

# Mohs Surgery

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# Financial Disclosure

I have no relevant financial disclosures related to this presentation.



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# Mohs Surgery

I. Review of Skin Cancer

II. Indications for Mohs Surgery

III. Mohs Micrographic Surgery Technique

IV. Reconstruction

V. Other Procedures & Pharmaceutical Agents

VI. Mohs and Melanoma Treatment

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# I. Review of Skin Cancer



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# I. Review of Skin Cancer

## Skin Cancer Incidence: Nonmelanoma Skin Cancer (NMSC)

- Most common cancer in the United States.
- One in five Americans will develop skin cancer in their lifetime.
- 9,500 people in the US are diagnosed every day.
- Nonmelanoma skin cancer affects more than 3 million Americans annually.
- Overall incidence of BCC increased by 145% between 1976-1984 and 2000-2010 and the overall incidence of SCC increased by 263% over that same period.

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# I. Review of Skin Cancer

## Skin Cancer Incidence: Melanoma

- <2% of skin cancer cases but causes the majority of skin cancer deaths.
- More than 1 million Americans have melanoma.
- Approximately 200,000 cases diagnosed annually.
  - 50% in situ and 50% invasive
  - **Invasive melanoma was the 5th most commonly diagnosed cancer in 2022 for men and women.**

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# I. Review of Skin Cancer

## Skin Cancer Incidence: Melanoma

- Melanoma rates in the US have been rising rapidly over the past 30 years.
  - Sun exposure habits, indoor tanning, Ozone layer depletion, aging population
- Patients with darker skin tones are often diagnosed later and tend to develop melanoma in areas that are not commonly exposed to the sun (i.e. palms, soles, groin, nails and inside of the mouth).
- **1 in 27 men will be diagnosed with melanoma.**
- **1 in 40 women will be diagnosed with melanoma.**

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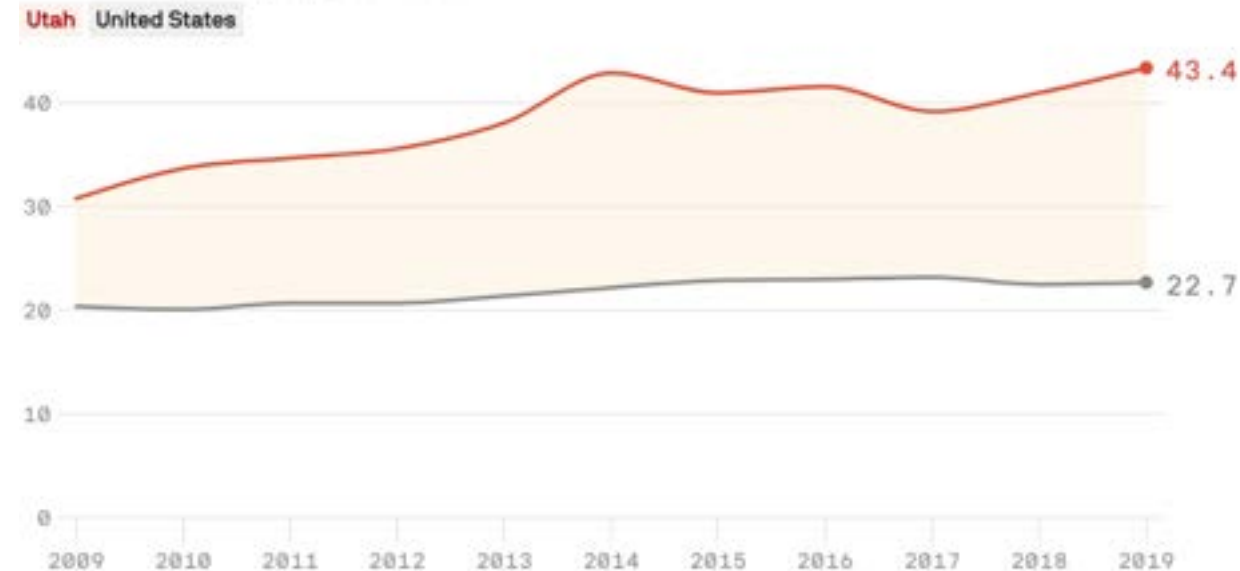
# I. Review of Skin Cancer

## Utah & Skin Cancer

- Highest rate of melanoma in the continental US.
- **38.4 per 100,000 Utahns** were diagnosed with melanoma in **2020**
  - Drop from **43.6 in 2019** likely due to the COVID19 pandemic.
- Rate nearly doubles the national rate of 20 cases per 100,000.
- Highest rate for 12 of the last 15 years and ranked among the top three states for melanoma since 2005.

### Rate of new cases of melanoma

Annual cases per 100k people; 2009 to 2019



Source: CDC

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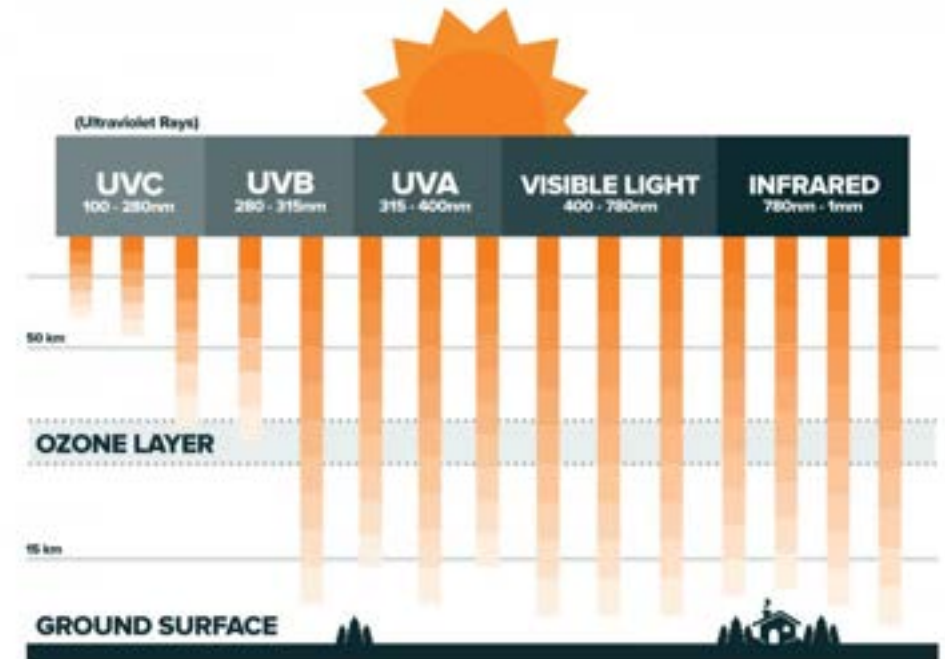


# I. Review of Skin Cancer

## Risk Factors for NMSC

- **UV exposure** from sunlight or indoor tanning
  - UVB (290-320 nm): *causes burning*
  - UVA (320-400 nm): *causes aging.*
  - BCC: intermittent, intense short bursts of UV
  - SCC: cumulative, long term exposure and childhood sunburns
- Tanning beds: *a single tanning session increases your risk of SCC by 67%, BCC by 29%.*
- Ionizing radiation (X-rays): 3 fold increased risk
- Chemicals (arsenic, coal tar)

