Moh's Surgery and Reconstruction

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Outline of Presentation

► Skin Cancer Statistics
► Listing of Therapeutic Modalities
► Mohs Surgery – Principles
► Reconstruction of Mohs Defects
  ▪ Cosmetic Principles
  ▪ Healing by Secondary Intent
  ▪ Skin Graft
  ▪ Primary closure
  ▪ Flap Reconstruction
  ▪ Reconstruction of specific locations
Skin Cancer

- Most common malignancy in Caucasians
- 500,000 new cases per year of non-melanoma CA’s
- Rise in incidence, but decrease in mortality.
Treatment Modalities for BCCA and Recurrence Rate for Each

<table>
<thead>
<tr>
<th>Treatment modalities</th>
<th>Primary</th>
<th>Recurrent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgical excision</td>
<td>10%</td>
<td>17%</td>
</tr>
<tr>
<td>Curettage-electrodessication</td>
<td>8%</td>
<td>40%</td>
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<tr>
<td>Radiotherapy</td>
<td>9%</td>
<td>10%</td>
</tr>
<tr>
<td>Cryotherapy</td>
<td>8%</td>
<td>&gt;13%</td>
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<tr>
<td>Mohs micrographic surgery</td>
<td>1%</td>
<td>6%</td>
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Mohs Surgery - History

- 1930’s Frederick E. Mohs
- In vivo chemical fixation - zinc chloride fixative paste
- 99% 5-year cure rate primary BCCA
- 96% 5-year cure rate for recurrent BCCA
- Procedure took several days
Moh’s Surgery - Principles

- Refined over the decades first to use a fresh tissue staining technique, then frozen section.
- Allows examination of 100% of the tumor margin, unlike convention surgery (<1%)
Mohs Surgery - Technique

- Biopsy via shave or punch
- Frozen section technique can be performed by surgeon alone, or in conjunction with pathologist
- Performed under local anesthesia
Moh’s Surgery Technique

From Davidson, Terence, Mohs Sipac 2000
Moh’s Surgery - Indications

- Recurrent skin cancer
- Skin cancer in “high risk anatomic areas” and cosmetically important areas
- Histologically aggressive skin cancer
- Large skin cancers
- Skin cancer with ill-defined clinical margins
- Irradiated skin
- Dermatofibrosarcoma Protuberans
- Selected mucosal squamous cell cancers
Mohs Surgery - Contraindications

- Small lesions without danger to important cosmetic units
- Malignant melanoma
- High cost and time – each cycle takes ~ 45 minutes
Mohs Surgery - Indications

► High risk anatomic areas
  ▪ Unclear if these areas provide fascial planes for spread.
  ▪ Studies have shown that these areas definitely tend to have more histologically aggressive tumors.
Mohs Surgery - Indications

► Histologically aggressive tumors

- Noduloulcerative type is most common and is not as aggressive
- Morpheaform, sclerosing, infiltrating, or keratinizing (metatypical and basosquamous) much more invasive
- Higher rate of recurrence, larger subclinical tumor extension
Mohs Surgery - Indications

- Histologically aggressive tumors - Example

From Quinn Grand Rounds Archive
Mohs Surgery - Indications

- Histologically aggressive tumor - Example

From Quinn Grand Rounds Archive
Mohs Surgery - Indications

- **Large Skin Tumors**
  - Higher cure rates with Mohs (93% 5yr disease free for tumors > 3cm)

- **Clinically Ill-Defined Margins**

- **Irradiated Skin**
  - More histologically aggressive tumors, more SCCA
Mohs Surgery - Indications

- Cosmetically important areas
  - Nasal tip, ala, bridge
  - Upper lip
  - Ear pinna
  - Eyelid
  - Eyebrow
Mohs Surgery - Indications

► Dermatofibrosarcoma protuberans (DFSP)
  - 15% reported in H&N
  - 49% recurrence with conventional excision
  - Even with 3 cm margins 11% recurrence
  - Several encouraging reports, jury out

