

## Canine Catch-Neuter-Return (CNR) Good Practice Guides

### Surgical approach to bitch spay

**Acts of veterinary surgery should only be performed by qualified, trained and licensed veterinary professionals. This is aimed at qualified and licensed veterinarians only and is not fully comprehensive and does not qualify you to perform surgery.**

#### Learning Outcomes:

1. Understand that acts of veterinary surgery should only be performed by qualified, trained and licensed veterinary professionals.
2. Describe the requirements in preparing the bitch prior to spay surgery.
3. Identify when to use either ventral or flank approach for spaying a bitch.
4. Use Halsted's seven principles of surgery and accurate anatomy identification to ensure no trauma to intestines or ureters during either ovariectomy or ovariohysterectomy.

The bitch must be stabilised under anaesthesia, and had appropriate analgesia and fluid therapy administered. The bitch should have been palpated for pregnancy, had her bladder expressed and the surgical site clipped and aseptically prepared during patient preparation. She should be comfortably positioned on a table, but not tied to the table, in the aseptically prepared surgical area.

The bitch should be positioned in lateral or dorsal recumbency depending on whether the surgeon will perform a lateral or ventral incision. Ventral incisions are recommended for bitches with any signs of pregnancy or complicating conditions such as pyometra, or for larger bitches >15kg. For routine spay surgery in healthy bitches, either approach is acceptable. Flank spays may be more technically challenging in larger dogs, fat dogs or those with reproductive pathology due to the limited field of vision. However, they provide the benefit of being able to easily assess the incision post-operatively and offer a reduced risk of catastrophic wound breakdown in the event of infection.

A sterile fenestrated drape should cover the aseptically prepared surgical site and a sterile surgical kit opened in such a way so as to maintain sterility. The depth of anaesthesia should be checked prior to commencing surgery. Count any gauze swabs to be used prior to the start of surgery.

#### Incision and approach

The incision should be made boldly with a single scalpel stroke to minimise tissue trauma and post-operative infection. Apply downwards pressure with the rounded sharp edge of the blade in one single smooth incision, extending the incision 4-8 cm.



Initial incision being made

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It must be long enough to complete the surgery safely, larger incisions make it easier, and if inexperienced do not worry about making an incision too big as incisions will heal across, and so larger incisions heal in the same time as smaller incisions.

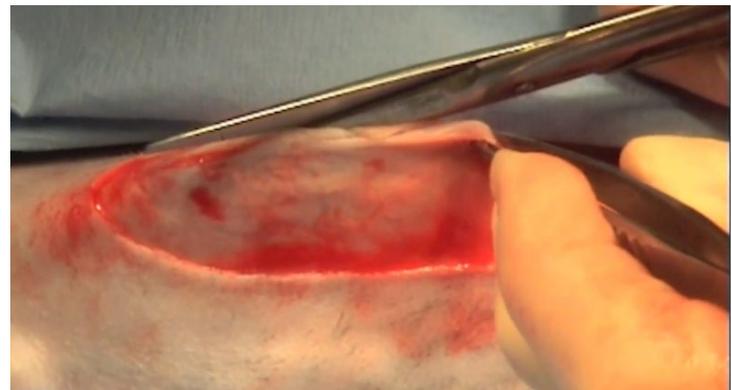
For the ventral approach the incision should start at or just caudal to the umbilicus, stay in midline and extend caudally. If using a spay hook, you may be able to make quite a small incision. Don't interfere with the subcutaneous tissue or undermine the skin unless necessary – this increases the risk of seroma formation in the dead space.

Lift the linea alba using rat toothed forceps lifting up and away from the underlying viscera, and using the point of the scalpel blade reversed, make a stab incision slightly below the highest point of the tent and move the blade upwards to make the incision



Cutting the linea alba using the point of the scalpel reversed

Use straight mayo scissors to extend the incision, one blade in right underneath the linea alba, ensuring no organs between scissor blade and linea alba, or tent up the linea alba with open forceps underneath, and then use a scalpel to complete the incision. Do not make the linea alba incision longer than the skin incision as this will make it difficult to close.



