Facial Flaps

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Types of Flaps

- Axial
  - Based upon a named artery.
  - Survival length depends upon the artery not the width of the flap.

- Random
  - Has random unnamed vessels supplying it.
  - Survival length is directly proportional to the width of the flap.
  - Survival length maybe increased by delaying the flap.

Flap Delay

- To delay a flap, elevate as a bipedical flap and return it to the flap's bed. Two weeks later, elevate as a unipedical flap.

Types of Flaps

- Interpolation flap is a two-staged flap where a pedicle traverses intact skin.
- The flap's pedicle maybe divided in three to six weeks. Early division requires training of the flap.
- Examples of this type of flap are the forehead flap, the Abbe-Estlander flap and some nasolabial flaps.

Rotation Advancement Flap

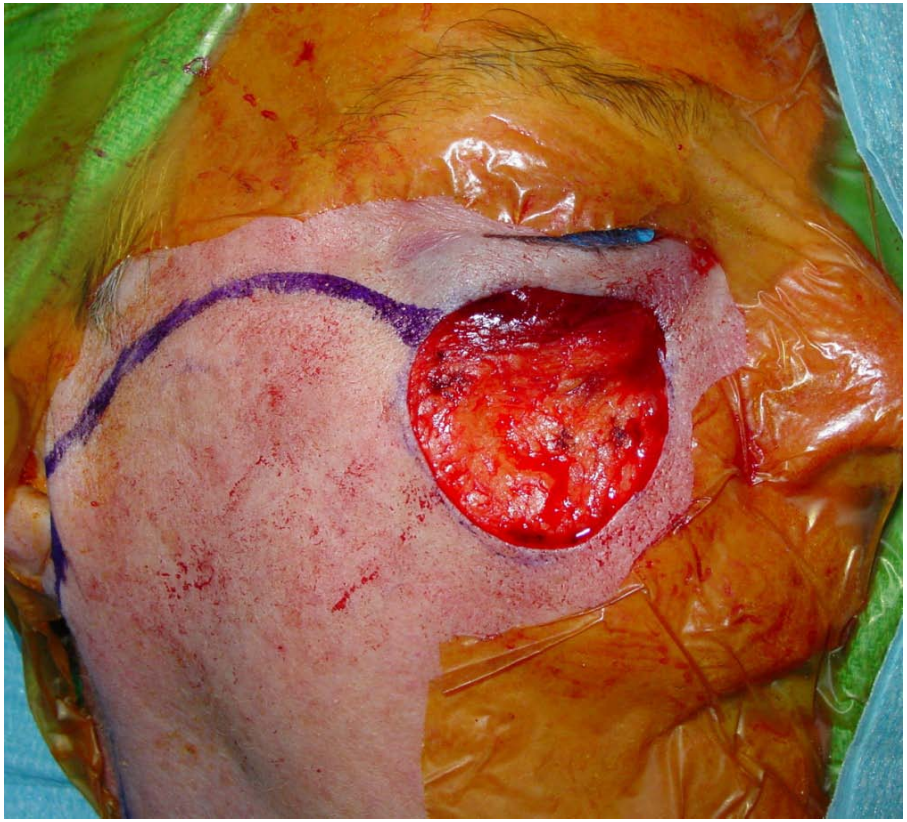
- This flap can be used to close large defects.
- The flap is planned so as not to violate cosmetic units of the face.
- The arc of the flap should be no greater than twice the base.
- A back-cut can be made to increase the flap's rotation.

Rotation Advancement Flap

This patient had a melanoma. A 1 cm margin is outlined around the melanoma. The melanoma had less than 1 mm of invasion.

Rotation Advancement Flap

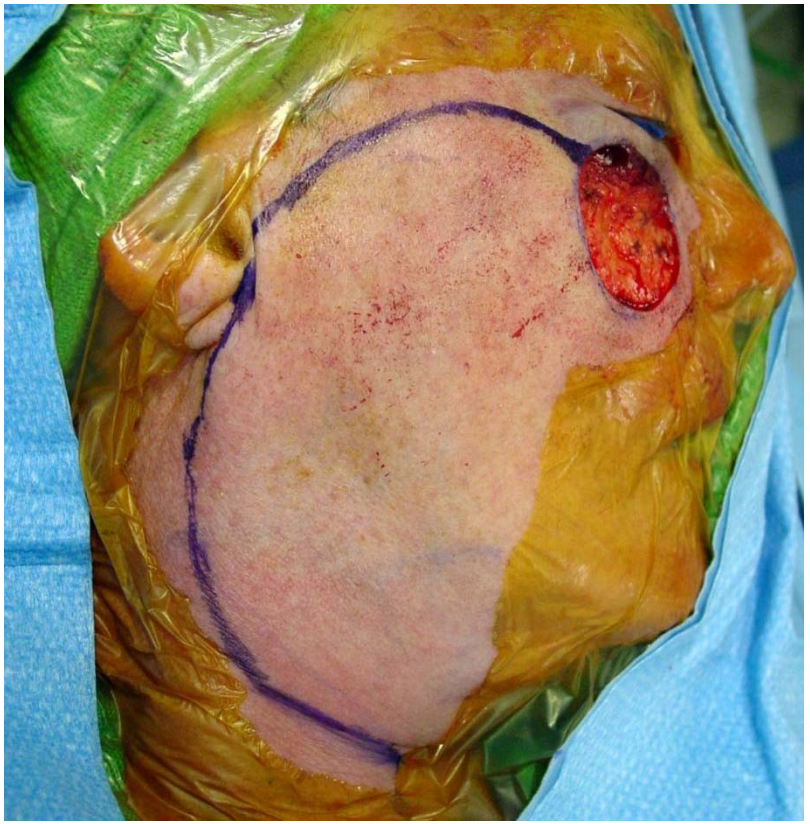
- The melanoma was resected. The adipose tissue of the cheek and orbicularis oculi muscle was exposed. A deep margin of the muscle and adipose tissue was negative.