## SOLAR UVA,UVB&UVC RAYS



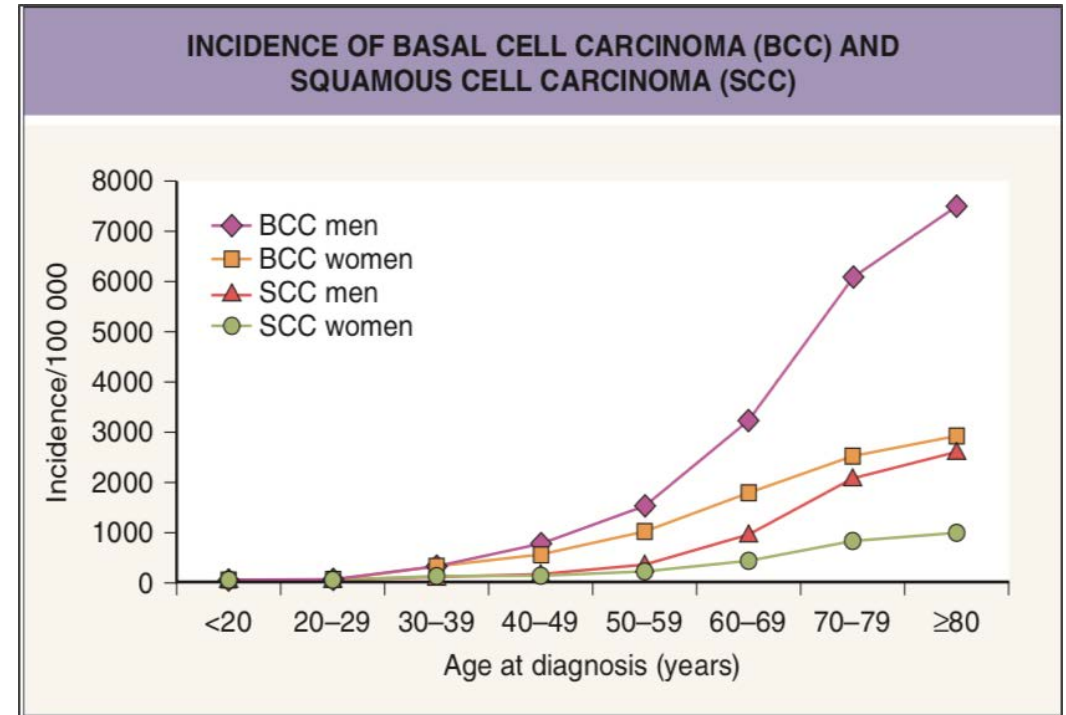
Source: [sunsafetyatwork.ca](http://sunsafetyatwork.ca)

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# I. Review of Skin Cancer

## Risk Factors for NMSC

- Fair skin, light eyes, blond or red hair, history of excessive sun exposure, skin cancer or weakened immune system.
- 1 in 4 Caucasians will develop NMSC.
- Males are 2x more likely than females to develop.
- **Age: Incidence doubles from 40-70.**
- Immunosuppression: organ transplant patient, CLL patients and hematopoietic transplant recipients
- HPV: type 16



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# I. Review of Skin Cancer

## Risk Factor: Organ Transplantation

- Incidence of **SCC** is **100-200 times greater**.
- Incidence of **BCC** is **5-10 times greater**.
- More likely to develop numerous lesions, suffer local recurrence and metastases.
- HPV DNA is found in approximately 70-90% of transplant associated SCCs.
- **5-8 years**: mean interval following transplantation that patient's begin to develop skin cancer
  - 10-45% of patients develop skin cancer



*Source: New England Journal of Medicine*

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# I. Review of Skin Cancer

## Risk Factors for Melanoma

- Regular sunscreen reduces the risk of SCC and melanoma.
- **Majority of melanoma cases (60-70%) are due to UV exposure.**
  - 5 or more blistering sunburns in adolescence increases the risk of melanoma by 80% and NMSC by 68%.
  - Women younger than 30 are 6x more likely to develop melanoma if they tan indoors.
- People with > 50 moles, atypical moles or large moles.



*Tanning by minors is illegal in 19 states including Utah.*

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# I. Review of Skin Cancer

## Non-melanoma skin cancer NMSC

### Basal Cell Carcinoma

- Most common
- Found early, highly treatable
- Low likelihood of metastasis but if left untreated becomes a non-healing wound which will invade other structures (nerves, blood vessels, muscle, bone, eye, etc.)

### Squamous Cell Carcinoma

- Second most common
- Slow growing but can metastasize, occurring in 1-5% of patients
- Responsible for 4-8k deaths annually

### Melanoma

- Less common, more aggressive
- Higher risk of metastasis
- 5 year survival
  - ◆ Localized: 99.4%
  - ◆ Regional: 63.6%
  - ◆ Distant: 22.5%

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# I. Review of Skin Cancer

## Basal Cell Carcinoma

- Presents as a pearly papule with arborizing vessels typically on sun exposed areas.
- Pimple-like papule, scar-like area, itchy red patch, non-healing ulcer
- Onset 6th to 7th decade
- Slow, indolent growth with local destruction → low rate of metastasis at 0.1%, spreads first to lymph nodes then bone



*Source: American College of Mohs Surgery*



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# Basal Cell Carcinoma Subtypes



# I. Review of Skin Cancer

## Basal Cell Carcinoma

- **Diagnosis:** Clinical evaluation, Dermoscopy & Biopsy
- **Treatment:** WLE, Mohs, ED&C, Radiation, Imiquimod, Topical 5-FU and vismodegib
- **Standard excision (WLE):**
  - 4 mm margin for non-Morpheaform BCC <2 cm; 98% cure rate
  - 6 mm margin for infiltrative BCC

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# I. Review of Skin Cancer

## Basal Cell Carcinoma

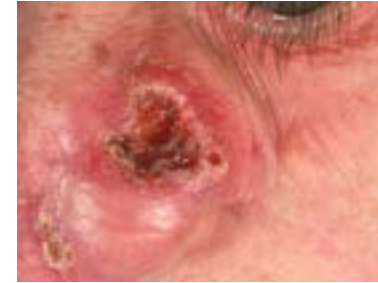
- Staging: Low Risk, High Risk, Regional or distant metastatic
- **High Risk Features → High risk for “recurrence”**
  - Area L > 2 cm (trunk and extremities)
  - Area M > 1 cm (cheeks, forehead, scalp, neck and pretibial area)
  - Area H (mask areas of the face/central face, periorbital, pre- and post-auricular, ears, genitalia, hands and feet)
  - Poorly defined borders
  - Recurrent
  - Aggressive growth pattern
  - Radiated site
  - Immunosuppression
  - Perineural involvement → MRI should be ordered

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# I. Review of Skin Cancer

## Squamous Cell Carcinoma

- Erythematous scaly papule, nodule or plaque; commonly on the head, neck and upper extremity (sun damaged skin).
  - Actinic keratosis → SCCis → Invasive SCC
- **Risk factors specific to SCC:** HPV, radiation, chronic ulcers/scars, hypertrophic LE/LP, arsenic exposure, chronic LS&A, lupus
- Male to female ratio of 3:1



*Source: VisualDx*

*Source: American College of Mohs Surgery*

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# Actinic Keratoses



Source: VisualDx



Erythematous papules or thin plaques with scale on sun exposed areas

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# I. Review of Skin Cancer

## Squamous Cell Carcinoma

Relatively low risk for metastasis, ~5%.

- Metastasis to lymph nodes.
- Mortality rate: 0.26/100,000

### SCC Subtypes

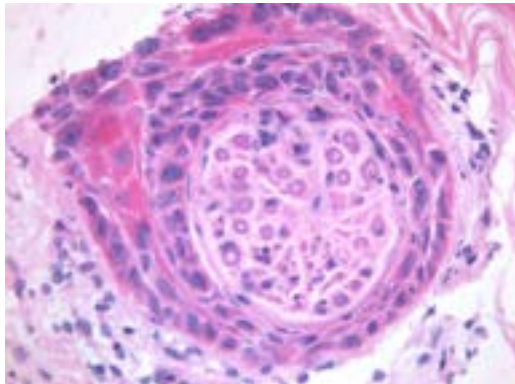
- Keratoacanthoma
- SCC from Bowen's disease
- Verrucous carcinoma
- Acantholytic
- Lymphoepithelioma-like
- Desmoplastic
- Adenosquamous
- Cystic



Source: VisualDx

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# I. Review of Skin Cancer



*Source: American  
College of Mohs  
Surgery*

## High Risk Features for SCC

- Increased tumor size >2 cm
- Location on the ear, genitalia
- Poorly differentiated desmoplastic
- Perineural involvement
- Lymphovascular involvement
- Increased depth of invasion >4 mm
- Immunocompromised status
- Recurrent
- Mucosal sites
- SCC arising in chronic wounds



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# I. Review of Skin Cancer

## Treatment of NMSC

- WLE
- Mohs
- ED&C
- Cryotherapy
- Topical Treatment
- Radiation
- Lasers

Advantages and Disadvantages to each treatment

Mohs indicated for high risk sites and tumors

Mohs with highest cure rate

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## II. Indications for Mohs Micrographic Surgery

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## II. Indications for Mohs

### Mohs Micrographic Surgery

- Standard of care when:
  - tumor is in critical location (cosmetic or functional)
  - tumor is recurrent
  - tumor has ill-defined margins
  - tumor is large (> 2 cm) or aggressive

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## II. Indications for Mohs

### Aggressive Histology

- Infiltrating BCC
- Micronodular BCC
- Morpheaform BCC
- Metatypical BCC
- Poorly differentiated SCC
- Acantholytic SCC
- Perineural invasion

