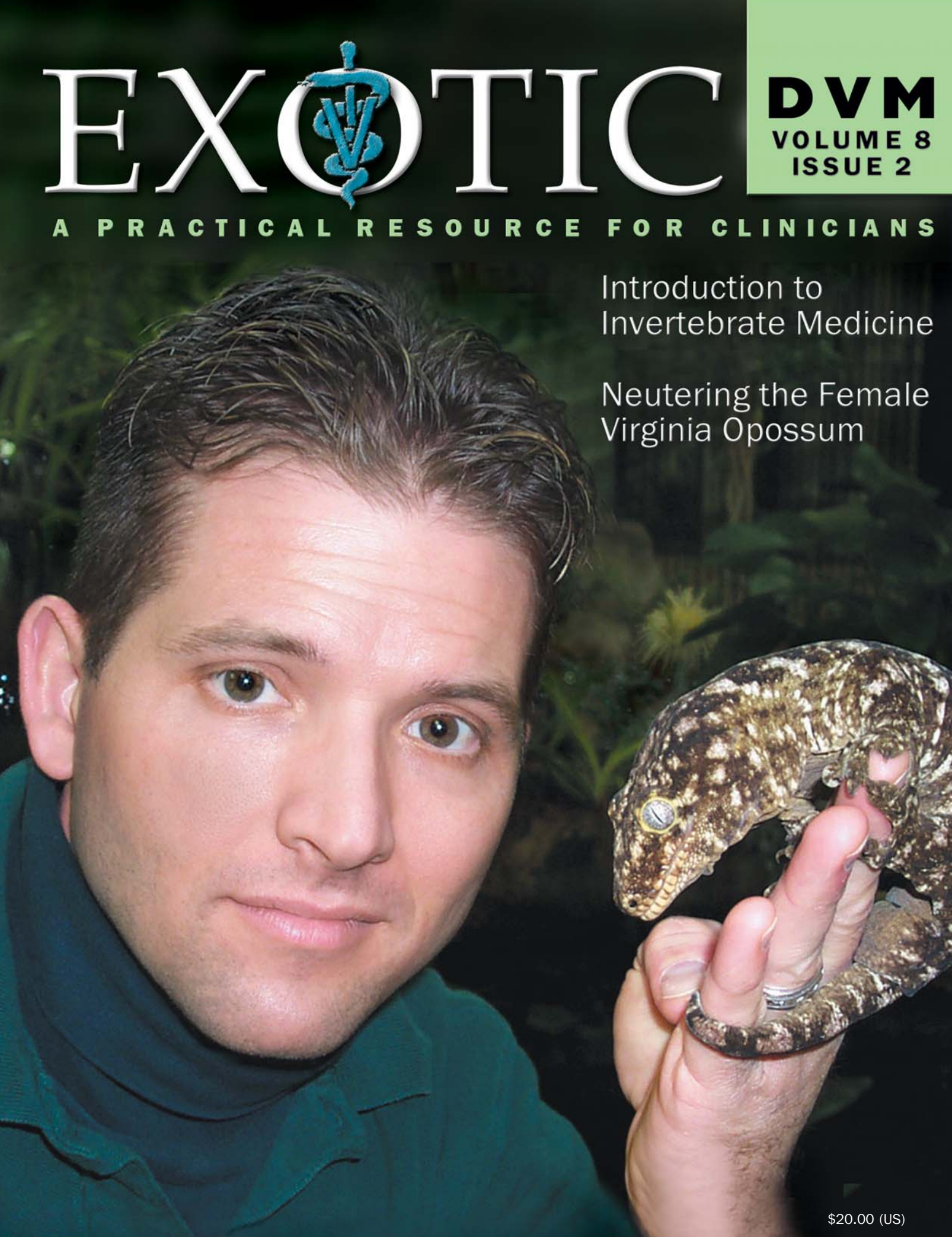
EXOTIC DVM

VOLUME 8
ISSUE 2

A PRACTICAL RESOURCE FOR CLINICIANS

Introduction to Invertebrate Medicine

Neutering the Female Virginia Opossum



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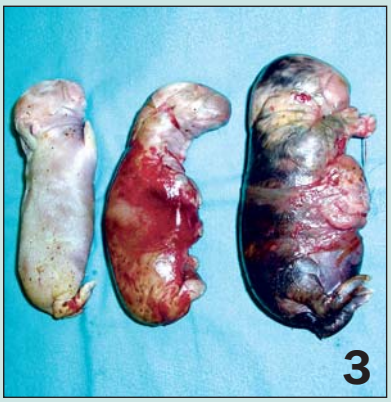

