Red Bumps *and* Brown Spots: Saving Lives in Primary Care

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Financial Disclosure

- No relevant financial disclosures.

Goals:

- To provide a basic overview of skin cancers
- To understand the process of Mohs surgery and why it has the highest success rate
- To provide tips to better diagnose skin cancers in clinical practice

Skin Cancer Incidence in the U.S.

- Most common type of cancer
- 20% of Americans will develop skin cancer
- Each year, more new cases of skin cancer than cancers of the breast, prostate, lung and colon ***combined***
- More people have had skin cancer than all other cancers combined over last 3 decades
- Treatment costs ***$8.1 billion*** each year

Source: Skin Cancer Foundation

Melanoma Incidence in the U.S.

- Estimate: 196,060 cases of melanoma will be diagnosed in the U.S. in 2020
- Melanoma accounts for < 2% of skin cancer cases, but the majority of skin cancer deaths
- An estimated 6,850 people will die of melanoma in 2020
- In the past decade (2010 – 2020), the number of new invasive melanoma cases diagnosed annually increased by 47 percent

Source: Skin Cancer Foundation

Melanoma


Asymmetry
The two halves of the mole look different
Border
The border is poorly defined or irregular
Colour
The colour varies from one area to another
Diameter
The mole is bigger than a pencil eraser
miiskin.com

Why the Rapid Increase?

- Sun exposure habits
- Prevalence of indoor tanning
- Ozone layer depletion
  - 4% - 5% increase in UVB radiation reaching earth (at latitudes that cover the U.S.)[2]
- Aging population

Causes of Skin Cancer

- Ultraviolet radiation – a proven human carcinogen
  - UVB (290nm - 320nm)
    - Most important: **cause burning**
  - UVA (320nm - 400nm)
    - More penetrating: **cause aging**
- Ionizing radiation (X-rays)
- Chemicals (arsenic, coal tars)

The Impact of Indoor Tanning

- 419,000+ cases of skin cancer linked to tanning each year
- Tanning by minors is banned in 19 states
- People who first use a tanning bed before age 35 increase their risk for melanoma by 75%
- More people develop skin cancer because of tanning than develop lung cancer because of smoking
- A single tanning session increases risk of SCC by 67%, BCC by 29%

Source: Skin Cancer Foundation

Causes of Skin Cancer

- "Marjolin's ulcers"- cancer developing in a chronic wound or scar
- Immunosuppression
  - Organ transplant patients
  - 10% - 45% of transplant patients develop skin cancers[3, 4]
  - 2 to 3 times more SCCs than BCCs[4]
- Human papillomavirus - HPV 16
- Inherited diseases - XP, BCNS, albinism

Basal Cell Carcinoma

- Most common cancer in America
- Usually seen in the middle-aged and elderly
- Usually due to solar radiation
- Most common locations:
    - Face - nose, cheeks, forehead, periocular
    - Ears, neck, trunk, extremities
- Frequently develop another within 5 years

Basal Cell Carcinoma

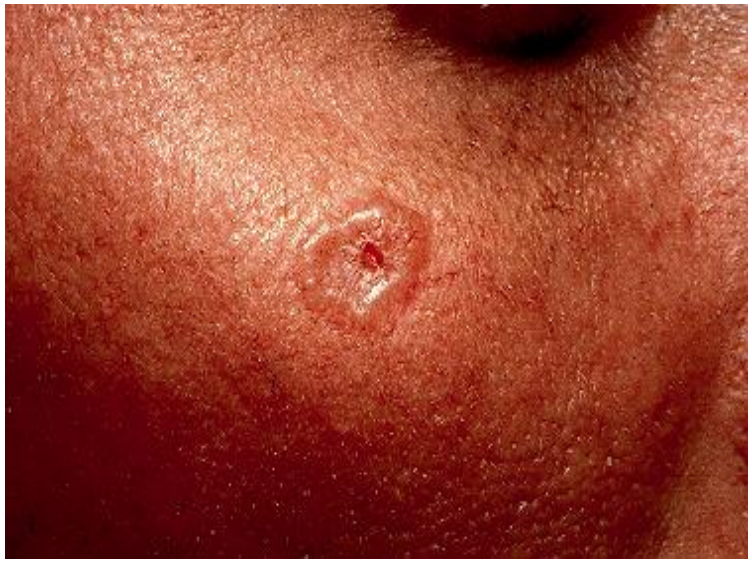
Subtypes

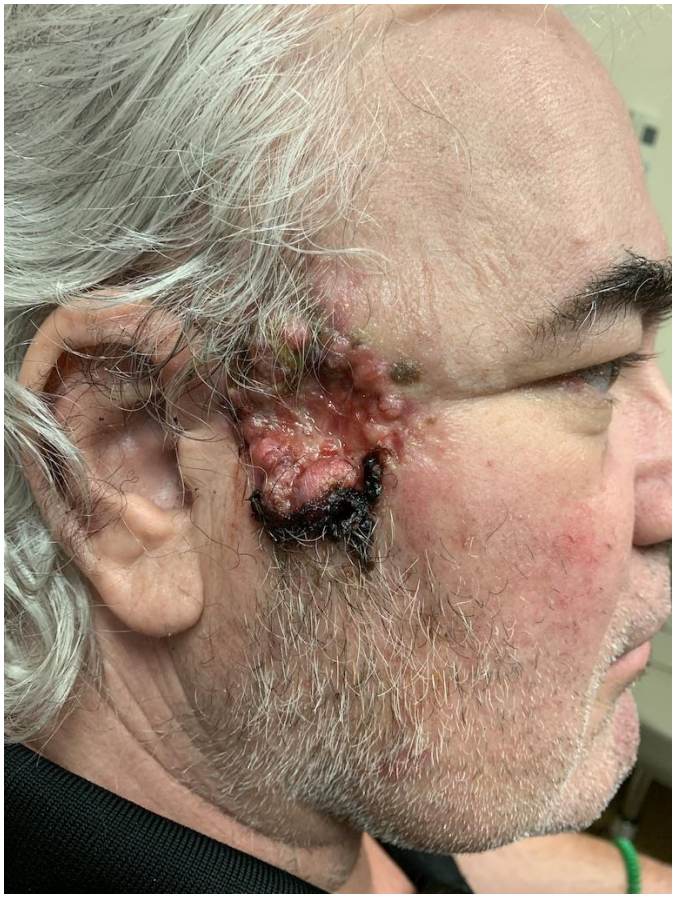
- Nodular (most common)
- Pigmented
- Morpheaform (sclerosing, infiltrative)
- Micronodular
- Metatypical (basosquamous)
- Superficial ("multicentric")

Basal Cell Carcinoma

Subtypes

- Nodular (most common)
- Pearly papule or nodule, may be ulcerated

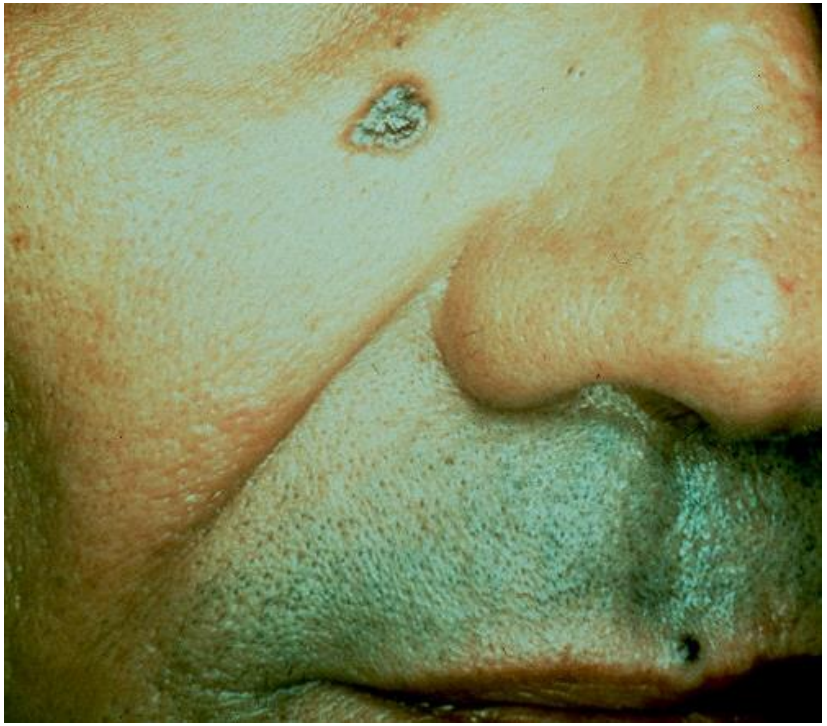




Basal Cell Carcinoma

Subtypes

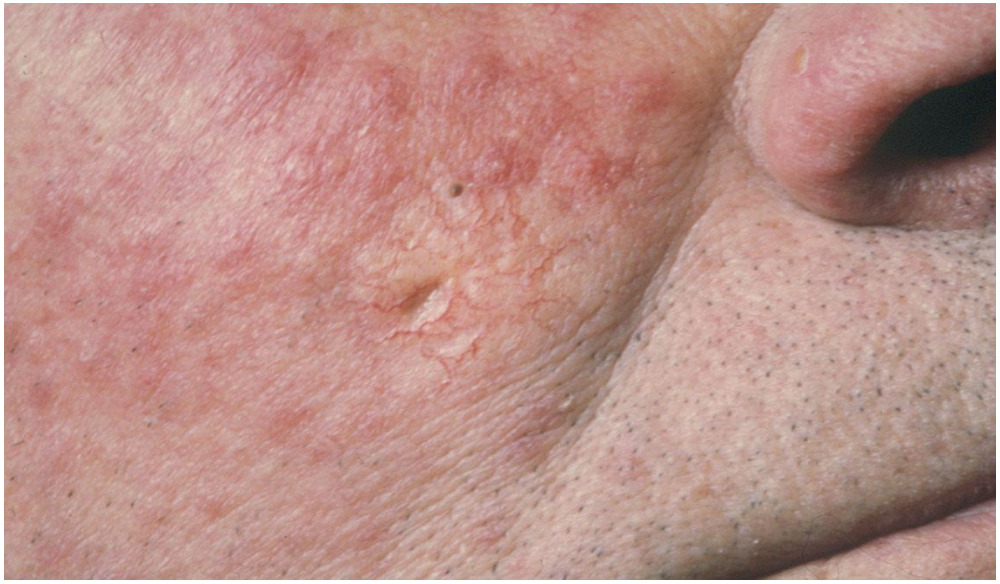
- Pigmented
- More common subtype in skin of color



Basal Cell Carcinoma

Subtypes

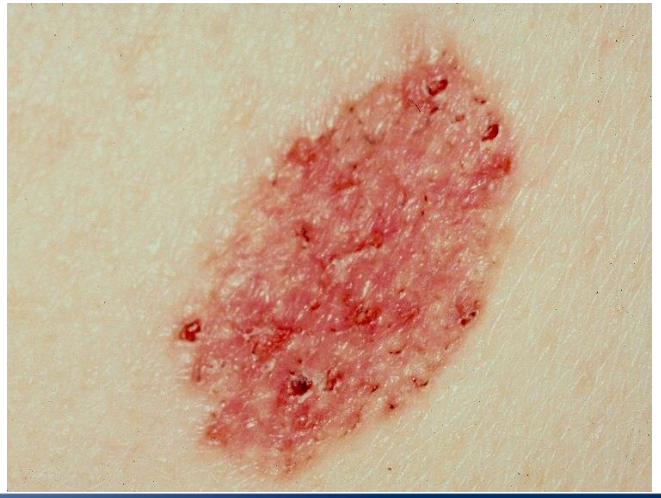
- Morpheaform/infiltrative/sclerosing
- Can be whitish in appearance like a scar



Basal Cell Carcinoma

Subtypes

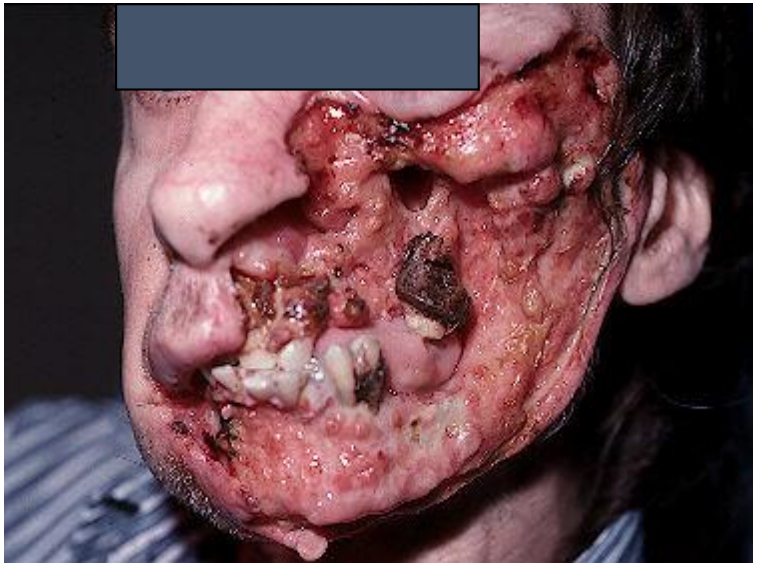
- Superficial
- Scaly pink patch or plaque- often misdiagnosed as psoriasis or eczema