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## II. Indications for Mohs

### Other Cutaneous Tumors

- Dermatofibrosarcoma protuberans (DFSP)
- Atypical fibroxanthoma (AFX)
- Sebaceous carcinoma
- Merkel cell carcinoma
- Microcystic adnexal carcinoma
- Verrucous carcinoma
- Angiosarcoma



*Source: Mayo Clinic*

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## II. Indications for Mohs

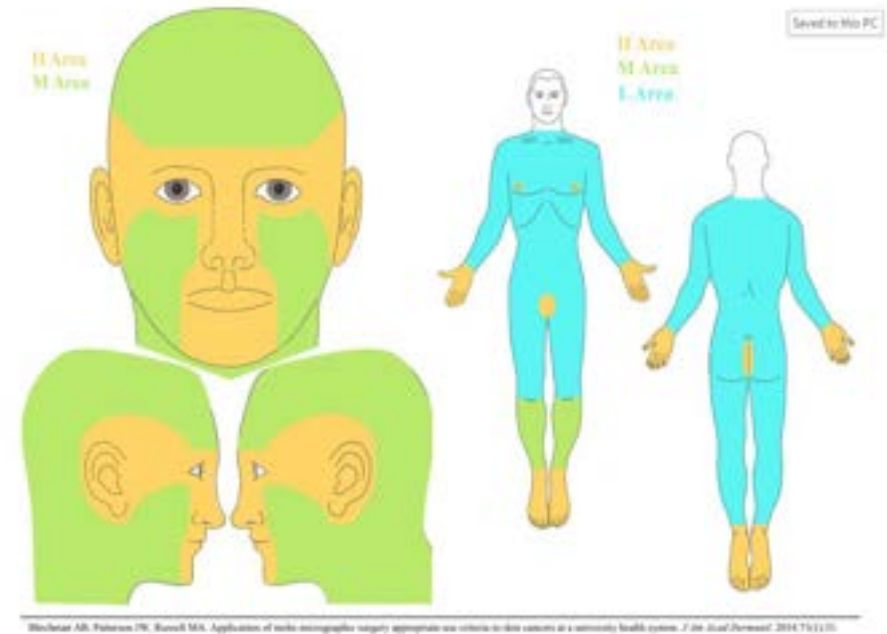
- Based upon *Appropriate Use Criteria*
- The American Academy of Dermatology, the American College of Mohs Surgery, the American Society for Dermatologic Surgery and the American Society for Mohs Surgery developed **appropriate use criteria for 270 scenarios for which Mohs micrographic surgery (MMS) is frequently considered based on tumor and patient characteristics.**

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## II. Indications for Mohs

### Areas of the body

- **Area H:** “Mask areas” of face (central face, eyelids, eyebrows, nose, lips, chin, ear and periauricular skin/sulci, temple), genitalia (including perineal and perianal), hands, feet, nail units, ankles, and nipples/areola
  - Essentially always indicated for Mohs
- **Area M:** Cheeks, forehead, scalp, neck, jawline, pretibial surface.
  - Almost always indicated for Mohs
- **Area L:** Trunk and extremities (excluding pretibial surface)
  - Only indicated for Mohs in certain situations



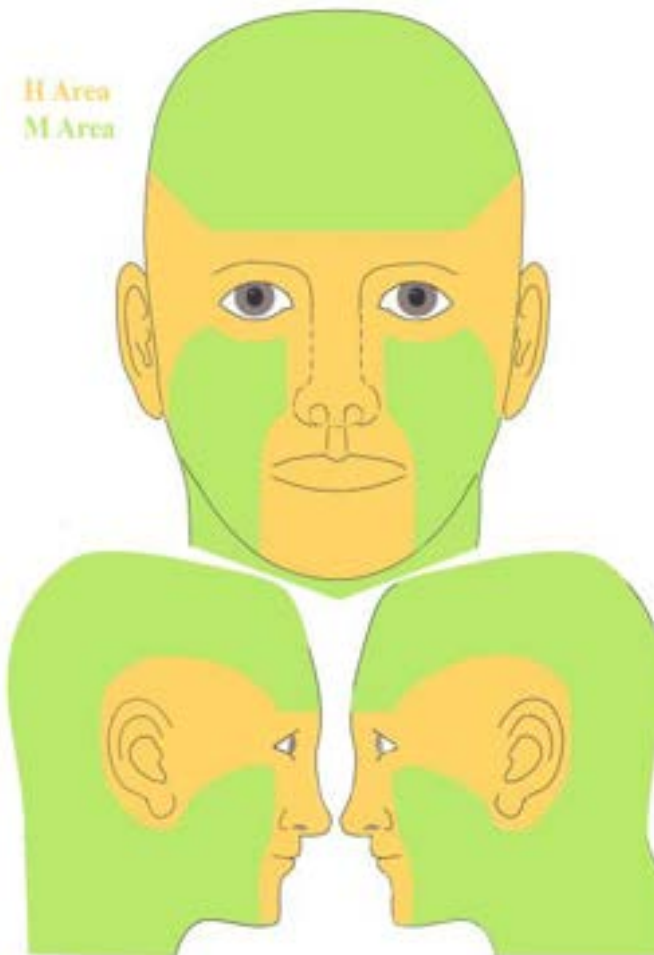
Richard AB, Polanco JN, Borell ML. Application of Mohs micrographic surgery appropriate use criteria to five common skin cancer sites in a community health system. *J Am Acad Dermatol*. 2018;79(1):10.

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## II. Indications for Mohs

AREA H	Appropriate	Uncertain	Inappropriate
<b>BCC</b>	Primary or recurrent: Aggressive Nodular Superficial		
<b>SCC</b>	Primary or recurrent: Aggressive Nonaggressive* Verrucous KA-type SCC <sup>†</sup> In situ SCC/Bowen		Primary or recurrent: AK with focal SCC in situ
<b>LM and MIS</b>	Primary or recurrent: LM MIS		

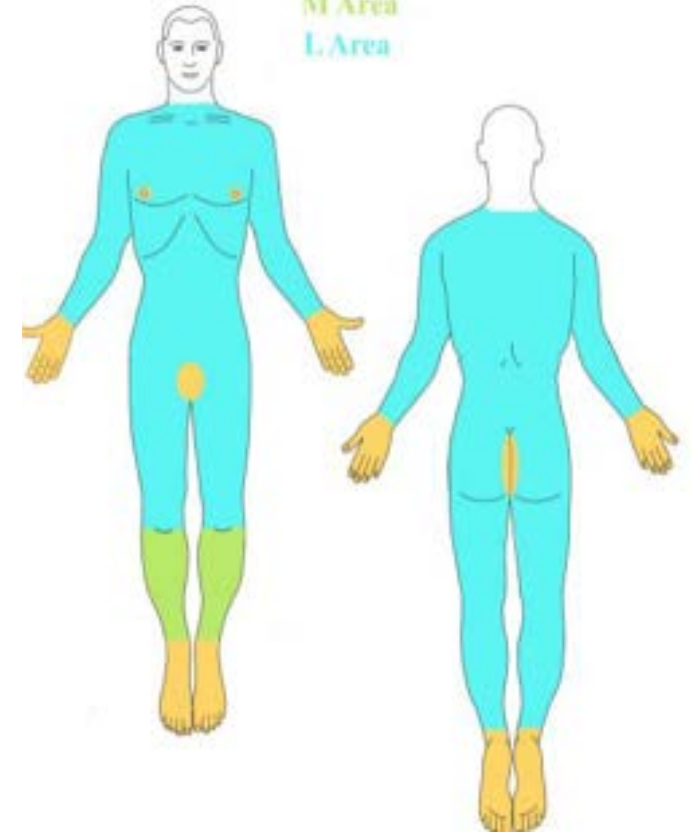
AREA M	Appropriate	Uncertain	Inappropriate
<b>BCC</b>	Recurrent or primary: Aggressive Nodular Superficial (IC) Primary: Superficial $\geq$ 0.6 cm	Primary: Superficial $\leq$ 0.5 cm	
<b>SCC</b>	Primary or recurrent: Aggressive Nonaggressive* KA-type SCC <sup>†</sup> In situ SCC/Bowen		Primary or recurrent: AK with focal SCC in situ
<b>LM and MIS</b>	Primary or recurrent: LM MIS		



