



UNC  
SCHOOL OF MEDICINE

# Cryosurgery and Electrosurgery

## *Practical Applications*

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All faculty in a position to control content for this session have indicated they have no relevant financial relationships to disclose.

The content of my material/presentation in this CME activity will not include discussion of unapproved or investigational uses of products or devices.

## Objectives

- At the end of lecture, learner will be able to:
  - » Identify the uses, risks, benefits, and complications of cryosurgery and electrosurgery
  - » Learn the methods and techniques of cryosurgery and electrosurgery for destroying benign and malignant cutaneous lesions
  - » Utilize standardized terminology, coding, and documentation to accurately code for cryosurgery and electrosurgery

## Case #1

- 65 year-old male
- 4mm recurrent erythematous, gritty macule w/ scale
- Location: R helix

### Diagnosis:

- ***Actinic keratosis***



# Cryosurgery<sup>1</sup>

- Mechanism of Action:
  - » cellular fluid crystallization
  - » tissue destruction
- Indications:
  - » Treat benign lesions
  - » Treat vascular lesions
  - » Treat premalignant and malignant skin cancer (ie, NMSC)
- **Contraindications:**
  - » Melanoma
  - » Nevi
  - » Recurrent NMSC
  - » Aggressive NMSC
  - » Skin cancer along areas where Mohs surgery is indicated

1. Usatine, RP. *Dermatologic and Cosmetic Procedures in Office Practice*. Saunders, 2012.

# Cryosurgery<sup>1</sup>

- Advantages:
  - » Ease and speed
  - » Multiple lesions
  - » No anesthetic
  - » No skin prep
  - » Low supply cost
  - » Effective for AK
- Disadvantages:
  - » Delivery and storage
  - » Diagnosis must be accurate (no tissue for pathology)
  - » Cosmetically imprecise
  - » Erythema, swelling, blistering, pain
  - » Multiple visits possible
  - » Hypopigmentation

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## Case #2

- 45yo immunocompetent patient
- 1mo h/o 1.1 x 0.7 cm verrucous, hyperkeratotic plaque
- Location: L cheek

### Diagnosis:

- ***Verruca vulgaris***

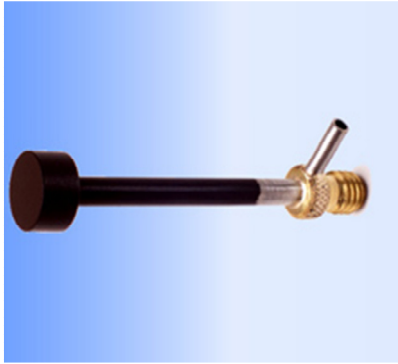
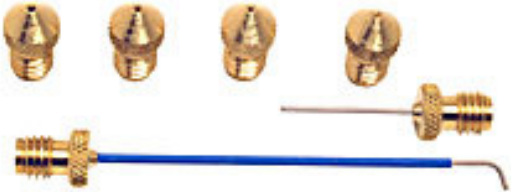


## Cotton wool bud (CWB) technique<sup>2</sup>

- **Advantages:**
  - » No upfront investment for cryogun
  - » May be preferred for low-volume practice
- **Disadvantages:**
  - » Fast LN2 evaporation
  - » Imprecise
  - » Possibility of viral transmission
  - » Medical waste (CWB, cup)



# Cryogun



## Costs



Family Practice Cry-Ac®

- Equipment
  - » Cryogun, spray tips, 20-liter dewar, cryoplate
  - » **\$2,000**
- Liquid nitrogen (LN2)
  - » 20-liter dewar – static holding time of 8-12 wks
  - » Lasts 2-3 wks in our busy practice
  - » Cost: \$0.25-0.50 per liter

## Case #3

- 55yo male
- 5 year h/o 1.2 x 1.0 cm waxy, brown, stuck-on plaque
- Slowly growing, slightly darkening
- Location: R temple