Basal Cell Carcinoma

Course

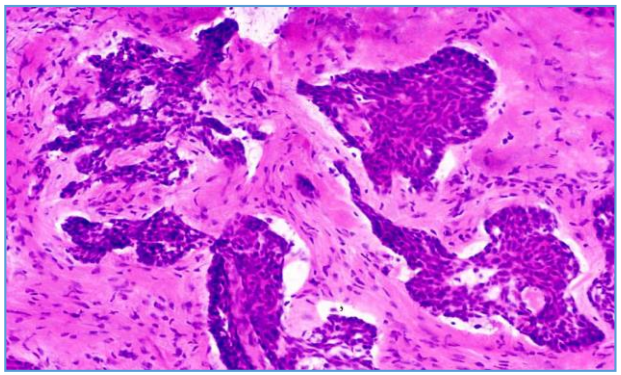
- Slow progressive growth
- Bleeding, ulceration
- Enlarges over months, years
- Capable of extensive tissue destruction (invading muscle, cartilage, bone) if untreated

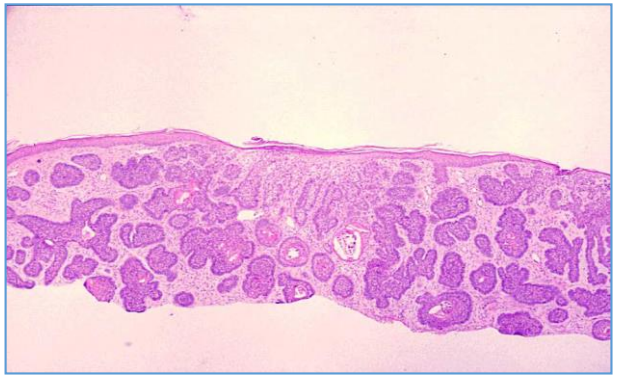


Basal Cell Carcinoma

Histopathology

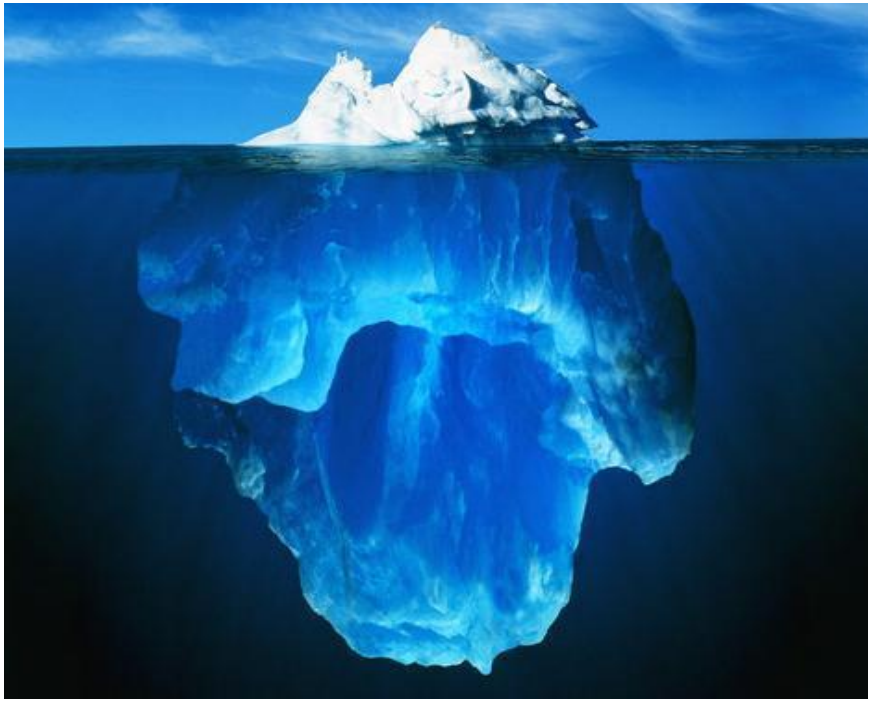
- Dark purple staining basal cells in mass
- Peripheral palisading
- Retraction





Basal Cell Carcinoma

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



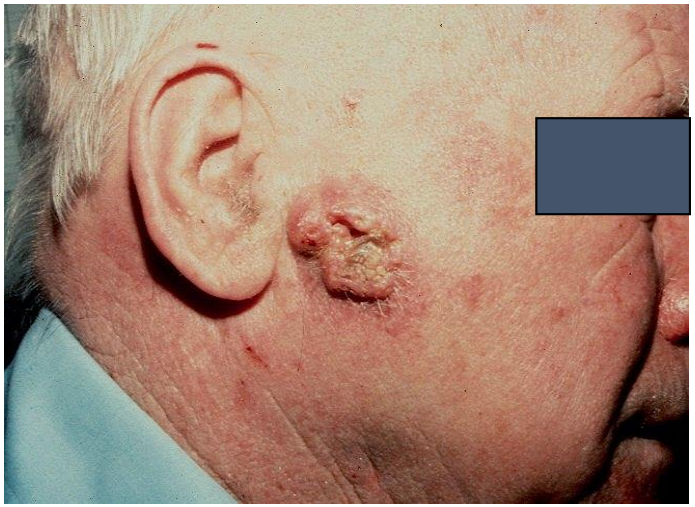
Squamous Cell Carcinoma

Arise primarily on sun-damaged skin

- Often from precursor actinic keratosis

May occur anywhere on skin

- Face
- Lips, mouth
- Ears
- Dorsal hands
- Chest and back
- Anogenital
- Extremities



Squamous Cell Carcinoma

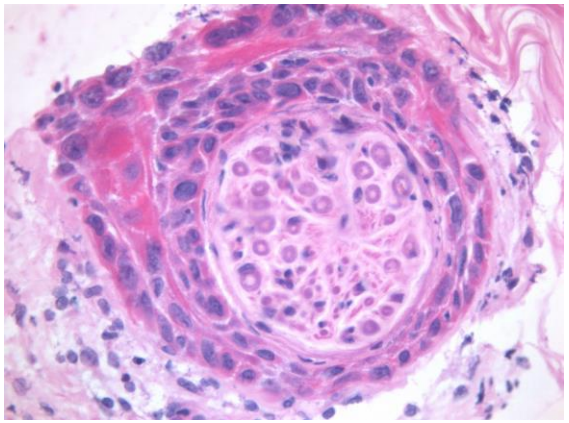
Cases where SCCs > BCCs:

- Immunocompromised patients
- Skin of color patients*
- On lips and dorsal hands
- PUVA treatment patients

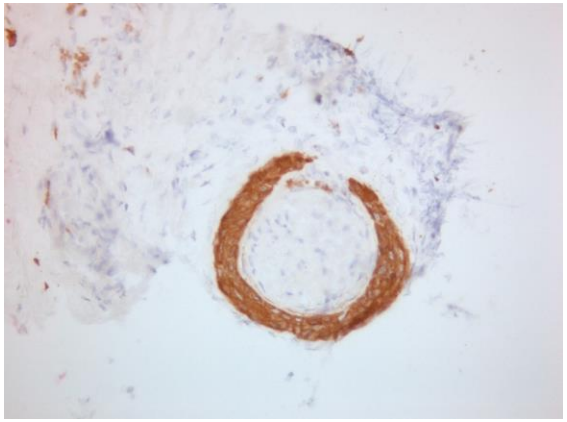
Squamous Cell Carcinoma

Metastasis more likely in:

- Recurrent tumors
- Those with diameter > 2 cm
- Depth >4 mm
- Mucosal sites
- Periauricular skin
- Those arising from chronic wounds (Marjolin's)
- Perineural invasion
- Immunocompromised patients



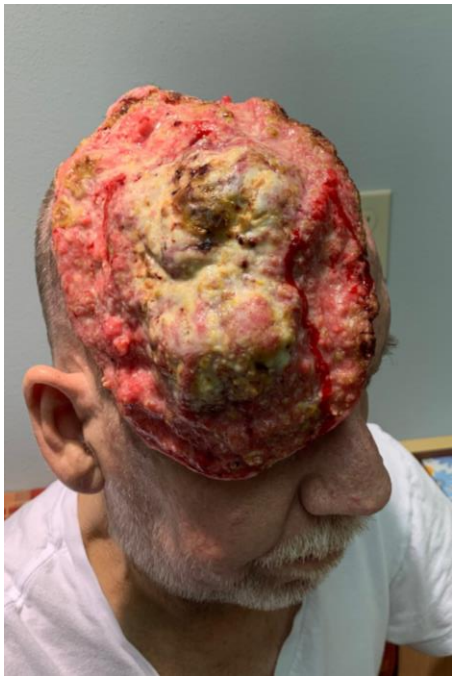
Perineural SCC on Mohs sections with H&E and CK stain



Squamous Cell Carcinoma

Subtypes

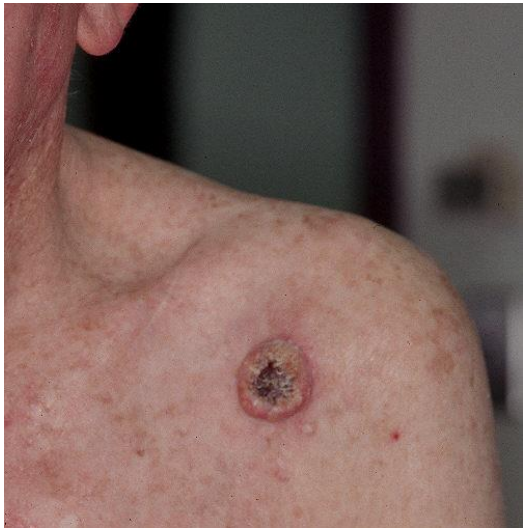
- Keratoacanthoma
- SCC from Bowen's Disease
- Verrucous carcinoma
- Well-differentiated SCC
- Acanthioloytic SCC
- Lymphoepithelioma-like carcinoma
- Desmoplastic SCC
- Adenosquamous SCC
- Cystic SCC



Squamous Cell Carcinoma

Subtypes

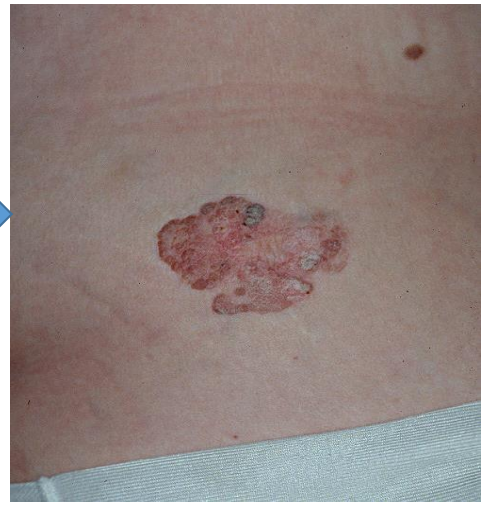
- Keratoacanthoma
  - Initial rapid growth
  - Exophytic nodule with central keratin-filled crater
  - Remains stable for a few months
  - May spontaneously resolve



Squamous Cell Carcinoma

Subtypes

- Bowen's Disease
  - Squamous cell carcinoma *in-situ*
  - Thin, erythematous, scaling plaques
  - Often progress into, and/or coincide with invasive SCCs
  - Can be misdiagnosed as psoriasis or eczema