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## II. Indications for Mohs

H Area  
M Area  
L Area



AREA I	Appropriate	Uncertain	Inappropriate
<b>BCC</b>	Recurrent: Aggressive Nodular Primary: Aggressive $\geq 0.6$ cm Nodular $> 2$ cm Nodular (IC) $\geq 1.1$ cm	Primary: Aggressive $\leq 0.5$ cm Nodular 1.1-2 cm Nodular (IC) 0.6-1 cm Superficial (IC) $\geq 1.1$ cm	Recurrent Superficial Primary: Nodular $\leq 1$ cm Nodular (IC) $\leq 0.5$ cm Superficial Superficial (IC) $\leq 1$ cm
<b>SCC</b>	Primary or recurrent: Aggressive Recurrent: KA-type SCC <sup>†</sup> Nonaggressive* Primary $> 2$ cm Nonaggressive* In situ SCC/Bowen Primary $\geq 1.1$ cm Nonaggressive (IC)* KA-type SCC <sup>†</sup> In situ SCC/Bowen (IC) KA-type SCC (IC) $\geq 0.6$ cm <sup>†</sup>	Recurrent SCC in situ/Bowen Primary 1.1-2 cm Nonaggressive* SCC in situ/Bowen Primary $\leq 1$ cm Nonaggressive (IC)* Primary 0.6-1 cm SCC in situ/Bowen (IC) Primary $\leq 0.5$ cm KA-type SCC (IC) <sup>†</sup>	Primary or recurrent: AK with focal SCC in situ Primary $\leq 1$ cm Nonaggressive* KA-type SCC <sup>†</sup> SCC in situ/Bowen Primary $\leq 0.5$ cm SCC in situ/Bowen (IC)
<b>LM and MIS</b>	Recurrent: LM MIS	Primary: LM MIS	

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## II. Indications for Mohs

### Appropriate Use Criteria (AUC)

- **Score 7 to 9.** The use of MMS is **appropriate** for the specific indication and is generally considered acceptable.
- **Score 4 to 6.** The use of MMS is **uncertain** for the specific indication, although its use may be appropriate and acceptable. Uncertainty implies that more research is needed to classify the indication definitively.
- **Score 1 to 3.** The use of MMS is **inappropriate** for the specific indication and is generally not considered acceptable.
- *This scoring system is the basis for insurance reimbursement.*
- Fortunately, there is an app that will calculate the AUC.

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# II. Indications for Mohs



**Mohs Surgery Appropriate Use Criteria** 12+

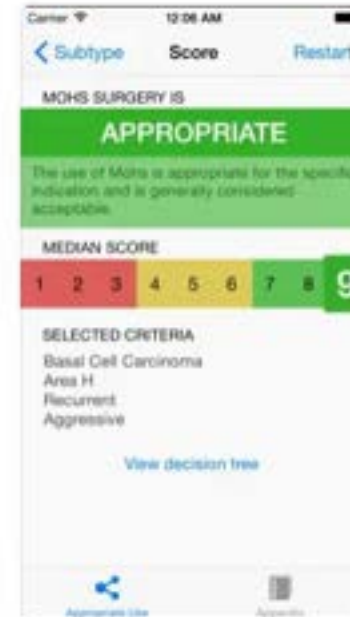
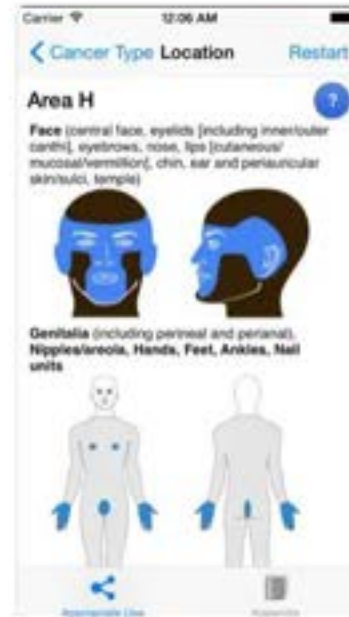
American Academy of Dermatology

Designed for iPhone

★★★★★ 5.0 • 3 Ratings

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## iPhone Screenshots



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# III. Mohs Micrographic Surgery Technique

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# III. Mohs Micrographic Surgery Technique

- Specialized method that combines **surgery** and **microscopic margin analysis**.
- A disc or “layer” of tissue around the biopsy site is excised.
- Tissue is divided, inked then processed into a frozen tissue block.
- Tissue is cut into thin sections, placed on slides and stained (H&E).
- Slides are reviewed by the surgeon. If residual tumor is identified, the inking pattern and corresponding “Mohs map” are used to localize the area.
  - En face processing allows for 100% histologic margin examination.
- Process is repeated until no residual tumor is identified.

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### III. Mohs Micrographic Surgery Technique



**Tumor identified and debulked**

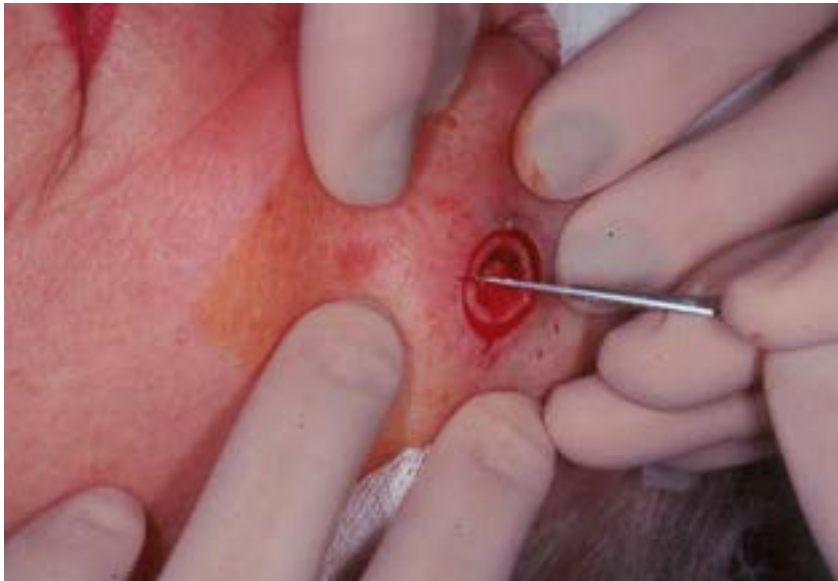


**Beveled incision with small margin (1-2 mm)**

*Source: American College of Mohs Surgery*

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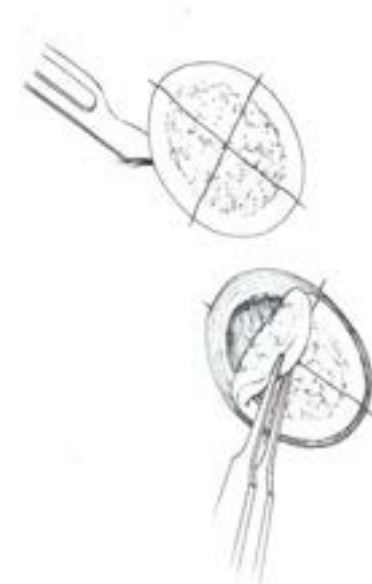
# III. Mohs Micrographic Surgery Technique



Hatch marks placed for orientation



Tissue removed

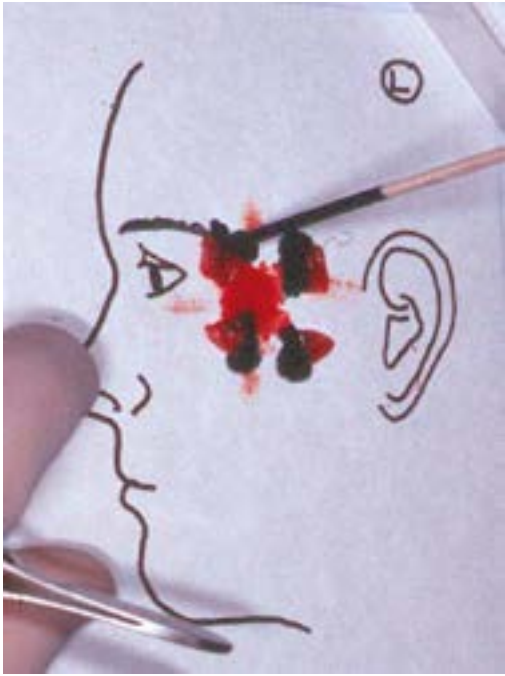
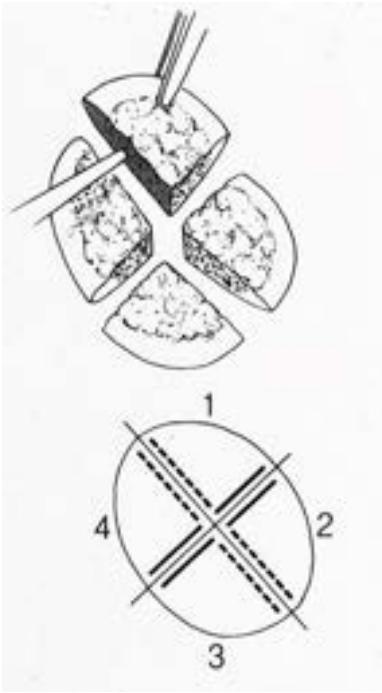