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Special Feature

Departments

Sacculectomy in the Pet Ferret and Skunk*

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* *Presented at 2005 International Conference on Exotics*

The ferret (*Mustela putorius*) and skunk (*Mephitis mephitis*) are carnivores belonging to the Mustelids family (Mustelidae). A unique anatomic feature of these species is the presence of developed anal sacs, which are large relative to the size of the animal, particularly in skunks, and are located in the perianal space lateral to the distal rectum. The primary excretory ducts open at the 3 o'clock and 9 o'clock positions at the junction between the anal and rectal mucosa (Fig 1).

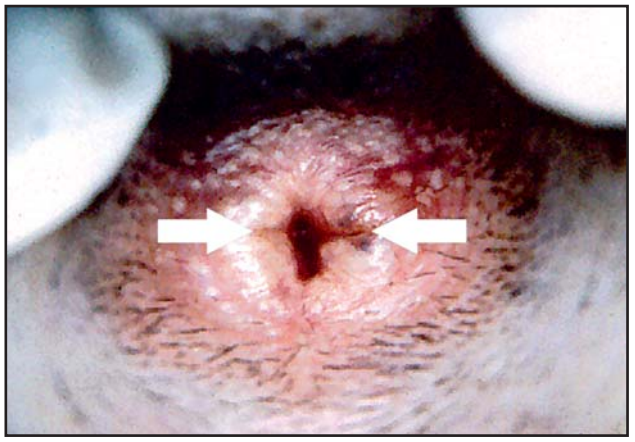

Fig 1. Close up of the ferret anus. Openings of the anal sac ducts are located at the 3 o'clock and 9 o'clock positions (arrows) and occasionally at the 4 o'clock and 8 o'clock positions in some individuals.

The anal sacs collect the secretion of the perianal glands. This oily, yellowish secretion has a very pungent odor and, in some species like the skunk, has been adapted for defensive purposes. Skunks are able to eject the secretion more than 3 meters. The odor associated with these secretions represents a serious problem when ferrets and skunks are kept as pets. Although the sacculectomy procedure is considered unethical in some countries, it is a recommended option for ferrets and mandatory for skunks.

The primary indication for bilateral anal sacculectomy is preventive descenting, although anal sac abscessation occasionally occurs in some non-descented ferrets. The procedure is usually performed when ferrets and skunks are very young, e.g., during the first weeks of life. The ductal technique is used most frequently. In most cases, especially in ferrets, sacculectomy is performed concurrently with neutering with the goal of reducing the odor of the skin and fur.

Due to the small size of both the patient and the anal sacs, many very young ferrets undergoing preventive ductal sacculectomy may exhibit mild to severe lesions of the anal sphincter (Figs 2, 3), which can be followed by complications (Fig 4).

The traditional ductal approach in the adult ferret and young skunk and the extraductal technique in the adult ferret are presented in this paper. Differences, advantages and disadvantages of the two techniques are highlighted and discussed.

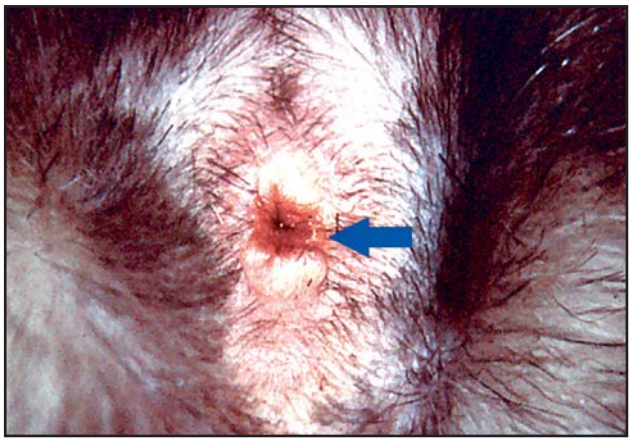

Fig 2. Shown is a lesion of the anal sphincter (arrow) following sacculectomy via the ductal technique.

