



Cool Solutions for Tight Surgical Spots: Intratumoral Cryotherapy for Complex Cases

When surgery isn't an ideal option, cryotherapy can provide a practical solution for veterinarians of every experience level.

Table of Contents

3	Surgical Sites Addressed In This Guide
5	Cryotherapy For Tricky Surgical Locations
6	A Step-By-Step Guide To Using Cryotherapy
9	Eyelids
11	Nose & Muzzle
12	Oral Cavity/Gums
14	Ear Pinna
15	Axilla/Inguinal
17	Perianal Region
18	Genital Lesions
19	Tail
20	Digits & Paws
21	About Kubanda Cryotherapy



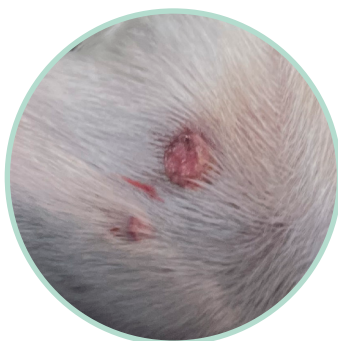
Surgical Sites Addressed in This Guide

Some patients aren't good candidates for surgery. Their age or the anatomical location of the surgical site can make traditional surgery a less-than-ideal option. In this guide, we'll review how cryotherapy can be an alternative to surgery or simplify a surgical treatment plan for these instances. Below is a quick reference guide to the nine conditions covered in this guide.



Benign Masses:

Cryotherapy can shrink or debulk masses that are bothering the pet or pet parent to improve comfort or appearance. Generally performed under mild sedation, it may be used for pets where elective surgery may put the patient at risk, including older animals and pets with other conditions.



Cancerous Masses:

Cryotherapy should be part of a comprehensive cancer treatment plan. It may be used to treat or debulk masses, particularly in difficult surgical areas—such as on the tail, paw, or mouth—or in pets otherwise not a fit for surgery. Cryotherapy can be used on its own, or to improve future surgical outcomes.





Surgical Site	Common Lesions in This Area	Why Cryotherapy is Useful
Eyelids	▪ Meibomian gland adenomas ▪ Papillomas	Avoids using a scalpel near the eye, reduces scarring, and preserves eyelid function.
Nose & Muzzle	▪ Papillomas ▪ Histiocytomas ▪ Squamous cell carcinoma	Eliminates the need for tight closures, preserves facial appearance, and produces low trauma, avoiding deeper facial nerves.
Oral Cavity/ Gums	▪ Epulides ▪ Papillomas ▪ Melanoma	Cryotherapy can treat lesions without placing sutures in wet areas like the mouth, where different tissue responds differently than other parts of the body.
Ear Pinnae	▪ Hemangiomas ▪ Histiocytomas ▪ Papillomas	Minimizes bleeding, preserves cartilage, and results in better cosmetic outcomes.
Axilla/Inguinal	▪ Lipomas ▪ Soft tissue sarcomas (small, superficial cases)	Cryotherapy avoids incision site dehiscence due to motion in this high-mobility area without a drain.
Perianal Region	▪ Perianal adenomas ▪ Papillomas ▪ Lipomas	Avoid fecal contamination of wounds, reduce inflammation and pain post-procedure with cryotherapy.
Genital Area	▪ Papillomas ▪ Transmissible venereal tumors (TVT)	Cryotherapy avoids surgical trauma in this sensitive site and may be used with mild sedation.
Tail	▪ Sebaceous adenomas ▪ Lipomas ▪ Soft tissue sarcomas ▪ Histiocytoma ▪ Superficial dermal lesions	Patients can experience poor healing with a surgical incision in this location—cryotherapy reduces the risk of delayed wound healing.
Digits/Paws	▪ Interdigital cysts ▪ Melanomas ▪ Plasmacytoma ▪ Lick granuloma ▪ Lipomas ▪ Soft tissue sarcomas	Cryotherapy avoids tight suture tension, enabling tissue-sparing treatment in this hard-to-suture area.