2. Beveled excision and scoring

*Source: American College of Mohs Surgery*

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# III. Mohs Micrographic Surgery Technique



*Source: American College of Mohs Surgery*

**Tissue grossed, inked & mapped by section**

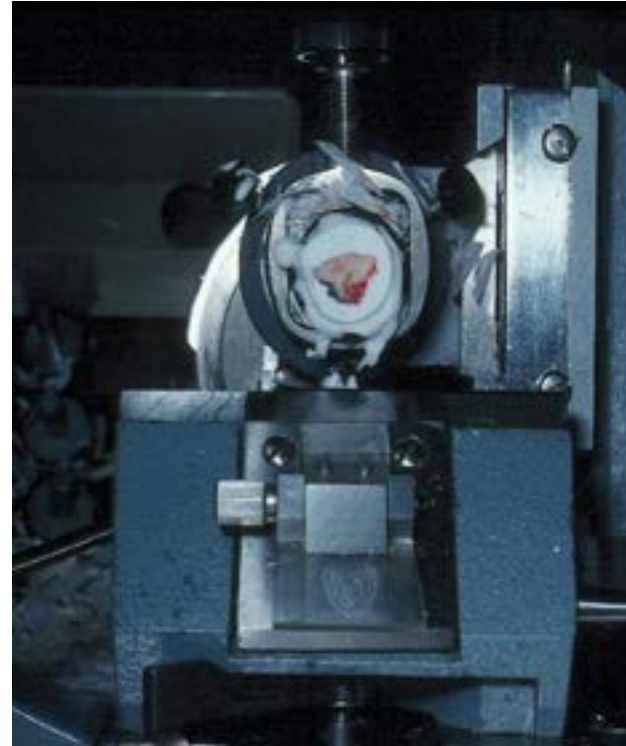
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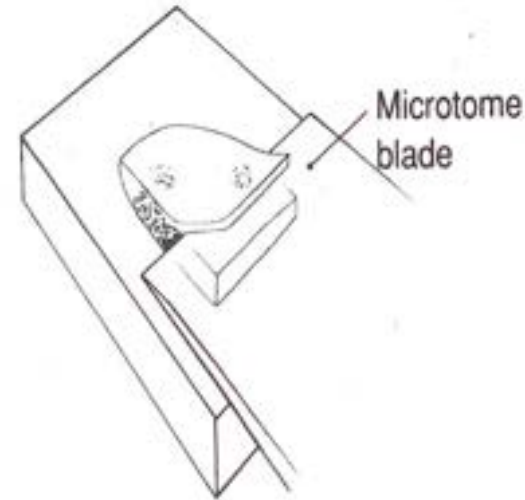
# III. Mohs Micrographic Surgery Technique



Frozen tissue embedded for horizontal sectioning



Then mounted on cryostat & cut with microtome



Source: American College of Mohs Surgery

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# III. Mohs Micrographic Surgery Technique



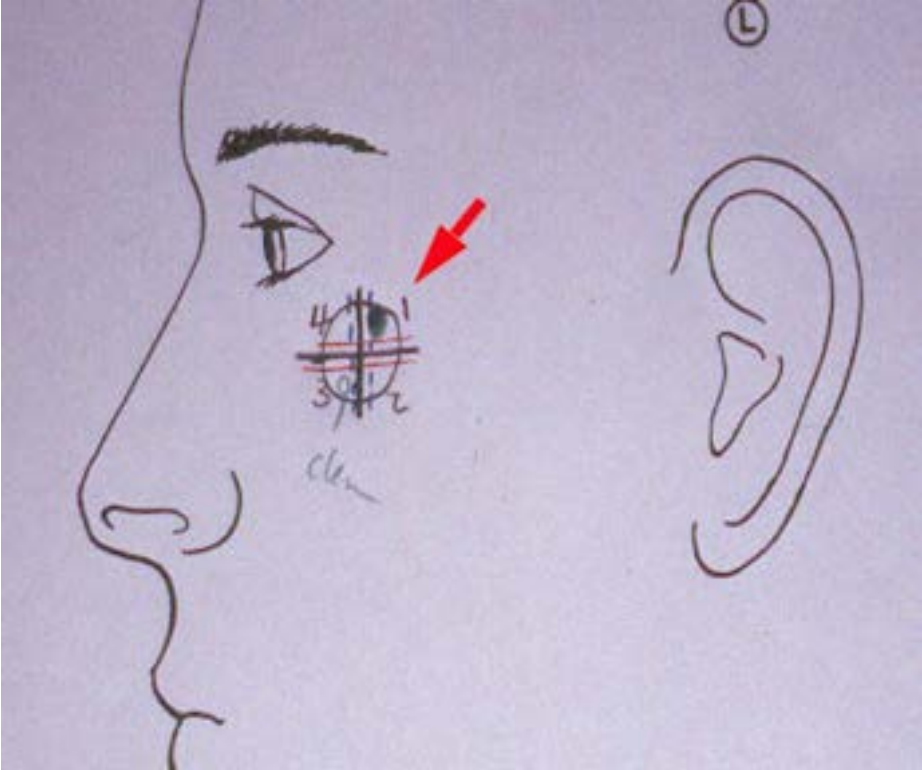
FIGURE 45.9 Specimen slides. (A) Unstained slide: the Mohs technician is able to visually assess for the presence of a complete section. (B) When using H&E stains, an automatic slide stainer can greatly improve the efficiency of the Mohs laboratory; a large number of slides can be batched to improve slide processing and reduce the time between stages of surgery. (C) The slide coverslip has been applied and the slides are ready for examination.



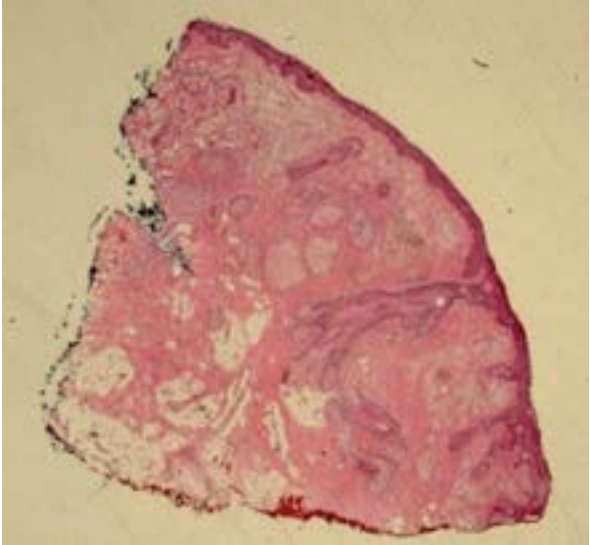
*Source: Flaps and Grafts in Dermatologic Surgery (Robrer)*

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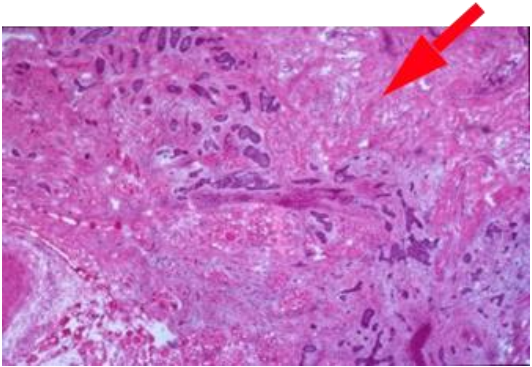
# III. Mohs Micrographic Surgery Technique