Fig 3. A mild prolapse of the rectal mucosa was due to incontinence of the anal sphincter. Usually prolapse is recurrent and is most severe during and immediately after defecation.

Fig 4. A rectal prolapse in a young ferret was due to severe incontinence of the anal sphincter secondary to ductal sacculectomy.

Ductal Technique in the Ferret

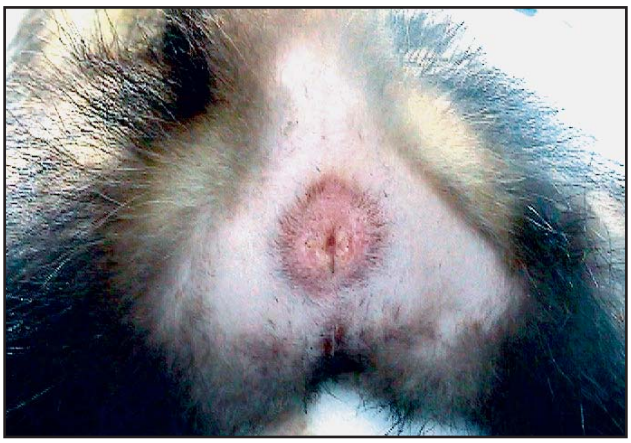

Fig 5. The ferret is placed in sternal or dorsal recumbency, depending on the surgeon's preference. Dorsal recumbency is usually preferred when neutering is performed concurrently. The ferret is placed under general anesthesia. The perianal area is shaved, taking care to prevent iatrogenic lesions to the delicate anal mucosa. The tail is elevated and maintained in position with a bandage or tape.

Fig 6. The perianal area is gently scrubbed and prepared for surgery. Due to the proximity to the anus and the rectum, the ductal approach is considered a clean but not sterile surgical technique; therefore, the surgical field is usually not draped.

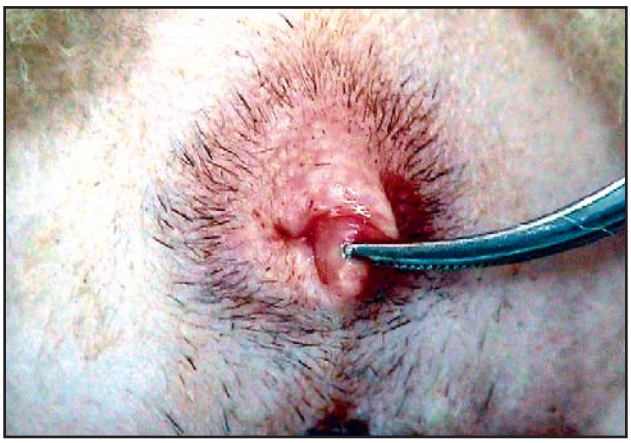

Fig 7. The opening of the duct is clamped with the tip of a hemostat forceps. This allows the surgeon to grasp the sac during dissection and prevent release of anal sac contents. The duct opening should be grasped gently to prevent edema of the rectal mucosa.

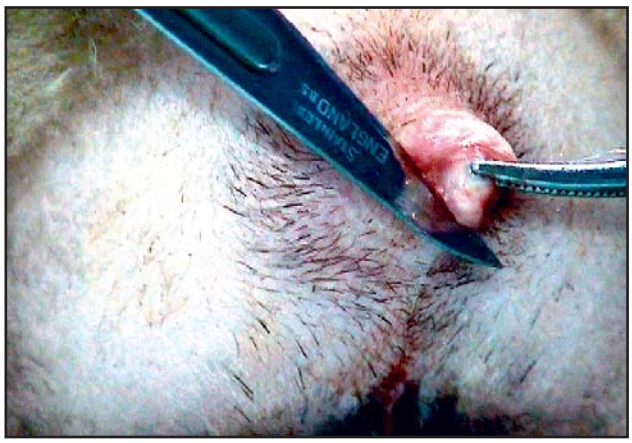

Fig 8. A circumferential incision of the mucosa around the duct opening is performed using a #11 scalpel blade.

Fig 9. While the anal sac is gently retracted with the forceps, the mucosa is reflected off the duct with gentle scraping, using the blade in a transverse fashion. The closer the scraping is performed to the sac, the easier the dissection becomes.

