

# **How-To Booklet: Pediatric Spay-Neuter**

## **Surgical Techniques Pictorial**

**Brenda Griffin, DVM, MS, DACVIM**



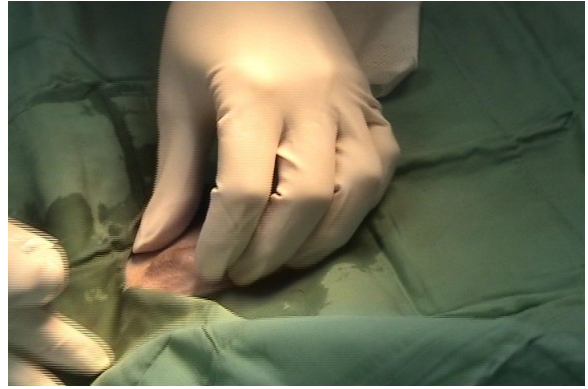
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*Acknowledgements: Drs. Karla Brestle, Mark Bohling, Brian DiGangi and Tracy Land*

## Approach to the Scrotal Neuter for Puppies



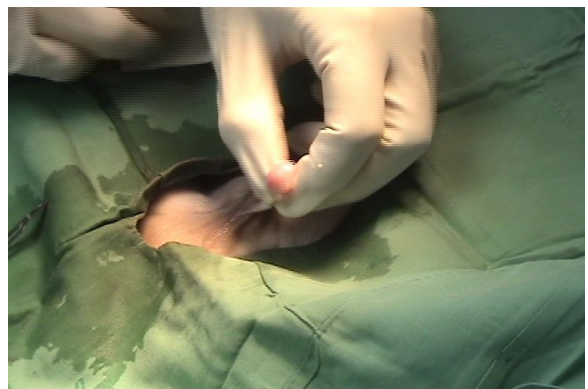
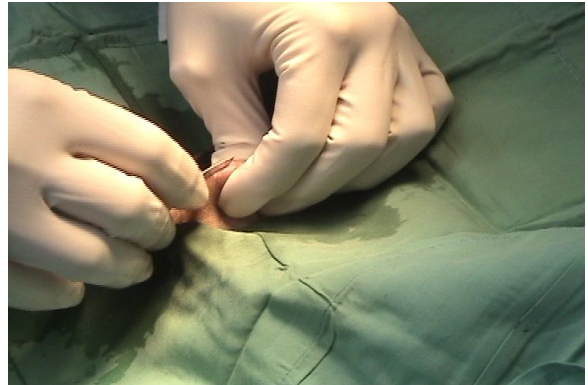
Surgical field. Note the entire scrotum has been clipped and prepped for surgery.



The surgeon grasps one testicle, positioning it such that the median raphe is elevated and exposed.



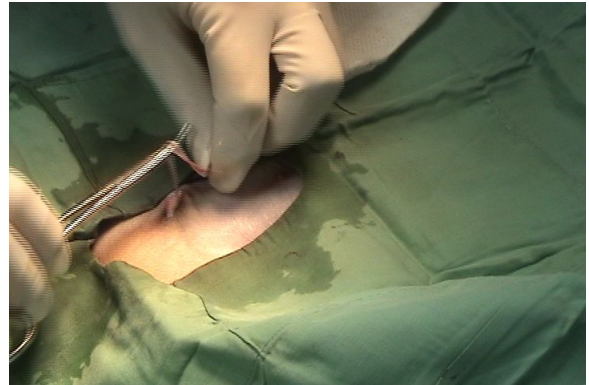
The incision is made on the median raphe. Both testicles will ultimately be removed through this same incision centrally located in the scrotum. This approach may be used in both pediatric puppy and feline castrations.



The testicle is exteriorized using gentle traction.



The cord is stripped of any excess tissue or fat. Open or closed technique may be used according to surgeon's preference.



A cord tie or Figure 8 knot is used to ligate the spermatic cord according to surgeon's preference. For puppies, the general rule of thumb for determining if the cord can be ligated using one of these techniques is as follows: if the scrotum is not pendulous and the testicular size is no larger than that of a mature tomcat, then these techniques are appropriate. For larger testicles, suture is recommended for ligation.

The procedure is repeated for the second testicle and the wound is left open to heal by second intention.