### Diagnosis:

- ***Seborrheic keratosis***



# Benign lesions: freeze times & margins<sup>1</sup>

Benign conditions	Average freeze time (s)	Halo diameter (mm)
Chondrodermatitis nodularis helioides	20	1
Condyloma	10	1-2
Dermatofibroma	20	1
Digital mucous cyst	15	1
Keloid	20	1
Molluscum contagiosum	5	0-1
Sebaceous hyperplasia	10	0
Seborrheic keratosis	15	1
Skin tag	5	0
Solar lentigo	5	0
Verruca	>10 x 2 cycles	1-2
Xanthelasma	15	1

1. Usatine, RP. *Dermatologic and Cosmetic Procedures in Office Practice*. Saunders, 2012.

# Vascular lesions: freeze times & margins<sup>1</sup>

Vascular lesions	Average freeze time (s)	Halo diameter (mm)
Angiokeratoma	20	0-1
Angioma	15	0-1
Pyogenic granuloma	20	0-1
Vascular malformations (port-wine stain)	25	0
Venous lake	15	0-1



1. Usatine, RP. *Dermatologic and Cosmetic Procedures in Office Practice*. Saunders, 2012.

## Case #4

- 63yo female w/ advanced dementia
- 1 year h/o 1.3 x 1.0 cm erythematous patch w/ scale & telangiectasia
- Location: L forearm

### Diagnosis:

- ***SCC in situ (Bowen's disease)***



## Premalignant and malignant lesions: freeze times & margins<sup>1</sup>

Conditions	Average freeze time (s)	Halo diameter (mm)
Actinic cheilitis	15	0
Actinic keratosis <sup>3</sup>	>5	1
BCC (superficial or very small nodular)	30 x 2 cycles	5
Keratoacanthoma	30 x 2 cycles	5
SCC in situ (Bowen's disease)	30 x 2 cycles	5
SCC (small and early)	30 x 2 cycles	5

1. Usatine, RP. *Dermatologic and Cosmetic Procedures in Office Practice*. Saunders, 2012.

3. *Int J Dermatol*. 2004 Sep;43(9):687-92.

# Factors that affect cryosurgery<sup>1</sup>

- Rate of freezing – rapid freezing means more tissue damage
- Rate of intermittent spraying – faster rate results in deeper freeze, but narrower edges
- Halo diameter – the wider the halo, the deeper the freeze at the periphery
- Distance of spray tip – the closer the tip, the colder the lesion gets
- Tissue temp – you need to reach **-30°C** to kill malignant cells
- Duration – longer freeze causes more tissue injury; max cell death occurs at **100 sec**
- Rate of thawing – slow thawing causes more cell death
- Number of freeze-thaw cycles – more cycles, more injury

1. Usatine, RP. *Dermatologic and Cosmetic Procedures in Office Practice*. Saunders, 2012.

# CRYOTHERAPY VIDEOS

# Coding and Billing

## Destruction or removal of skin tags

11200	Up to 15 skin tags
11201	Each additional 10 skin tags

## Destruction of warts, molluscum, milia, or SK

17110	Up to 14 lesions
17111	15 or more lesions

## Destruction of cutaneous vascular lesions (eg, angioma)

17106	<10 cm <sup>2</sup>
17107	10-50 cm <sup>2</sup>
17108	>50 cm <sup>2</sup>

## Destruction of premalignant lesions (eg, AK)

17000	1 <sup>st</sup> lesion
17003 x ##	Each additional lesion (lesion #2 to #14)
17004	15 or more lesions

## Destruction of malignant lesions (eg, BCC, KA, BD, SCC)

<i>Location</i>	<i>&lt;0.5cm</i>	<i>0.6-1.0cm</i>
Trunk, arms, legs	17260	17261
Scalp, neck, hands, feet, genitals	17270	17271
Face, ears, eyelids, nose, lips	17280	17281

## Case #5

- 44yo male, healthy
- 5mm purplish-red papule that gets irritated and has bled
- Location: L upper back

### Diagnosis:

- ***Cherry angioma  
(hemangioma)***



# Electrosurgery<sup>1</sup>

- Mechanism of Action:
  - » Hot probes – heat transfer, causing burning
  - » Cold electrodes – energy transfer to H<sub>2</sub>O molecules, resulting in vaporization
- Indications:
  - » Tissue excision
  - » Vaporization of tissue
  - » Hemostasis (coagulation)
  - » Nail matrixectomy
  - » Epilation
  - » Cosmetic (skin tightening)
- Contraindications:
  - » Caution w/ pacemaker
  - » Melanocytic lesions if dysplasia or melanoma suspected
  - » Recurrent NMSC
  - » Aggressive NMSC
  - » Skin cancer along areas where Mohs surgery is indicated