**Tumor mapped, if positive**



*Source: American College of Mohs Surgery*

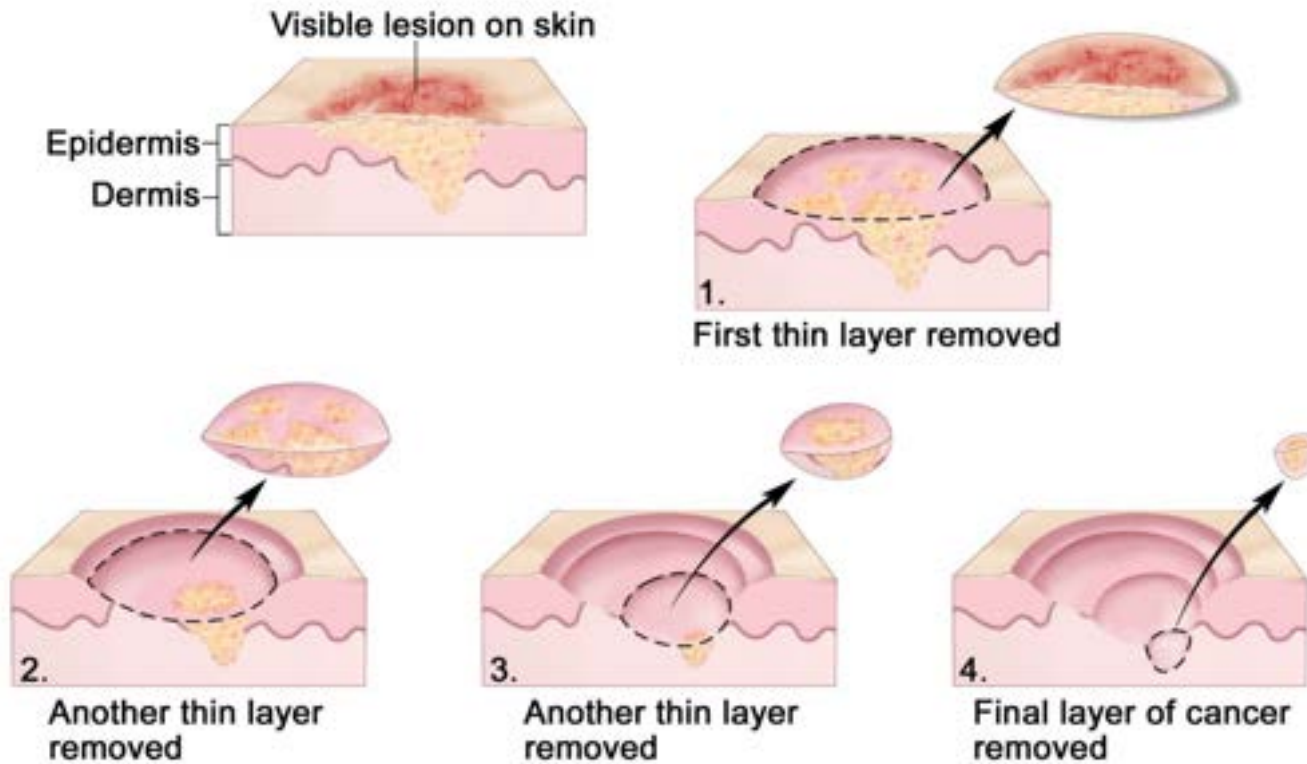


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# III. Mohs Micrographic Surgery Technique

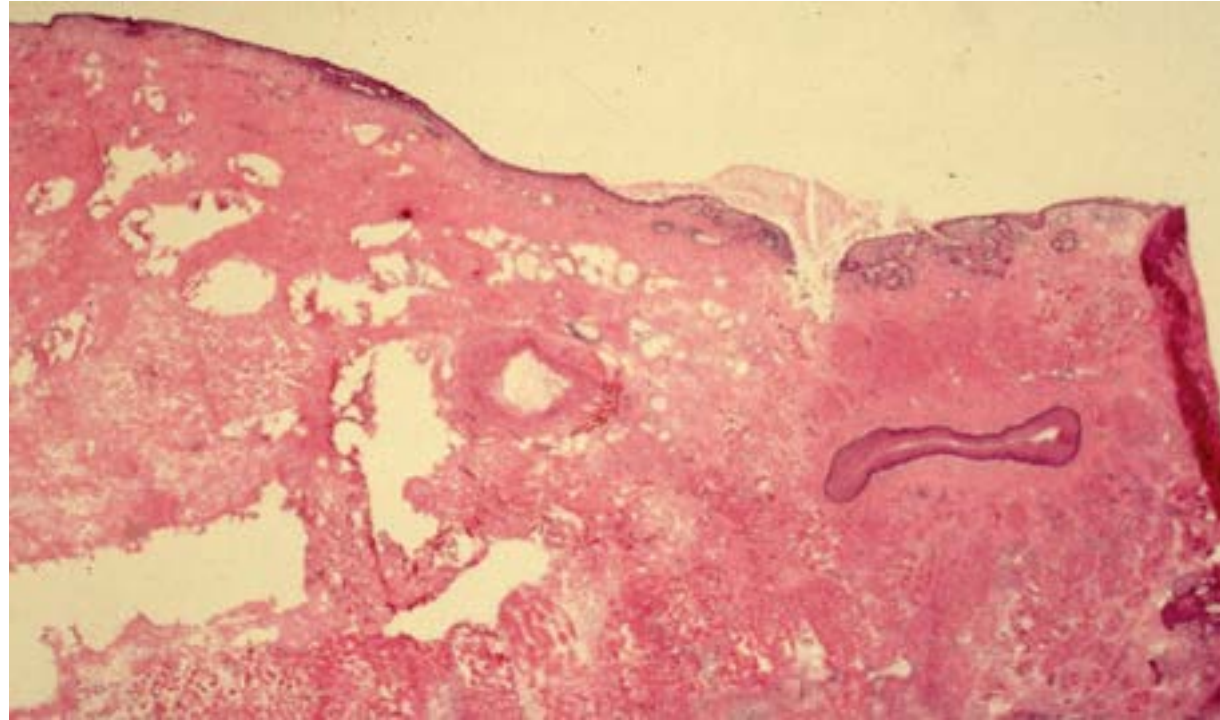
## Mohs Surgery



*Source: American College of Mohs Surgery*

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# III. Mohs Micrographic Surgery Technique



*Source: American  
College of Mohs  
Surgery*


**Process continued until clear**

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# III. Mohs Micrographic Surgery Technique

## Why Mohs?

### Mohs advantages

1. High cure rate 
2. Tissue conservation
3. Convenience
4. Cost

### Highest Cure Rate: Mohs


- 97-99% for primary tumors (at 5 years)
- 94% for recurrent tumors
- Cure rates for other methods
  - Standard excision: 89.9%
    - RR of 0.7-5% for low risk lesions
    - RR of 10-20% for high risk lesions
  - ED&C: 81-96%
  - Radiation: 91%

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# III. Mohs Micrographic Surgery Technique

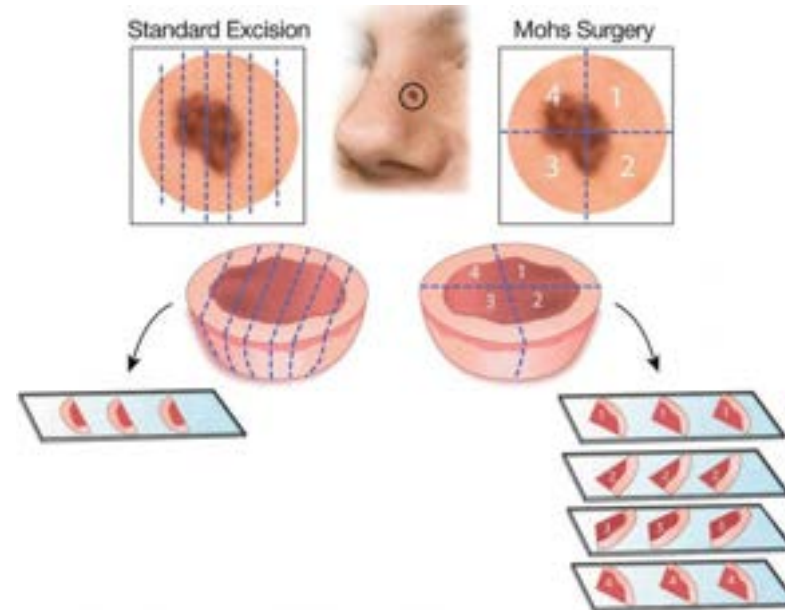
## Why Mohs?

### Mohs advantages

1. High cure rate 
2. Tissue conservation
3. Convenience
4. Cost

## Highest Cure Rate: Mohs

- All of peripheral and deep margin is examined.
- Versus WLE in which only 1% of the tissue is examined because of vertical breadloafing.




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# III. Mohs Micrographic Surgery Technique

## Why Mohs?

### Mohs advantages

1. High cure rate
2. Tissue conservation 
3. Convenience
4. Cost

### Tissue Conservation

- Preserves maximal amount of healthy skin
- *Smallest surgical defect possible – very important in cosmetically sensitive area*
  - i. increases the chance of a good aesthetic result.