Extending the linea alba incision using straight mayo scissors

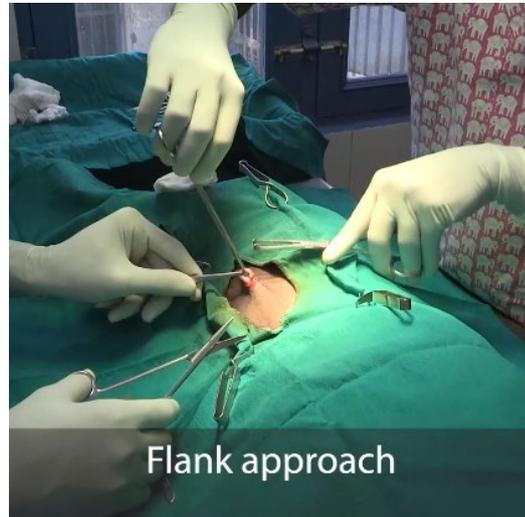


Linea alba being raised with forceps to continue excision with scalpel

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For the flank approach position the bitch on the operating table in left lateral recumbency. A cranio-caudal incision is made at a position ventral to the iliac crest, and at the level of the fold of skin connecting the stifle to the abdominal wall. In young dogs, the incision may be placed slightly more caudally. Use blunt dissection to expose the external abdominal oblique muscle and slip along its fibres.

Use the same technique to split the internal abdominal oblique and then elevate the rectus abdominus and carefully dissect through taking care not to damage any internal organs when entering the peritoneum.



Splitting the internal abdominal oblique muscle in the flank spay approach

### Bitch spay triple clamp technique

Once in the abdominal cavity, use a spay hook or your fingers to locate the uterine horn. For flank spays or those with a very small incision, spay hooks may be preferred. Follow the uterine horn to the ovary and to the bifurcation to ensure correct anatomy.

The uterus has a different blood vessel structure to intestines and is paler and firmer than the intestines.



Uterine horn in the upper part of the photograph and intestines in the lower part. Note the colour difference.

Locate the ovary sitting within the bursa. Pull caudally on the suspensory ligament and use a finger to apply gentle pressure to break the connection to the ovary, be careful not to rupture the ovarian blood vessels which are located below the ligament. This is more likely if you pull up than if you pull caudally.

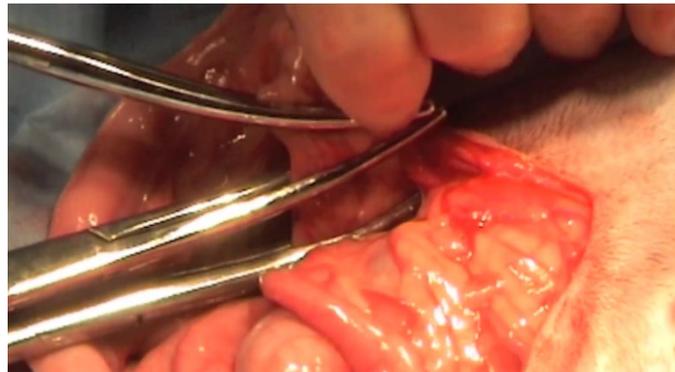


Ovary sitting within the bursa

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Always apply tension in a caudal direction, not in an upwards motion to minimise the risk of rupturing the entire pedicle. Breaking down suspensory ligament allows for better visualisation, less tissue to include in ligatures, and prevents damage to the ureters which run very closely to this. Handling the ovaries and manipulating the ovarian pedicles is painful and can stimulate an animal if the plane of anaesthetic is too light, so notify your anaesthetic monitoring assistant regarding what you are doing to ensure he/she can closely monitor the dog's reaction and adjust anaesthetic depth accordingly/give more analgesia.

The ovarian pedicles should be ligated using the triple clamp technique. Bluntly dissect through the broad ligament away from ovarian vessels and place one haemostat proximal to the body down the ovarian pedicle. Place the second haemostat further towards the ovary and then the third haemostat between the middle clamp and the ovary taking care that no ovarian tissue or any other abdominal viscera or fat is entrapped in the haemostats. The triple clamp technique provides multiple points of security and haemostasis to prevent haemorrhage of the ovarian pedicle.