## Cord Tie

Once the cord has been isolated, the tip of the hemostat is passed under (ventrally) and around the cord as shown below. The jaws of the hemostat are then opened as the distal (testicle) end of the cord is advanced around and up into them and clamped. Next, the cord is divided between the clamp and testicle (close to the clamp) using a scalpel blade or scissors. Following removal of the testicle, the surgeon pushes the knot off of the tip of the hemostats. The knot is tightened to ensure its security as the surgeon applies gentle proximal pressure to it. If necessary, excess cord may be trimmed but it is important to leave approximately 5 mm distal to the knot to ensure that it does not unravel. Inspect for bleeding before releasing.







## Figure 8 Knot

The figure-8 knot is a modification of the more common cord tie knot. The additional pass through the knot increases friction within the knot; this leads to increased security against untying when the knot is used for the cord tie for feline or pediatric puppy castration. The technique for tying the figure-8 knot using the hemostat requires only one simple modification to the cord tie. The surgeon holds the testis in the non-dominant hand and wraps the spermatic cord around the hemostat once, then proceeds to perform the cord tie as usual.

Place the hemostat on top of the cord. Wrap the distal (testicle) end of the cord over the hemostat once. Direct the cord-wrapped hemostat ventral to the cord, passing it under and around as shown below. The jaws of the hemostat are then opened as the distal (testicle) end of the cord is advanced around and up into them and clamped. Next, the cord is divided between the clamp and testicle (close to the clamp) using a scalpel blade or scissors. Following removal of the testicle, the surgeon pushes the knot off of the tip of the hemostats. The knot is tightened to ensure its security as the surgeon applies gentle proximal pressure to it. If necessary, excess cord may be trimmed but it is important to leave approximately 5 mm distal to the knot to ensure that it does not unravel. Inspect for bleeding before releasing.



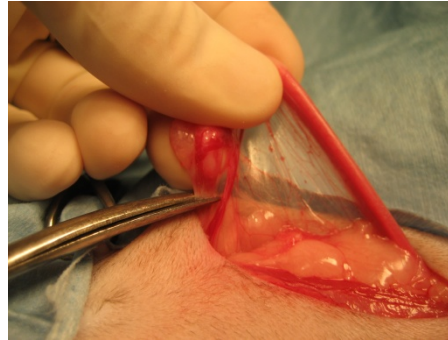




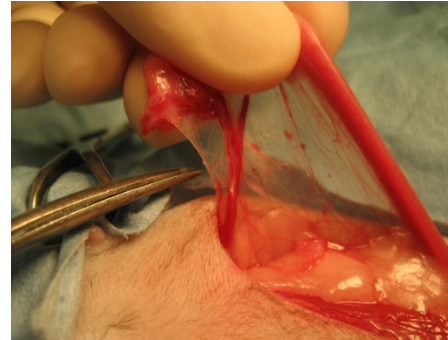
## Ovarian Pedicle Tie – Cats ONLY



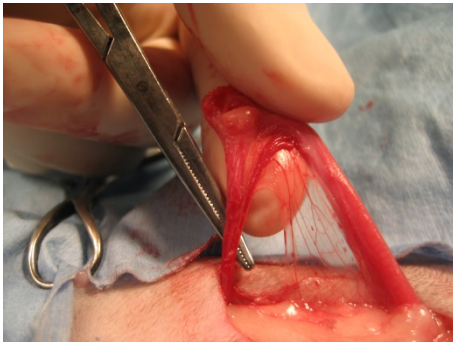
The ovary is retracted into the incision and the suspensory ligament and ovarian artery are identified.



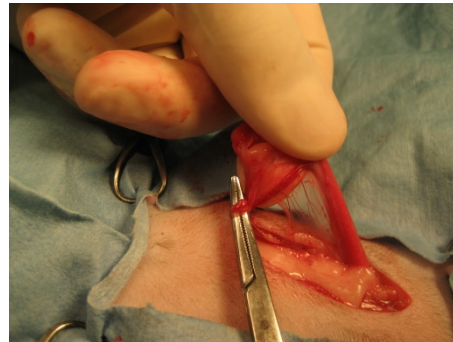
The suspensory ligament is sharply divided as close to the ovarian pedicle as possible.



An aperture is created in the broad ligament adjacent to the ovary.