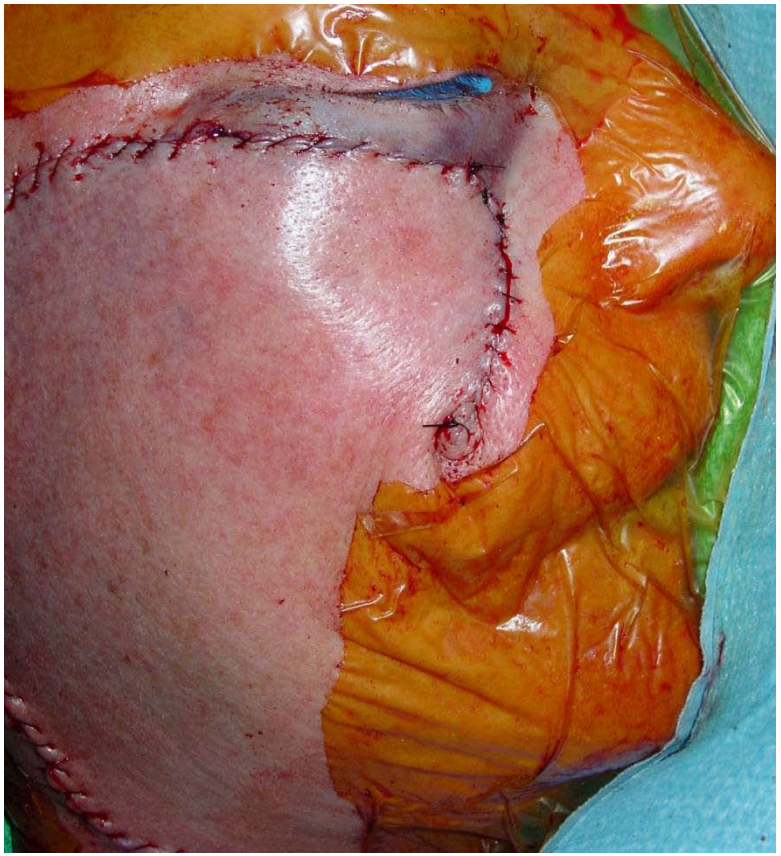
Rotation Advancement Flap

The length of the flap should be 4:1 to the defect. A wedge of tissue may be taken inferiorly to prevent a dog ear.

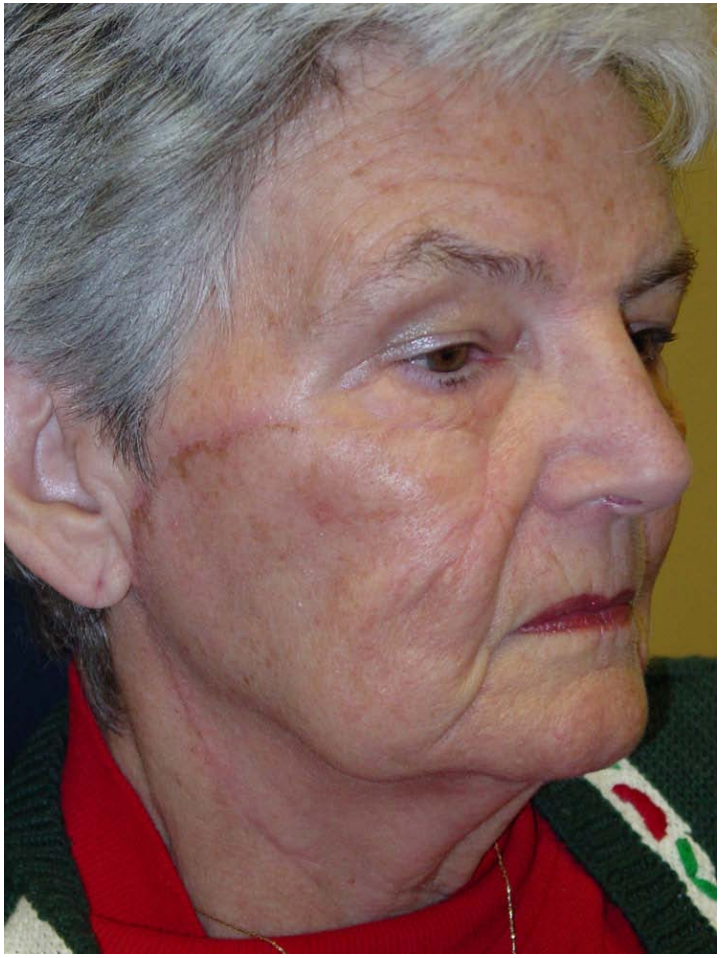
The flap is designed to not cross facial sub-units. This incision arches superiorly around the orbital rim, across the temple area where “crows feet” wrinkles are common, then down the pre-auricular area into the neck.