Cryotherapy for Tricky Surgical Locations

Intratumoral cryotherapy has become a preferred treatment for surgical locations that lack enough tissue for easy closure, or that are too small or sensitive for a scalpel blade. Kubanda Cryotherapy is the first minimally-invasive, point-of-care treatment for lumps, bumps, and tumors in pets.

Cryotherapy can either be used in place of surgery or alongside surgical procedures. In the case of combined cryotherapy and surgery, veterinarians often use cryotherapy to shrink the tumor, enabling them to have enough skin during surgery to remove the debulked tumor and more comfortably close the surgical site. In other cases, veterinarians may remove the tumor surgically and then freeze the margin or, for a topical lesion, freeze the root after clipping a pedunculated lesion.

Pearls and Pitfalls

- Patients typically return to normal activities and energy levels within 24 hours of cryoablation
- Most patients do not experience pain at treatment site within 48 hours after treatment
- Mild oozing of serosanguinous fluid from the subcutaneous probe insertion site may be expected for up to 48 hours after cryoablation. Keeping the wound clean and dry will promote healing
- Topically treated lesions may itch as they heal
- There may be blanching of the fur on the treated area
- A physical barrier may be needed (such as an E-collar) if the patient is likely to inflict mechanical trauma to the area



After the cryo procedure, I was impressed—no blood on my hands! That wouldn't happen with surgery.

– Dr. K, VMD



A Step-by-Step Guide to Using Subcutaneous Cryotherapy

Kubanda Cryotherapy is administered via a closed-tip cryoprobe, allowing pets to go home and return to normal activity without a large incision or complex aftercare. A freeze-thaw-freeze cycle kills cells safely, quickly, and economically.

Step 1

The tumor is diagnosed by a veterinarian and cryotherapy is deemed an appropriate option.

Step 2

The veterinarian discusses patient goals and establishes a treatment plan. If cryotherapy is determined to be the plan of action, the veterinarian explains the procedure and sets the pet owner's expectations.

Cryotherapy is a minimally-invasive treatment that will shrink the tumor over the next several weeks/months after treatments. Sometimes results are visible faster, but the reduction in tumor size typically happens over several weeks. The tumor will be measured prior to treatment and re-assessed several weeks post-treatment for size reduction.

If the plan of care includes an FNA or a biopsy of the tumor, cryotherapy treatment will not interfere with the ability to also perform these diagnostics.

Step 3

The patient is lightly sedated. Kubanda Cryotherapy can be administered in a treatment room, no surgical suite is required. Cryotherapy can also be paired with other procedures, such as a dental cleaning, maximizing time and economic efficiency.

Step 4

The Kubanda cryoprobe is placed into the tumor by the veterinarian, and treatment time is determined based on the size and location of the tumor.

Step 5

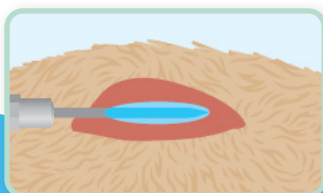
The veterinary technician monitors the iceball formation process. The treatment can be easily monitored through visual and physical examination. An ultrasound may be optionally used to monitor the iceball at the veterinarian's discretion but is not required.

Step 6

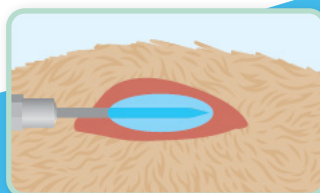
The patient returns home the same day without the need for drains or complex post-procedure care protocols. The tumor begins shrinking over the next few weeks.

Iceball Formation

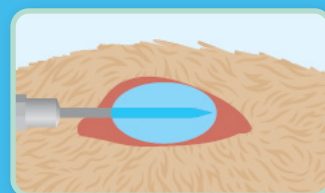
The iceball is the volume of frozen tissue created by the cryoprobe. It expands radially from all surfaces of the cryoprobe in an ellipsoid shape during the freezing cycle.



Beginning freeze



Mid freeze



End of freeze



How Do Cells Get Damaged by Freezing?