Fig 10. The anal sac itself is yellow in color, which helps the surgeon distinguish it from surrounding tissues. Bleeding and damage to the anal sphincter muscle are minimal if dissection is performed close to the sac. The surgeon must take care to prevent incision of the sac or rupture of the duct.

Fig 11. When the anal sac is completely dissected and exteriorized, the caudal end is dissected free from the retractor and constrictor muscles of the anal sac.

Fig 12. The anal sac is completely removed.

Fig 13. A cotton-tipped applicator is introduced into the anus to check for the integrity of the distal tract of the rectum. Iatrogenic perforation of the rectum must be repaired to prevent the formation of a rectal/perianal fistula and infection.

Fig 14. The wound can be left to heal by simple second intention. However, the author prefers to close the mucosal incision using a single knot of absorbable suture (Monocryl 4-0), especially when the surgery is performed at 4-6 months of age and the anal sacs are well developed.

Fig 15. The procedure is repeated on the second anal sac.

Fig 16. Appearance of the anus after surgery. If the surgical procedure is performed carefully, the risk of complications is minimal and the skin incisions heal by first intention.

Ductal Technique in the Skunk

Fig 17. While sacculectomy of the ferret is considered an optional surgery, sacculectomy of the skunk is mandatory when one considers the keeping of this species as a pet. Anal sacs are relatively large in the skunk, and the odor of the secretion is extremely offensive. Skunks are much more prone than ferrets to express the anal sac secretion as a defense mechanism. Sacculectomy is best performed in young animals between 10 and 20 days of age. Because the procedure is considered a clean but non-sterile surgical technique, and the odor of the secretion is very unpleasant if accidentally released, this surgery may be performed outdoors, if proper anesthesia and patient support can be maintained outside the surgery suite.

Fig 18. The technique is the same as described previously for the ferret. When the anal mucosa is everted with a finger, the end of the duct appears as a papilla.

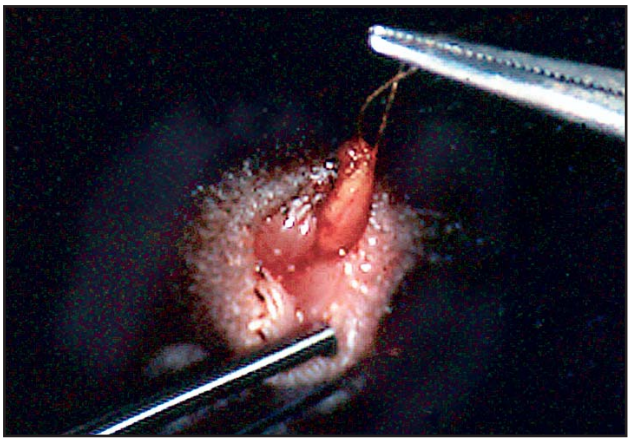

Fig 19. Following a circumferential incision of the mucosa around the duct opening, the end of the duct can be ligated and grasped while blunt dissection is performed.

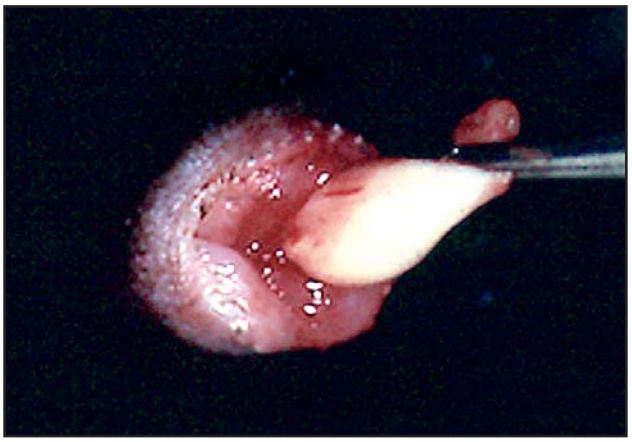

Fig 20. Otherwise, as in the ferret, the duct is clipped, grasped with a hemostat forceps and bluntly dissected.