► Mucosal Squamous Cell Cancer
  - Not commonly used
  - Reports of good local control
Mohs Reconstruction

- Secondary Intent
- Primary Closure
- Skin Grafting
- Flap Closure
Secondary Intent

- Indicated in certain areas and in patients who cannot undergo surgery
  - Concave areas of face often heal well
    - Nasolabial fold, nasoalar sulcus, alar facial groove
  - Forehead – minimal distortion of hairline
  - Temple – minimal distortion of hairline
  - Some Auricular Lesions
  - Some lower eyelid defects – partial thickness
Secondary Intent - Forehead

Secondary Intent - Temple

Secondary Intent – Lower Eyelid

Secondary Intent - Auricle

► To consider this, perichondrium should be present over cartilage.
► Missing cartilage is acceptable only in cosmetically unimportant areas
► Not generally useful for lobule or helix

Primary Closure

► Careful attention to RSTL

From Quinn Grand Rounds Archive
Primary Closure

► Younger patients require more undermining
► Undermining usually one width on either side at center, total of one at ends
► Can’t distort nondistortable structures
Primary Closure

M-Plasty
Skin Grafting

- Use full thickness, epidermis and dermis on face
- Survival depends upon adequate nutrition and removal of waste
- Close contact without separation, immobile
- Adherence by fibrin exudate, plasma provides nutrition and transports waste
- Outgrowth of capillary buds by 3rd or 4th day
Skin Grafting

- Fibrin infiltrated by fibroblasts, fibrous attachment 4th or 5th day
- Good capillary budding from muscle, periosteum, perichondrium, not bare bone, cartilage or tendon
- Common donor sites - preauricular, postauricular, melolabial fold, supraclavicular area, and for eyelid defects, upper eyelid skin
Skin Grafting

► Facial Esthetic Units
Facial Flaps

- Cannot distort non-distortable structures
- Attempt to place as much of flap incision in RSTL
- Vector of tension away from important structures
Facial Flaps

► Superficial Vascular Plexus
  - Nutrient supply to skin
  - Superior aspect of reticular dermis

► Deep Vascular Plexus (Subdermal Plexus)

► Musculocutaneous vs. Direct Cutaneous Arteries
Facial Flaps

- Random Flaps – supplied by subdermal plexus/musculocutaneous arteries
- Axial Flaps – supplied by direct cutaneous arteries
  - Capable of greater length:width ratio
  - Deeper plane of dissection
  - Examples include PMFF, Dorsal Nasal Flap
Facial Flaps – Random Flaps

Rotation/Transposition Flap – Donor Pivots around a point and distributes the tension of closure.

Rhomboid Flap:
Facial Flaps – Random Flaps

Duoformental Flap

Triple Rhomboid Flap
Facial Flaps - Random

Bilobed Flap

Figure 9. A and B, Bi-Lobe flap.
Facial Flaps - Random

Advancement Flaps

Island Pedicle Flap
Mohs Reconstruction

Specific Sites of the Face

- Eyelid
- Nose
- Cheek
- Forehead
- Lip
Eyelid Reconstruction

► Anatomy
Eyelid Reconstruction

- Must preserve the following:
  - smooth mucous membrane internal lining
  - skeletal support equivalent to the tarsus
  - stable margin, keep eyelashes from cornea
  - proper fixation of medial and lateral canthal attachments
  - adequate muscle for closure
  - supple, thin skin to allow eyelid excursion
  - adequate levator action to lift upper lid above visual axis
Eyelid Reconstruction

► Options:

- For partial thickness defects with preservation of tarsal plate
  - Primary closure
  - FTSG from contralateral lid
  - Secondary Intention for lower lid defects