Ovarian pedicle triple clamp technique

Place an encircling ligature around the pedicle in the crush line of the proximal haemostat and tie with a surgeon's square or slip knot then place a transfixing ligature between this ligature and middle haemostat ensuring that it does not overlap the first ligature and again tighten it into the crush of the middle haemostat. Be careful that the distal haemostats do not stretch out the pedicle and prevent tightening of the ligature. This can be avoided by adjusting the distal haemostat. Use an appropriate sterile, absorbable suture material and if transfixing, use swaged-on suture with a round-bodied needle to prevent inadvertently nicking the ovarian vessels. Ensure that an appropriate number of throws are placed: 6-8 throws (3-4 knots) for monofilament suture and 4-6 throws (2-3 knots) for multifilament suture. The crush line created by the middle haemostat also acts as haemostasis.

For the transfixing ligature, place the needle through the middle of the ovarian pedicle, place a single surgeon's throw, then pass through the hole in the broad ligament around the pedicle and do another single surgeon's throw, and then 3 single throws to complete the knot. The suture ends do not need to be long.



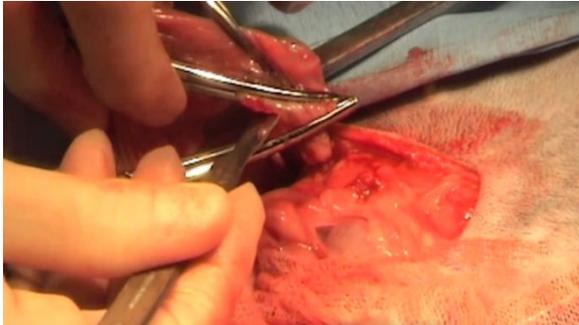
Placing a transfixing ligature on the ovarian pedicle

For an encircling or circumferential ligature- pass the suture material through the window in the broad ligament, pass it under and around the proximal haemostat, surgeon's throw, then release the

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proximal haemostat and put a suture into the crush line, apply pressure with fingers, and hand tie with 3 throws to finish.

Incise between the middle and distal haemostats to release the ovary



Incising between the middle and distal haemostat on the ovarian pedicle to release the ovary.

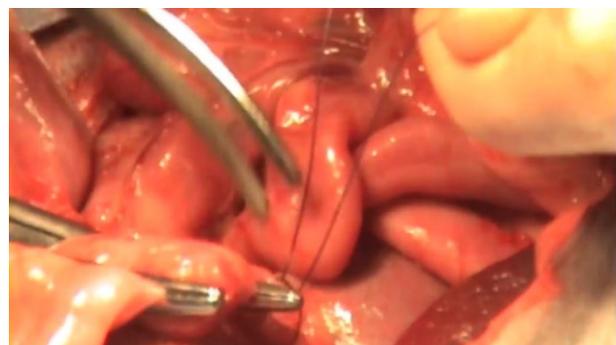


Incising between the middle and distal haemostat on the ovarian pedicle to release the ovary

If no oozing or bleeding is noted, then but grasp the pedicle with rat tooth forceps and then gently release the pedicle and watch the pedicle retract back into the abdomen.

The modified triple clamp technique may also be used where the last clamp is placed on the proper ligament connecting the ovary to the uterine horn, if there is limited space or access to the ovarian pedicle.

In this technique the ligatures are placed in the crushed tissue where the proximal clamp is removed, and once the ovarian pedicle is adequately ligated as already described, the pedicle is transected between the middle clamp and the ovary.



Ligature being placed in the crushed tissue on the ovarian pedicle.

When using this technique, the third clamp is not there to act as a barrier to the ovary and so care must be taken to ensure that no ovarian tissue is accidentally transected and left in the pedicle.

Break down the suspensory ligament and pull the ovary upwards to prevent damage to the ureters which run very closely to this. Locate the second ovary and repeat this technique for the other side.

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If performing an ovariohysterectomy, once both ovarian pedicles are ligated, retract the excised ovaries and uterine horns caudally, and bluntly dissect the broad ligament to the cervix.



