

## Cryosurgery

- Purpose: For rapid treatment of common skin conditions
- Benign lesions: warts, seborrheic keratosis
- Premalignant lesions: actinic keratosis
- Malignant tumors: Basal Cell/squamous cell carcinomas.
- MUST KNOW THE DIAGNOSIS

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## Key recommendations for clinical practice

CLINICAL RECOMMENDATION	EVIDENCE RATING
Malignant skin lesions should not be treated using the dipstick method because of inadequate depth of freezing.	C

Cryosurgery is more effective than salicylic acid or observation for the cure of common warts, but not plantar warts.	B
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Cryosurgery is highly effective for actinic keratosis and is the treatment of choice for most patients.	C
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CLINICAL RECOMMENDATION	EVIDENCE RATING
In the treatment of deep plantar or palmar warts, favorable cure rates have been reported for initial pretreatment with keratolytics (salicylic acid).	A

Molluscum contagiosum, a common dermatologic problem in younger persons, is caused by a poxvirus. This lesion is amenable to cryosurgery, if indicated.	C
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## Liquid nitrogen

- Boiling point is -196°C
- Cellular destruction
  - Ice crystal formation
  - Cellular dehydration
  - Protein and enzymatic denaturization

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## Liquid nitrogen Advantages

- Clinician
  - Maintenance cost is inexpensive
  - Easy to learn
  - Can freeze multiple lesions at once
  - No assistance needed to perform
- Patient
  - No local anesthetic needed
  - Pain tolerable
  - No sutures
  - Would care is reality easy

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## Liquid nitrogen Disadvantages

- Clinician
  - Initial start up cost
  - Storages facilities
  - Filling storage canisters
- Patients
  - Multiple treatments for some lesion
  - Comorbid conditions (DM II, PAD, Raynaud's)

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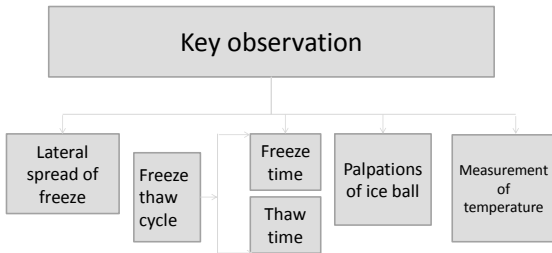
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## Key observations during cryosurgery




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## Lesion freezing

- When apply liquid nitrogen the frozen area turns white = "freezeball" or "ice ball"
- Depth of freeze will achieve 1-1.5 times radius of lesion
- Lethal zone
  - Tissue temp < -20°C
  - 2-3.5 mm inward from the outer margin of freezeball
- Freeze 1-2 mm beyond lesion edge




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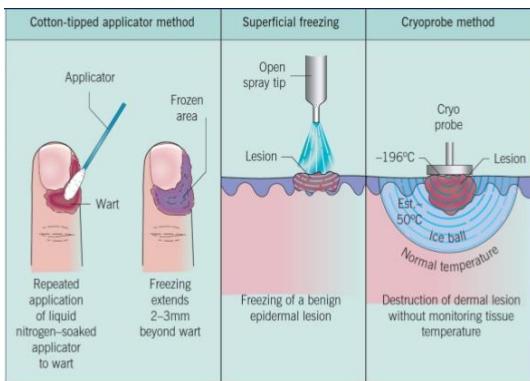
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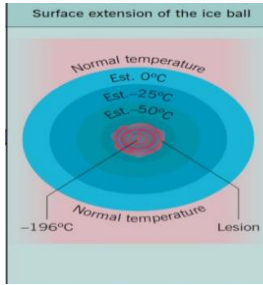
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### Freezeball temperature zones

- Size of freezeball will extended 1 to 1.5 times as deep as is wide
- Keep freezeball within 1-2 mm of outer edge of skin lesion



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### Cotton tip

- Fill a cotton applicator tip with liquid nitrogen
- Apply direct pressure to the lesion for desired freezeball



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### Cryoprobe

- Nitrous oxide (N<sub>2</sub>O), laughing gas, is applied to skin lesion through cryoprobes.
- Liquid N<sub>2</sub>O is applied at a constant temperature of 89°C direct to area
- N<sub>2</sub>O can be stored safely and does not have any storage or transportation hazards associated with liquid nitrogen.



