

LITERATURE REVIEW AND SUMMARIES

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1. Onychectomy in Veterinary Practices: Surveys
2. Behavior Changes in the Declawed Cat
3. Methodology: Onychectomy Methods and Surgical Pain
4. Long-Term Concerns in the Declawed Cat

1. Onychectomy in Veterinary Practices: Surveys

Ruch-Gallie R, Hellyer PW, Schoenfeld-Tacher R, et al. Survey of practices and perceptions regarding feline onychectomy among private practitioners. *J Am Vet Med Assoc.* 2016; 249(3):291–298.

This survey was conducted in 2014 and published in 2016. The survey was based on questions sent by email to members of the Veterinary Information Network (VIN), which were answered anonymously online by 10.4% of its members.

Seventy-two percent of respondents indicated that they were still performing onychectomy, with 61.4% of these respondents performing the procedure less than once per month. Over 74% of respondents who still performed onychectomy indicated that they were recommending non-surgical alternatives. Of the 24% of respondents who indicated that they no longer perform onychectomy, when asked to check all that apply, 81.9% stated it was against their personal beliefs or ethics, 19.3% never learned the procedure, 17.7% indicated there was no client demand for the service, 14.5% indicated it was prohibited by clinic policy, and/or 9.4% indicated it was prohibited by local or national law.

Of the veterinarians who were still performing onychectomy, 61% were opposed to a legislative ban, while 63% of veterinarians, who no longer perform onychectomy, supported a legislative ban. In a similar trend, 39.3% of veterinarians who were still performing onychectomy agreed that the procedure involves a great deal or quite a bit of pain, while 82.3% of veterinarians no longer performing onychectomy felt that the procedure did involve a great deal or quite a bit of pain. This survey confirmed that differences of opinion pertaining to legislation, level of pain, and general attitudes towards the procedure reflected the individual's own practice behavior. It also highlighted the decreasing frequency that onychectomy is performed, even in practices that still offer it, with a shift towards offering alternatives to the procedure.

Why is this publication relevant?

- While onychectomy was still being offered, demand for the procedure is decreasing, with procedures being performed less than once a month.

- When onychectomy was still being offered, an increasing number of veterinarians were recognizing the utility of offering alternatives to onychectomy, including resource management and behavioral modification.
- It highlights that with changing perceptions and a better understanding of feline scratching behavior, veterinarians are in the perfect position to stop declawing. Instead, we can take the time to guide our clients on how to train and live with clawed cats successfully.

Wilson DV, Pascoe PJ. Pain and analgesia following onychectomy in cats: a systematic review. *Vet Anaesth Analg.* 2016;43(1):5–17.

This publication constitutes a systematic review of existing, published studies that evaluated pain associated with onychectomy in cats. Twenty papers were evaluated in total, in which 12 analgesics were evaluated, with nine studies involving a direct comparison of analgesic agents. The goal of the review was to assess the efficacy of the analgesic therapies administered to attempt to identify optimal analgesia strategies for onychectomy. Criteria to measure pain varied from limb use to various pain scales to behavior assessment, with many studies highlighting the difficulties associated with assessing pain in cats. Physiological variables, such as heart rate, respiratory rate, and body temperature, were not found to be useful in assessment of analgesic efficacy. Additionally, none of the studies administering rescue analgesia reported reassessment of these patients outside of the time points of the study. No clearly superior analgesic treatment was identified, no single agent was found to be effective, and insufficient evidence exists to support the success or failure of a multimodal analgesic approach.

Why is this publication relevant?

- In reviewing 20 different studies, this systematic review highlighted the challenges that exist in truly assessing and understanding the degree of pain onychectomy patients are experiencing.
- With 20 studies assessing different analgesics, there has been no success in determining a suitable analgesic to meet the pain needs of onychectomy patients.
- The need for analgesia was observed as long as 12 days postoperatively, yet there are no studies assessing pain beyond this time frame, and most patients go without analgesia, sometimes immediately postoperatively and sometimes after only a few days of analgesia.



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2. Behavior Changes in the Declawed Cat

Martell-Moran NK, Solano M, Townsend HG. Pain and adverse behavior in declawed cats. J Feline Med Surg. 2018;20(4):280-288.