Uterine horns retracted caudally after both ovarian pedicles have been ligated and transected

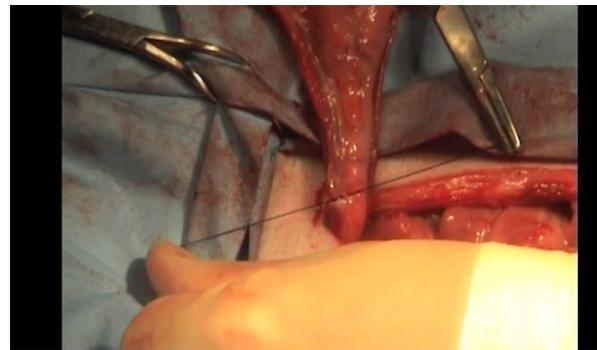
In bigger dogs, or dogs in heat or if the broad ligament is very fatty and vascular, the broad ligament blood vessels should be ligated to avoid prolonged oozing or haemorrhage.

When performing an ovariohysterectomy, leave a small portion of uterine body, and transect the distal portion of the female reproductive tract above the cervix. Because the ureters run very close to the cervix, placing the ligature slightly higher minimises the risk of ureteral trauma.

Place at least one transfixing ligature close to the cervix through the uterine body avoiding the uterine vessels. Either place another transfixing ligature or a circumferential ligature slightly above the previous in the uterine body.

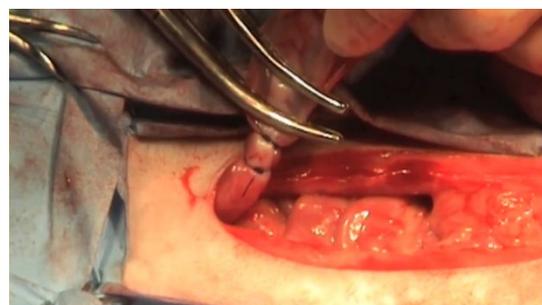


A transfixing suture being placed through the uterine body.



Tightening the knot on a uterine body transfixing suture.

Then place 2 haemostats above these two sutures to form a crush to add to the haemostasis and reduce risk of contamination into the abdomen.



Incising between the 2 haemostats above the uterine body transfixing sutures.

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Then cut between these haemostats. In total around 95% of the uterus should be removed.



Incising between the 2 haemostats above the uterine body transfixing sutures.

Uterine remnants or ovariectomy alone is not a problem as long as all ovarian tissue is removed. Check the cervical stump by holding onto the non-ligature portion with plain forceps, release clamp, check for haemorrhage, then release the cervical stump watching it retract back into the abdomen.

Visually inspect all pedicles. Drag intestinal tract cranially using fingers, then drag laterally to review each ovarian pedicle. If you have enough space to neuter the dog, you have enough space to check the pedicles. You are as likely to get bleeding from uterine stump as the pedicle stumps. Open the ovarian bursa and check for complete ovary removal. Ensure to count the gauze swabs in the surgical kit before and after surgery, to ensure none are left inside the dog.

### Abdominal and skin closure

Close the abdomen (linea alba) or flank using a long lasting, absorbable or non-absorbable suture material e.g. PDS. Do not use short acting suture material such as monocril or cat gut. Simple continuous or simple interrupted suture patterns should be used. A simple interrupted pattern ensures that if one suture dislodges, the other sutures will continue to keep the abdomen closed. However, a simple interrupted pattern means there will be more knots and a potential for more suture reactions. A simple continuous pattern is a bit quicker to place, but if a portion of suture breaks, then the whole incision can open up.

Start simple continuous with 4-6 knots to make it secure, ensuring flat square knots.

Ensure you take good bites of the tissue, do not include fat in your sutures but take a bite of fascia with each suture. Ensure that the tissues are gently apposed but do not crush together as this increases the risks of wound breakdown and post-operative pain.



Closing the linea alba with a simple continuous suture pattern

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Subcutaneous tissue sutures are placed to close dead space. Subcutaneous tissue can be closed with a simple continuous pattern using absorbable suture material.