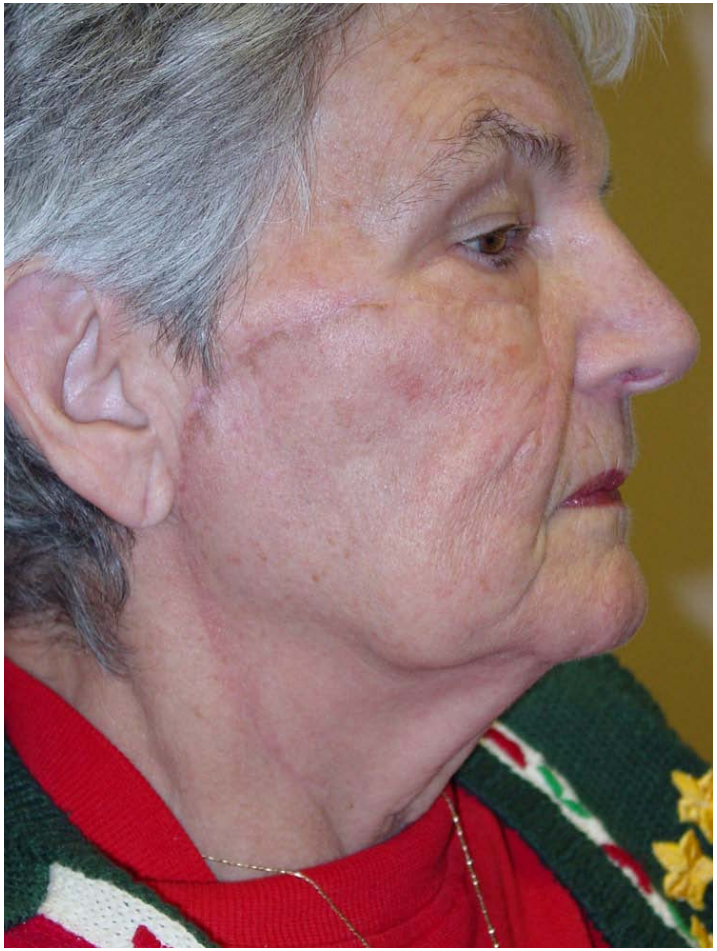


Rotation Advancement Flap



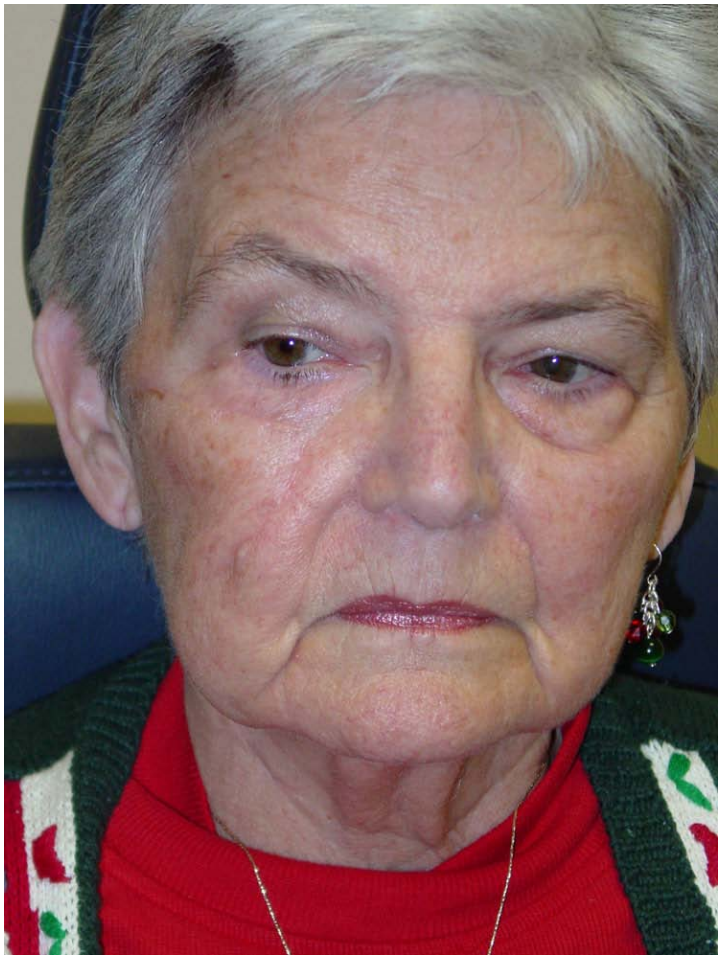
Rotation Advancement Flap





Rotation Advancement Flap

A very small dog-ear remained which was resected under local anesthesia in the office.

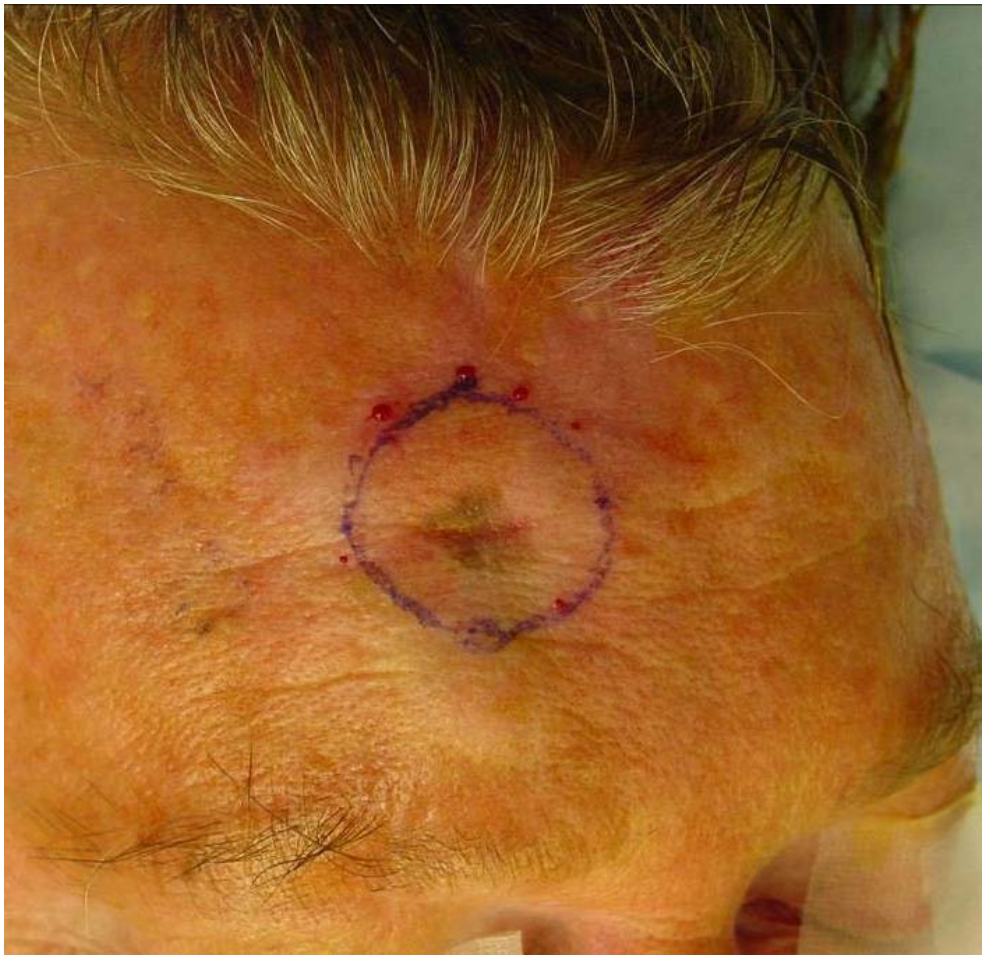


Rotation Advancement Flap

This patient had a melanoma of the forehead. A 1 cm margin is outlined.