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# III. Mohs Micrographic Surgery Technique

## Why Mohs?

### Mohs advantages

1. High cure rate
2. Tissue conservation
3. Convenience
4. Cost



### Convenience

- Peripheral margin checked at time of surgery
- Reconstruction performed on same day
- Patient does not have to wait for outside pathologist to clear lesion.
- Reduces need for repeat procedures.


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# III. Mohs Micrographic Surgery Technique

## Why Mohs?

### Mohs advantages

1. High Cure Rate
2. Tissue Conservation
3. Convenience
4. Cost 

## Cost Effective

- Outpatient setting (not OR), pathology reading included, local anesthesia (not general), lowest recurrence.

	<u>cost</u>	<u>recurrence</u>
Mohs surgery	\$1,243	1%
Destruction	\$652	4% - 19%
Office excision: perm. sections	\$1,167	10.1%
Office excision: frozen sections	\$1,400	10.1%
Ambulatory surgical facility excision	\$1,973	10.1%
Radiation therapy	\$4,558	9%

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## IV. Mohs Reconstruction

*Sometimes what is seen at the surface is only the tip of the iceberg.*



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## IV. Mohs Reconstruction

- Secondary intention
- Primary closure
- Graft
- Flaps: Advancement, Rotation, Transposition, Interpolation

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## IV. Mohs Reconstruction

- Secondary intention



*Source: American  
College of Mohs  
Surgery*

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## IV. Mohs Reconstruction

- Secondary intention



*Source: American College of Mohs Surgery*

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## IV. Mohs

### Reconstruction

- Secondary intention healing of the ear

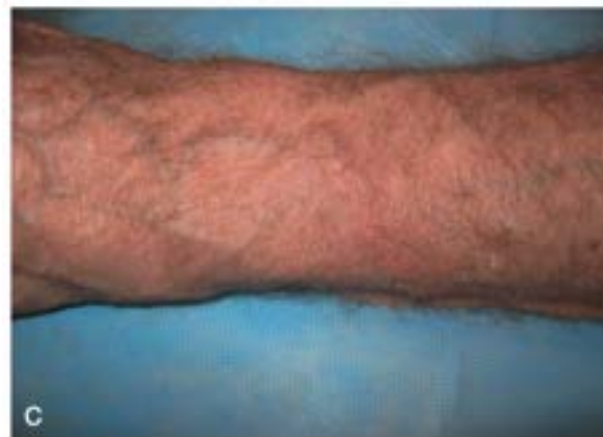
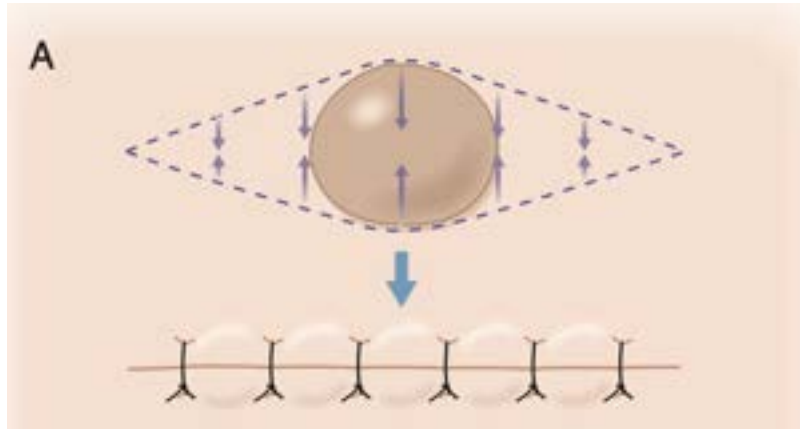