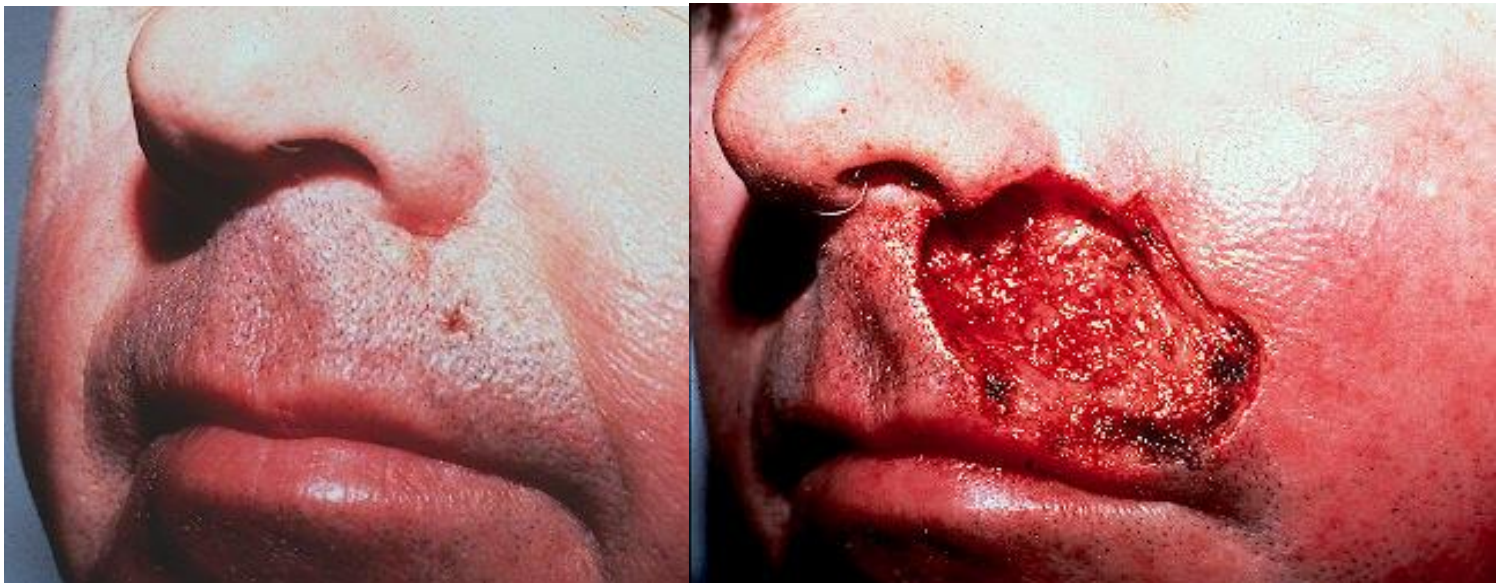
Squamous Cell Carcinoma

Subtypes

- Verrucous Carcinoma
  - Exophytic, verrucous, or fungating tumor
  - Usually in genital or oral regions but also found on the sole of the foot
  - May be related to human papillomavirus

Non-Melanoma Skin Cancer

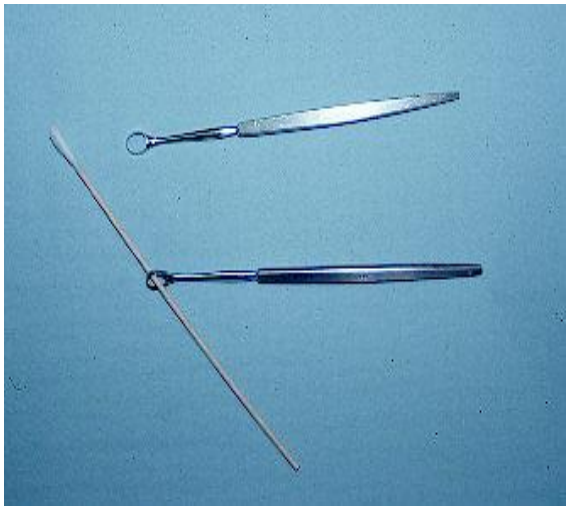
Sometimes what is seen at the surface is only the tip of the iceberg.



Treatment of BCCs and SCCs

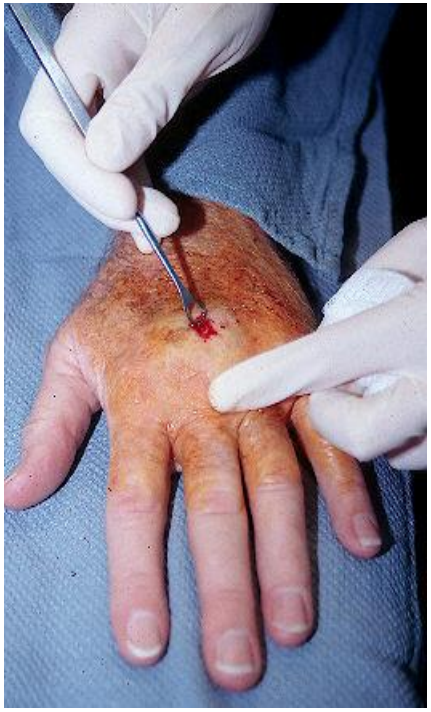
Electrodesiccation and Curettage (EDC)

- Scrape and burn lesion until a healthy base is achieved
- Cure rate dependent on experience
- Lacks margin control (pathologic confirmation)
- "Blind procedure"

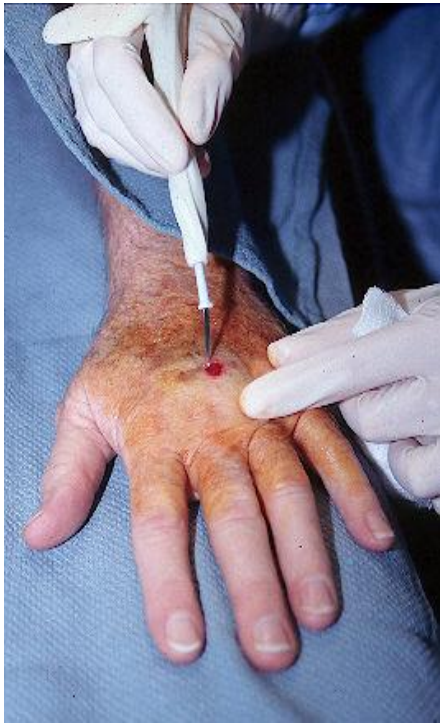


Treatment of BCCs and SCCs

Curettage



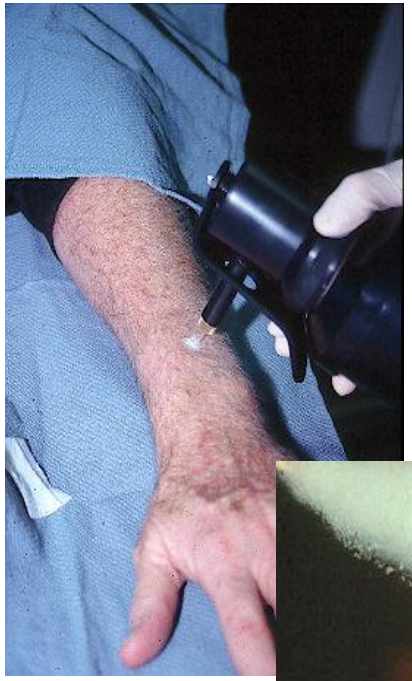
Electrodesiccation

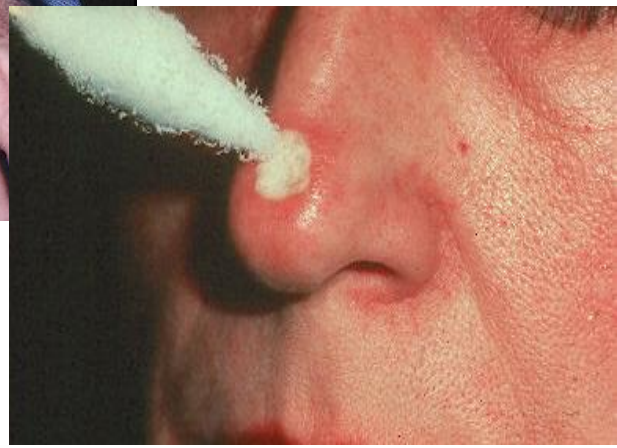


Treatment of BCCs and SCCs

Cryotherapy

- Liquid nitrogen
- Used frequently to destroy benign or premalignant (AKs)
- May be used to treat malignancies
- Lacks margin control
- Method of blind destruction





Treatment of BCCs and SCCs

Radiation therapy

- May be very effective in certain areas
- Primary vs. adjuvant role (with surgery)
- Requires multiple treatments over 4 to 8 weeks
- Tumor may recur in more aggressive form
- Used in certain patients, such as those unable to tolerate surgery

Treatment of BCCs and SCCs

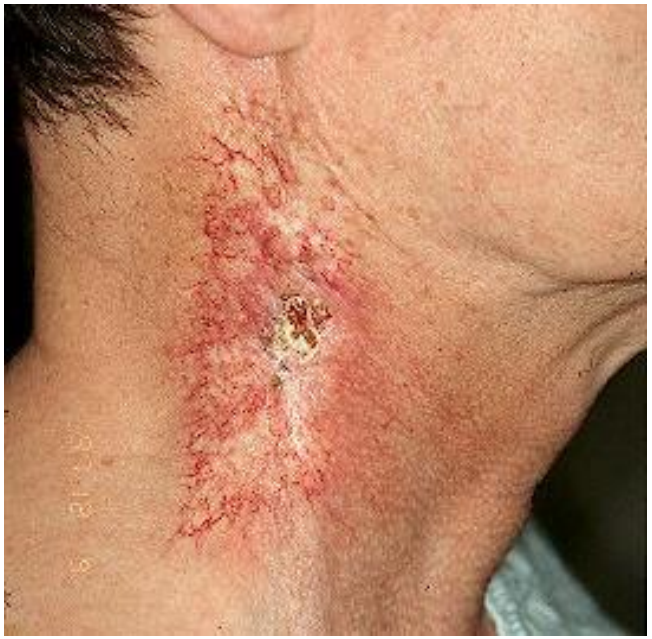
Radiation therapy

- Can be a primary treatment in certain patients who are unable to tolerate surgery
- Adjuvant role (following surgery) for some high-risk tumors
- Requires multiple treatments over a period of weeks
- Tumor may recur in more aggressive form

Treatment of BCCs and SCCs

Radiation therapy

- Malignancy may develop within irradiated skin



Treatment of BCCs and SCCs

Lasers and light-based treatment

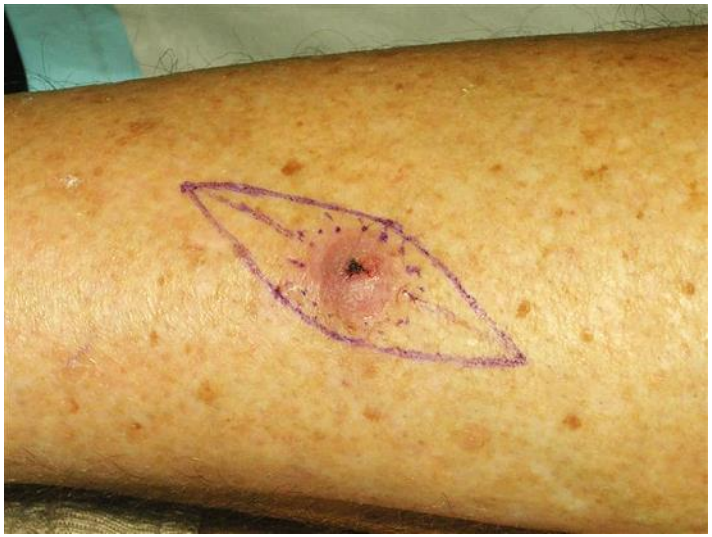
- Destructive lasers
  - Carbon dioxide
  - Erbium: YAG
- Photodynamic therapy

- Limited utility except in small and/or superficial disease

Treatment of BCCs and SCCs

Surgical Excision

- Common treatment for low-risk cancers
- Elliptical excision, linear closure
- Flaps or grafts for larger lesions
- Approximately 90% cure rate[5]