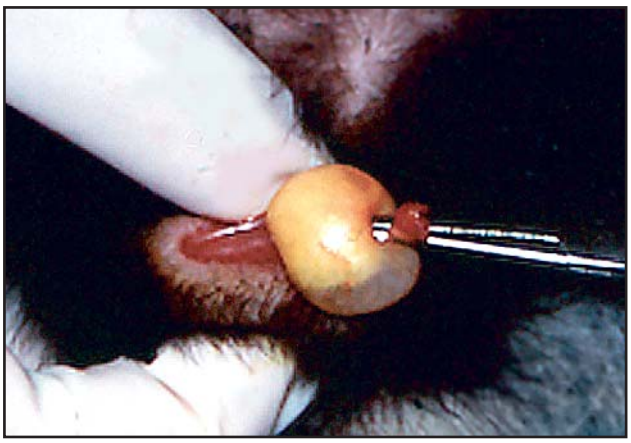

Fig 21. The sac appears as a large, yellow, vesicular structure due to the color of the secretion.

Fig 22. "Skunk Off" (Thornell Corp, www.thornell.com) is a product that greatly reduces the odor of skunk anal gland secretion. It is helpful in controlling the odor relating to accidental spread of the secretion when the surgery is performed indoors and may be used to fill the container for holding the discarded anal sac following surgical removal.

Extraductal Technique in the Ferret

Fig 23. The ferret is placed in dorsal recumbency with the hind limbs spread and secured with bandage material or tape.

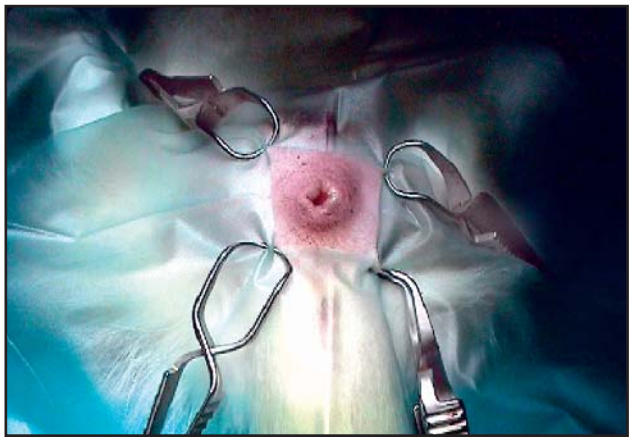

Fig 24. The perianal area is shaved, scrubbed and surgically prepared.

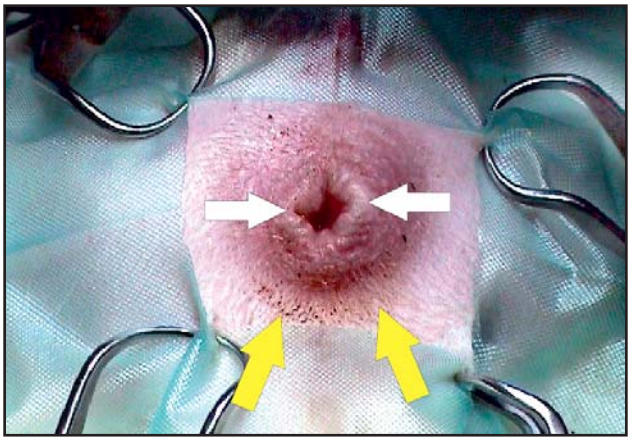

Fig 25. The duct openings (white arrows) and the mucocutaneous junction (yellow arrows) are highlighted in this close-up view.

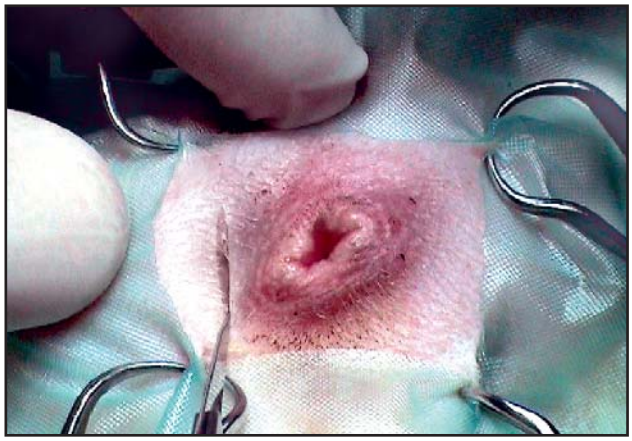

Fig 26. A 1-cm skin incision is made at the mucocutaneous junction lateral to the opening of the anal sac.

