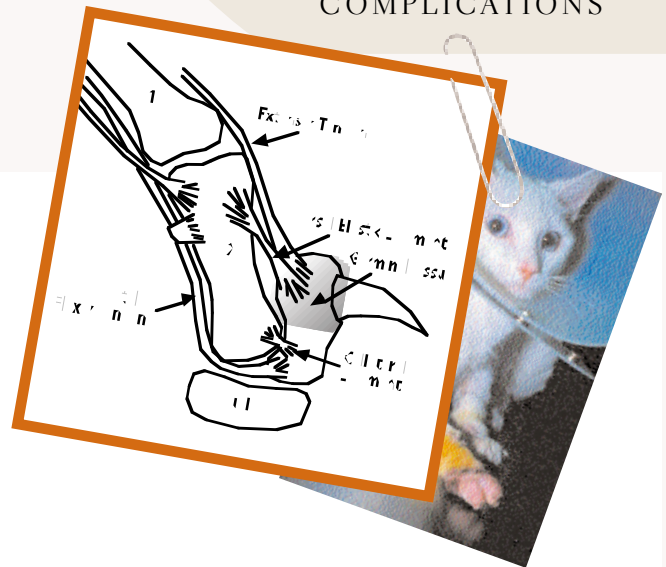


# Feline Onychectomy Complications: Prevention and Management

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## Profile

### DEFINITION

Feline onychectomy (declaw) is total or subtotal removal of the third digital phalanx (P<sub>3</sub>). It is estimated that this procedure is done in 19% to 46% of the U.S. cat population.

### CLIENT EDUCATION

Cats are presented for onychectomy because of unmanageable scratching of furniture or people. Onychectomy is elective amputation of P<sub>3</sub>. **This procedure has a complication rate of about 20%**, and owners must accept the possibility of short- or long-term complications. Self-defense is impaired, and **declawed cats must be kept indoors**. Feline onychectomy is also associated with adverse social behavior, such as inappropriate urination and biting in some cats. Occasionally, there is a viable medical reason for onychectomy, such as neoplasia or onychomycosis.

### ALTERNATIVES

Commercially available vinyl caps<sup>a</sup> in conjunction with scratching posts or behavior modification may be successful alternatives. Deep digital flexor tendonectomy is also an alternative but requires continued nail trimming and may be associated with delayed-onset lameness secondary to nail thickening and ankylosis of the P<sub>2</sub>-P<sub>3</sub> joint.

NSAIDs = nonsteroidal antiinflammatory drugs.

### ANATOMICAL CONSIDERATIONS

The third phalanx is supported dorsally by the common digital extensor tendon and the dorsal elastic ligament. Collateral ligaments give support from P<sub>3</sub> to the lateral epicondyles of P<sub>2</sub>. The deep digital flexor tendon attaches to the flexor process of P<sub>3</sub>. Within the dorsal aspect of P<sub>3</sub> is the unguis crest, which contains germinal tissue for the nail. Incomplete removal of the unguis crest results in either nail regrowth or drainage.

## Treatment

### ANESTHESIA & ANALGESIA

Feline onychectomy is painful, and preemptive analgesia is essential. We use combination therapy: a regional nerve block (Figure 1), pre- and postoperative opioids, and a single postoperative dose of NSAIDs. Acceptable opioid analgesics include hydromorphone (0.05 to 0.1 mg/kg IM Q 6 H), buprenorphine (0.01 to 0.02 mg/kg IM or PO Q 6 H), or fentanyl patch (25 µg/hr). Of these, **buprenorphine is believed to give the best analgesia and can be given at home orally**, but it is also the most expensive, followed by fentanyl and hydromorphone. Butorphanol (0.2 to 0.4 mg/kg IM Q 2 H) is considered less efficacious than other opioids because of the short half-life.

During recovery we give a single dose of ketoprofen at 2 mg/kg IM or SQ. Other injectable NSAIDs, such as meloxicam and carprofen, are due to be marketed shortly and will offer further alternatives to ketoprofen.