Treatment of BCCs and SCCs

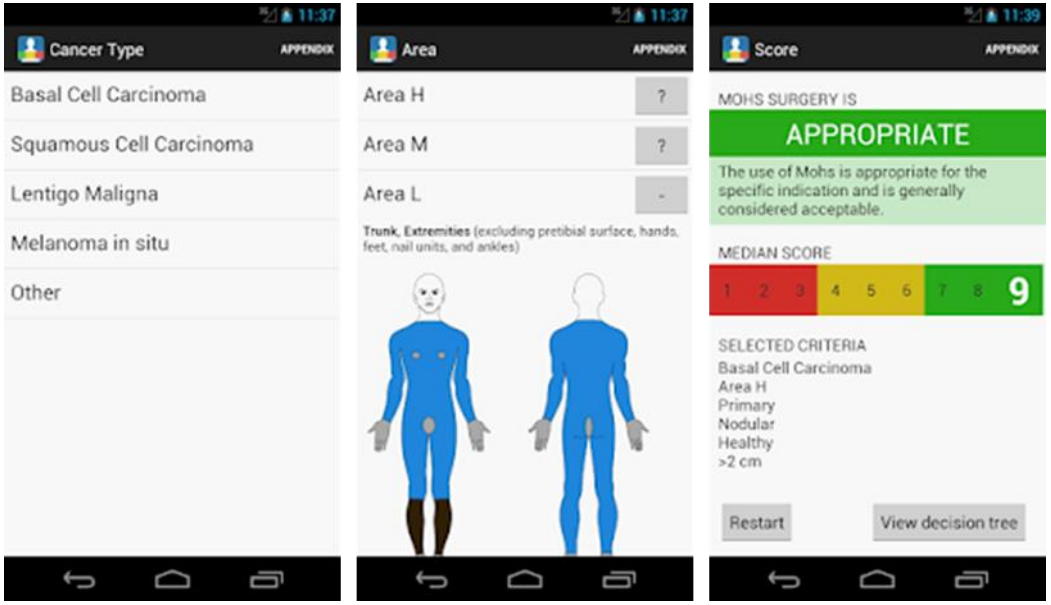
Mohs Micrographic Surgery

- Highest cure rate (97-99%)[5, 6]
- Evaluates the entire surgical margin microscopically
- Spares healthy tissue
- 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

Treatment of BCCs and SCCs

Mohs Micrographic Surgery

- Appropriate Use Criteria (AUC) helps clinical decisions[9]
  - https://www.aad.org/member/publications/apps/mohs



Mohs Surgery

- Used on tumors with contiguous growth
- Precise microscopic margin control of tumor margins
- 100% of peripheral & deep margin examined
  - Traditional vertical sections examine less than 1%

Mohs Surgery

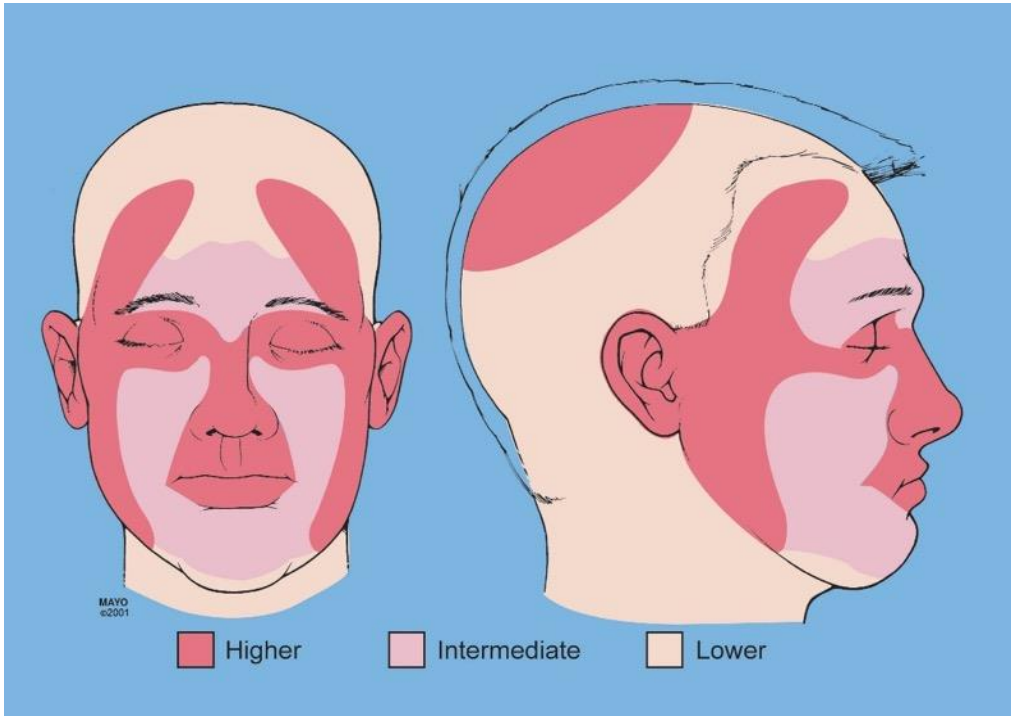
Recurrent Tumors

- Can be more aggressive than original tumor
  - More difficult to cure
  - Have even higher subsequent recurrence
  - More ill-defined
  - Have higher metastatic potential

Mohs Surgery

Critical Location
(Cosmetic and Functional)

- Periorbital
- Perioral
- Periauricular
- Perinasal
- Hands and feet
- Genitalia



Mohs Surgery

Aggressive Histology

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

Mohs Surgery

Other Cutaneous Tumors

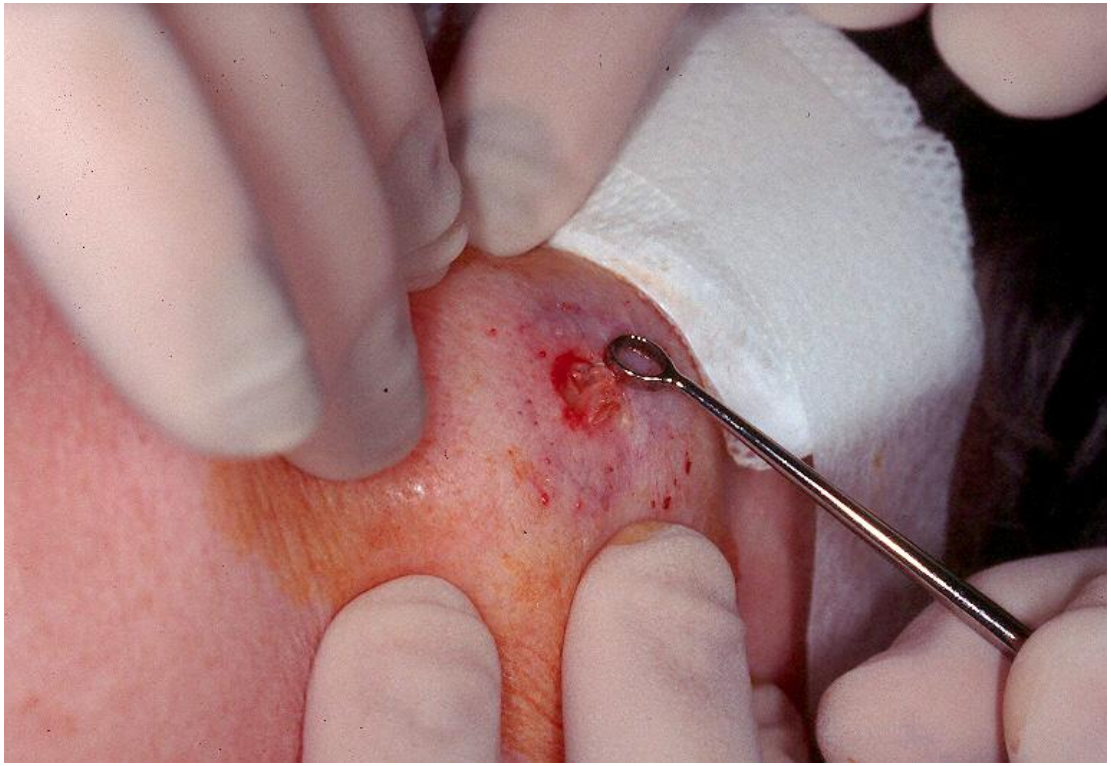
- Dermatofibrosarcoma protuberans (DFSP)
- Atypical fibroxanthoma (AFX)
- Sebaceous carcinoma
- Merkel cell carcinoma
- Microcystic adnexal carcinoma
- Verrucous carcinoma
- Angiosarcoma

Mohs Surgery Procedure

1. Tumor identified and debulked
2. Saucer-shaped piece of tissue excised with 1-2 mm margin
3. Skin marked for orientation
4. Excised tissue color-coded and mapped by sections
5. Tissue sections processed with frozen horizontal technique
6. Mohs surgeon evaluates slides
7. If residual tumor found, it is marked on the map
8. Subsequent Mohs layer taken ***only*** in positive area
9. Process repeated until margins clear
10. Defect repaired with appropriate technique