This was a retrospective cohort study looking at 137 declawed and 137 non-declawed cats. Within each group, 88 were owned cats, and 49 were shelter cats. Cats with a previous history of trauma or congenital or developmental conditions were excluded from the study. The study assessed patients for behavior changes, including aggression, house soiling, and barbering, and also the presence or absence of back pain. The study also looked at the prevalence of P3 fragments in declawed patients and the relation of these to the four parameters. Onychectomy technique was taken into consideration. Declawed cats were found to have an increased risk of back pain (odds ratio [OR] 2.9), house soiling (OR 7.2), biting (OR 4.5), and barbering (OR 3.06). The presence of remaining P3 fragments further increased the risk of back pain and adverse behaviors. The age of the cat was not related to any of the outcomes. The authors concluded that onychectomy increases the risk of undesirable behaviors and may increase the risk for back pain regardless of surgical technique.

Why is this publication relevant?

- It is the first study to show behavior changes associated with being declawed.
- It is the first study to show an increased risk of back pain associated with being declawed.
- The study showed an increased risk of certain problem behaviors when fragments of P3 were left in situ.
- The problem behaviors noted were biting, house soiling, and barbering.
- Some or all of these behaviors most certainly can be linked to chronic pain. More studies are needed.

Wilson C, Bain M, DePorter T, et al. Owner observations regarding cat scratching behavior: an internet-based survey. J Feline Med Surg. 2016;18(10):791-797.

This internet-based survey was conducted to examine aspects of the cat, the environment, and scratching posts, and how these aspects might influence scratching behavior with the goal of using this information to assist in redirecting unwanted scratching behaviors in cats. The survey looked at the number and location of scratching surfaces, types of scratching substrates (e.g., rope, carpet, cardboard, wood), and the height and width of scratching

posts. The survey also examined the age and sex of the cat and whether these impacted undesirable scratching behaviors. Age was also examined as a factor in determining substrate preferences. Important points noted:

- Inappropriate scratching decreased as the different types/styles of posts increased in the home.
- The height, width, and base of a scratching post influenced use with a preference for two or more levels, upright structures, and structures taller than three feet (taller than the cat's stretched out height) with a narrower base (less than three feet).
- It is important to experiment with a variety of textures and types of scratchers to determine what a cat prefers. Cats nine years of age and under preferred rope>carpet>cardboard, while cats over nine years preferred carpet>rope>cardboard.
- Location is critical, and scratchers should be recommended in these areas:
 - Near the cat's sleeping areas (they often stretch or scratch when they wake up)
 - In areas where territory might be challenged (e.g., near entry doors, windows, feeding areas)
 - Multiple areas throughout the household
 - In living areas where humans spend time
- Punishment did not affect the frequency of inappropriate scratching, whereas positive reinforcement favorably impacted the use of desirable scratching surfaces.

Why is this publication relevant?

- This research provides valuable information about scratching preferences, which can assist owners in reinforcing desired scratching behaviors and redirecting unwanted scratching behaviors.

DePorter TL, Elzerman AL. Common feline problem behaviors: Destructive scratching. J Feline Med Surg. 2019; 21(3):235-243.

This publication is a review which looks at scratching behavior in cats. It explores the natural behavior of scratching and why cats scratch. The review examines treatment approaches for destructive scratching and provides tips for the use of appropriate scratching substrates, which substrates to use, and how to select them for each individual cat. The authors also discuss the use of synthetic feline pheromones to direct scratching behaviors. The review covers techniques to discourage the use of unwanted scratching on inappropriate substrates without the use of punishment, which can



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2. Behavior Changes in the Declawed Cat *continued*
increase anxiety and frustration. Onychectomy is presented, with the growing concern that the procedure is a significant welfare issue, which is coming under increased scrutiny as the long-term negative consequences of onychectomy are revealed. Alternative techniques to reduce damage to property from unwanted scratching behavior are presented, including application of plastic nail caps. A number of supplementary materials have been made available, including a valuable owner handout describing 'Strategies for reducing scratching by your cat.'

Why is this publication relevant?

- It provides valuable information on a natural feline behavior.
- It provides guidance on directing natural feline behavior to desired surfaces through provision of appropriate resources as well as behavioral modification.
- It provides options for positive reinforcement and the use of safe, humane alternatives to redirect scratching behavior.
- This is an excellent resource for veterinary professionals wanting to counsel their clients on scratching behaviors in cats.

Cloutier S, Newberry RC, Animal ACA, et al. Behavioural signs of postoperative pain in cats following onychectomy or tenectomy surgery. *Applied Animal Behaviour Science*. 2005;92(4):325–335.