*Source: Flaps and Grafts in Dermatologic Surgery (Robrer)*

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# IV. Mohs Reconstruction

- Primary Closure

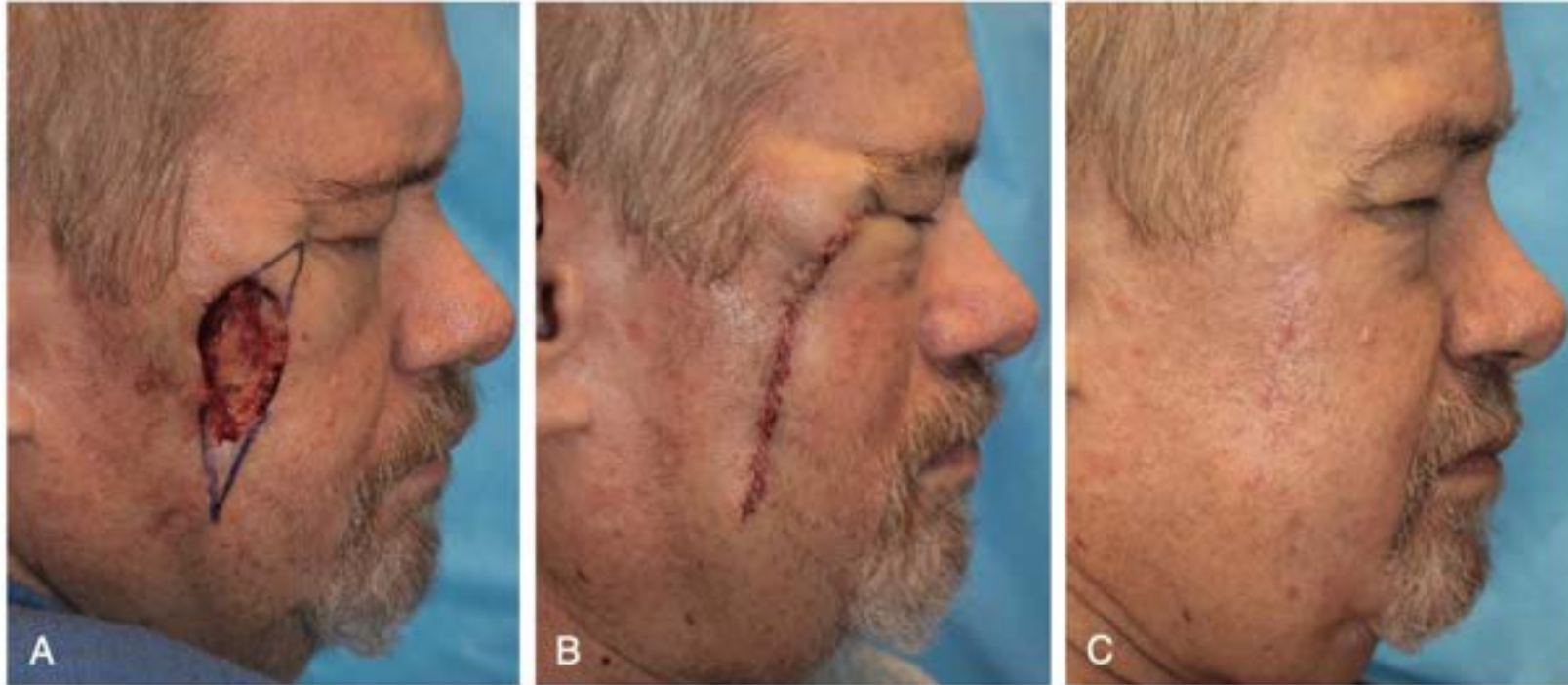


*Source: Flaps and Grafts  
in Dermatologic Surgery  
(Rohrer)*

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# IV. Mohs Reconstruction

- Primary Closure



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## IV. Mohs Reconstruction

- Primary Closure



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College of Mohs  
Surgery*

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## IV. Mohs Reconstruction

### Flaps

- Advancement
- Rotation
- Transposition
- Interpolation

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## IV. Mohs Reconstruction

### Flaps

- Advancement



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(Robrer)*

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# IV. Mohs Reconstruction

## Flaps

- Advancement



*Source: Flaps and Grafts in Dermatologic Surgery (Robrer)*

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# IV. Mohs Reconstruction

## Flaps

- Advancement



*Source: Flaps and Grafts in Dermatologic Surgery (Rohrer)*

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## IV. Mohs Reconstruction

### Flaps

- Rotation



*Source: Flaps and Grafts in Dermatologic Surgery (Rohrer)*

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# IV. Mohs Reconstruction

## Flaps

- Rotation



*Source: American College of Mohs Surgery*

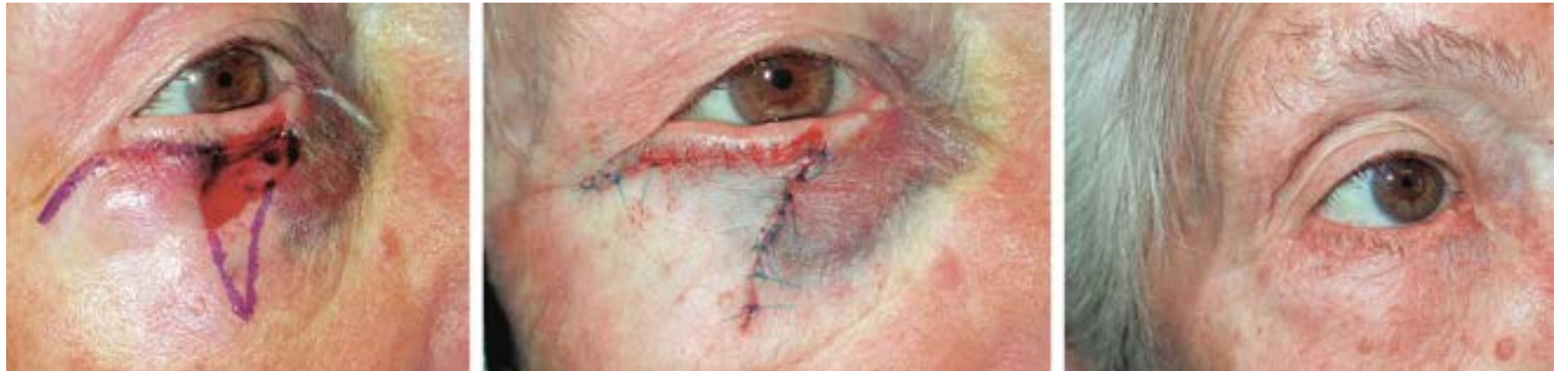
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## IV. Mohs Reconstruction

### Flaps

- Rotation



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# IV. Mohs Reconstruction

## Flaps

- Transposition



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## IV. Mohs Reconstruction

### Flaps

- Transposition



*Source: Flaps  
and Grafts in  
Dermatologic  
Surgery  
(Robrer)*

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# IV. Mohs Reconstruction

- Interpolation Flaps



*Source: American  
College of Mohs  
Surgery*

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# IV. Mohs Reconstruction

- Full Thickness Skin Grafts



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College of Mohs  
Surgery*

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## V. Other Procedures & Agents

- Wide local excision
- ED&C
- Cryotherapy
- Topical Treatment
- PDT & Lasers
- Radiation
- Misc. Agents

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# V. Other Procedures & Agents

## Wide Local Excision

- Common treatment for low-risk cancers
- Elliptical excision, linear closure
- Flaps or grafts for larger lesions
- Approximately 90% cure rate



*Source: American College of Mohs Surgery*

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# V. Other Procedures & Agents

## ED&C

- Scrape and burn lesion until a healthy base is achieved
- Cure rate dependent on experience
- Lacks margin control (pathologic confirmation)
- Longer healing time and poorer cosmesis than surgery

## Cryotherapy

- Liquid nitrogen, method of blind destruction
- Used frequently to destroy AKs
- May be used to treat malignancies
- Lacks margin control



*Source: American College of Mohs Surgery*



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## V. Other Procedures & Agents

### Topical Field Treatment

#### 5-Fluorouracil

- FDA approved for superficial BCC
- BID for 3-6 weeks
- 80% effective for superficial BCC

#### Imiquimod

- FDA approved for superficial BCC
- 5 night weekly for 6 weeks
- 83% effective for superficial BCC



*Source:  
VisualDx*

**Response to 5-Fluorouracil**

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## V. Other Procedures & Agents

### Radiation therapy

- Used when surgery is contraindicated
- Typically reserved for patients over 60
- May be very effective in certain areas
- Primary vs. adjuvant role (with surgery)
  - i. Primary: patients who are unable to tolerate surgery
  - ii. Adjuvant: for high risk tumors
- Requires multiple treatments over 4 to 8 weeks
- Tumor may recur in more aggressive form



*Source: American  
College of Mohs  
Surgery*

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# V. Other Procedures & Agents

## Superficial Radiation Therapy

- X-ray based, requires multiple patient visits.

## How does SRT compare to MMS?

- Inferior long-term cure rates compared to Mohs surgery
- Requires multiple treatment visits
- Higher cost
- Limited published literature on its side effects.

SRT should only be considered as a second-line treatment option under special circumstances for non-surgical candidates.

	SRT	MMS
<b>Efficacy and Patient Burden</b>		
Number of Visits to Complete Treatment*	5-30	1-2
Published Recurrence Rates for Primary BCC**	4.2 - 15.8%	1.0 - 2.5%
Published Recurrence Rates for cSCC**	5.8 - 10.7%	2.6 - 3.1%
Published Follow-up	Short (1-3 years)	Long (5-10 years)
Pathologic Confirmation of Margin Status	No (disease control determined by clinical exam +/- ultrasound)	Yes (frozen section histology)
<b>Expert Consensus Recommendations</b>		
AAD Position Statement	Second-line option when surgery is contraindicated	Most effective treatment option with the highest cure rates
NCCN Guidelines	Second-line option for non-surgical candidates	First-line treatment for high-risk BCC and low-, high- and very-high risk cSCC risk
<b>Scope of Practice / Level of Training***</b>		
Residency Curriculum Requirement	No	Yes
Fellowship Training Available/Encouraged	No	Yes
Board Certification***	No	Yes

\*Depending on a pre-op evaluation

\*\*5-year relapse free survival rate

\*\*\*Current board certification for MMS requires a minimum number of cases and/or fellowship training

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## V. Other Procedures & Agents

**Metastatic NMSC:** Aggressive local surgery, lymph node dissection, and postoperative radiation therapy are often needed.

- Chemotherapy for metastatic SCC is usually administered by oncologists and typically includes EGFR inhibitors
- For metastatic BCC, vismodegib or sonidegib can be considered.
- **Vismodegib:** selective inhibitor of Hedgehog pathway activation via binding to the protein Smoothened, treatment option for locally advanced or metastatic BCC.
  - **Side effects:** dysphagia (40%), muscle spasms, alopecia, nausea, reduced appetite, diarrhea, fatigue, SCCs, cough, CHF, pneumonia.

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## VI. Mohs & Melanoma Treatment



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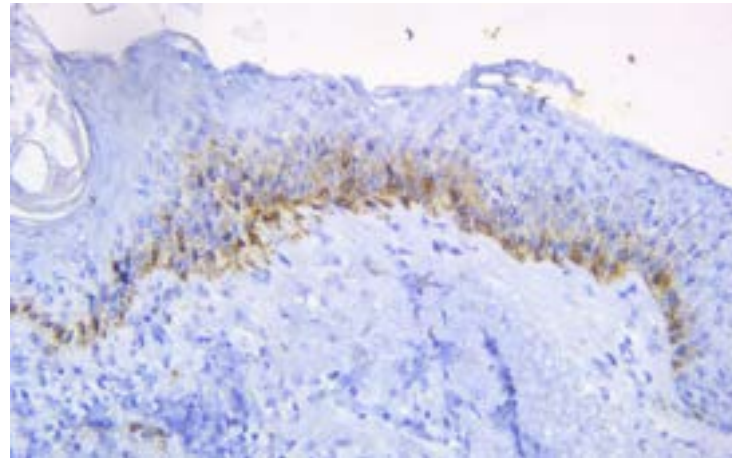
## VI. Mohs & Melanoma Treatment

- National Comprehensive Cancer Network (NCCN) recommends wide local excision (WLE) for all cutaneous melanomas.
  - **Mohs may be considered for minimally invasive (*melanoma in situ or T1a*) melanoma in anatomically constrained areas (i.e. face, ears, acral sites) along with other methods that provide comprehensive histologic assessment such as staged excision with permanent sections.**
- Use of MMS for melanoma in the United States increased 304% from 2001 (2.6% of melanomas) to 2016 (7.9% of melanomas).

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## VI. Mohs & Melanoma Treatment

- 2022 Meta-analysis showed **significantly lower recurrence rate** for all types of cutaneous melanoma with **MMS (<1%)** compared to staged excision (3%) and wide local excision (7%).
  - Other studies have found local recurrence rates for MMS that vary: 0 - 2.6%
- Procedure uses **MART-1** immunostaining to provides tissue conservation and same-day reconstruction of histologically verified tumor-free margins in a convenient, single-day procedure.



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