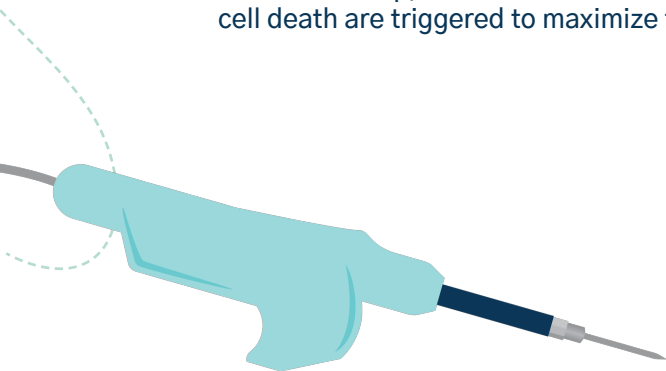
There are multiple mechanisms of cell death, including apoptosis and necrosis.

Ice crystals form inter and intracellular in target tissues. In the case of tumor cells, as the ice crystals form inside the cell, fluid rushes out, solute concentration increases, and the tumor cell dehydrates. The ice crystals and the chemical changes due to high solute concentration within the tumor cell can damage the organelles and weaken the cell membrane.

When thawing occurs, free extracellular fluid from thawed ice crystals rushes back into the hypotonic tumor cells, causing them to swell and ultimately burst through the weakened tumor cell membrane (cell lysis).

Two freeze-thaw cycles are typically performed. During the second freeze cycle, ice crystals grow larger and more quickly because the local tissue temperature is lower than the initial temperature prior to cryoablation. Additionally, occlusions in microvasculature can lead to ischemia in the tumor tissue.

This three-step, freeze-thaw-freeze cold injury process ensures that multiple mechanisms of cell death are triggered to maximize the treatment's efficacy.



The tumors shrank just days after the cryo treatment.

– Danielle, Pet Owner

Cryotherapy Fits Seamlessly Into Clinic Workflows



Minimal veterinarian time is required for treatment. Technicians can easily monitor freeze-thaw-freeze cycles.



Treatment can be administered on the same day as the diagnosis since no operating rooms or additional scheduling is required.



Light sedation makes cryotherapy a viable option for patients who are not good surgical candidates.

Cryotherapy enables veterinarians to treat tumors for half the cost of traditional surgery, resulting in more tumor treatments, better patient outcomes, and happier pet parents.



Surgery Clinic Overhead and COGS

Clinic overhead and COGS for surgery on a small tumor on the trunk costs \$350 on average, compared to a large tumor in the axilla that may cost as much as \$1,500.

VS.

Cryotherapy Clinic Overhead and COGS

Clinic overhead and COGS for cryotherapy treatment on a small tumor on the trunk costs \$150 on average, compared to a large tumor in the axilla which costs \$300 on average.

This significant reduction in overhead and COGS with cryotherapy enables veterinary clinics to offer subcutaneous cryotherapy treatments for \$250–\$900 compared to surgery, which typically costs pet owners \$1,000+.

Eyelids

Cryotherapy Treatment Cheatsheet

Lesions that commonly occur in this area:

- Meibomian gland adenomas
- Papillomas

Why traditional surgery is challenging:



Thinner, delicate tissues



Innervation



Delicate structure of the eye



Extremely small sutures required

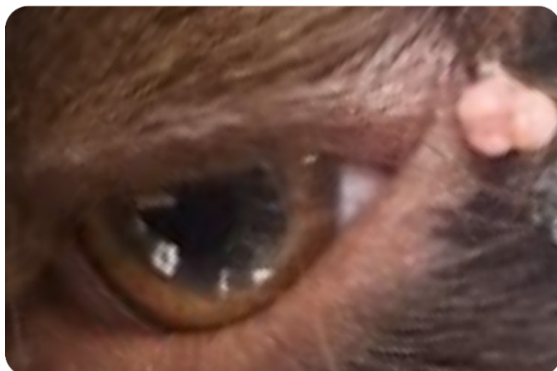


Risk of corneal abrasion

Cryotherapy enables the practitioner to more easily treat eyelid masses while reducing scarring and preserving eyelid function. It allows for a deeper treatment of any neoplastic tissue at the root or base of the lesion. **Here are some tips for how to use Kubanda's cryotherapy system to optimize outcomes:**

1. Confirm your diagnosis and that cryotherapy is indicated for the tumor.
2. Treat with the Kubanda topical probe. This direct contact allows for a highly specific, deeper freeze than a spray-based approach.
3. Typically this can be performed under light sedation.
4. Larger or pedunculated eyelid masses can be snipped and then frozen at the base.
5. Use of a chalazion clamp can stabilize the surrounding tissue during treatment and can also enable a deeper freeze as it reduces local blood flow.
6. Pet parents should be informed that retreatment may be necessary, as a topical approach treats a 2mm layer at a time. This should be scheduled for at least 2 weeks after the initial treatment.