Closure of forehead defects must be done carefully so the eyebrow is not raised. If the width is over 2.5 cm it is very hard to close primarily.

The scalp is even less forgiving, since the tissues do not stretch. Relatively large flaps are needed to close small defects.



Rotation Advancement Flap

A small back cut can be made and the drain placed through the opening.

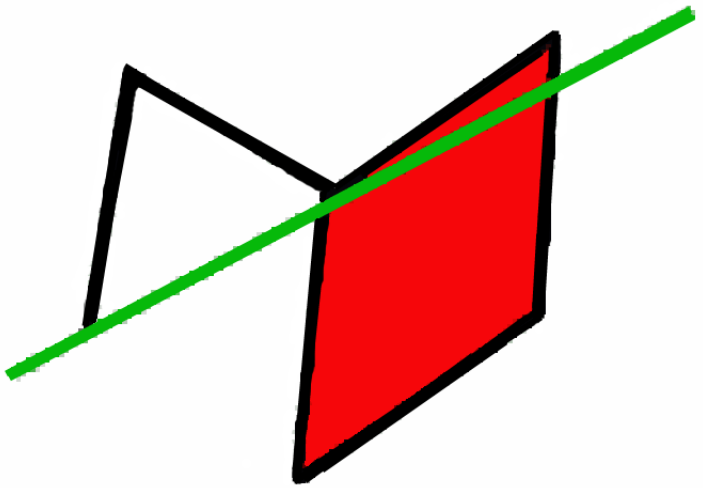
Rotation Advancement Flap

At two weeks postop, a prominent dog ear was present.

The six week postop result is shown on the left. The eyebrow is not raised and the dog ear has regressed.

Rhomboid Flap

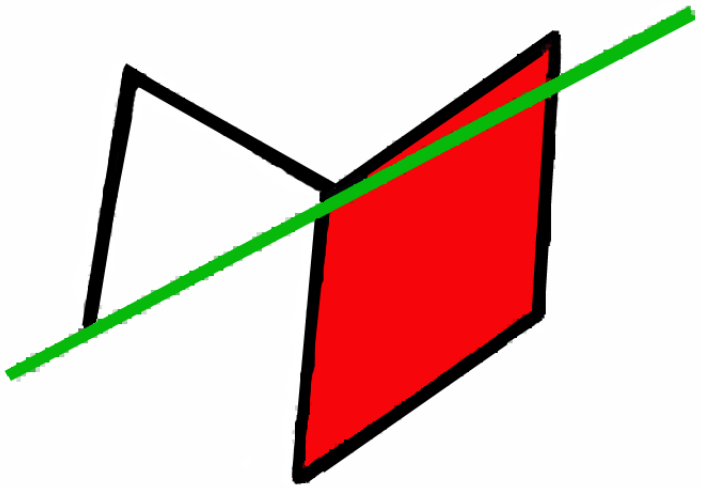
- A rhomboid flap uses a geometric design and measurements to close defects. All sides are of equal length.
- The defect can be varied from a square to a 60-120-60-120 deg rhomboid.
- A square defect will produce the smallest defect but the largest dog ear.
- The rhomboid defect will produce the largest defect but the smallest dog ear.



Shown above is a 60-120-60-120 degree defect (red) which will produce the smallest dog ears.

Rhomboid Flap

- Two defects are presented that were reconstructed with a rhomboid flap.
- In the first and younger patient, there is very little stretching of the tissue and a dog ear was created with a square shaped flap.
- The dog ear can be excised in the office under local anesthesia. The square shaped flap has the advantage of creating a smaller defect and less facial scaring.

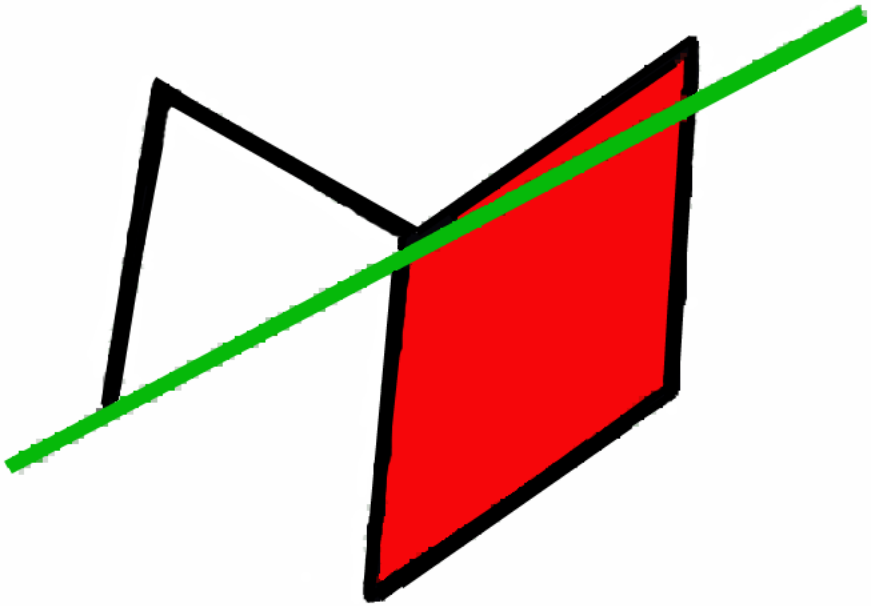


Shown above is a 60-120-60-120 degree defect (red) which will produce the smallest dog ears.