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## Spray methods

- Timed-spot freeze technic
- Rotatory or spiral pattern
- Paintbrush method




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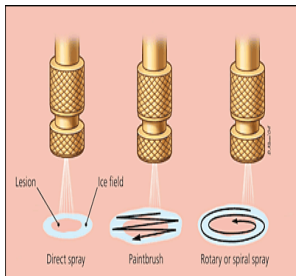
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## Spray techniques

- Direct spray best for using a consistent temperature
- Rotatory/Paintbrush can be useful for treating larger lesion.
- Rotatory/Paintbrush no well standardized for ensuring temperature needed for malignant lesions.




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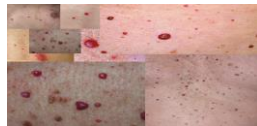
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## Cryosurgery Effectiveness

- **Low**
  - Vascular lesion: e.g. angiomas
  - Achrochordons
- **Medium**
  - Xanthelasma
  - Dermatofibroma
  - Keloids
  - Molluscum
  - Prurigo nodularis




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### Cryosurgery Effectiveness

- **Medium-High**

- Seborrheic keratosis
- Verruca
- Condyloma
- Lentigo
- Freckles



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### Cryosurgery Effectiveness

- **High**

- Actinic keratosis
- Superficial Basal Cell Carcinoma
- Superficial Squamous Carcinoma



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### Cryosurgery: Special population

- Children
  - Try to avoid pain
  - Use a lidocaine/prilocaine cream (EMLA cream) if needed
- Useful modality for those on anticoagulants, individuals with pacemakers and patients allergic to anesthetics.

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## Cryosurgery: Contraindications

• **Absolute:**

- Lesion for which tissue pathology is required
- Lesion located in an area with compromised circulation  
Melanoma
- Patient unable to accept possibility of pigmentary changes
- Proven sensitivity or adverse reaction to cryosurgery
- Sclerosing basal cell carcinoma or recurrent basal cell or squamous cell carcinoma, particularly when located in a high-risk area (e.g., temple, nasolabial fold)

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## Cryosurgery: Contraindication

**Relative:**

- Cold intolerance
- Cold urticaria
- Collagen disease or autoimmune disease
- Concurrent treatment with immunosuppressive drugs
- Cryoglobulinemia
- Heavily pigmented skin
- Lesions located in pretibial areas, eyelid margins, nasolabial fold, and hair-bearing areas
- Multiple myeloma
- Raynaud's disease
- Uncontrolled diabetes

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## Cryosurgery: Side Effects

• **Short Term**

- Pain and erythema
- Blister formation
- Hemorrhage
- Infection
- Pyogenic granuloma



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## Cryosurgery: Side Effects

- Long Term
  - Nerve damage
  - Pigmentary changes
  - Hyerphtrophic scar formation
  - Permanent nail dystrophy
  - Recurrence of lesion
  - Multiple visit may be needed

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## Complications/Side Effects of Cryosurgery

<b>Acute</b>
Bleeding at the freeze site
Blister formation
Edema
Headache (after treatment of facial lesions)
Pain
Syncope (vasovagal; rare)
<b>Delayed</b>
Bleeding
Excess granulation tissue formation (rare)
Infection (rare)
<b>Protracted or permanent</b>
Atrophy (rare)
Hair and hair follicle loss
Hypopigmentation
<b>Protracted but temporary</b>
Alteration of sensation
Hyperpigmentation
Hypertrophic scarring
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