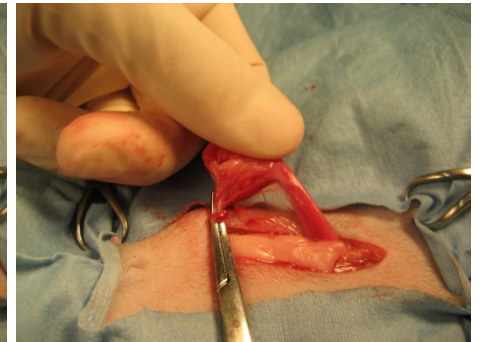
The pedicle is now isolated and ready for ligation. The hemostat is held in the closed position with the jaws pointing towards the surgeon; it is passed through the aperture in the broad ligament and behind the pedicle.



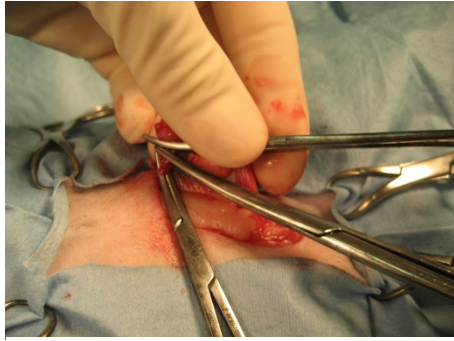
The tip of the hemostat is directed over the near side of the pedicle and the entire instrument is turned 180 degrees.



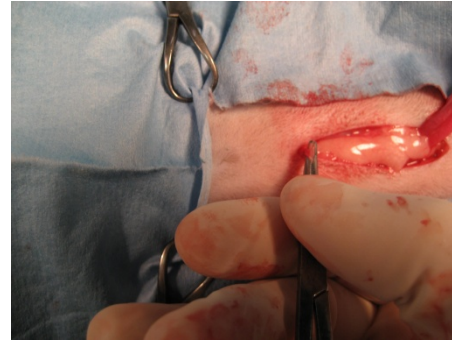
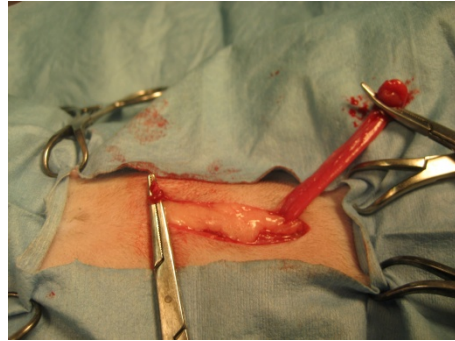
The pedicle is loosely clamped with the tips of the hemostats.



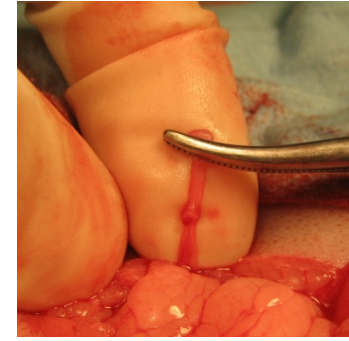




The pedicle is divided between the ovary and the hemostat and the ovary and uterus are laid down to one side of the surgery field. Note the placement of the additional hemostat just proximal to the ovary to prevent bleeding following division from the pedicle.



The hemostat is clamped completely shut and the surgeon pushes the knot off the tip of the hemostat.