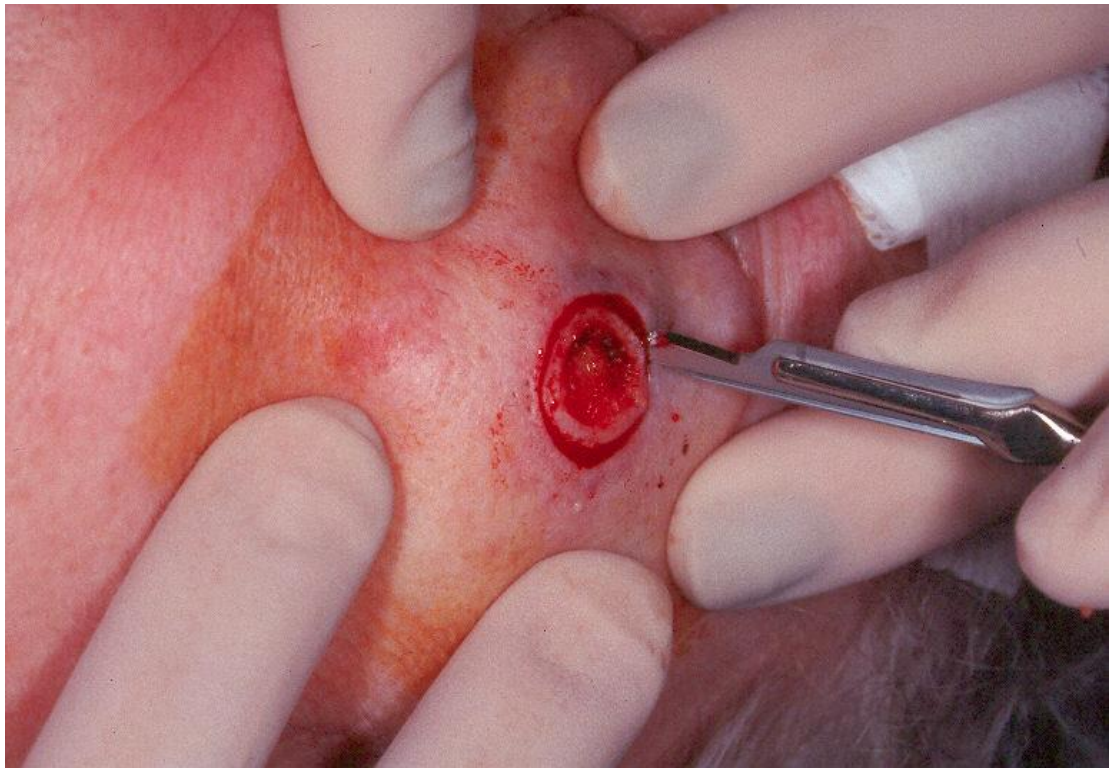
Mohs Surgery Procedure

Tumor identified and debulked



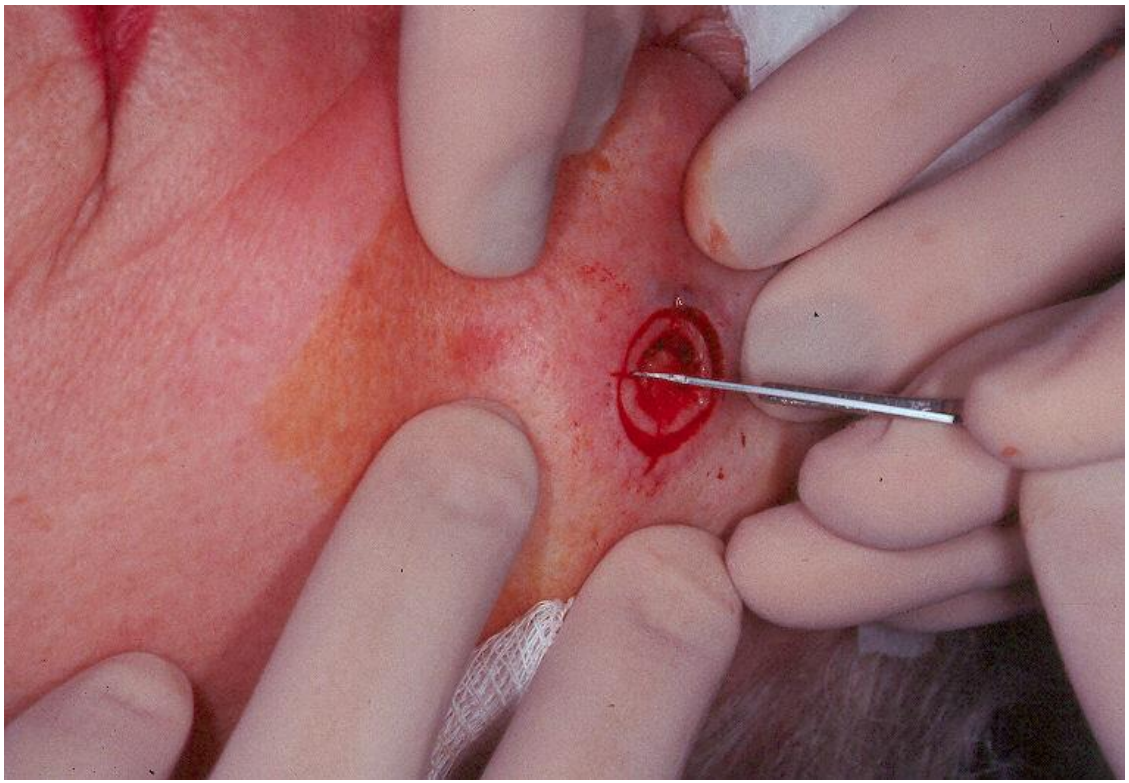
Mohs Surgery Procedure

Beveled incision with small margin



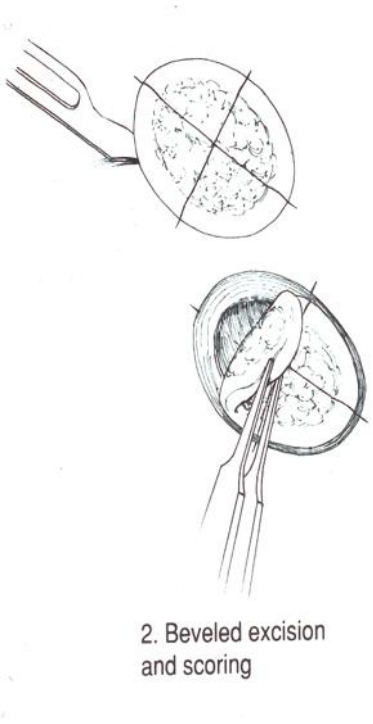
Mohs Surgery Procedure

Hatch mark(s) made on skin for orientation

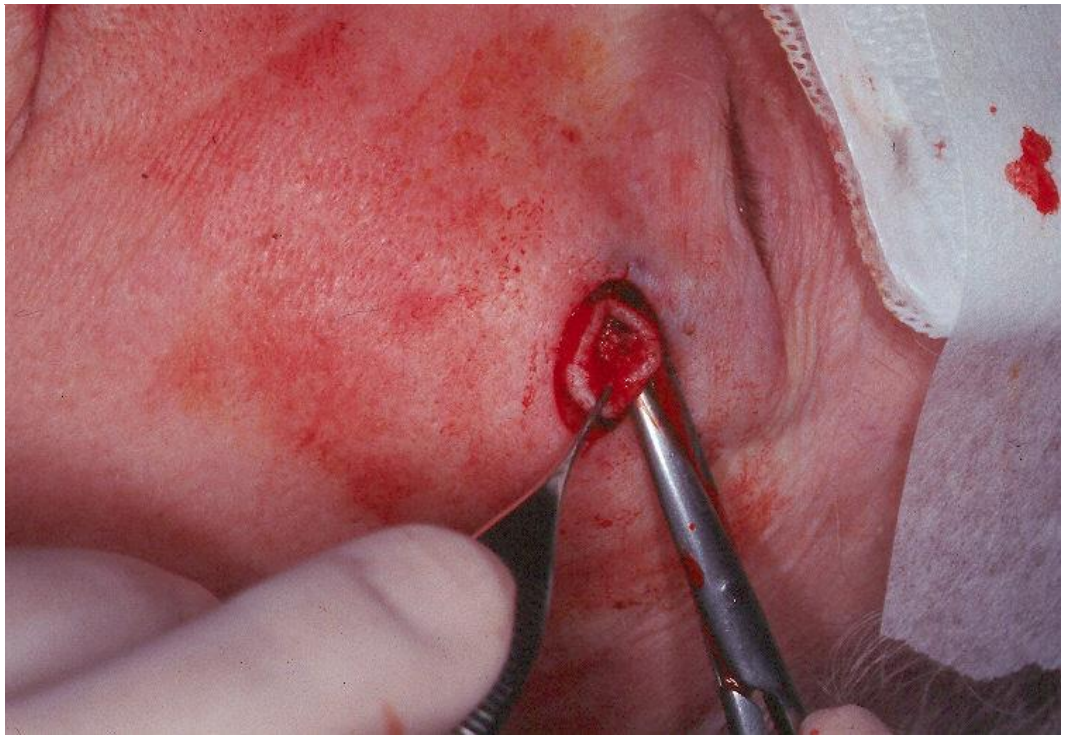


Mohs Surgery Procedure

Tissue removed

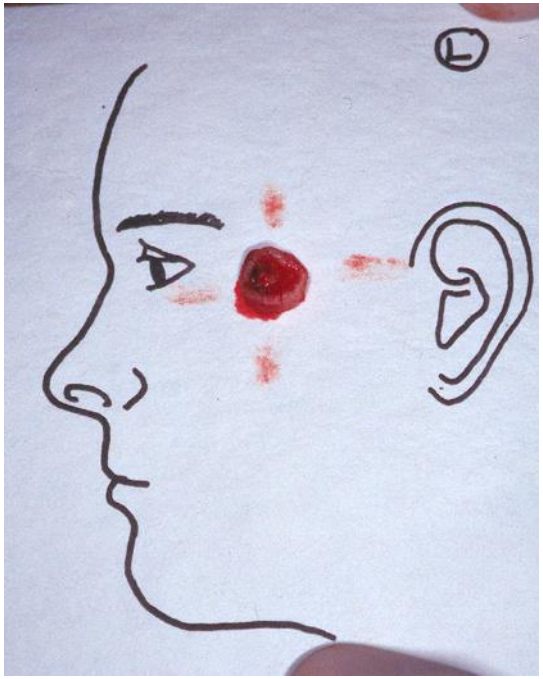


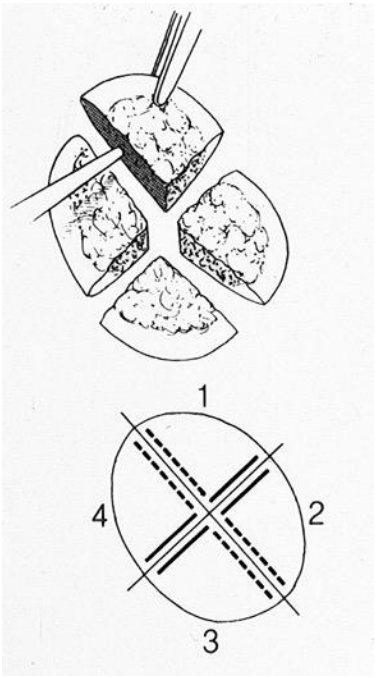
2. Beveled excision and scoring

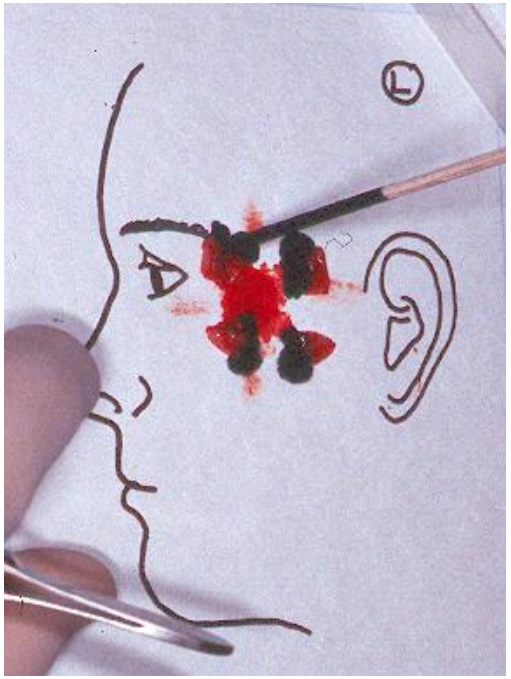


Mohs Surgery Procedure

Tissue grossed and mapped, color-coded

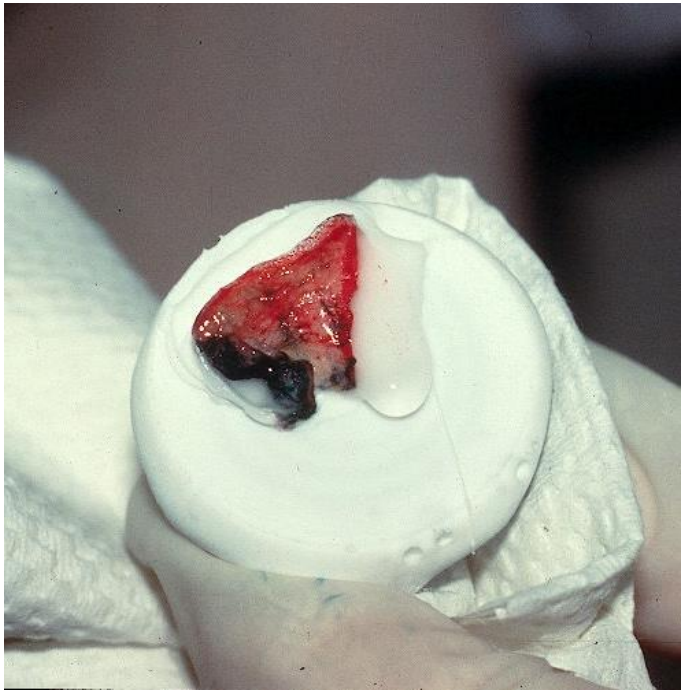






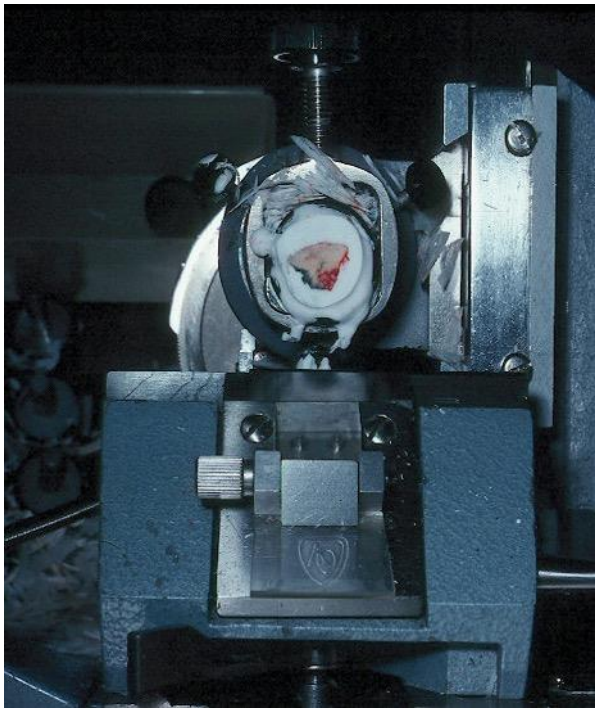
Mohs Surgery Procedure

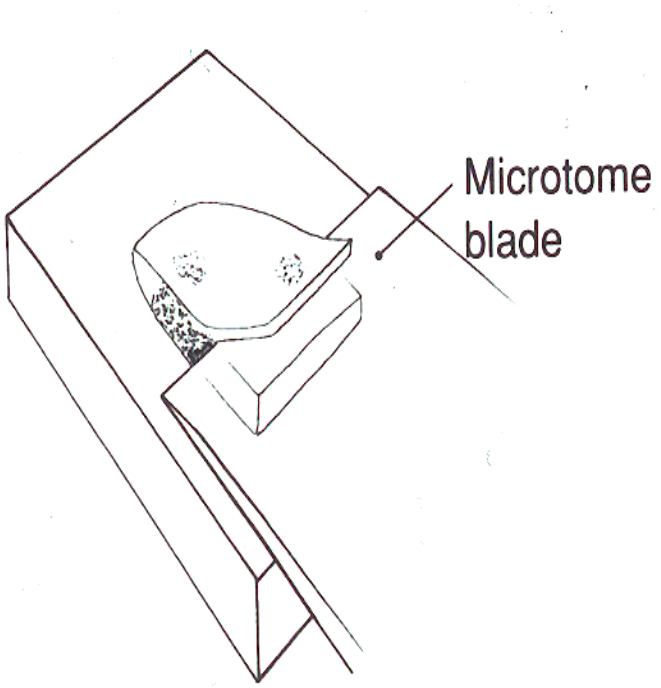
Sections embedded for horizontal sectioning