Rhomboid Flap

This patient had a resected basal cell carcinoma of the cheek with positive margins. The surgical site needed excision and had to be closed without placing tension on the lower eyelid.

Rhomboid Flap



A rhomboid flap uses a geometric design and measurements to close defects. All sides are of equal length.

Rhomboid Flap

Rhomboid Flap

Rhomboid Flap

At one week post op the patient had a small dog-ear. There was no tension on the lid. The patient was lost to followup.

Rhomboid Flap

Rhomboid Flap

Surgical Closure

One Week Postop Result

Rhomboid Flap

One Month Post
Operative Result

Nasolabial Flap

- Can be both Axial and Random.
- The artery is relatively deep so Nasolabial Flaps for facial reconstruction are usually random.
- The flap can also be inverted and placed through the cheek for floor of mouth reconstruction. This is a thicker flap and can incorporate the artery.

Nasolabial Flap – Random

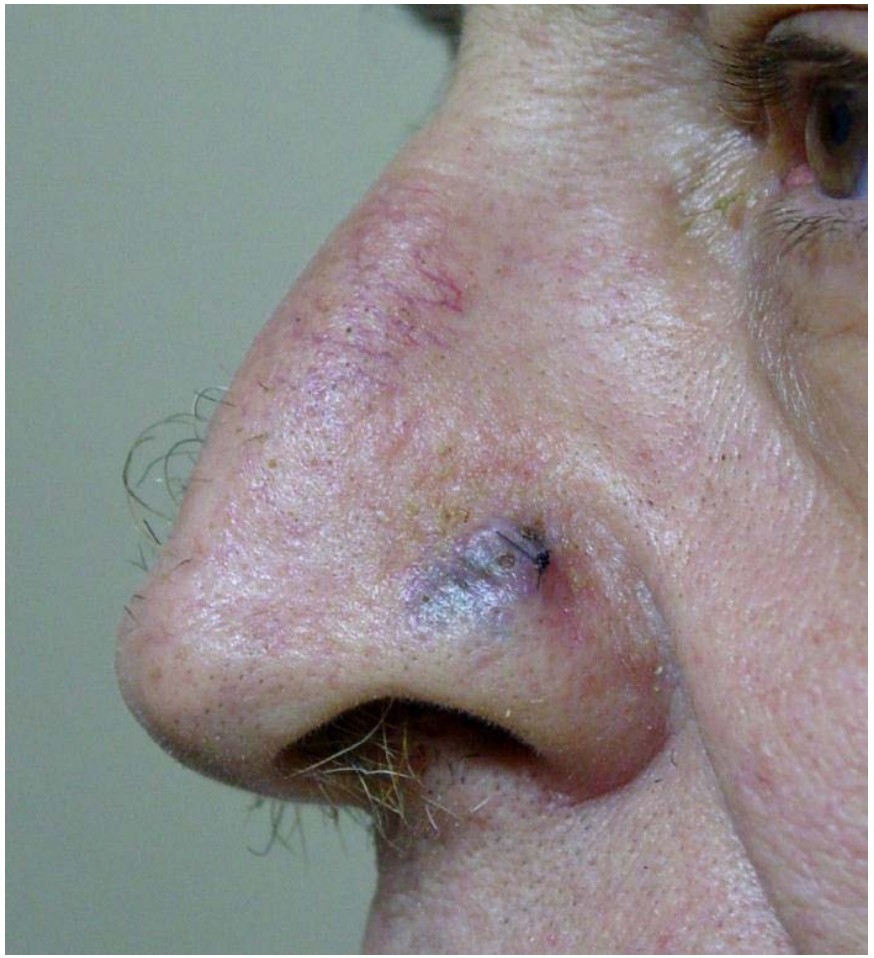
- Flaps wider than 1.5 cm can create a defect which is difficult to close. In addition, closure of a large defect can result in widening of the nasal ala (superiorly based flaps) or notching of the nasal ala (inferiorly based flaps).
- Flaps longer than 2.5 times the width are at risk of tip necrosis.
- Thus, the maximum length should be around 3.75 cm.

Nasolabial Flaps

- Superiorly Based
  - Can easily reach most nasal defects.
  - Because of poor lymphatic flow (uphill) they tend to swell. Look good right after the operation but become hypertrophic at one month, with some resolution of the swelling by six months postop.
  - Glasses rest on the flap's base which increases swelling and chances of necrosis.
  - The higher the base of the pedicle the less the flap has to rotate and the less of a dog ear will form.
  - Need to plan for a second stage to thin the flap.