- Deep Component damage requires complex closure
Eyelid Reconstruction

► Involvement of Tarsal Plate
  ▪ Direct closure if no more than 45% of width
  ▪ Lateral cantholysis may aid
    ▶ Resuspend tendon or orbicularis
Eyelid Reconstruction

► Direct Closure
  - Reapproximate Gray line
  - Reapproximate Tarsal Plate
  - Separate Orbicularis from tarsal plate to aid in suture placement
Eyelid Reconstruction

► Advancement Flaps
  ▪ Tenzel Advancement Flap can be used for defects up to 60%
    ► Re-anchor Orbicularis
  ▪ Mustarde Flaps for larger defects

► Canthal Tendon Defects, Lacrimal Repair
  ▪ See Quinn’s Archive
Nasal Reconstruction

► Cosmetic Subunits

- If >50% of Subunit is missing, better to excise entire unit.
- must replace missing tissue with like tissue
- septal and conchal cartilage
- septal or bipartite intranasal lining flaps
Nasal Reconstruction

- convex subunits - dorsum, tip, alae, columella reconstruct well with flaps
- concave subunits - soft triangle and nasal sidewalls reconstruct well with skin grafts
- thin skinned regions; dorsum, sidewalls, collumella, lower half of infratip lobule
- repair with transposition flaps for defects < 1.5 cm or preauricular skin grafts
Nasal Reconstruction

► PMFF

- axial flap based on supratrochlear artery primarily, dorsal nasal arteries and supraorbital artery
- Useful for Nasal Tip, Dorsal Nasal, and occasionally alar defects
Nasal Reconstruction

- PMFF
  - Flap may be thinned in the distal 1-2cm
  - 1.2cm minimum width of pedicle
  - Plane of dissection is Subgaleal first, then Subperiostial
Nasal Reconstruction

PMFF
Nasal Reconstruction

► Melolabial Flap

- axial flap from perforators of levator labii superioris
- medial incision in nasolabial fold lateral incision to level of inferior wound
- Useful for alar defects
Nasal Reconstruction

➤ Dorsal Nasal Flap
  ▪ Axial/Transposition Flap based on Angular artery to the face
  ▪ Useful for Nasal tip Defects less than 1.5cm
Cheek Reconstruction

- reconstruction aided by laxity of skin and relative abundance
- small to moderate defects closed primarily
- advancement, transposition, rotation flaps
- caution given to level of facial nerve
Cheek Reconstruction
Cheek Reconstruction
Forehead Reconstruction

► Sensory function
  ▪ supraorbital and supratrochlear nerve run with vessels in sub-Q tissue to parietal scalp
► maintenance of brow symmetry
► maintenance of natural-appearing temporal and frontal hairlines
► hiding of scars when possible (into hairlines or eyebrows)
► creation of transverse instead of verticle scars whenever possible (except in midline forehead), avoidance of diagonal scars
Forehead Reconstruction

Primary Closure:
Forehead Closure

► Primary Closure
Forehead Closure

A to T flaps, Advancement Flaps, Local Flaps
Auricular Reconstruction

- Healing by second intention discussed previously
- Skin Grafting
- Helical Defects < 1.5 cm can be closed primarily with helical rim advancement
  - Shortens vertical height
- Helical Defects > 2 cm often requires Composite Graft from opposite ear ½ size of the defect
Lip Reconstruction

- skin, muscle, obicularis oris
- vermilion - modified mucosa, anterior limit vermilion line, post innermost contact with closed mouth
- upper lip - base of nose, melolabial sulcus, commissure
- lower lip - mental crease to commissure
Lip Reconstruction

► Lip Defect < 1/2 of lip
  – close primarily
    ▪ W-Plasty
Lip Reconstruction

- Defect ½ to 2/3 of lip
  - Karapandzic Flap
Lip Reconstruction

- ½-2/3 Lip Defect
  - Does defect involve oral commissure?
Lip Reconstruction

► >2/3 of Lip Defect
  - Bernard vs. Webster
Conclusions

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