Mohs Surgery Procedure

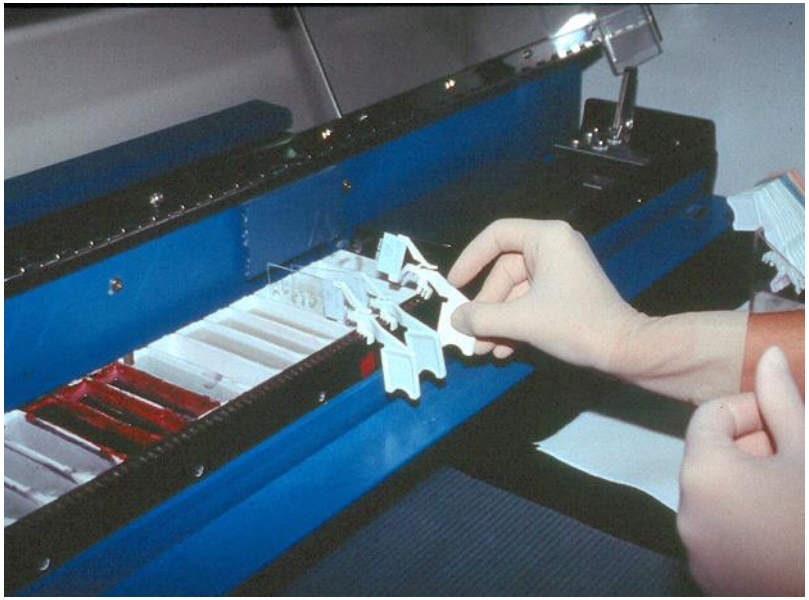
Frozen sections taken and mounted on slide

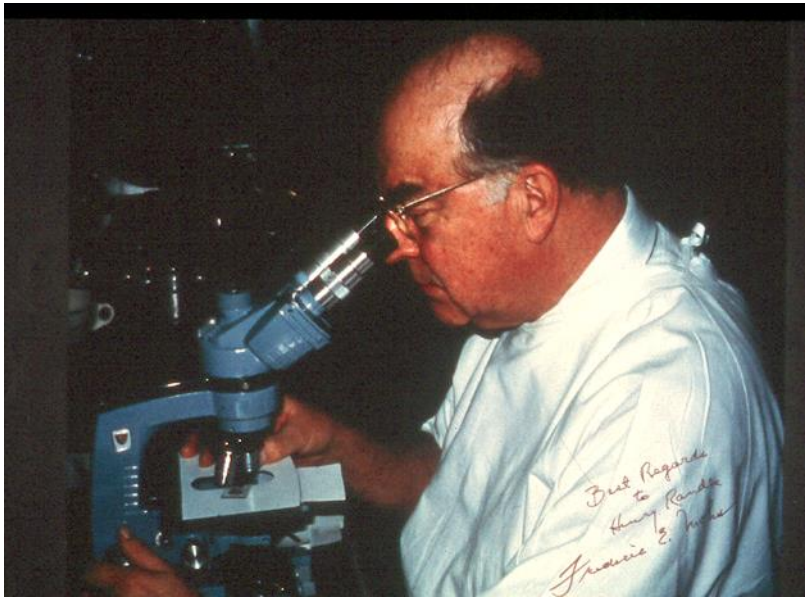




Mohs Surgery Procedure

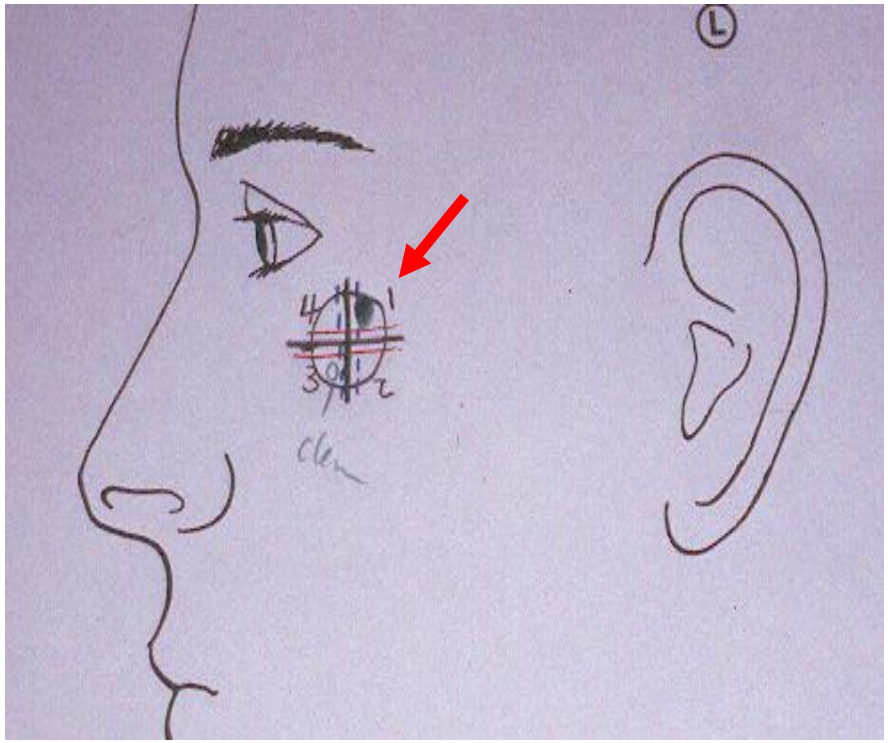
Pathology read by Mohs surgeon

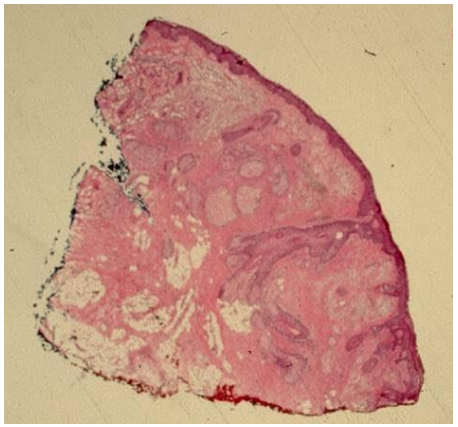


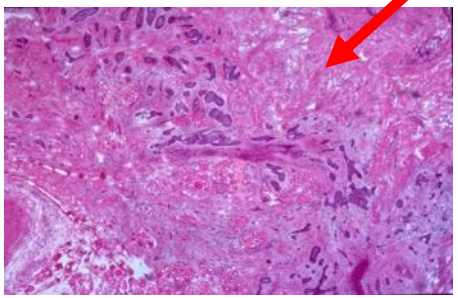


Mohs Surgery Procedure

Tumor mapped, if positive

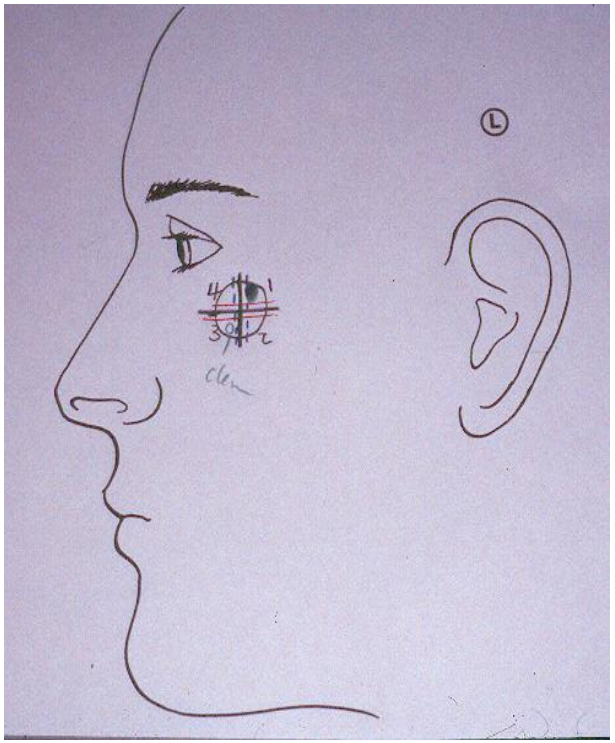


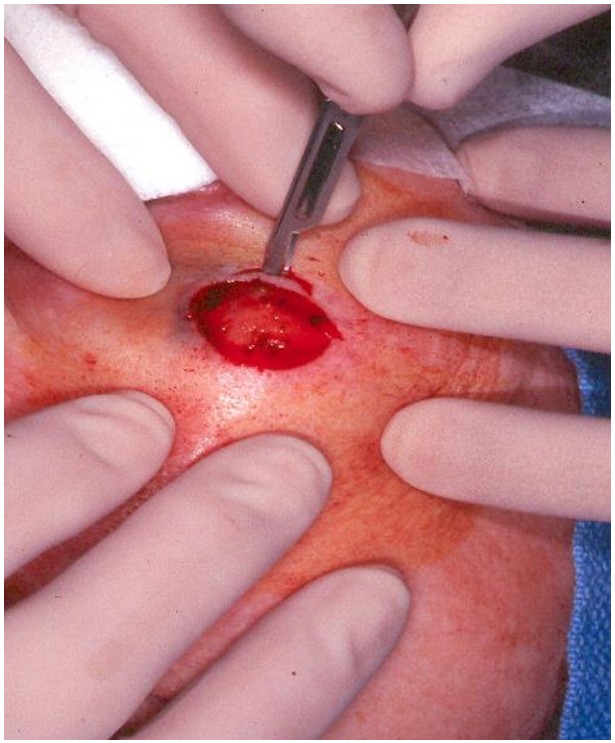




Mohs Surgery Procedure

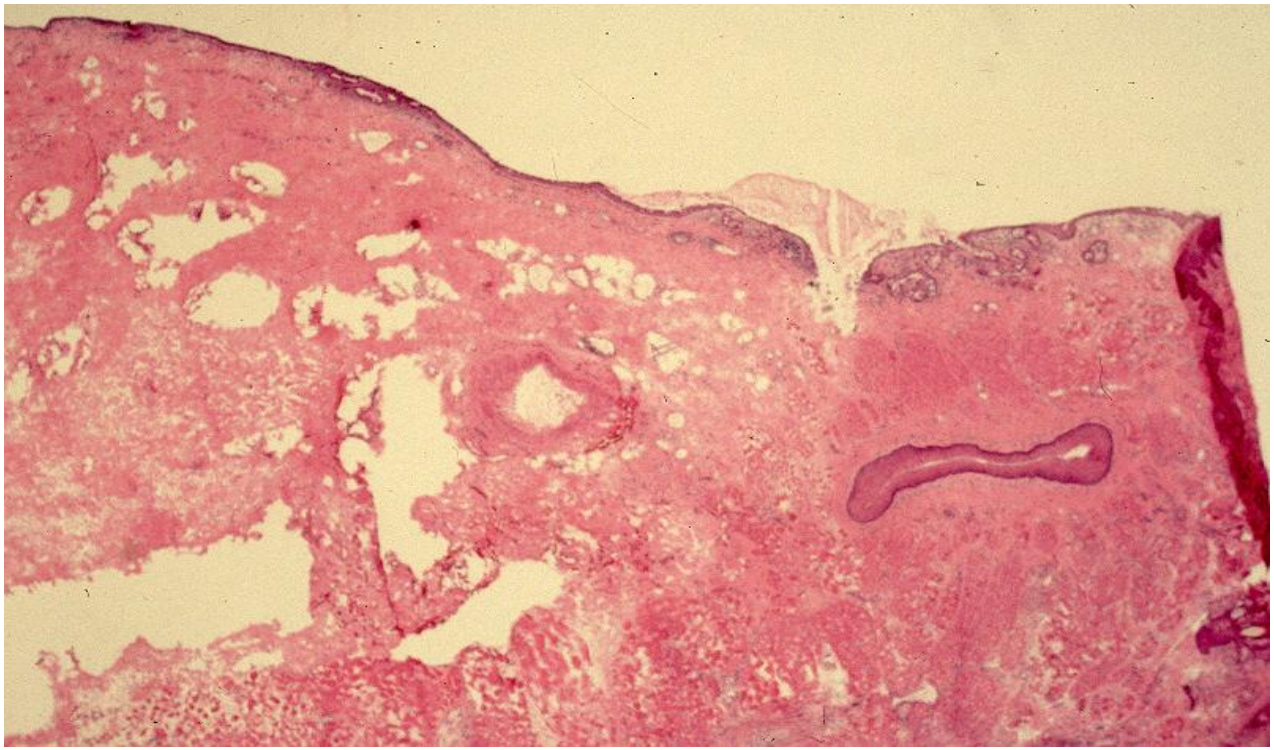
Only area with tumor re-excised





Mohs Surgery Procedure

Process continued until margins are clear



Mohs Surgery Advantages

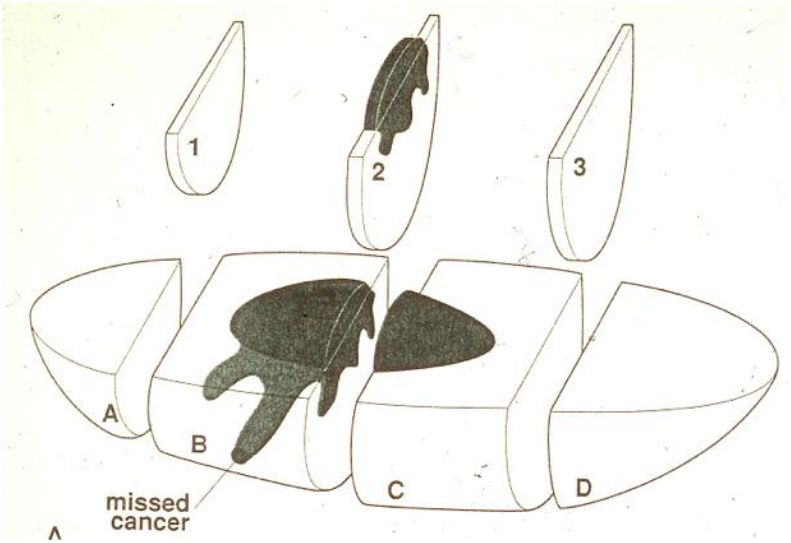
Highest Cure Rate

- 97-99% for primary tumors[5, 6]
- 94% for recurrent tumors[6]
- Cure rates of other methods:
  - Standard excision 89.9%[5]
  - Destruction 81-96%[5, 6, 7]
  - Radiation 91%[5]