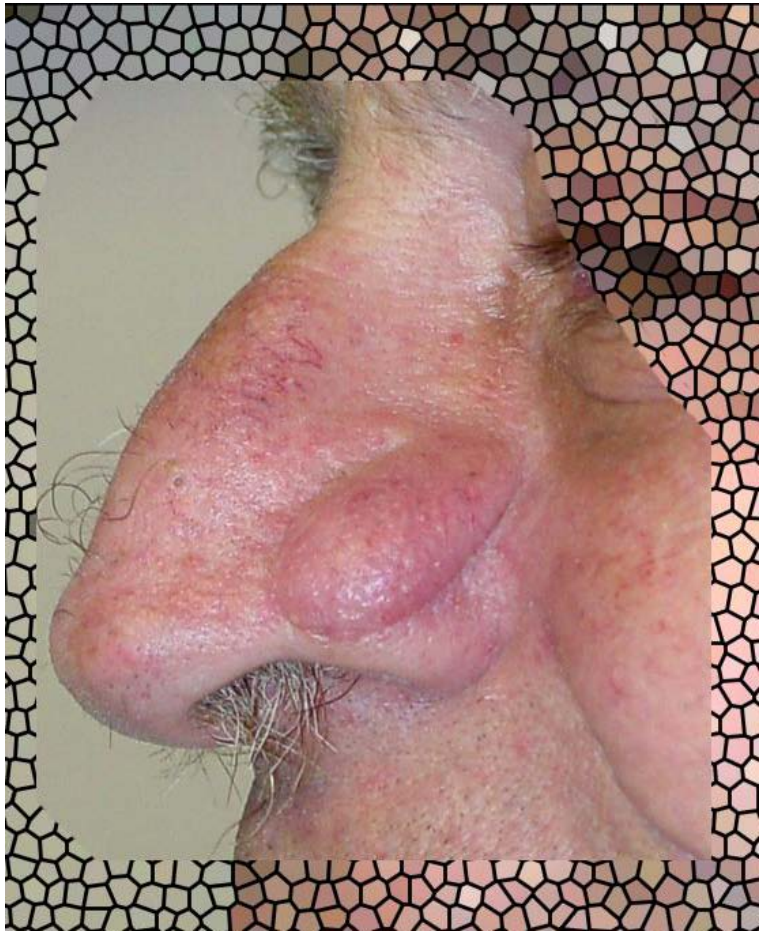
Nasolabial Flaps

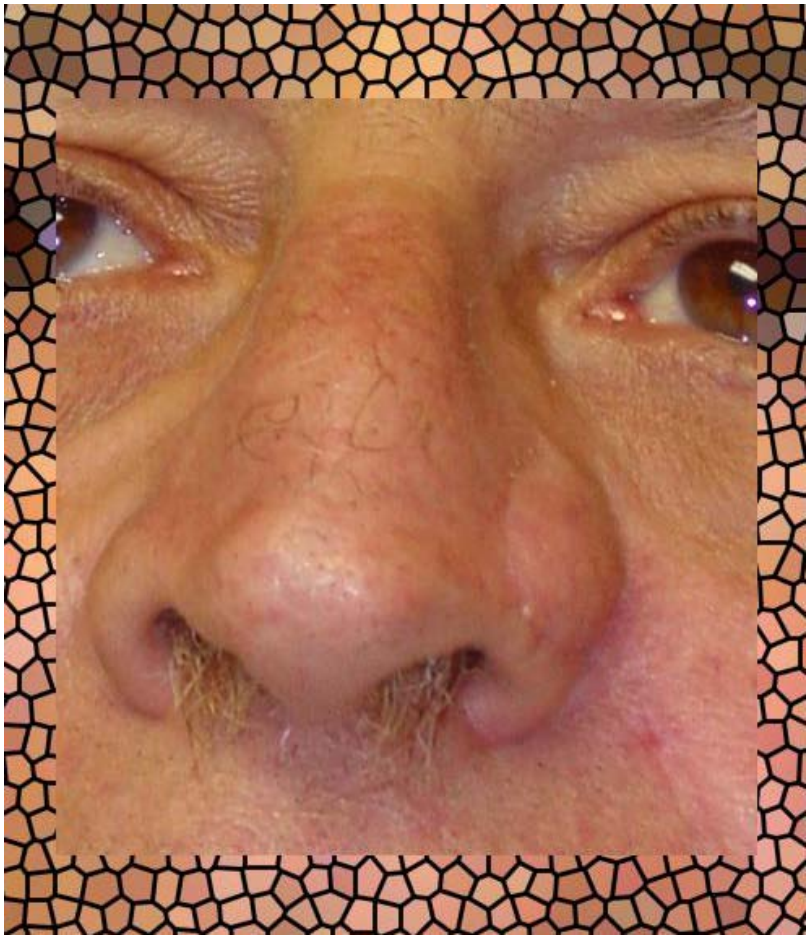
Basal cell carcinoma of the left nasal ala.