This study examined relative degrees of acute pain in cats postoperatively, comparing onychectomy, digital flexor tenectomy (DFT), and sham surgery (control) patients. All three groups underwent anesthesia, surgeries were performed by the same surgeon, and bandages were placed regardless of study group. The authors hypothesized that compared to onychectomy, DFT would be less painful in the immediate postoperative period. Pain was assessed starting 0.5 hours after surgery and continued for 35.5 hours postoperatively. Before and after surgery, criteria assessed as indicators of patient comfort, discomfort, or pain included: groom body, groom with forepaw, groom bandages, shake forepaw, wipe forepaw, stand/sit, lie on sternum, lie on side, manipulate toy with forepaw, hide under blanket, and drink. These criteria were assessed by an experienced, blinded observer. The authors concluded that bandages contribute to increased forepaw wiping, shaking, and lying on side, even in control cats. They

concluded that tendonectomy patients had similar pain signs to those cats that had been declawed, thus indicating that the procedure is no less painful.

Why is this publication relevant?

- It demonstrates that tendonectomy as an alternative approach to declawing does not cause less pain in the immediate postoperative period.
- It demonstrates that both cats undergoing tendonectomy and declawing experience pain in the immediate postoperative period, while control cats that underwent 'sham' surgeries did not.
- It demonstrates that the practice of bandaging paws postoperatively is in and of itself a source of discomfort and agitation to cats.

Romans CW, Gordon WJ, Robinson DA, et al. Effect of postoperative analgesic protocol on limb function following onychectomy in cats. *J Am Vet Med Assoc* 2005; 227(1):89–93.

This prospective study directly compared limb function in cats post-onychectomy treated with either transdermal fentanyl, intramuscular butorphanol, or intraoperative topical bupivacaine. Limb function was determined by measuring peak vertical force (PVF), vertical impulse (VI), and PVF ratio at time periods before surgery and at 1, 2, 3, and 12 days after surgery. Patients in the study underwent unilateral onychectomy of the left forelimb only, allowing assessment of the right forelimb as a control. In all three groups, PVF, VI, and PVF ratios were significantly decreased compared to baseline values on the day after surgery. The narcotic treatments resulted in less impairment of limb function compared to intraoperative topical bupivacaine on day 2 postoperatively. Compared with baseline measurements, and regardless of analgesic protocol, cats continued to show significantly reduced limb function 12 days postoperatively. Measurements were not conducted beyond 12 days.

Why is this publication relevant?

- It confirms reduced limb function as a marker of pain directly related to onychectomy surgery.
- It reports continued reduced limb function regardless of the three analgesia protocols utilized.
- It demonstrates that reduced limb function in a declawed limb continued postoperatively up to and possibly beyond 12 days.

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3. Methodology: Onychectomy Methods and Surgical Pain

Robinson DA, Romans CW, Gordon-Evans WJ, et al. Evaluation of short-term limb function following unilateral carbon dioxide laser or scalpel onychectomy in cats. J Am Vet Med Assoc 2007; 230(3):353–358.

Holmberg DL, Brisson BA. A prospective comparison of postoperative morbidity associated with the use of scalpel blades and lasers for onychectomy in cats. Can Vet J 2006; 47(2):162–163.

These studies compared post-onychectomy patient limb function in patients undergoing laser or scalpel onychectomy. Limb function was determined in the first study by measuring peak vertical force (PVF), vertical impulse (VI), and PVF ratio with patients having either declaw by laser or declaw by scalpel technique. In the second study, cats were monitored for lameness by trained but blinded observers, with one paw declawed by laser and one paw declawed by scalpel. In both studies, there were days postoperatively that the patient or paw subjected to scalpel declaw showed reduced limb function or increased evidence of lameness. However, both studies also documented days when no differences were noted between different study groups (patient or paw), with both groups suffering similar limb dysfunction or lameness. The studies did not look beyond 12 days (Robinson) and ten days (Holmberg), with limb dysfunction noted at 12 days for both groups and normal gait noted at ten days for both paws.

Why are these publications relevant?

- They documented pain as measured by limb function or lameness postoperative onychectomy up to and possibly beyond 12 days.
- They documented only single time points when patients declawed by laser experienced less reduction in limb function or reduced lameness.
- They documented some level of pain in all declaw patients, regardless of method used.

4. Long-Term Concerns in the Declawed Cat

Cooper MA, Laverty PH, Soiderer EE. Bilateral flexor tendon contracture following onychectomy in 2 cats. Can Vet J. 2005; 46(3):244–246.

Cabon Q, Plante J, Gatineau M. Digital flexor tendon contracture treated by tenectomy: different clinical presentations in three cats. Journal of Feline Medicine and Surgery Open Reports. July 2015.