Mohs Surgery Advantages

All of peripheral & deep margin examined

- Less than 1% examined in standard vertical sections
- Standard breadloafing provides a small sample



Mohs Surgery Advantages

Tissue Conservation

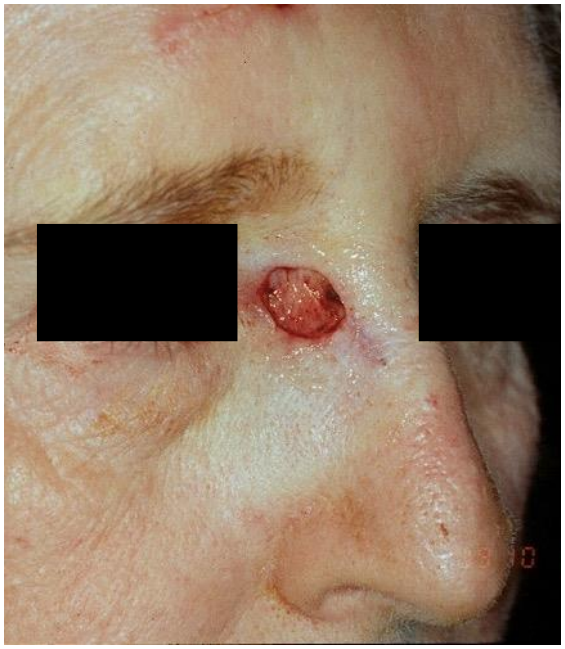
- Preserves maximal amount of healthy skin
- ***Smallest surgical defect possible***

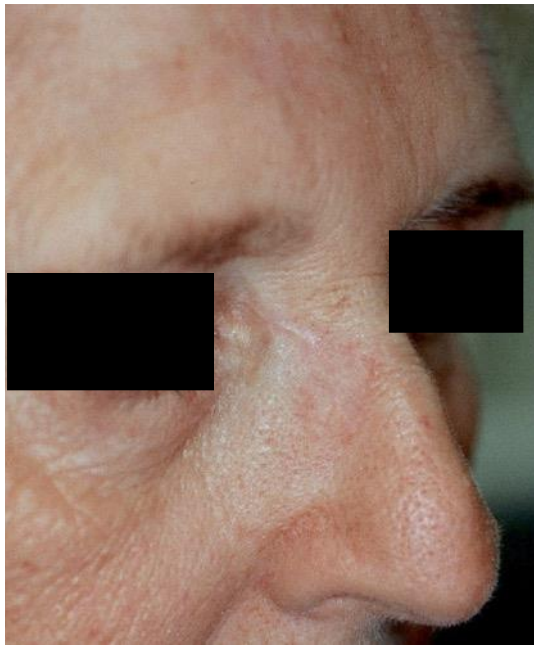
Mohs Surgery Advantages

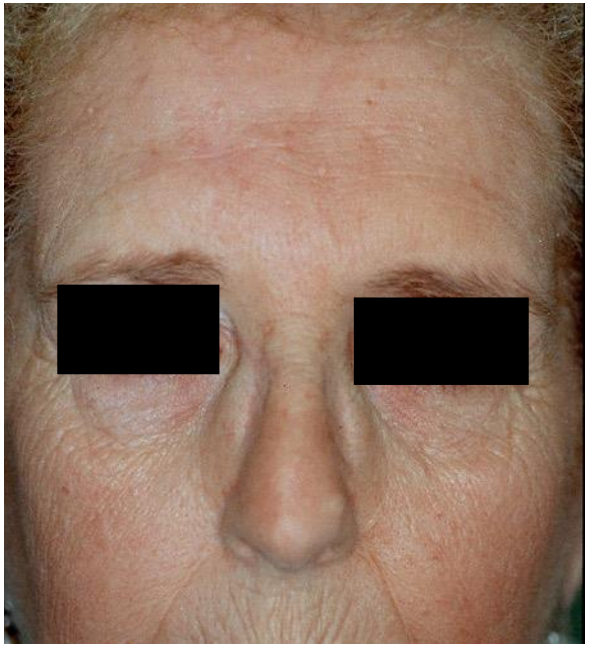
Extremely high cure rate gives Mohs surgeons confidence to repair with most appropriate technique