Before Cryo



After first Cryo Session





Research Supporting the Use of Cryo for Eyelid Tumors:



Application of local anaesthesia and cryosurgery for eyelid masses in dogs

[pmc.ncbi.nlm.nih.gov/articles/PMC8959322/](https://pubmed.ncbi.nlm.nih.gov/articles/PMC8959322/)

This study found that local anaesthesia and cryosurgery were clinically efficacious and cost-effective treatments for patients with eyelid masses who were not good candidates for general anesthesia.



Feline distichiasis treated with cryoepilation: A retrospective study of 15 cats (27 eyes)

onlinelibrary.wiley.com/doi/10.1111/vop.13202?af=R

The study concluded that cryoepilation effectively relieved symptoms in distichiasis in cats with some patients requiring a second procedure.



Canine distichiasis cryoepilation using a liquid nitrogen-cooled, closed probe transconjunctival triple-freeze technique: Outcomes in 125 dogs (234 eyes)

pubmed.ncbi.nlm.nih.gov/38071437/

The study revealed that cryotherapy for canine distichiasis is relatively simple and safe with a high success record.

Muzzle

Cryotherapy Treatment Cheatsheet

Lesions that commonly occur in this area:

- Papillomas
- Squamous cell carcinoma
- Histiocytomas

Why traditional surgery is challenging:



Limited skin for closure



Highly vascular region



Highly mobile region where licking is a concern



Sensitive area near crucial structures

Cryotherapy enables the practitioner to avoid using the scalpel near more sensitive and highly vascular structures and offers a solution that preserves cosmetic appearance while eliminating the need for small and tight sutures in this region. Cryotherapy produces low tissue trauma and avoids disruption of surrounding tissue. **Here are some tips for how to use Kubanda's cryotherapy system to optimize outcomes:**

1. Confirm your diagnosis and that cryotherapy is indicated for the tumor.
2. For small lesions (<5mm), treat with the Kubanda topical probe. For larger masses, use the subcutaneous probe. If the lesion is pedunculated, snip it and freeze its base.
3. Typically this can be performed under light sedation.
4. For subcutaneous treatments, protect the surrounding tissue from cryogenic injury by applying warm sterile saline or water over the skin's surface every 30 seconds. This protects delicate anatomy while maintaining subzero temperatures below the skin.



Research supporting the use of cryo for the muzzle



Combined carbon dioxide laser and cryosurgical ablation of rostral nasal septum squamous cell carcinoma in 10 dogs

pubmed.ncbi.nlm.nih.gov/30133041/

This study revealed that combination CO2 laser and cryosurgical ablation provided an effective outcome in dogs with squamous cell carcinoma restricted to the nasal septum.

Oral Cavity/Gums

Cryotherapy Treatment Cheatsheet

Lesions that commonly occur in this area:

- Epulides
- Papillomas
- Melanoma

Why traditional surgery is challenging:



Non-Pliable Tissue



Vascular area
prone to bleeding



Mouth melanomas are
always high-grade
in dogs



Challenging to get
clear margins without
radical resection

Cryotherapy is significantly less invasive than surgical resection in the oral environment. It may also be paired with immunotherapy for melanoma. **Here are some tips for how to use Kubanda's cryotherapy system to optimize outcomes:**

1. Confirm your diagnosis and that cryotherapy is indicated for the tumor.
2. Typically, this can be done under light sedation; however, when working orally, it is always important to monitor the airway
3. When using cryotherapy as a component of comprehensive care in malignant cases, freeze from the inside of the oral cavity outwards in the event resection is required to prevent tumor seeding through the mouth/lip flap.
4. A soft food diet is recommended after any treatment involving an oral mucosal surface.