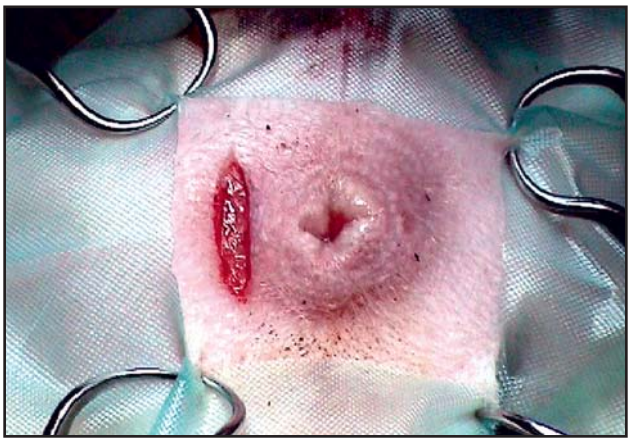

Fig 27. The body of the anal sac lies under the subcutaneous fascia beneath this incision.

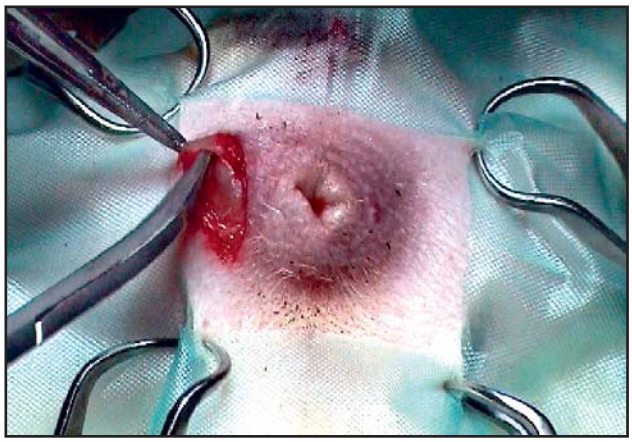

Fig 28. Blunt dissection of the anal sac is begun. The anal sac is surrounded by the constrictor muscles and eventually appears as a yellow vesicle due to the color of the contents. It is mandatory to prevent accidental incision and rupture of the sac wall.

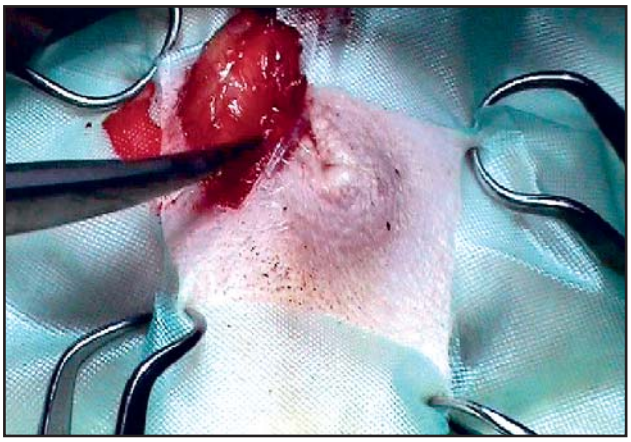

Fig 29. The wall of the sac is grasped gently with a small hemostat forceps, taking care to prevent rupture. The sac must be dissected and exteriorized completely up to the termination of the duct.

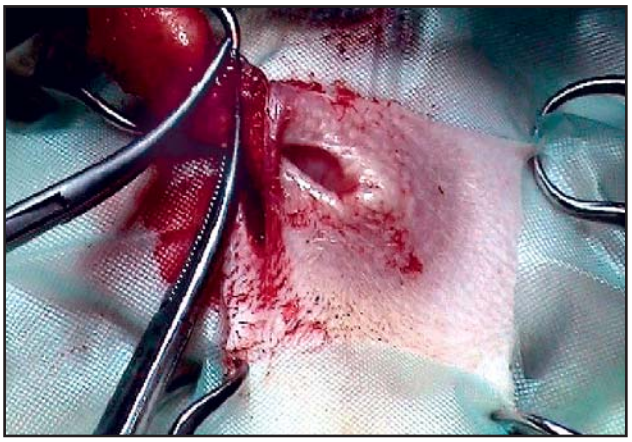

Fig 30. The duct can be ligated with 4-0 absorbable suture; however, the author prefers to simply double clamp and dissect the duct, because the presence of suture material could impair the healing of soft tissues.

