

## A VASECTOMY TECHNIQUE FOR EGYPTIAN FRUIT BATS (*ROUSETTUS AEGYPTIACUS*)

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**Abstract:** Bats in captivity reproduce well and contraceptive techniques are needed. In initial attempts at vasectomy using a prescrotal approach, it was difficult to identify the mesoductus deferens. The technique described here uses a scrotal approach with exteriorization of the testis, followed by identification and ligation of the mesoductus deferens. Nine Egyptian fruit bats (*Rousettus aegyptiacus*) underwent vasectomy for this study. No postoperative complications were seen ( $n = 18$  testes), but some of the testes (5/18, 27%), which previously moved freely from the scrotum to the abdominal cavity, were still adhered to the scrotal sac 14 mo postoperatively. This technique appears safe, is fast, and is relatively easy to perform.

**Key words:** Vasectomy, reproductive surgery, *Rousettus aegyptiacus*, Egyptian fruit bats, contraception.

### BRIEF COMMUNICATION

The captive management of many commonly kept bat species requires contraception to prevent overpopulation. Although castration is a common contraceptive method, vasectomy has the advantage of controlling reproduction without altering hormone production. This can help maintain normal social interaction and behavior in a group setting. The vasectomy technique has been described in dogs (*Canis familiaris*), boars (*Sus scrofa*), llamas (*Llama glama*), ferrets (*Mustela putorius furo*), humans (*Homo sapiens*), and marmosets (*Callithrix* spp.).<sup>1,2,4,5,7</sup> In small mammals, an inguinal or prescrotal approach is described,<sup>2</sup> whereas in ungulates an approach through the pendulous scrotum is recommended.<sup>2</sup>

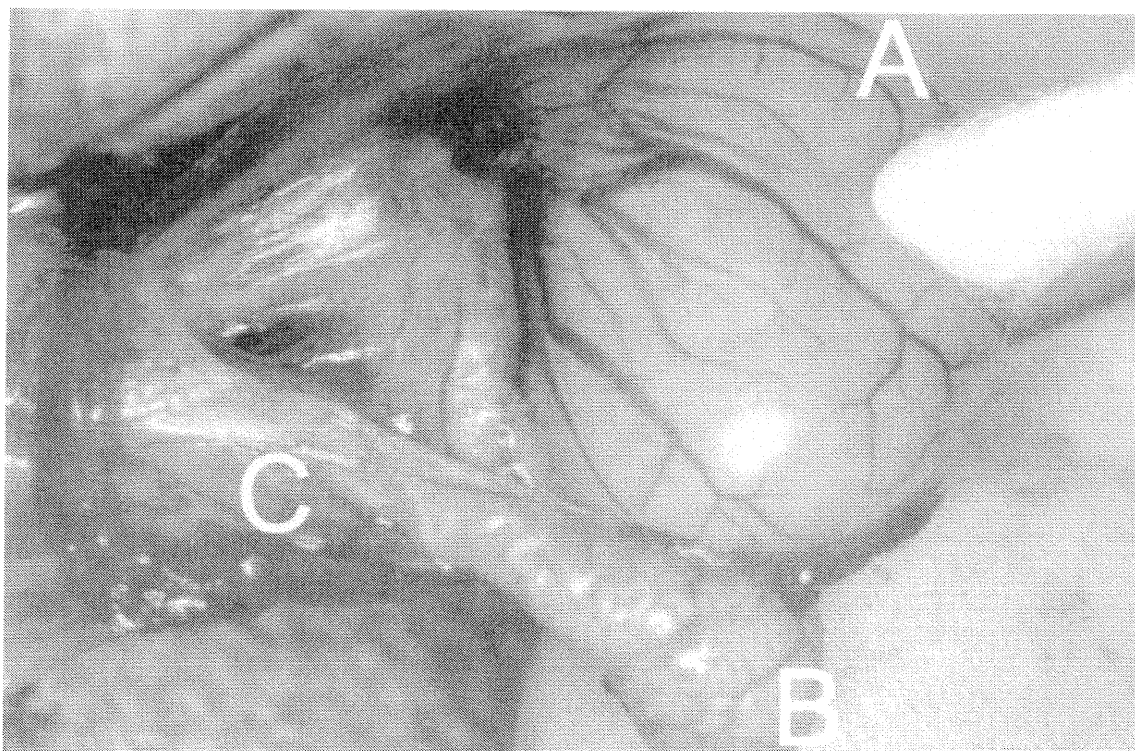
Bat testicular and epididymal anatomy is typically mammalian, but the location of the testes is variable according to species. The testes are either permanently abdominal, inguinal, scrotal, or mobile between the abdomen and the scrotum through the inguinal canal. The latter is typical for the Egyptian fruit bat (*Rousettus aegyptiacus*). Although sperm production can be affected by testicular position, the epididymides retain sperm regardless of position and are capable of storing sperm for weeks to months.<sup>3</sup>