Mohs Surgery Results

Second intention healing

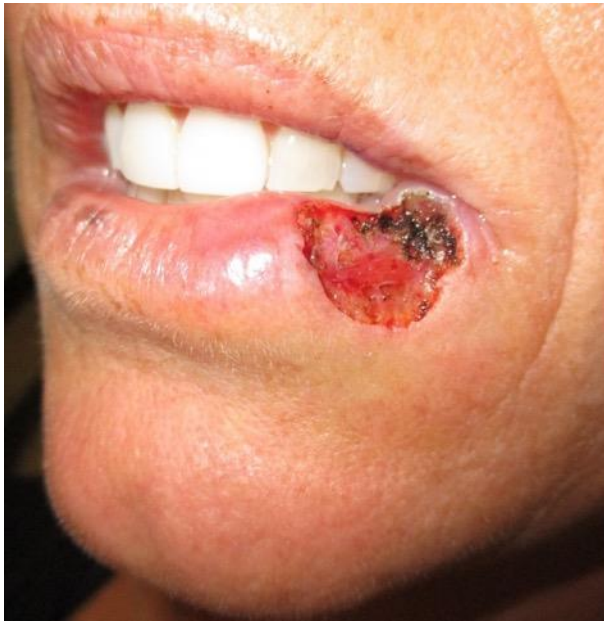


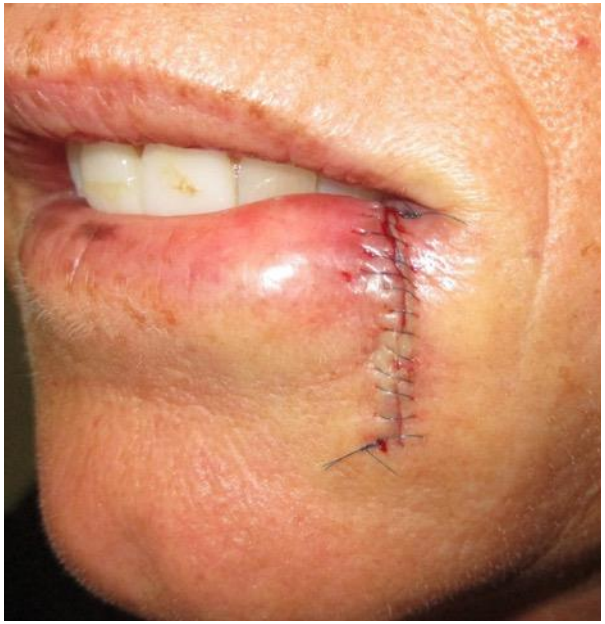


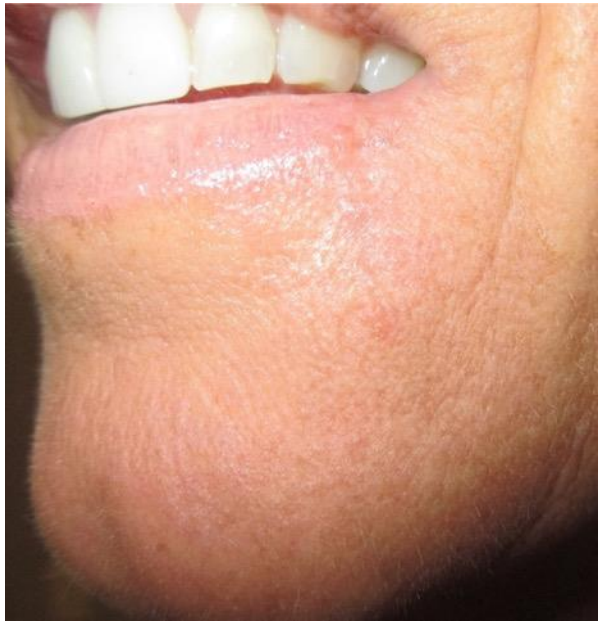


Mohs Surgery Results

Complex linear closure

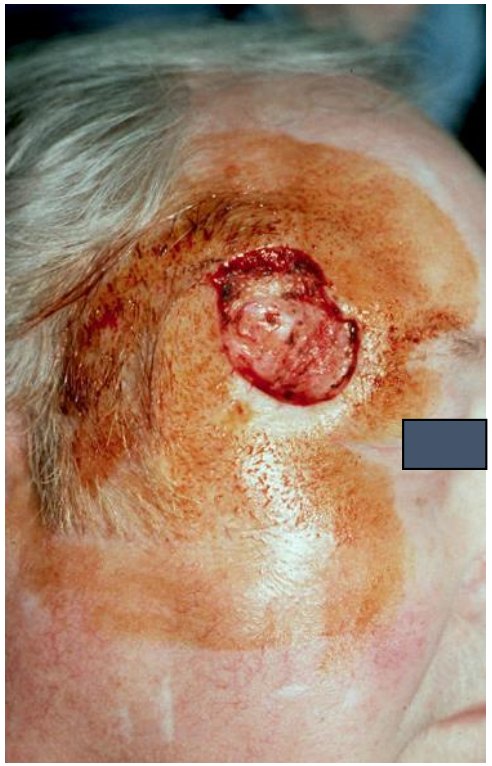


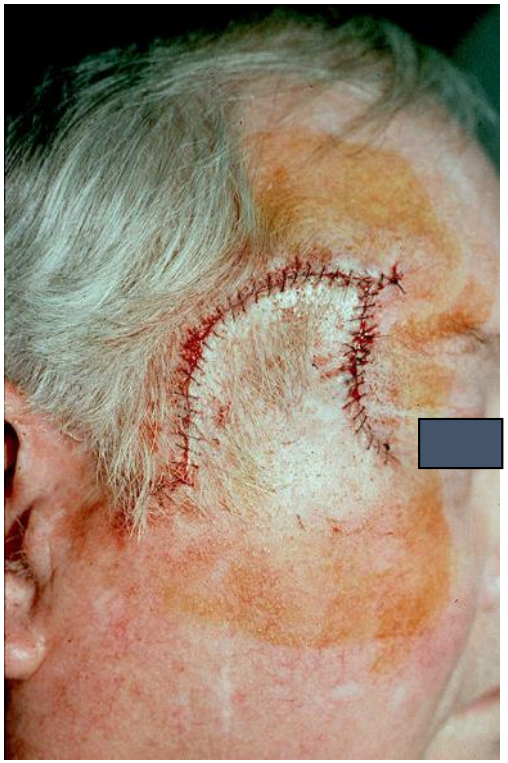


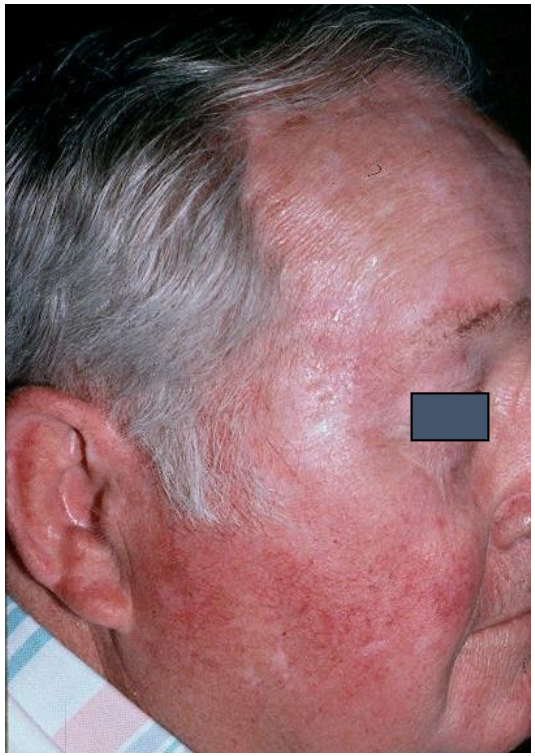


Mohs Surgery Results

Local flap reconstruction

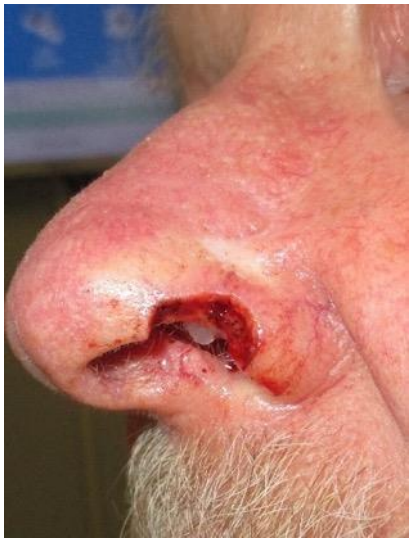
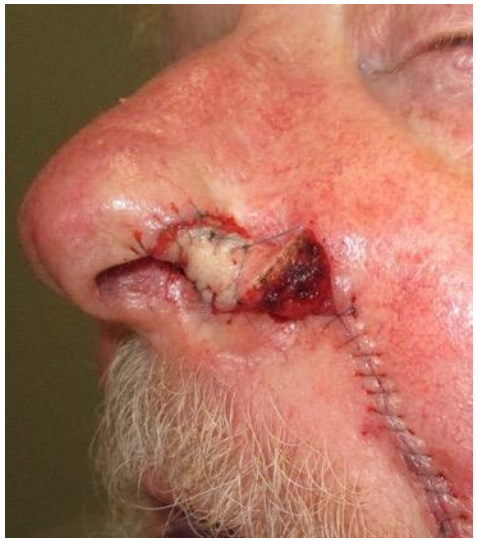
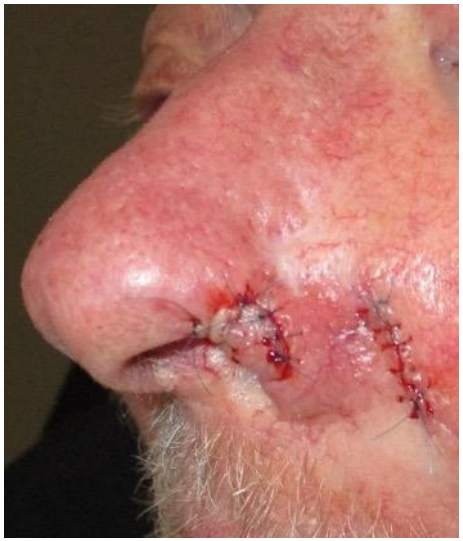
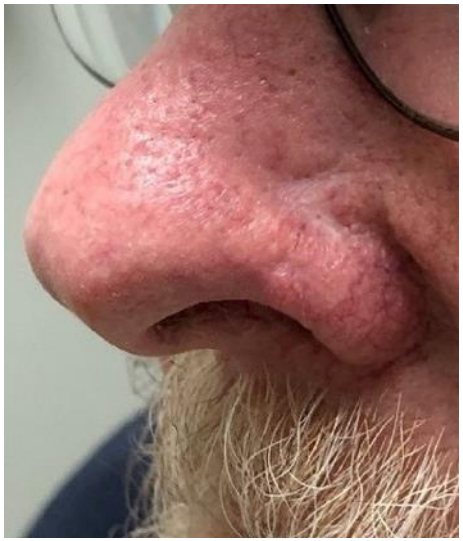






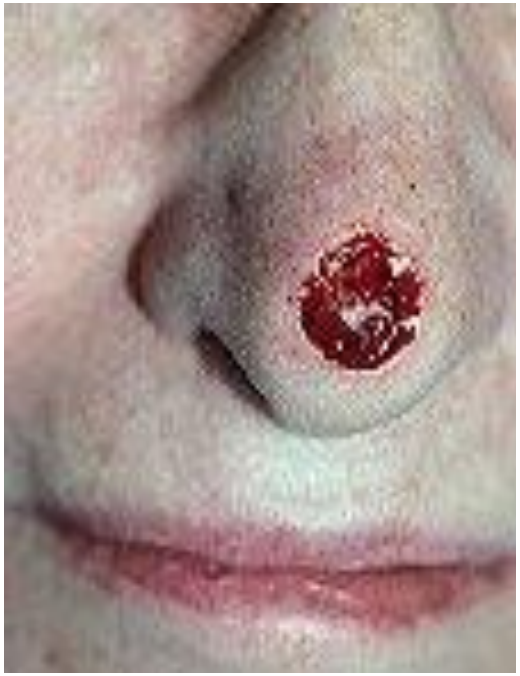
Mohs Surgery Results

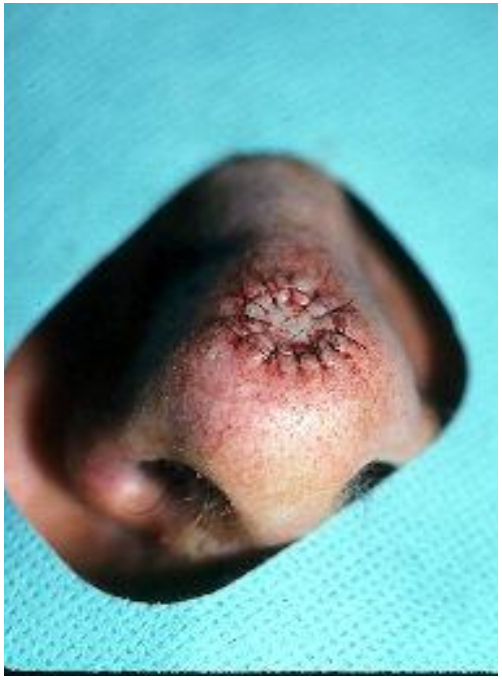
Local flap reconstruction

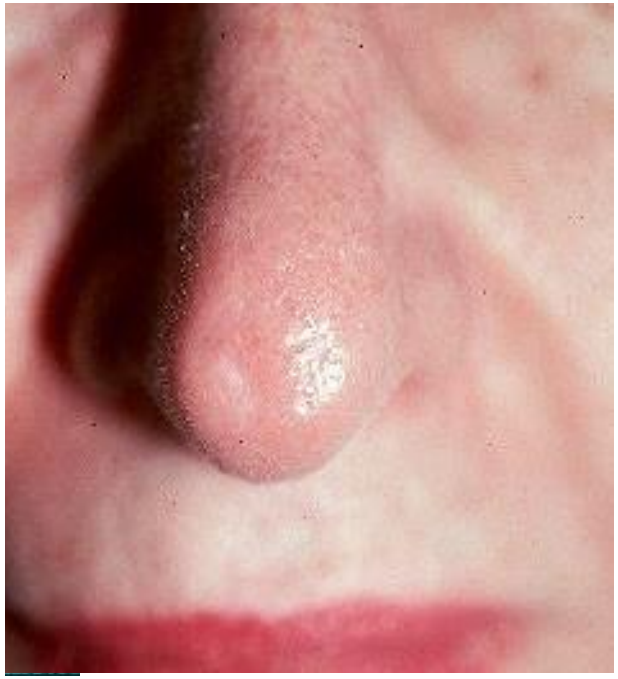





Mohs Surgery Results

Skin graft

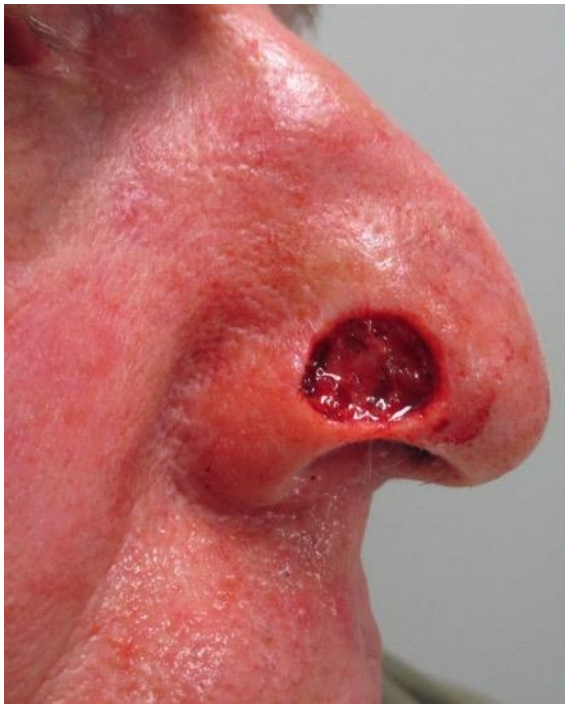


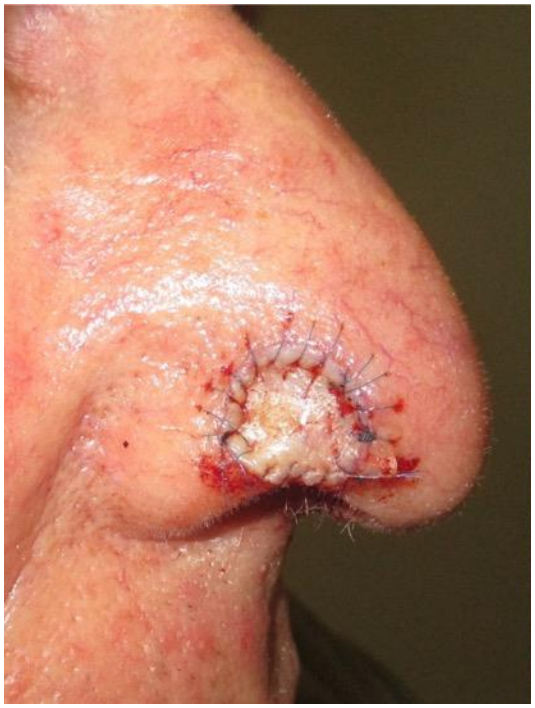


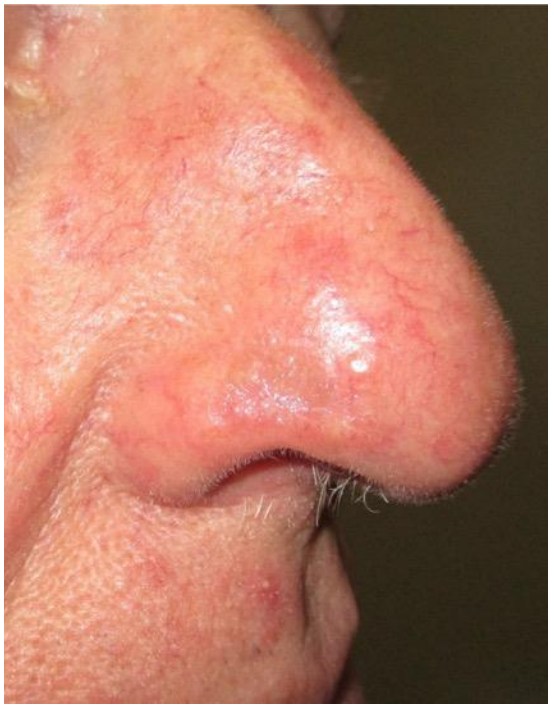


Mohs Surgery Results

Composite graft (skin and cartilage)







Mohs Surgery: Summary

- Highest cure rate (97-99%)[5, 6]
- Smallest surgical defect
  - Increases the chance of a good aesthetic result
- Most cost-effective treatment of select tumors
- Safe
  - Outpatient setting, local anesthesia

Georgia Skin Cancer & Aesthetic Dermatology

- Athens
- Lake Oconee
- Gainesville
- Commerce
- Winder
- Elberton

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