Closing the subcutaneous layer with a simple continuous suture pattern.

Skin should be closed using a buried, continuous subcuticular or intradermal pattern with absorbable suture material ensuring accurate apposition of skin. This pattern reduces scarring and also alleviates the need to remove sutures at a later date and also reduces dogs chewing at their incisions and dislodging sutures. Use a cutting needle to minimise tissue trauma as the subcutis is very fibrous tissue.

Bury the starting knot, deep to superficial on one side then superficial to deep with the loop sitting on top of the knot and knot underneath so no suture is poking through the skin which could draw infection into the incision. Tie parallel to the wound for good apposition of the knot in the deeper structures. 4-5 knots, shouldn't be taking much tension. Cut the loop very short.



Burying the knot and cutting the loop very short before placing simple continuous intradermal sutures to close the skin.

Suture just below skin edge running parallel to the skin surface. This ensures good apposition of skin edges. Ensure to not come through the skin as this will create a path for infection to enter.



Placing simple continuous intradermal sutures to close the skin.

At the end of the incision, again bury the knot. Come to the very end of the wound, start on the same side you have just come out and go deep to superficial, then superficial to deep. This leaves you with the loop and the end to tie together. Tie a normal knot ensuring even tension on both

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strands using needle holders in the middle of the loop. Cut the loop close to the knot for very short ends.

Then insert the single strand back through the incision and come out a small distance away from the incision through the skin, check that the knot has been buried and then cut at skin surface.



Inserting the suture material a small distance away from the incision through the skin in order to bury it



Preparing to cut the buried suture material very short so flush with the skin.

### Pyometra

Females can develop infections of the uterus, called pyometra. Pyometra is a life-threatening condition during which animals often become very ill and must be treated aggressively and monitored very closely to prevent septicaemia, uterine rupture and death. Patients must be stabilised, and surgery performed as soon as possible.



An infected uterus filled with pus.

The surgical approach is similar to the standard ovariohysterectomy, the difference being the uterus will be distended to variable degrees due to an accumulation of pus and the tissue may be very friable, gentle handling is therefore very important.

The abdomen should be evaluated for signs of free fluid or peritonitis in case the reproductive tract has ruptured. Ensure that the uterus is transected/removed at the level of the cervix. Lavage the vaginal stump to clean away any infected debris. Prior to transecting the uterus, pack sterile laparotomy swabs around the reproductive tract in case any infected material leaks out, so it does not enter the abdominal cavity. Remove laparotomy swabs and change any contaminated surgical instruments, gloves and drapes to minimise contamination of the abdomen. Count all laparotomy swabs pre-operatively and prior to closing the abdomen, and recount to ensure all swabs are accounted for and that none are left within the abdomen.



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Pyometra patients require aggressive fluid therapy, antibiotic treatment, analgesia and monitoring. Surgery is the **ONLY** therapy for pyometra that will provide long-term success. Antibiotics are a necessary part of therapy but will not cure pyometra alone. Pyometra is 100% preventable by early neutering of reproductively active bitches.

### Checklist:

- ✓ Acts of veterinary surgery should only be performed by qualified, trained and licensed veterinary professionals
- ✓ Ventral incisions are recommended for bitches with any signs of pregnancy or complicating conditions such as pyometra
- ✓ For routine spay surgery in healthy bitches, either ventral or flank approach is acceptable
- ✓ The ovarian pedicles should be ligated using the triple clamp technique or the modified triple clamp technique
- ✓ Leave a small portion of uterine body, transecting above the cervix to minimise the risk of ureteral trauma.
- ✓ Uterine remnants or ovariectomy alone is not a problem as long as all ovarian tissue is removed
- ✓ Check for bleeding from both uterine stump and ovarian pedicle stumps prior to closing

### References:

Fossum, T. W. (2013). *Small Animal Surgery Textbook* - E-Book, Elsevier Health Sciences.

Reece, J. F., et al. (2012). "Description and evaluation of a right flank, mini-laparotomy approach to canine ovariohysterectomy." *Veterinary Record* 171(10): 248.