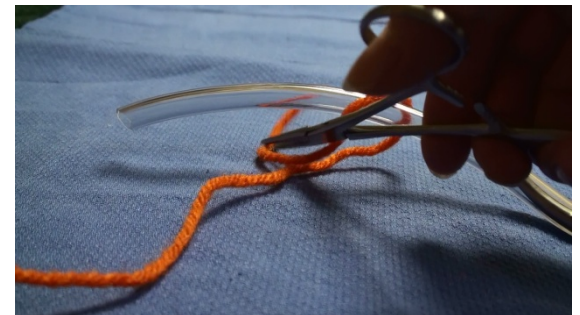
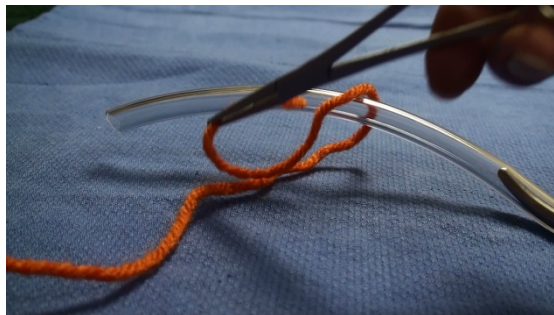
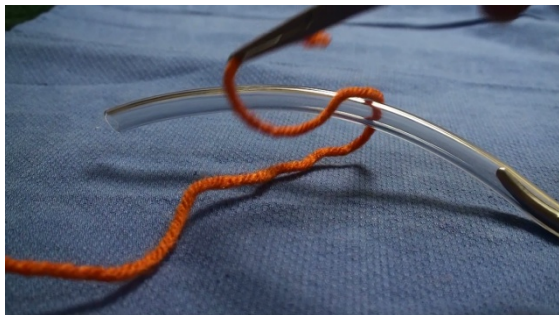
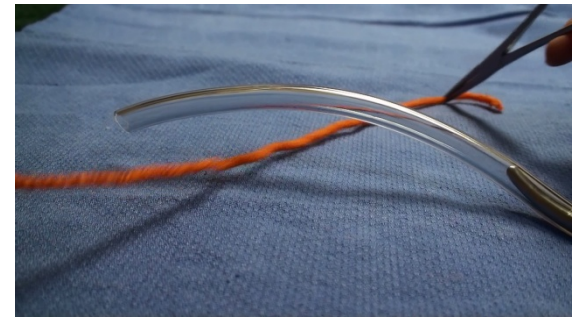
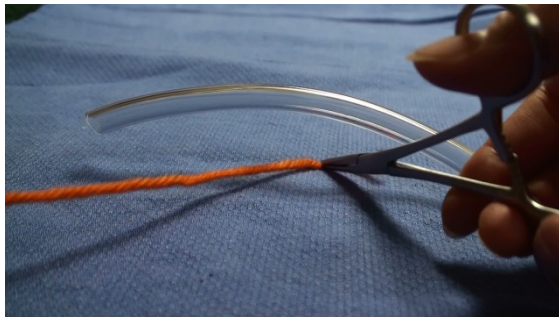


The knot is manually tightened and the pedicle inspected for hemorrhage.

