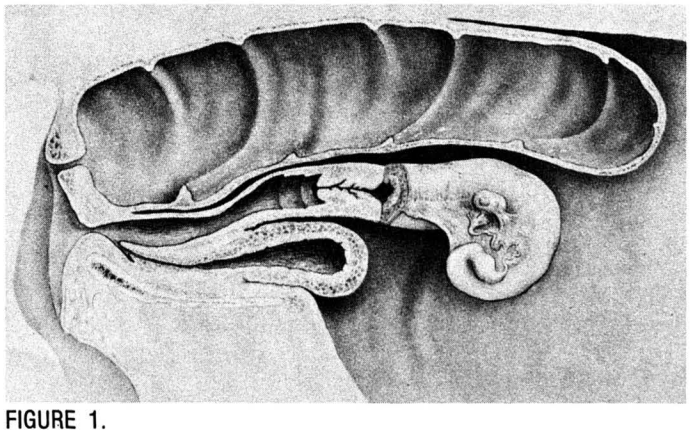


FIGURE 1.

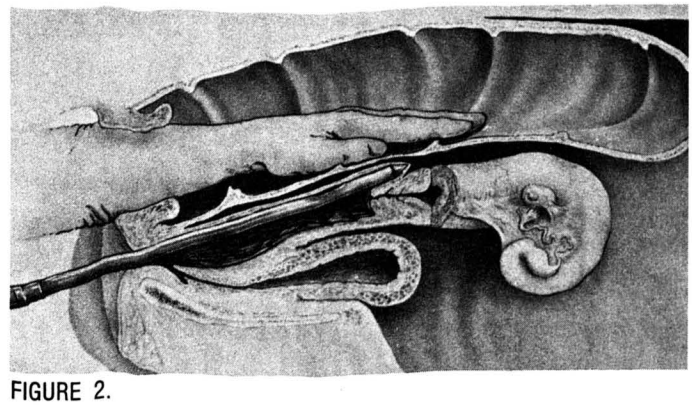


FIGURE 2.

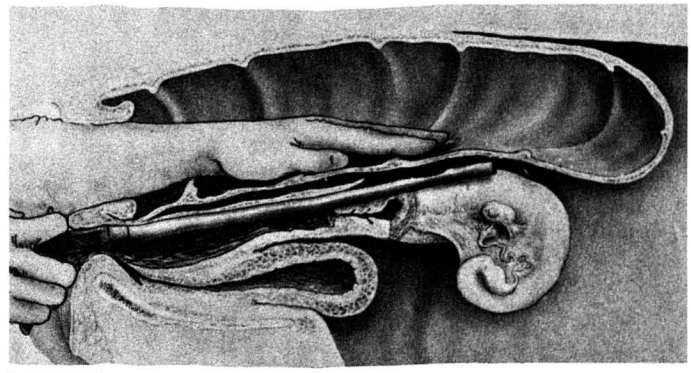
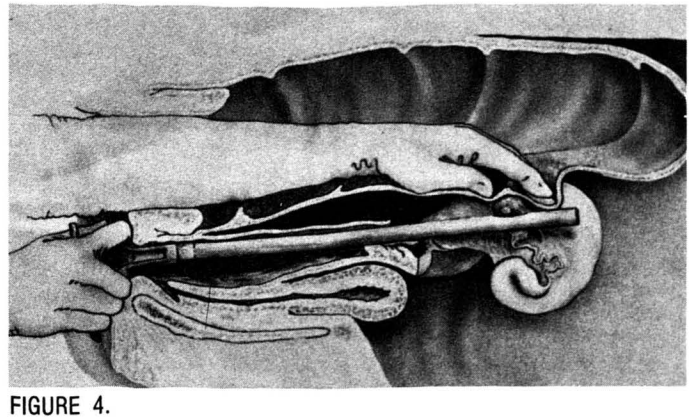


FIGURE 3.



