A special advertising section

The CO_2 laser in urogenital surgeries

By Daniel M. Core, DVM
For The Education Center

Carbon dioxide laser surgery provides precision incision, control of hemorrhage, diminished collateral injury, decreased swelling and pain, and superior cosmetic results. While these attributes are very important in any soft-tissue procedure, they are critical in urogenital surgery.

The urogenital anatomy is characterized by an excellent blood supply. It's a blessing, because healing depends on blood supply and oxygen flow to the affected site and the extraction of harmful byproducts.

However, a disadvantage of this increased blood supply is the need for hemorrhage control in the surgical field. Excess bleeding increases the risk of imprecise incision and dissection with extended surgical time which, ultimately, leads to prolonged healing times. The following two urogenital surgeries illustrate the use of the CO_2 laser for soft-tissue surgery in highly vascularized areas.

Case 1: Preputial plasty for feline phimosis utilizing CO_2 laser

Patient: A 2-year-old neutered male cat was presented for an evaluation for a possible perineal urethrostomy. The owner had adopted this cat as a neonate, part of a litter of three kittens. The owner noted that the two female kittens constantly nursed on this male.

The patient was neutered at the age of six months. As the cat reached maturity, the owner noticed some stranguria and vocalization in the litter box. After exiting the litter box, the cat was dripping urine. Physical exam revealed that the patient had a very small preputial orifice of approximately 1 mm. No other abnormalities were noted. His laboratory test, including BUN, creatinine, phosphorus and urinalysis were normal.

Phimosis is defined as the inability of the penis to protrude from the prepuce. A 360-degree prepuce plasty was recommended to enlarge the stenotic preputial opening. **Figure 1A** demonstrates the patient's phimosis pre-operatively.

Anesthesia: Surgery was performed under general anesthesia. The patient was pre-medicated with glycophosphate, acepromazine and torbutrol (for pain control). An IV catheter with fluids was used. Anesthesia was induced and maintained with sevoflurane.

Laser settings: The Aesculight CO_2 laser settings included a 0.25 mm focal spot size at 10 watts in the superpulse mode. **Figures 1B, 1D** and **1E** show the adjustable tipless laser handpiece.


Figure 1A.
Feline phimosis.
Pre-operative view.


Figure 1B.
Preparing to incise prepuce. The adjustable tipless handpiece is set to 0.25 mm focal spot size.

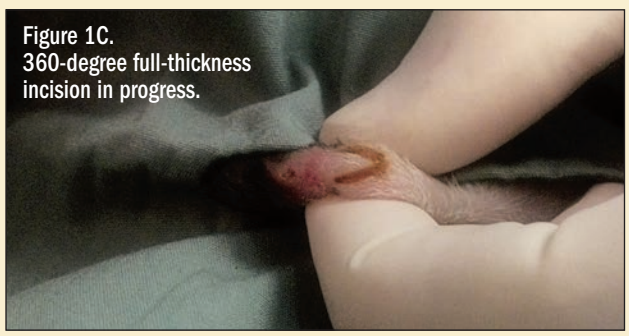
Figure 1C.
360-degree full-thickness incision in progress.


Figure 1D.
Continuing full-thickness incision.


Figure 1E.
Trimming preputial mucosa.

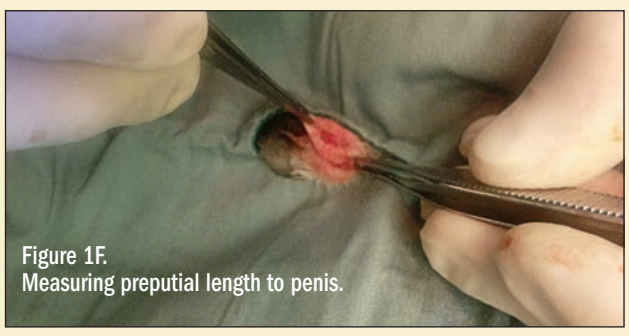
Figure 1F.
Measuring preputial length to penis.

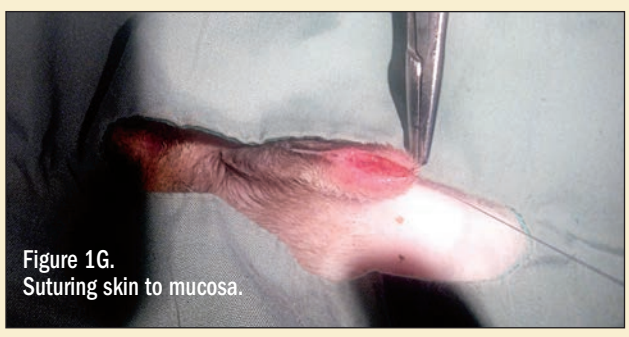
Figure 1G.
Suturing skin to mucosa.

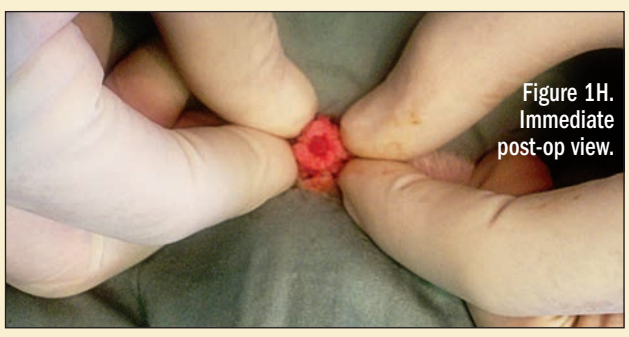
Figure 1H.
Immediate post-op view.