### SURGICAL CONSIDERATIONS

Feline onychectomy can be performed by using subtotal osteotomy (nail clipper) or total disarticulation (blade or CO<sub>2</sub> laser). Bleeding is controlled with the use of a tourniquet placed below the elbow. **Tourniquet time should not exceed 20 minutes**. Hair removal is a matter of personal preference.

### TYPES OF ONYCHECTOMY

**Nail clipper technique.** Either guillotine-type nail trimmers or side-cutting nail shears can be used. The cutting edge of the

continues



Figure 1. Injection sites for regional nerve blocks. The palmar branches of median and ulnar nerve are being blocked. Superficial branches of the radial nerve are seen on the lower part of the image. Total dose of bupivacaine is 3 mg/kg.



**Figure 2.** Normal appearance of removed claws after blade disarticulation (*left*) and clipper osteotomy (*center*). Incorrect osteotomy through the unguis crest necessitates manual dissection to remove additional fragments (*right*).

clippers is placed over the skin of the nail bed and between P<sub>2</sub> and P<sub>3</sub>. The nail is rotated dorsally with a hemostat before the cut is made. Removal of the entire unguis process as well as the unguis crest is essential; varying amounts of the distal phalanx flexor process can be left (**Figure 2**).

**Advantages of the technique include speed and reduced short-term pain and bleeding. Disadvantages include the potential for nail regrowth, development of draining tracts, or long-term lameness.** Lameness results if P<sub>2</sub> is damaged by the nail clippers.

**Blade technique.** Disarticulation of P<sub>3</sub> is commonly performed using a no. 12, 11, or 15 blade. The skin of the nail bed is incised dorsally, followed by the extensor tendon and dorsal elastic ligament. The joint capsule is then incised until the collateral ligaments are identified and transected. The claw is then flexed, and the deep digital flexor tendon is carefully transected and the flexor process is carefully dissected away to preserve the pad. **Short-term pain and bleeding are more common than with clipper techniques, but regrowth of the nail is avoided.** Because the deep digital flexor tendons are removed, the cat may stand in a more plantigrade stance.

**Laser onychectomy.** CO<sub>2</sub> lasers<sup>b</sup> are currently popular for declawing (**Figure 3**).



**Figure 3.** Intraoperative image of CO<sub>2</sub> laser onychectomy. No tourniquet has been applied, and there is no bleeding.

**Excellent hemostasis is achieved, often precluding the need for a tourniquet or postoperative bandaging. Lasers also reportedly reduce postoperative pain, swelling, and inflammation** compared with the blade technique for the first 24 hrs after surgery.

The laser is set at 6 W in a continuous-wave mode using a 0.8-mm bore tip. A circumferential incision is made through the redundant epidermis of the unguis crest, preserving as much skin as possible. The laser is used to disarticulate the toe by incising through the extensor tendon, synovium, collateral ligaments, and flexor tendon. Enough of the nail bed epidermis is preserved to cover the surgical site. Sutures or tissue adhesives are often not necessary.

#### **CONTROL OF HEMORRHAGE**

Bleeding may be minimized by suturing the skin. Short-acting absorbable suture material—such as chromic gut, polygalactin 910, Monocryl, or plain gut (4-0)—is used. A simple square knot, which the cat often licks out in several days, is used.

Cyanoacrylate tissue adhesives are popular agents for apposition of skin flaps. These adhesives are marketed for human use to

stop intraabdominal hemorrhage from such injuries as injured liver or spleen. However, with declaws they assist hemostasis by the apposition of the skin flaps and have some bacteriostatic qualities. In young cats, they may obviate the need for bandages. These products are meant to be used on the skin wound, but hemostasis is poor unless a drop of adhesive is placed in the wound. Swelling of the toes may occur after application of the tissue adhesive. In addition, the cyanoacrylate may eventually work its way to the surface in the form of a foreign body. Newer-generation absorbable cyanoacrylates are being developed to reduce this problem.