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# Electrosurgical functions<sup>1</sup>

- Fulguration:
  - » Electrode away from skin
  - » Sparking to the surface
  - » Latin: fulgur (lightning)
  - » Shallow destruction
- Electrodesiccation:
  - » Electrode touches or inserted to skin
  - » Deeper destruction
  - » Example - *epilation*
- Electrocoagulation:
  - » Used to stop bleeding
  - » For superficial & deep surgery
  - » Even deeper destruction
- Electrosection:
  - » Used to cut tissue
  - » High-frequency (HF) electrosurgical units (ESUs) excel in this function
  - » *Higher frequency* means *less tissue destruction*

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# Electrosurgery<sup>1</sup>

- Advantages:
  - » Ease and speed
  - » Versatility
  - » Hemostasis while cutting or destroying tissue
  - » For destruction, sterility and sutures not needed
  - » HF-ESUs minimize tissue destruction
  - » Low infection rates
- Disadvantages:
  - » Safety risks (eg, shocks, burns, etc)
  - » Hypertrophic scars, if poor technique
  - » Smoke may carry viral particles
  - » Odor of smoke plume
  - » Delayed hemorrhage
  - » Slow healing for large areas; unsightly wound
  - » No specimen vs artifacts

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## Case #6

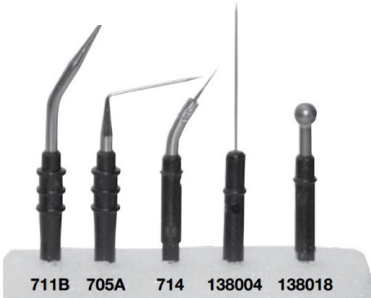
- 53yo male w/ HTN
- Hit his L middle finger with a hammer while woodworking yesterday
- Presents with pain, swelling, & mild numbness

### Diagnosis:

- ***Subungual hematoma***












# Electrosurgical devices & units



# Electrosurgical devices & units

## Surgitron® Dual RF™ 120



-  A2D
-  A3D/OS
-  A8D
-  B1D
-  B2D
-  C3D
-  D8D
-  E3D
-  E4D
-  F1D

# Tips for radiosurgery<sup>1</sup>

- **Activation** – activate first before skin contact; use foot pedal for fine procedures
- **Cutting** – adjust intensity to allow smooth uninterrupted movement (like “hot knife through butter”) – less tissue destruction
- **Neutral plate (“antenna”)** – plate should be under patient, close to operative site (no skin contact necessary)
- **Minimize lateral heat when cutting** – minimize contact time, intensity of power, electrode size
- **Tissue prep** – use alcohol or moist 4x4, esp. for highly keratinized (dry) tissue
- **Clean reusable electrodes** – must be free of carbon (use fine sand paper to keep them shiny)

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# ELECTROSURGERY VIDEOS

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Trunk, arms, legs	17260	17261
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# Practice Recommendations

- Use **cryotherapy** or **electrosurgery** for *benign, premalignant, malignant* and *vascular* skin lesions. Both surgical techniques are *easy* to learn and *quick* to perform, but are *not indicated* for lesions suspicious for melanoma, recurrent or aggressive NMSC, when the diagnosis is unclear or a tissue sample is imperative, and in areas where Mohs surgery is optimal. (***SORT C***)
- **Complications** of cryosurgery include *pain, swelling, blistering,* and *hypopigmentation*. Complications of electrosurgery include excessive *tissue damage,* electric *shocks,* *interference* with other medical devices, and hypertrophic *scars*. (***SORT C***)
- **Radiosurgery** is a *precise* surgical technique that can be used for *fulguration, desiccation, coagulation, and cutting*. Some of these functions can be performed simultaneously. (***SORT C***)
- Understanding documentation, coding and billing is key to appropriate reimbursement of cryosurgery and electrosurgery. (***SORT C***)

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