Procedure: After surgical clip and prep, with the patient in ventral recumbency, a 360-degree full-thickness incision was performed at the mucocutaneous junction of the preputial opening **(Figures 1B-1D)**. A small portion of the prepuce was removed, allowing visualization of the penis and prepuce **(Figure 1E)**.

The amount of preputial tissue removed should allow normal protrusion of the penis during urination without causing a permanently exposed penis, which could, in turn, result in chronic penile irritation **(Figure 1F)**. The penis and prepuce were inspected for other injuries or defects. Once the correct amount of prepuce was removed, the preputial mucosa was sutured to skin in a single interrupted pattern using 5-0 polydioxanone suture material **(Figure 1G)**.

Note that the only hemorrhage observed during the surgery was from the suture. **Figure 1H** shows an immediately post-operative view of the surgical site. The patient recovered from anesthesia without complications.

Post-operative care: Therapy laser was used immediately post-operatively. An E-collar was placed on the patient. He was able to urinate normally without pain in the litter box as soon as he recovered from anesthesia. He was discharged the day following surgery, and the sutures were removed at 10 days. Follow-up examination at six months post-operatively was normal.

Case 2: Surgical CO_2 laser excision of penile neoplasm in a dog.

Patient: A 12-year-old neutered male Labrador retriever was presented for a preputial swelling and bleeding from the prepuce. Physical exam revealed circular swelling on the ventral surface of the prepuce and dried blood at the preputial opening.

Retraction of the prepuce revealed a raised oblong hemorrhagic mass located at 4-5 cm on the ventral surface of the proximal penis **(Figure 2A)**. Fine-needle aspiration biopsy revealed atypical round cells. No other abnormalities were noted on physical exam and laboratory test. Excisional biopsy was performed in order to establish a definitive cellular diagnosis and provide a possible surgical solution.

Anesthesia and procedure preparation: The patient was pre-medicated with glycophosphate, acepromazine and torbutrol (for pain control). An IV catheter with fluids was used. Anesthesia was induced and maintained with sevoflurane. While under general anesthesia, the patient was prepped for the surgery and positioned in ventral recumbency. The prepuce was flushed and retracted. A urethral catheter was placed to prevent inadvertent incision into the urethra.

Laser settings: The Aesculight CO_2 laser was set at 15 watts of power in the superpulse mode. The tipless fixed spot size 0.4 mm handpiece was utilized for this procedure **(Figure 2B)**.

Procedure: The mass was carefully excised using a full-thickness incision of the tunica albuginea **(Figure 2B-2C)**. Careful dissection over the urethra was necessary to avoid perforation. The excision was essentially bloodless. The edges of the tunica albuginea were apposed with 3-0 polydioxanone.

Most of the hemorrhage observed resulted from sutures **(Figure 2D)**. The urethral catheter was removed and patient recovered from anesthesia without complications. He urinated without pain or blood the day of surgery.

Post-operative care and follow-up exams: NSAIDs were prescribed post-operatively. Suture removal was

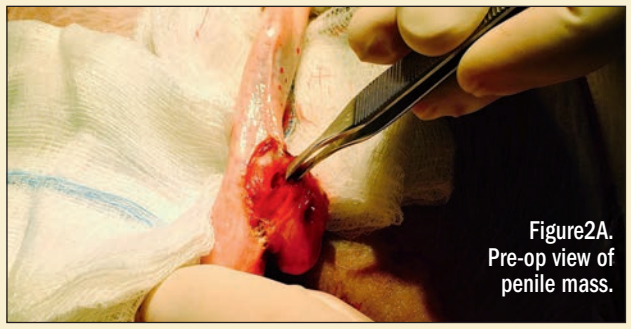
Figure2A.
Pre-op view of penile mass.


Figure 2B.
Initial incision around mass.


Figure 2C.
Completed excision.

performed 10 days post-surgically, and the incision site was perfect. Histopathological analysis revealed the neoplasm was a plasmacytoma with narrow clean margins.

Although plasmcytomas can recur and metastasize, the owner elected conservative treatment. We recommended monthly re-checks for four months and every third month for two years. The patient was tumor-free at five months post-operatively.

Diminished hemorrhage and minimal tissue damage

I have used a CO_2 laser in my practice for more than 15 years, since 1999. Two goals of soft-tissue surgery are early return to function and anatomic cosmesis. Carbon dioxide laser surgery provides diminished hemorrhage, ensuring a precise incision and dissection with the minimal collateral tissue damage of as little as 60 µm.1 This results in a shorter surgery time and an earlier return to full activity with a pleasing cosmetic appearance. ●

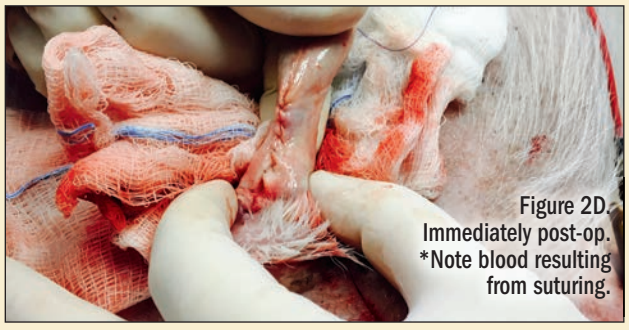
Figure 2D.
Immediately post-op.
*Note blood resulting from suturing.


Figure 2E.
Excised penile neoplasm specimen approximately 3x4 cm.

REFERENCES...

Wilder-Smith P, Arrastia AM, Liaw LH, Berns M. Incision properties and thermal effects of three CO_2 lasers in soft tissue. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 1995;79(6):685-691.

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This Education Center story was underwritten by Aesculight of Woodinville, Wash., manufacturer of the only American-made CO_2 laser