Probe selection will be determined by the size and exact location (as well as ability for good visualization) of the lesion. Larger round or protruding lesions would benefit from the iceball ablation generated by the subcutaneous (penetrating) probe. Superficial lesions or pedunculated lesions that are snipped before freezing can utilize the ball or blunt-tip topical probe.





Research in Human Health Supporting the Use of Cryo for Oral Applications



Immunotherapy Plus Cryotherapy: Potential Augmented Abscopal Effect for Advanced Cancers

www.frontiersin.org/journals/oncology/articles/10.3389/fonc.2018.00085/full



Cryoablation and post-progression immune checkpoint inhibition in metastatic melanoma: a phase II trial

www.nature.com/articles/s41467-024-51722-x#:~:text=From%20May%202018%20through%20July,response%2C%203%20stable%20disease

Ear Pinna

Cryotherapy Treatment Cheatsheet

Lesions that commonly occur in this area:

- Hemangiomas
- Papillomas
- Histiocytomas

Why traditional surgery is challenging:



Limited tissue for incision closure



High bleeding risk area



Cartilage heals slowly



High infection risk



Difficult to bandage

Cryotherapy lets the practitioner minimize bleeding, preserve cartilage, and provide better cosmetic outcomes. **Here are some tips for how to use Kubanda's cryotherapy system to optimize outcomes:**

1. Confirm your diagnosis and that cryotherapy is indicated for the tumor.
2. Use the Kubanda topical probe for best results.
3. Typically this can be performed under light sedation.
4. The ear pinna is a high cartilage area. Treat slowly to prevent permanent damage to the cartilage. Retreatment is preferred to over-treatment in this more delicate region.
5. Closely monitor treatment to avoid causing cauliflower ear.¹
6. Pet parents should be informed that retreatment may be necessary, as a topical approach treats a 2mm layer at a time. This should be scheduled for at least 2 weeks after the initial treatment.

Research supporting the use of cryo for the ear pinna:



Surgery of the ear and pinna

[pmc.ncbi.nlm.nih.gov/articles/PMC7118988/](https://pubmed.ncbi.nlm.nih.gov/articles/PMC7118988/)

This study includes a comprehensive overview of performing surgery on the ear and pinna, including cryosurgery recommendations.



Axilla/Inguinal

Cryotherapy Treatment Cheatsheet

Lesions that commonly occur in this area:

- Lipomas
- Soft tissue sarcomas (small, superficial cases)

Why traditional surgery is challenging:



This region often requires a drain to be placed



Closure is difficult because the tissue spans a mobile joint



There is the brachial plexus and other innervation and vasculature in the area

Cryotherapy provides an efficient, significantly less invasive solution for this highly mobile surgical site. This treatment further limits incision site dehiscence due to motion in this high-mobility area and doesn't require the placement of a drain. **Here are some tips for how to use Kubanda's cryotherapy system to optimize outcomes:**

1. Confirm your diagnosis and that cryotherapy is indicated for the tumor.
2. Use the Kubanda subcutaneous probe for lesions in these deeper locations. If the mass is small (<5mm), the probe may be placed adjacent to rather than through the mass.
3. Extra care will need to be taken in planning the approach and insertion site due to the complex structures and limited mobility of this anatomical region.
4. Once the mass has started to freeze, you may use manual traction to move the mass and freeze-zone away from underlying structures in order to prevent cold injury to other tissues
5. For diffuse masses, such as some lipomas, you may consolidate and compress the diffuse tissue toward the probe, where it will freeze in place.
6. Pet parents should be advised that for larger masses -- particularly those larger than the max treatment volume (up to 4 treatments of 2.5 x 2.5 x 4 cm volume) -- the mass may need to be treated in a staged approach, with the initial focus on debulking and restoring normal motion for the patient. There should be at least a one-month interval between sessions to allow for initial debulking to occur.