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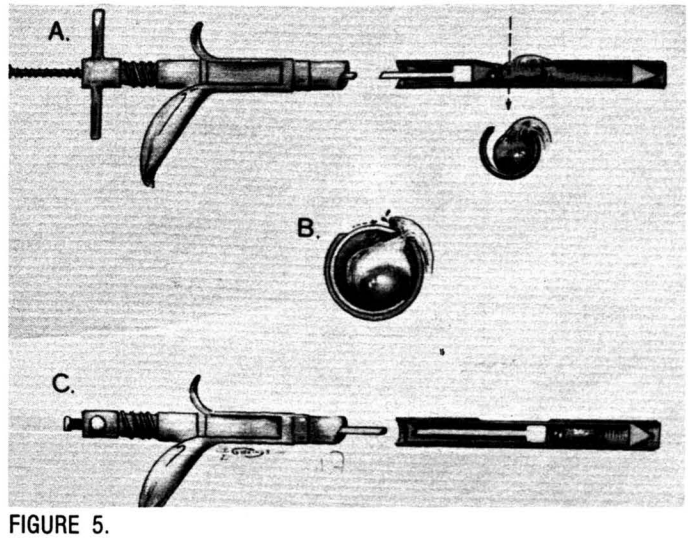

FIGURE 5.

Advantages of the vaginal approach and the K-R instrument include the following:

1. A crew of 4 can work efficiently.
2. Inclement weather is not as limiting as in the flank method.
3. In the hands of a highly skilled operator and crew, up to 40 animals per hour can be processed.
4. If damage is done by cutting the rectal wall or intestines, the cut portions will remain in the instrument. The technician who cleans the instruments between heifers should examine the contents carefully. If there is evidence of damage, repairs can be made.

Disadvantages of the K-R procedure include the following:

1. The technique is difficult to learn and people who have large forearms may not be able to use this technique efficiently.
2. A trained technician is required to clean the instruments and identify the contents after each heifer.
3. The heifers need to be identified. Two common methods include ear tagging and specific branding. Blue ear tags and spade brands are commonly used.
4. The recommended cleaning procedure is somewhat complicated but should not be compromised. The procedure is outlined below:
   a. Water containing a disinfectant (nolvasan or an iodophore) is kept in a pressure tank with a spray nozzle. This is used to clean the area around the vulva.
   b. Three buckets of disinfectant solution are used to clean the instruments between heifers. The ovaries are removed each time and the instrument is rinsed vigorously in each of two solutions and is stored in the third. The use of 2 instruments is recommended. One can be cleaned while the other is being used.

More recently a new vaginal spaying instrument has been designed and patented. It is distributed by Willis Veterinary Supply of Presho, S.D. and is gaining in popularity. The Willis instrument is relatively simple (see Figure 6). It consists of a

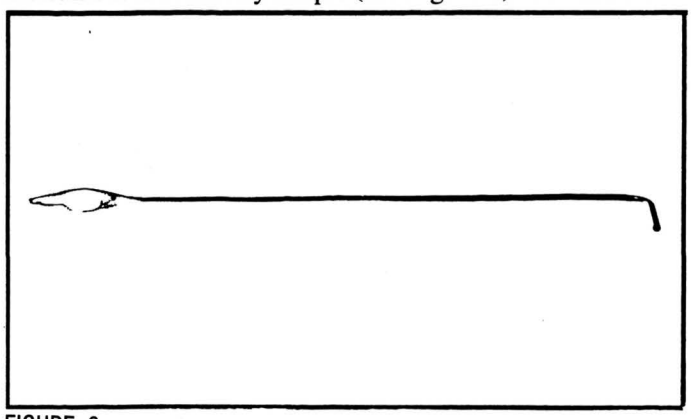

FIGURE 6.

stainless steel rod that is flattened into a spear on one end and bent into a handle on the other. The spear end is hollowed out to admit an ovary. The hollow portion extends forward in a slit that contains a cutting edge. The technique is very similar to K-R technique except that the ovaries are severed by pulling the instrument backwards and are allowed to fall into the peritoneal cavity. Apparently the ovaries are inactivated and do not cause problems in the peritoneal cavity. The cleaning procedures recommended for use of the K-R instrument are also appropriate for use of the Willis instrument.

Advantages of the Willis instrument include the following:

1. All of the advantages of vaginal spaying in general.
2. The instrument is lighter, smaller and easier to clean than is the K-R instrument. It is also less expensive.
3. The instrument is probably easier to learn to use than is the K-R instrument.

Disadvantages:

1. There is some danger of catching a loop of intestine in the cutting portion of the instrument. If this happens there is no way for the operator to know about it and make repair.
2. There is a remote possibility of injuring abdominal organs with the uncovered sharp end of the instrument.