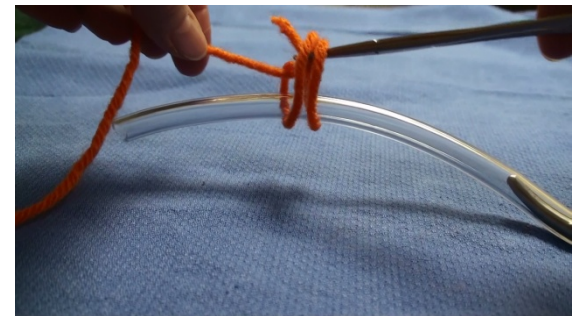
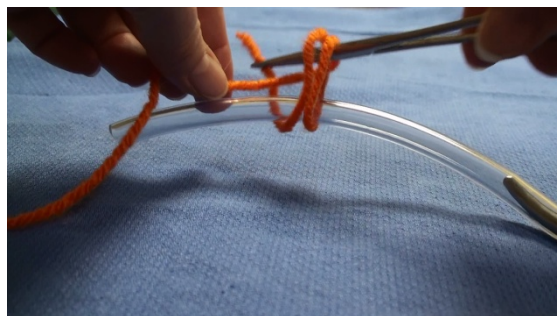
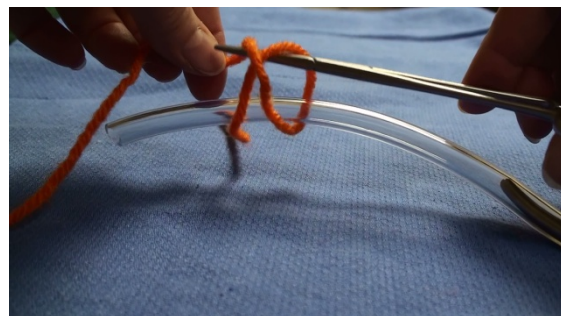
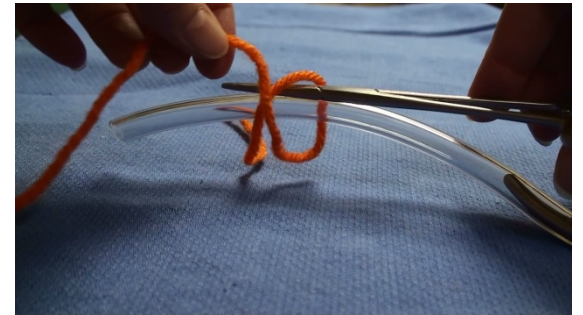
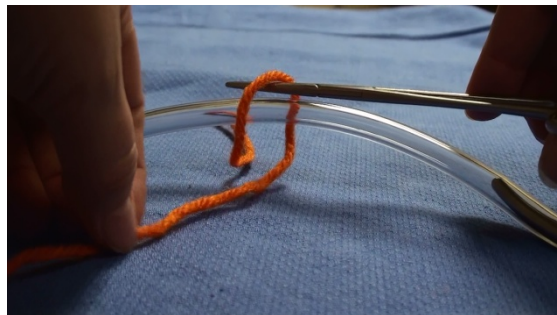
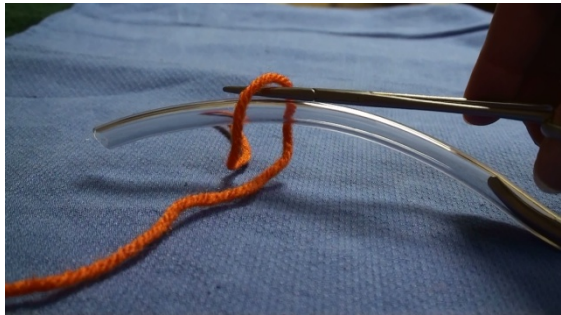
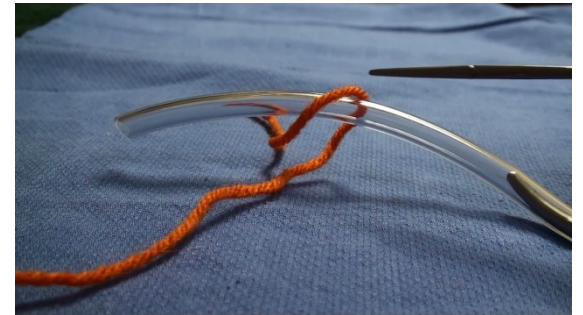
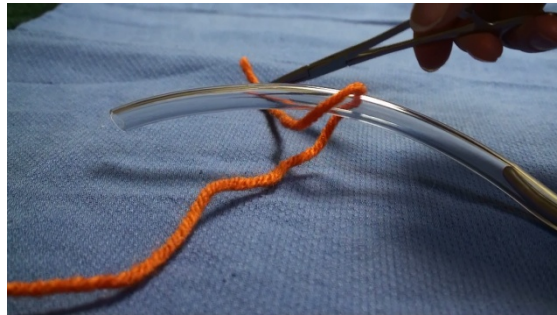
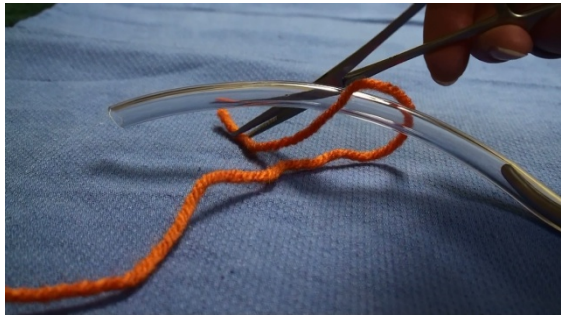
## Modified Miller's Knot