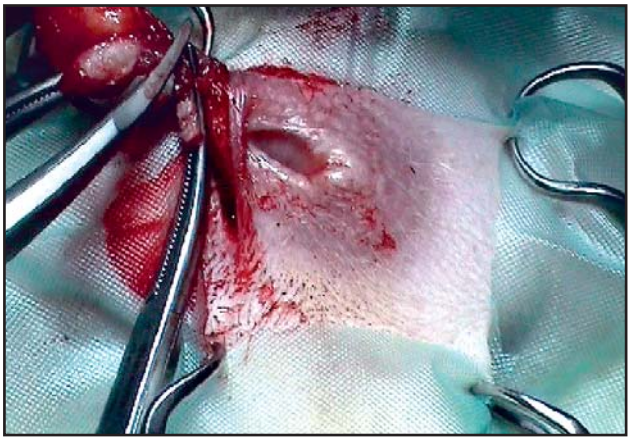

Fig 31. The duct is dissected, and the anal sac is completely removed.

Fig 32. The skin incision may be sutured immediately or delayed until after the excision of the second anal sac in order to check for hemorrhage.

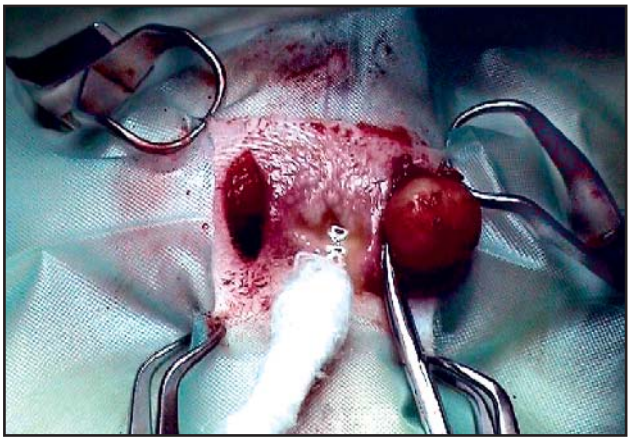

Fig 33. The procedure is repeated on the contralateral anal sac. Because the duct is not closed as it is during the ductal technique, some secretions can exit the sac during surgery. These can be absorbed with a cotton-tipped applicator. This is usually not a problem in the surgery room because the ferret odor is not as objectionable as that of the skunk.

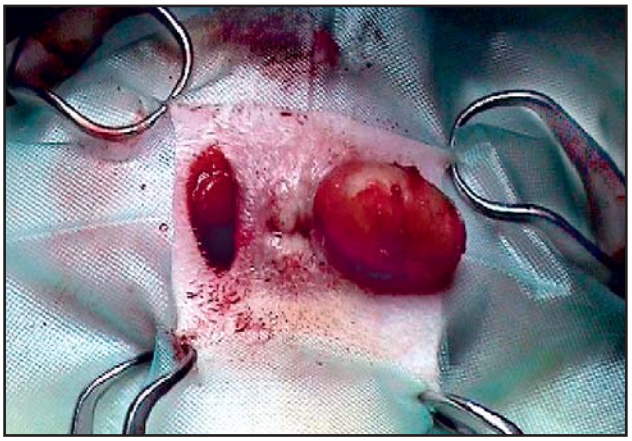

Fig 34. The second anal sac is completely exteriorized before dissection and removal of the duct.

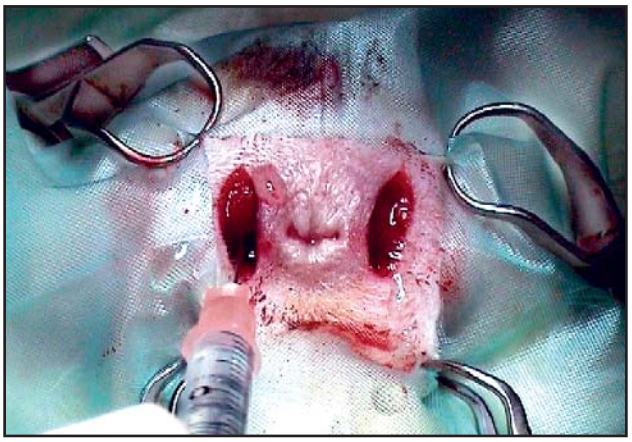

Fig 35. The soft tissues of the perianal space are flushed with saline prior to suturing.