Comparative Results

Four heifer spaying trials were conducted by the University of Nebraska in 1985. Results are summarized below:

TRIAL 1. Hudson, Bohlender, Mactee at North Platte*

Spay Technique	Number	ADG, 115 days on grass
Flank Spay & Ovarian Autograft & Ralgro implant	44	2.26 lbs.
K-R Spay & Ralgro implant	43	2.38 lbs.
Willis Spay & Ralgro implent	44	2.33 lbs.

*No significant difference among treatments.

TRIAL 2. Hudson, Sears, Macfee, Whitman; Gudmundson Sandhills Laboratory — West Central Center.

Spay Technique	Number	ADG 80 days grass	ADG 120 days feedlot	Feed Efficiency feed/gain
Flank Spay & Ovarian Autograft	31	1.55[a]	3.57[a]	5.68[a]
K-R Spay & Ralgro implant	30	1.73[b]	3.98[b]	5.54[a]
Willis Spay, ovaries dropped in body cavity	29	1.45[a]	3.60[a]	5.70[a]

a, b in same column, means they are significantly different (PL .01).

TRIAL 3. Grotelueschin, Rush; Scottsbluff, Nebraska.

Spay Technique	Number	ADG 95 days grass	ADG 174 days grass
Flank Spay & Ovarian Auto-graft & Ralgro implant	27	1.73	1.23
Flank Spay & Autograft	27	1.67	1.17
Flank Spay & Ralgro implant	27	1.75	1.20
Flank Spay	27	1.65	1.15

These data have not been statistically analyzed.

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Abstracts

Efficacy of 1α hydroxyvitamin D_3 in the prevention of bovine parturient paresis

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One hundred and seventeen Israeli-Friesian cows from herds with a milk fever incidence of more than 15 per cent were injected intramuscularly with either 350 μg 1α hydroxyvitamin D_3 ($1\alpha OHD_3$) in propylene glycol or with the vehicle alone, close to calving. If parturition had not occurred within 72 hours a second injection was administered; parturition was induced two days after the second injection if necessary. There were 10 cases of milk fever among 57 control cows as opposed to two cases among the 60 animals treated with $1\alpha OHD_3$. In an attempt to prolong the effect of the drug, Israeli-Friesian cows were injected intramuscularly with 350 μg $1\alpha OHD_3$ in either 10 ml propylene glycol or arachis oil. $1\alpha OHD_3$ in arachis oil did not prolong the effect of the drug. $1\alpha OHD_3$ in propylene glycol increased plasma calcium concentrations more rapidly than when the drug was administered in oil. Additional cows of the same breed and age were injected intramuscularly with 350 μg $1\alpha OHD_3$ in propylene glycol. Five of the animals received a second dose four days, and five received a second dose five days after the first injection. Five animals served as uninjected controls. The plasma calcium levels of the injected cows were significantly higher ($P<0{\cdot}01$) than those of the controls from the second until the 14th day after the first injection. Based on these results 451 Israeli-Friesian cows from herds with a milk fever incidence of more than 15 per cent were injected intramuscularly with $1\alpha OHD_3$ close to calving. If parturition had not occurred up to 100 hours later, a second injection was administered; parturition was induced two days after the second injection if necessary. There were 27 cases (6 per cent) of milk fever among the 451 injected cows. The incidence in 68 animals injected less than one day before calving was 23·5 per cent (16 cows). However, a significantly lower incidence (2·9 per cent, $P<0{\cdot}01$) occurred in the 383 cows which were injected more than one day before calving, with less than four days between the two injections of $1\alpha OHD_3$, and when parturition occurred not more than four days after the last injection of the drug either with or without induction of parturition.

Some effects of water quality on the performance of high yielding cows in an arid climate

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The water from wells in Saudi Arabia is often high in mineral content. The cows in this study had been receiving water containing between 4000 and 5000 ppm total dissolved solids. Four groups of 16 cows were calved down and milked under similar conditions in the hot summer months. Two of the groups were given normal well water and the other two groups received water after desalination in a reverse osmosis plant. One group on each type of water also had their water cooled. The groups of cows receiving treated water drank more water, consumed more concentrate and produced significantly more milk than the groups given normal well water. A similar effect on feed intake and milk production was seen when treated water was given to a 1000-cow unit with a similar number of control cows.