The ductus deferens can be difficult to identify in bats because it is surrounded by fat. In initial attempts at vasectomy using a prescrotal approach, it was difficult to identify the mesoductus deferens. The present study evaluated a scrotal approach for vasectomy in small bats.

Nine captive born, 3–10-yr-old, 140–215 g male Egyptian fruit bats were vasectomized. The bats were housed together in indoor free-flight enclosures at the Lube Foundation in Florida. They were fed a diet of fresh fruits with vitamin, mineral, and protein supplements. All appeared healthy on the basis of physical examination. Each bat was anesthetized with isoflurane (Aerrane, Anaquest, Liberty Corner, New Jersey 07938, USA; 5%, decreased to 2–3%) in oxygen (1 L/min) through a face mask attached to a nonbreathing system. After weighing the bat, butorphanol (Torbugesic, Fort Dodge, Iowa 50501, USA, 0.2 mg/kg s.c.) was administered. Ultrasonic Doppler (Parks Medical Electronics, Aloha, Oregon 97007, USA) and pulse oximeter probes (Vet/Ox 4404, Heska, Fort Collins, Colorado 80525, USA) were placed, one over each foot for anesthetic monitoring. A 5- by 5-cm area including the scrotum was clipped and aseptically prepared for surgery. Magnifying loupes (Surgitel Ergovision HB, GSC, Ann Harbor, Michigan 48103, USA) were used to aide in visualization of the testicular anatomy.

Holding the base of the testicle to prevent its retraction into the abdomen, a 5- to 8-mm longitudinal scrotal incision was made over one testis, through the skin, and the s.c. tissue and parietal vaginal tunic. The testis was exteriorized and the epididymis and mesoductus deferens (ductus deferens, deferent artery, and vein) identified (Fig. 1). Using blunt dissection with tenotomy scissors, a tissue dissection plane was created around the mesoductus deferens. Two circumferential ligatures (4-0 PDS, Ethicon, New Jersey 08876, USA) were placed 1 cm apart around the mesoductus deferens. A 5 mm section of mesoductus deferens was excised from between the two ligatures. The contralateral testis and mesoductus deferens were treated

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**Figure 1.** Surgical exposure of the testis of an Egyptian fruit bat (*Rousetus aegyptiacus*) showing the anatomical relationship of the testis (A), tail of the epididymis (B) and the mesoductus deferens (C).

in a similar fashion through a second scrotal incision.

Using 4-0 PDS, the parietal vaginal tunic was closed by placing two or three simple interrupted sutures. The scrotal incisions were closed with a continuous intradermal pattern using 4-0 PDS. The excised part of each mesoductus deferens was placed into 10% neutral-buffered formalin and submitted for histopathologic examination. All samples contained mesoductus deferens. The surgical time to perform the procedure on each testis was 12–15 min.

An Elizabethan collar made from radiographic film was placed on each bat for the first 24–48 hr after surgery. The bats were returned to the Lube Foundation and examined daily by the keepers and biweekly during regular veterinary visits to the collection for 1 mo. None of the common complications reported in humans with vasectomies (hematoma, infection, sperm granuloma, epididymitis-orchitis, or congestive epididymitis) were observed in these bats.<sup>6</sup> However, the normally freely moveable testes appeared to be adhered to the scrotum and unable to be pushed into the abdominal cavity 2 wk postoperatively, and 27% (5/18) were still adhered at 14 mo. Immediately postoperatively the testes

were able to be positioned intraabdominally, indicating that adhesions formed during the initial 2 wk postoperative period. Complications during surgery included incision of the visceral vaginal tunic and the tunica albuginea in two testes (11%, 2/18).

The technique described here was relatively easy to perform and permitted direct visualization and identification of the mesoductus deferens. Microsurgical instruments and magnification were very useful for the procedure on these small animals.

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