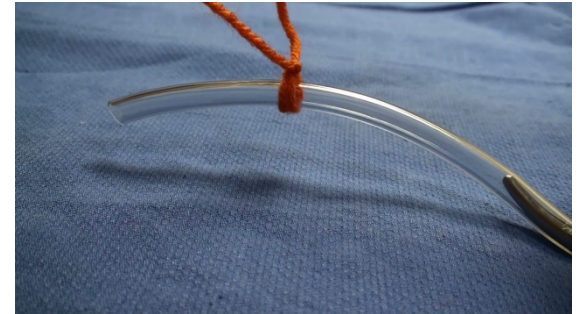
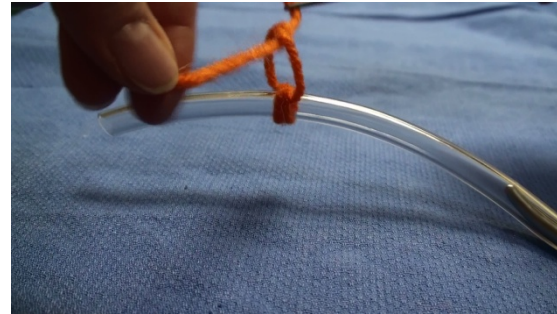
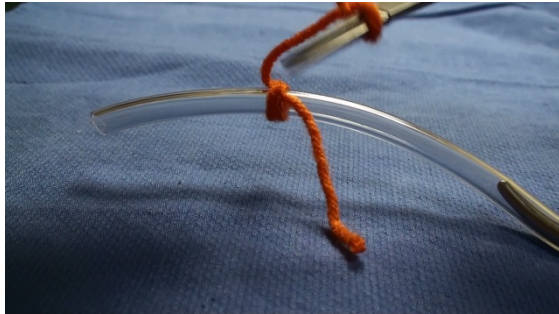
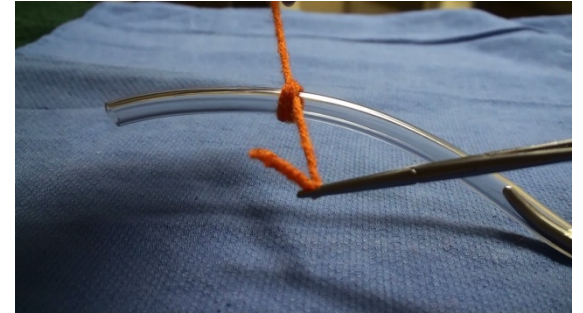
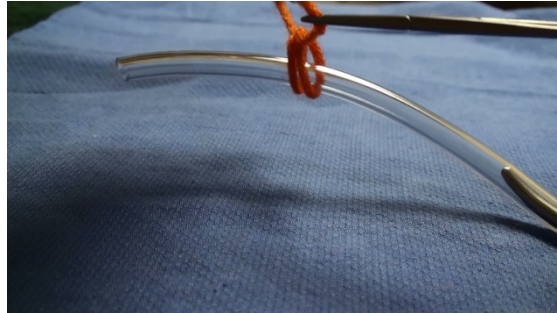
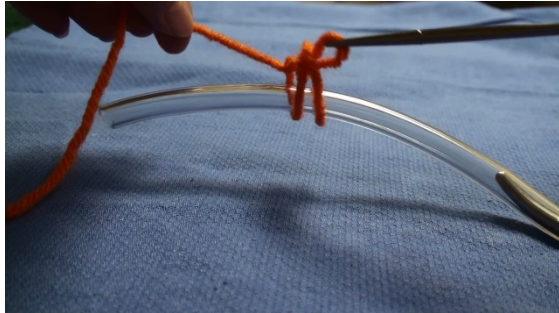
The modified Miller's knot is a binding knot of the friction knot category and as such is a very secure tie for ligatures. The modified Miller's knot is easily learned and rapid to perform as an instrument tie, enabling the surgeon to quickly apply a secure ligature to thick tissues such as the uterine body, eliminating the need for double ligation. The modified Miller's knot can be used to securely and efficiently ligate the uterine body, ovarian pedicle, or spermatic cord of cats and dogs and may be particularly helpful when tissues are friable. This is because it distributes pressure over a greater surface area than a single encircling ligature, thereby reducing the tendency to cut or crush friable tissue. The modified Miller's knot is not always necessary in pediatric patients where a simple ligation is adequate unless tissues are thick or well-developed.

The modified Miller's knot is created by passing a length of suture material around the tissue twice, creating a loop as shown. The needle holders are then passed through the loop and the surgeon proceeds by creating a standard square knot throw. The knot is secured, ensuring that both loops are tightened evenly (hint: elevating the loops as they are tightened is helpful). This will ensure that the tissue is thoroughly compressed. The modified Miller's knot is then finished with a series of square knots to prevent loosening.