Nasolabial Flaps

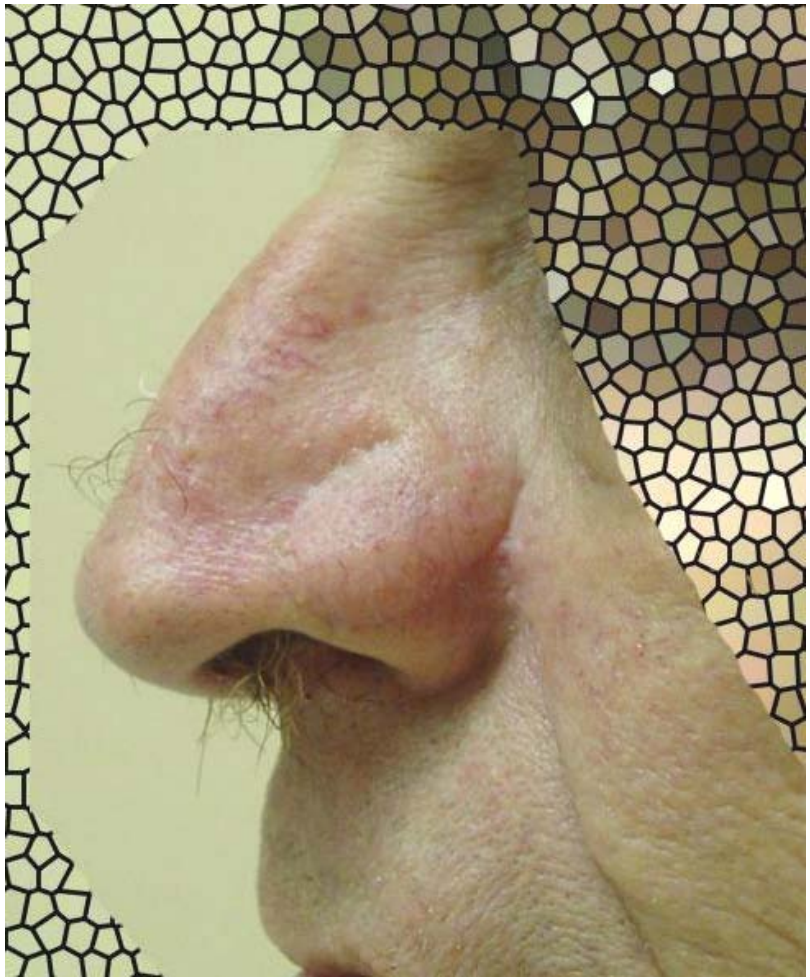
Nasolabial Flaps

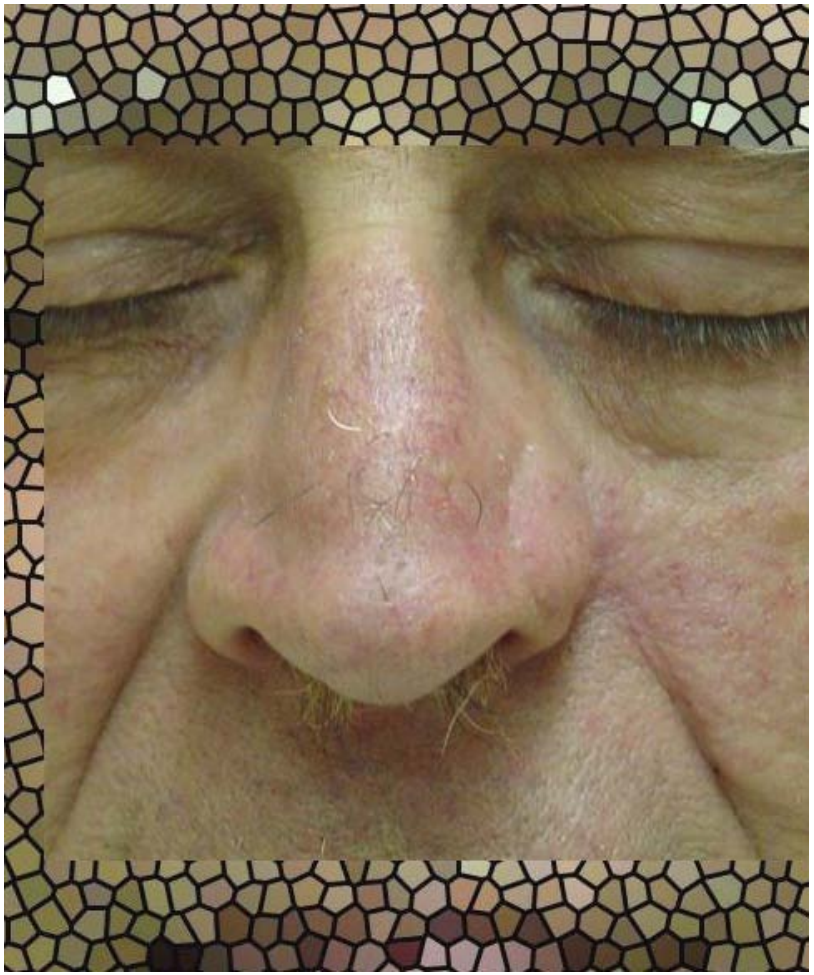




Three Month Postop Result – Note Flap Swelling

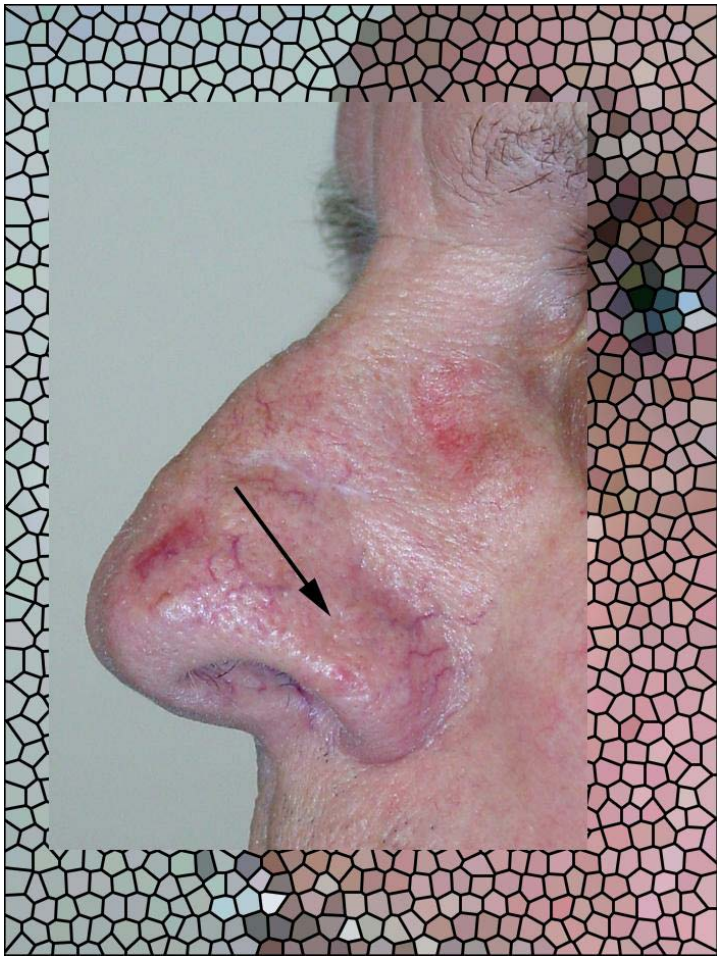
Nasolabial Flaps

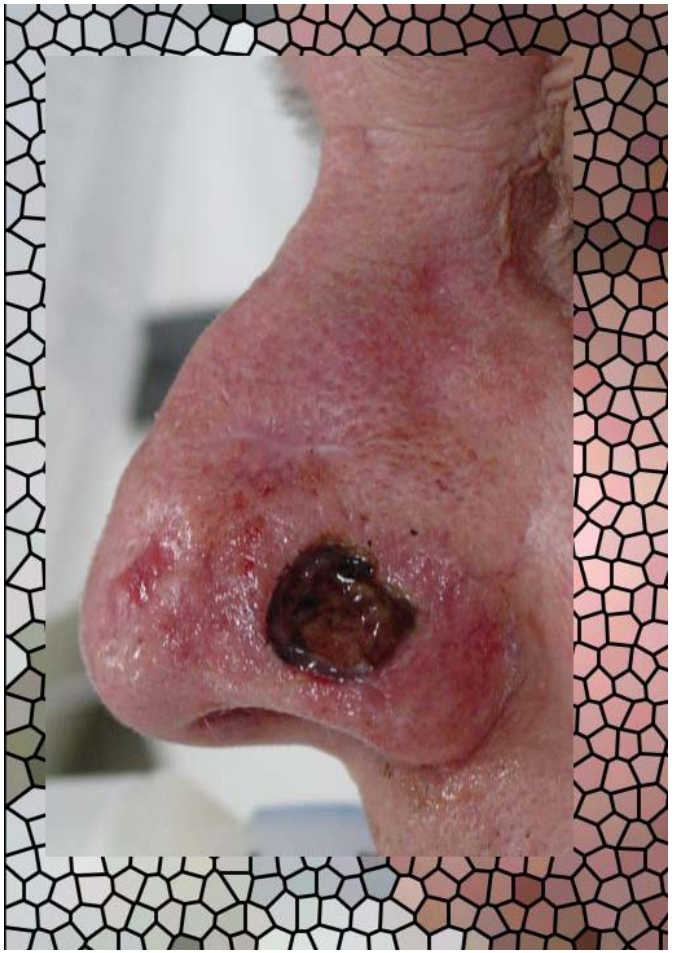