#### **BANDAGING**

Effective bandaging is challenging since cats inherently try to shake wraps off, thereby increasing risk for hemorrhage. Bandaging techniques vary greatly but ideally should control bleeding without creating bandage-induced ischemia. I use four layers of tube gauze held in place by double-sided, 1-inch adhesive tape covered by self-adherent wrap or adhesive tape. Bandages should be removed within 12 to 24 hours.



#### **Follow-up**

Cats should be kept indoors on clean, dry surfaces, and clay litter should be replaced with paper litter or newspaper. Most patients recover uneventfully. However, 19% to 20% of declaw patients develop some sort of postoperative complication that requires veterinary attention. Short-term complications include pad laceration, pain, hemorrhage, swelling, lameness, and infection. Pain is managed as discussed in Anesthesia & Analgesia. Hemorrhage is usually managed by sedation or anesthesia and rebandaging the limbs. Applying cyanoacrylate or suturing skin flaps is sometimes helpful.



## Cautions

**Wound infection/dehiscence.** Infection and dehiscence of the onychectomy wound occur in 12% to 22% of cases. Chlorhexidine 0.5% foot soaks and antibiotics effective against gram-positive organisms usually resolve the problem. Exposure of P<sub>2</sub> is a more significant complication associated with wound dehiscence (Figure 4). It is preferable to close the skin over the exposed bone without excising P<sub>2</sub>. If there is not enough skin to pull over the bone, the exposed condyles of P<sub>2</sub> are excised using a nail trimmer or bone cutter. The skin on either side of the exposed bone is apposed with sutures, and the foot is wrapped until the sutures are removed.



Figure 4. Wound dehiscence with protrusion of P<sub>2</sub> two weeks after onychectomy. Removal of condyles and primary wound closure resolved the condition.



Figure 5. Spread-toe radiograph of cat with chronic drainage and lameness 3 years after onychectomy. Note residual unguis process and crest of P<sub>3</sub> in all digits.

**Lameness.** Lameness occurs after most onychectomies but usually resolves within a week. The blade technique causes the longest period of lameness, followed by the clipper technique, with the CO<sub>2</sub> laser causing the least lameness. With the clipper technique, at 3 days 44% of cats are lame, but by day 14 only 11% are lame. Long-term lameness for more than 4 months after surgery occurs in fewer than 1% of cases, but when it does occur it should be worked up with radiographs of the toes (Figure 5) to look for remaining germinal tissue.

**Chronic drainage/nail regrowth.** Chronic drainage from a declawed toe is most likely caused by retention of germinal epithelium. Swelling, pain, and drainage may commonly occur for months

to years before eruption of the nail. The erupted nail is routinely disfigured and difficult to remove (Figure 6). Before surgery to remove retained germinal tissue, radiographs of the toes should be done to identify additional areas of retained unguis crest for removal, even if the nail has not yet erupted.

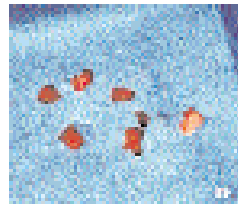


Figure 6. Surgically removed remnants of germinal tissue from the cat in Figure 5.

## SEVERE COMPLICATIONS

**Radial nerve paralysis.** A severe complication of onychectomy is tourniquet-induced radial paralysis. This neuropraxia of the radial nerve manifests as inability to extend the paw in cases in which tourniquets were placed below the elbow. If the tourniquet was placed above the elbow, a dropped elbow due to high radial nerve paresis results. Neuropraxia or sheath swelling is



Figure 7. Cat with pressure-induced ischemic necrosis of feet and toes following tight bandage application

commonly responsible. Resolution may take 4 to 6 weeks. Corticosteroids may be used but are of questionable value.

**Bandage- or tourniquet-induced ischemia.** This complication can vary in significance from mild swelling to full-thickness tissue slough requiring reconstructive surgery. In severe cases, skin grafts or toe or limb amputation may be required (Figure 7). ■

See Aids & Resources, back page, for references, further reading, and contacts.



# consultant on call

## ONYCHECTOMY COMPLICATIONS . PREVENTION AND TREATMENT