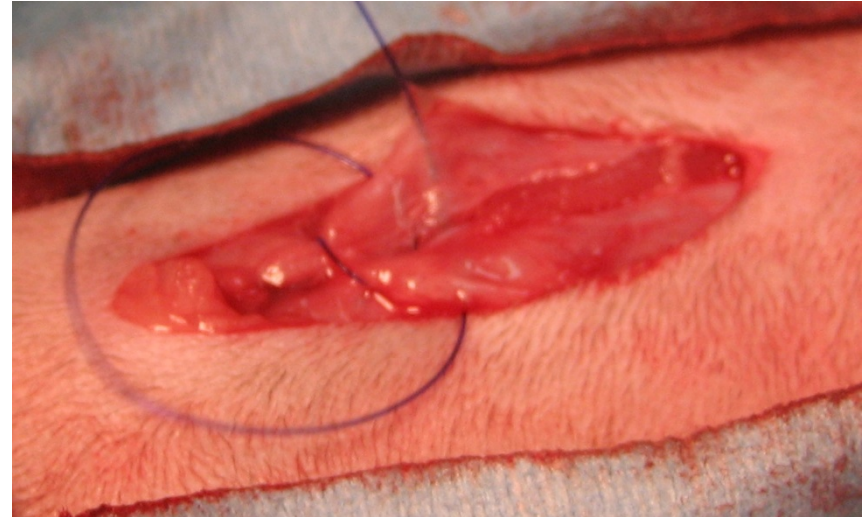
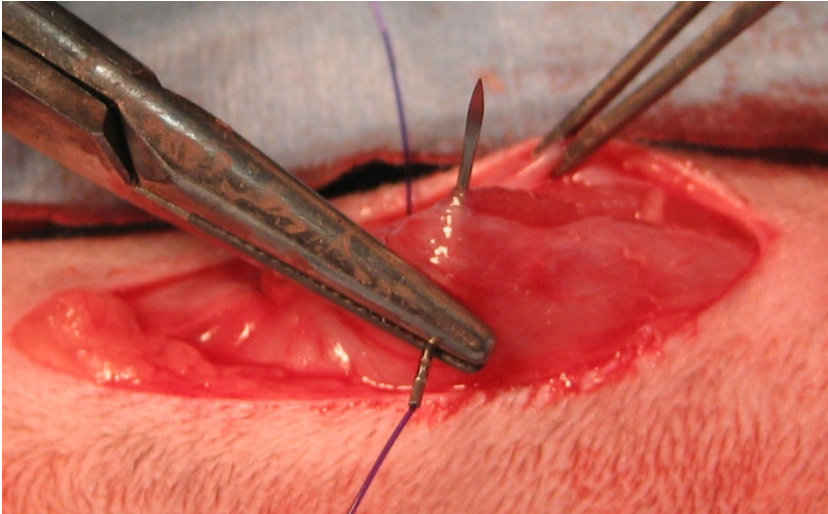








## Closure of the Body Wall



### Closure of the Rectus Sheath: Keys to Success

1. Avoidance of crushing necrosis of the body wall/rectus
  - This is the most important feature of closure
  - It is best accomplished by a combination of an approximately 4:1 ratio and by not pulling on the suture too tightly
2. Attention to proper knot-tying technique (good snug square knots)
3. Gentle tissue handling
4. Adequate “bites” of the rectus sheath

Photos: Note the big bites: 0.5 cm for cats (as shown) and for puppies and small dogs  
1 cm for big dogs

Each succeeding bite should advance the same distance along the incision as the distance from the cut edge; ie, with a big dog, the needle is inserted 1 cm from the cut edge and each new suture is placed 1 cm advanced along the line of closure from the prior one. This provides for a 4:1 ratio of suture length to incision length during closure and minimizes risk of dehiscence.

## Scoring Tattoo



Many surgeons prefer to make a separate superficial skin incision on the abdomen and apply paste to the incision.



This is sometimes called a scoring tattoo since the skin is scored with a scalpel blade and paste is then applied.

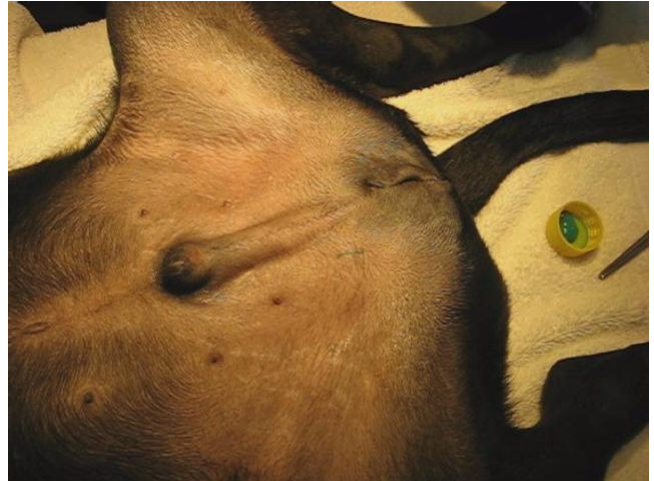




The blunt end of a scalpel blade or a paper sterility indicator strip from the surgery pack may be conveniently used to apply the paste to the incision.