Treatment Examples and Research Supporting the Use of Cryo for Axilla/Inguinal Applications:

Dermal Lesion



Topical Freeze



SubQ Lesion



SubQ Freeze



Clinical study of cryosurgery efficacy in the treatment of skin and subcutaneous tumors in dogs and cats

pubmed.ncbi.nlm.nih.gov/18986310/

This study concluded that cryosurgical ablation is an effective treatment for cutaneous or subcutaneous tumors in dogs and cats where wound closure might limit surgical excision.

Perianal Region

Cryotherapy Treatment Cheatsheet

Lesions that commonly occur in this area:

- Perianal adenoma
- Lipomas
- Perianal carcinoma

Why traditional surgery is challenging:



High risk of infection



Innervation makes this region difficult



Swelling can lead to bowel obstruction or continence issues



Clean surgical margins are difficult to obtain

Cryotherapy can help avoid fecal contamination of wounds and can reduce post-operative pain and inflammation. **Here are some tips for how to use Kubanda's cryotherapy system to optimize outcomes:**

1. Confirm your diagnosis and that cryotherapy is indicated for the tumor - only use for external perianal tumors.
2. For small lesions (<5mm), treat with the Kubanda topical probe. For larger masses, use the subcutaneous probe.
3. Typically, this can be done under light sedation.
4. Thoroughly prep the site to avoid fecal contamination risk.
5. For subcutaneous treatments, protect the surrounding tissue from cryogenic injury by applying warm sterile saline or water over the skin's surface every 30 seconds. This protects delicate anatomy while maintaining subzero temperatures below the skin.
6. Research indicates that cryoablation in this region should be avoided for dogs with Cushing's Disease.²

Research supporting the use of cryo for the perianal region:



Cryotherapy treatment of perianal adenoma in a dog

dergipark.org.tr/en/download/article-file/2839148

This research revealed that cryotherapy shrinks perianal adenoma without causing incontinence and helps control secondary symptoms like ulceration and bleeding.



Genital Lesions

Cryotherapy Treatment Cheatsheet

Lesions that commonly occur in this area:

- Papillomas
- Transmissible venereal tumors (TVT)

Why traditional surgery is challenging:



High risk of infection



Limited skin makes incision closure difficult



Licking, chewing, and self-trauma are difficult to prevent in this area



Surgical complications can have long-term impact on breeding

Cryotherapy can be utilized to reduce surgical trauma in this sensitive location. **Here are some tips for how to use Kubanda's cryotherapy system to optimize outcomes:**

1. Confirm your diagnosis and that cryotherapy is indicated for the tumor.
2. For small lesions (<5mm), treat with the Kubanda topical probe. For larger masses, use the subcutaneous probe.
3. Typically this can be performed under light sedation.
4. For subcutaneous treatments, protect the surrounding tissue from cryogenic injury by applying warm sterile saline or water over the skin's surface every 30 seconds. This protects delicate anatomy while maintaining subzero temperatures below the skin.



Research supporting the use of cryo for genital lesions:



Cryosurgery and electrocautery in treatment of transmissible venereal tumors in large breed dogs: a case report

www.cabidigitallibrary.org/doi/pdf/10.5555/20143394187

This case report concluded that the combination of electrocautery and cryosurgery was clinically efficacious, cost-effective, and convenient and presented no complications or recurrence.



Persistent papilloma treated with cryotherapy in three dogs

pubmed.ncbi.nlm.nih.gov/28722195/

This study concluded that cryotherapy can effectively resolve papilloma lesions.

Tail

Cryotherapy Treatment Cheatsheet

Lesions that commonly occur in this area:

- Sebaceous adenoma
- Lipomas
- Histiocytoma
- Soft tissue sarcomas
- Superficial dermal lesions

Why traditional surgery is challenging:



There is poor blood supply to the tail, which can delay healing



There is little skin for closing a surgical incision



Surgical complications can have a long-term impact on balance



The tail poses an increased infection risk



Licking, chewing, and self-trauma are difficult to prevent on the tail

Cryotherapy enables the practitioner to perform less invasive tumor treatment if traditional resection or amputation is not possible or desired, and the minimally invasive nature of the procedure allows for faster healing, which is particularly important in this highly mobile area. **Here are some tips for how to use Kubanda's cryotherapy system to optimize outcomes:**

1. Confirm your diagnosis and that cryotherapy is indicated for the tumor.
2. For small lesions (<5mm), treat with the Kubanda topical probe. For larger masses, use the subcutaneous probe.
3. Typically this can be performed under light sedation.
4. Cryotherapy may be paired with surgery to first debulk the mass, allowing for easier surgery with adequate skin for closure. If this is done, there should be a two-week to one-month interval between cryotherapy and surgery.