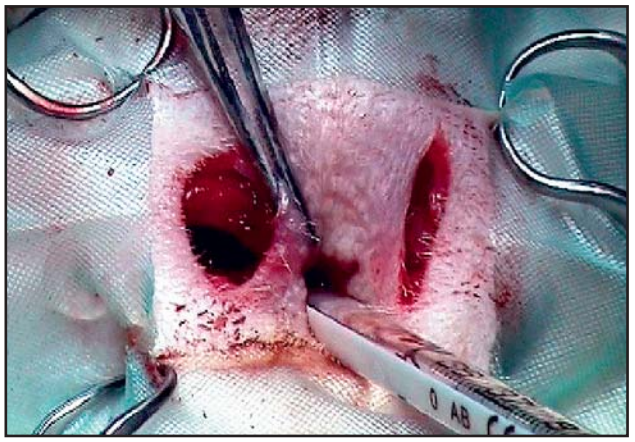

Fig 36. Although the ductal approach greatly reduces the risk of iatrogenic lesions, it is still important to check the integrity of the rectal wall by introducing a thermometer into the anal opening.

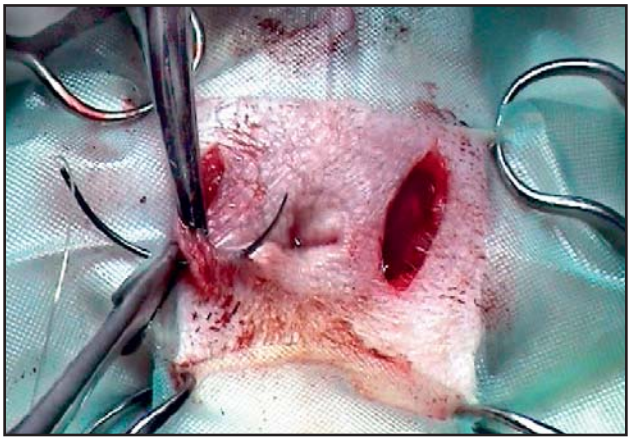

Fig 37. Suture of the skin incision is performed using 4-0 absorbable suture material. The author prefers the apposition of single knots in a horizontal "U-shaped" suture pattern.

Fig 38. Shown is the appearance of the skin sutures at the completion of the surgery. With the extraductal technique, the anal sphincter remains untouched, and complications discussed previously are prevented.

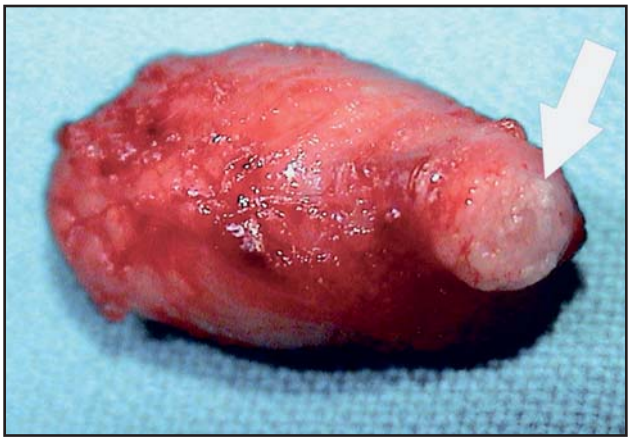

Fig 39. Close up of the anal sac where the duct is clearly visible (arrow).

Table 1. Comparison Between Ductal and Extraductal Techniques for Sacculectomy

DUCTAL TECHNIQUE		EXTRADUCTAL TECHNIQUE	
Advantages	**Disadvantages**	**Advantages**	**Disadvantages**
• Generally shorter procedure • Release of secretions during surgery is prevented (unless rupture of the anal sac occurs)	• Frequent lesions to the anal sphincter and related complications • More difficult removal of the entire duct	• Prevents lesions to the anal sphincter and resulting complications • Reduces the risk of iatrogenic rectal lesions • Allows for assured removal of the entire anal sac	• Longer procedure • Release of secretion is possible (due to rupture or compression of the anal sac during the procedure) • Suture of the skin is needed

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