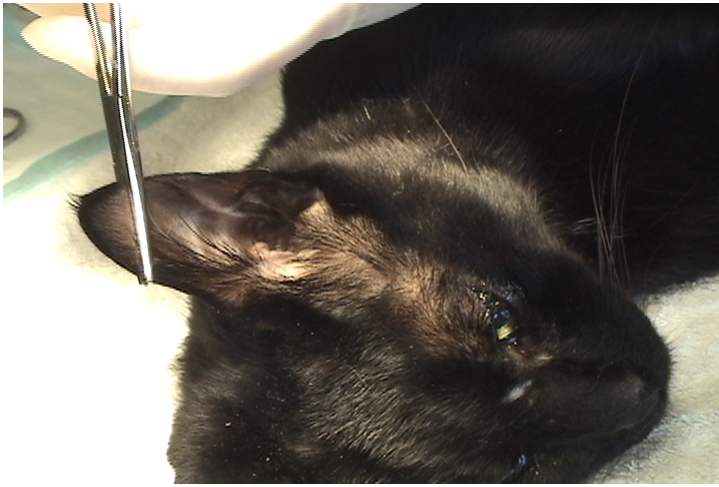
Afterwards, the skin edges are slightly inverted and a drop of tissue adhesive is applied on top of the skin for closure.



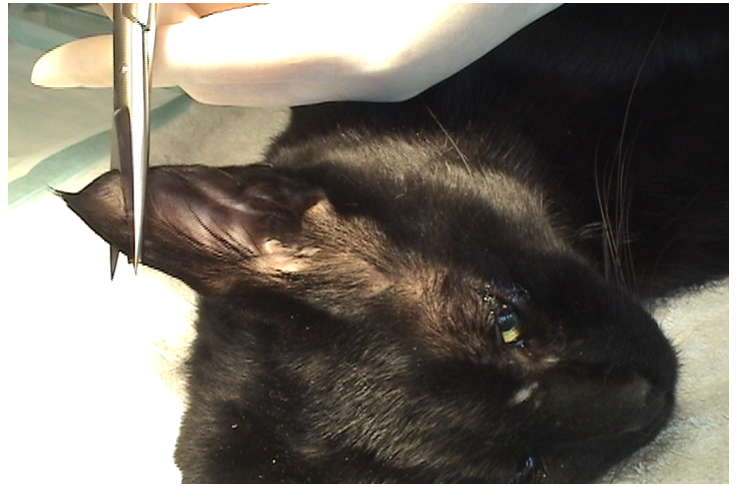
This closure technique prevents patients from licking the tattoo and developing a temporary case of “green tongue” in recovery. In addition to females, males should also be tattooed on their ventral midline at the time of neutering, as this will serve to prevent an unnecessary laparotomy should a neutered tom ever be mistaken for a queen, or a neutered dog for a bilateral cryptorchid.



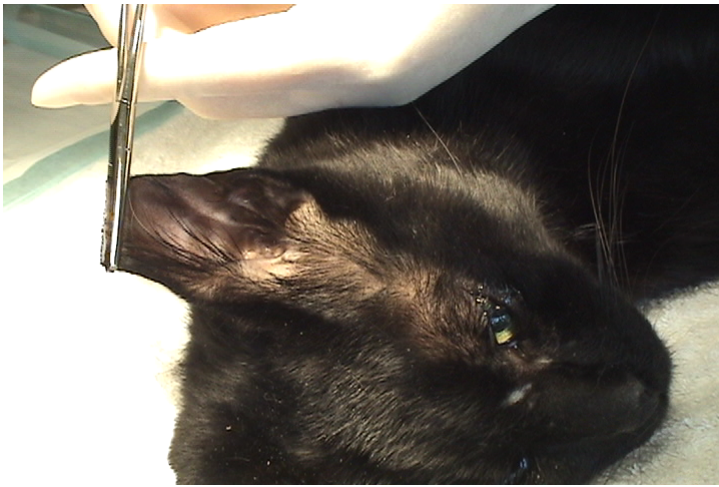
## Ear-Tipping



A straight hemostat is placed perpendicular to the long axis of the pinna exposing proportionately approximately 1/3 of the ear tip.



The ear tip is removed using the straight scissors to cut over the edge of the hemostats.



The hemostats are left in place until hemostasis occurs.



Proper appearance of an ear after being cropped. Note the distinctive straight edge that is easily recognizable from a distance.