These studies identified a unique and under-diagnosed negative sequela of onychectomy: digital flexor tendon

contracture. All five patients were presented for thoracic limb lameness of variable duration, with onychectomy having been performed as early as three months and up to years prior. The patients were found to be painful, with mild to severe tension of the P1-P2 forelimb digits and reduced ability or inability to extend this joint. On further assessment, negative sequelae were found to include soft and bony tissue changes. Tendon histopathology revealed reactive fibroplasia with well-differentiated fibroblasts, small-caliber blood vessels, and thin collagen fibers. Radiographically, the joint angle of P1-P2 was frequently noted to be less than 90°. Successful treatment for all five patients involved tenectomy of the superficial and deep (Cabon) or deep digital flexor (Cooper) tendon(s), which resulted in release of the contracture and resolution of lameness.

Why are these publications relevant?

- They documented a previously unreported sequela of onychectomy.
- They documented a variable time frame to development of this sequela post-onychectomy, indicating that this condition may be more common in declawed cats as long-term monitoring for sequelae is rare.
- They provide information about a differential diagnosis for thoracic limb lameness.
- They provide criteria by which veterinarians should be monitoring declawed patients at every preventive care visit for evidence of tendon contraction.

O'Hagan, BJ. Neuropathic pain in a cat post-amputation. Aust Vet J. 2006; 84(3):83-86.

This case report describes a hindlimb amputee patient that presented clinical signs consistent with neuropathic or phantom limb pain (PLP) 38 days postoperatively. The patient had suffered a traumatic sciatic nerve injury 42 days prior, with subsequent limb amputation. The patient's clinical signs included hiding and urine house soiling. The patient was also described to be holding his stump in the air as though trying to shake the amputated limb. This pattern worsened over eight days, with the patient becoming lethargic and unable to take only a few steps before pausing to attempt to shake the stump and falling over. Treatment with amitriptyline did not resolve the concern. The patient was admitted for treatment for PLP, starting with induction to an initial anesthetic state, followed by constant rate infusion of morphine, lignocaine, and ketamine. This was continued for a total of 36 hours with ongoing



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4. Long-Term Concerns in the Declawed Cat *continued*
O'Hagan, BJ. Neuropathic pain in a cat post-amputation.
Aust Vet J. 2006; 84(3):83-86. *continued*
 transmucosal-buprenorphine and oral amitriptyline for 21 days. At discharge, the clinical signs had resolved and did not recur after 14 days, 21 days, or ten months post-amputation.

Why is this publication relevant?

- It is the first published case of possible PLP in a cat.
 - It confirms that nerve damage can lead to clinical signs consistent with PLP.
- It should encourage us to look to all onychectomy patients for evidence of PLP: shaking of limbs, avoidance of digging in litter box, hiding, or any other abnormal, unexplained clinical sign or behavior.
 - PLP in humans can occur immediately or years post-amputation, with signs being described as intermittent but occasionally constant. Signs include shooting, stabbing, or pricking pains that last for short periods. Onychectomy patients that suffer PLP may be overlooked as having other medical concerns as a result of the inconsistent pattern of PLP.



FEATURED WEBINAR
**Feline Onychectomy:
 What We Know and
 What We Don't Know**

Dr. Kelly St. Denis, MSc, DVM, DABVP (Feline)

Complimentary Webinar**Feline Onychectomy: What We Know and What We Don't Know**

Kelly St. Denis, MSc, DVM, DABVP (Feline)

Onychectomy has always been a controversial topic, but over the last decade, a large push to end this practice has revived the controversy. Declawing is an emotionally charged issue, leading to much discussion on social media sites, in social settings, at conferences, and in the clinic. This presentation will provide a review of the current understanding of the surgical procedure known as 'declawing.' We will discuss the factors behind the desire for declaw, as well as the shift that is diminishing that demand. Surgical, short, and long-term risks will be reviewed. Given that much has yet to be learned about the long-term consequences of feline onychectomy, the presentation will also review applicable literature from other species undergoing similar surgical procedures.

Webinar Objectives:

- Gain an understanding as to why cats scratch
- Review the reasons why people have pursued onychectomy in the past
- Explore the short-term surgical risks of onychectomy
- Explore the long-term surgical risks of onychectomy
- Explore the long-term neurological side effects of amputation as it is understood in other species as well as in feline amputee patients

RACE approved: 1 CE Hour

VIEW WEBINAR: www.catvets.com/onychectomy