Zone of
Necrosis:
2.5 cm x 4 cm
per 10/7/10
freeze cycle

Distal Limbs, Digits & Paws

Cryotherapy Treatment Cheatsheet

Lesions that commonly occur in this area:

- Interdigital cysts
- Melanomas
- Plasmacytoma
- Lick granuloma
- Lipomas
- Soft tissue sarcomas

Why traditional surgery is challenging:



Post-operative sutures on the paws are difficult to manage



There is limited tissue for incision closure



The vasculature of the paws causes bleeding



Constant motion and weight bearing



Surgical complications can have long-term gait and balance implications

Treating distal limbs, paw, and digit conditions with cryotherapy helps practitioners avoid the use of tight sutures on a high-mobility anatomical area where there is limited skin for closure. **Here are some tips for how to use Kubanda's cryotherapy system to optimize outcomes:**

1. Confirm your diagnosis and that cryotherapy is indicated for the tumor.
2. For small lesions (<5mm), treat with the Kubanda topical probe. For larger masses, use the subcutaneous probe.
3. Typically this can be performed under light sedation.
4. Topical lesions such as lick granulomas should be treated conservatively with short freeze cycles.
5. Cryotherapy may be paired with surgery to first debulk the mass, allowing for easier surgery with adequate skin for closure. If this is done, there should be a two-week to one-month interval between cryotherapy and surgery.
6. Pet parents should be informed that retreatment may be necessary, due to the difficult anatomical location, particularly if a topical approach is used, as it only treats a 2mm layer at a time. This should be scheduled for at least 2 weeks after the initial treatment.



About Kubanda Cryotherapy

Kubanda Cryotherapy lets you treat lumps, bumps, and tumors in your office by providing an easy-to-use, minimally invasive, point-of-care solution to pet parents looking for better treatment options.

Kubanda's cryotherapy system uses extreme cold to deliver high-quality, targeted tumor treatment at a fraction of the cost of surgery. Our custom-designed cryosystem consists of a cryoprobe and a gas-control module that fits perfectly into the general veterinary workflows.

Treatment is done with mild sedation, and the short recovery time and low cost means cryotherapy is a great choice for happy vets, pets, and pet parents. Kubanda Cryotherapy can be used in all areas of tumor management (cancer, cosmesis, palliation, and debulking) as a versatile addition to the veterinary tool box.

We allow vets to trade a knife for a needle and provide state-of-the-art tumor treatment in the primary care setting with a versatile, adaptable tool suitable for both benign and cancerous masses.



Kubanda's simple procedure really made a difference in our dog's quality of life. We are beyond grateful.

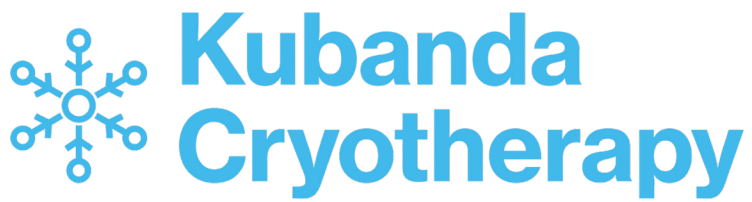
– Victor, Pet Owner



Visit Kubanda Cryotherapy
to learn more
kubandacryotherapy.com/vets



Schedule a 15-minute
introduction call
bit.ly/cryo15mincall



Thanks for Reading!

kubandacryotherapy.com/vets
Sales@KubandaCryo.com
667.401.2796

References

1. <https://open.lib.umn.edu/largeanimalsurgery/chapter/field-treatment-options/>
2. <https://www.vin.com/apputil/content/defaultadv1.aspx?id=3859205&pid=11223&print=1>