Five Month Postop Result – Note Flap Swelling

Nasolabial Flap



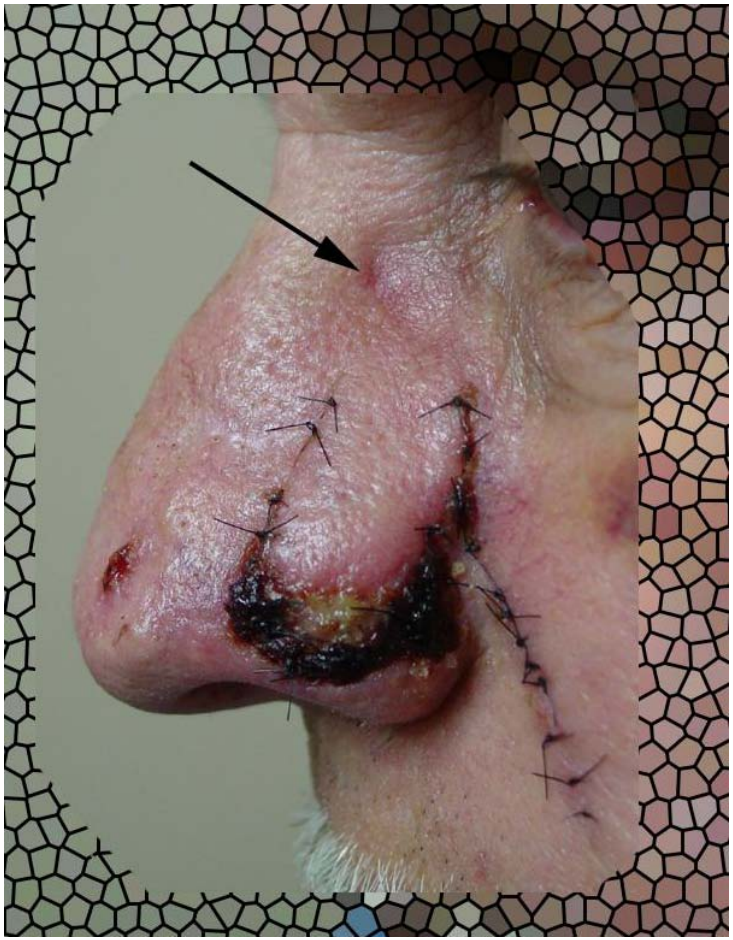


Nasolabial Flap

Flap Length to Width Ratio Was 2.5 to 2.75 To 1

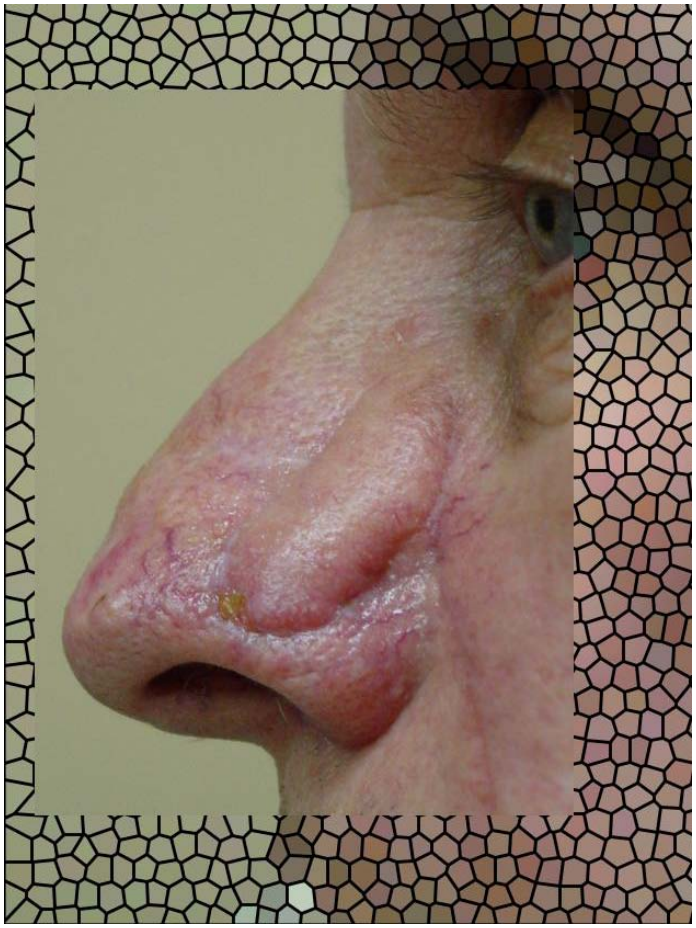
Nasolabial Flap

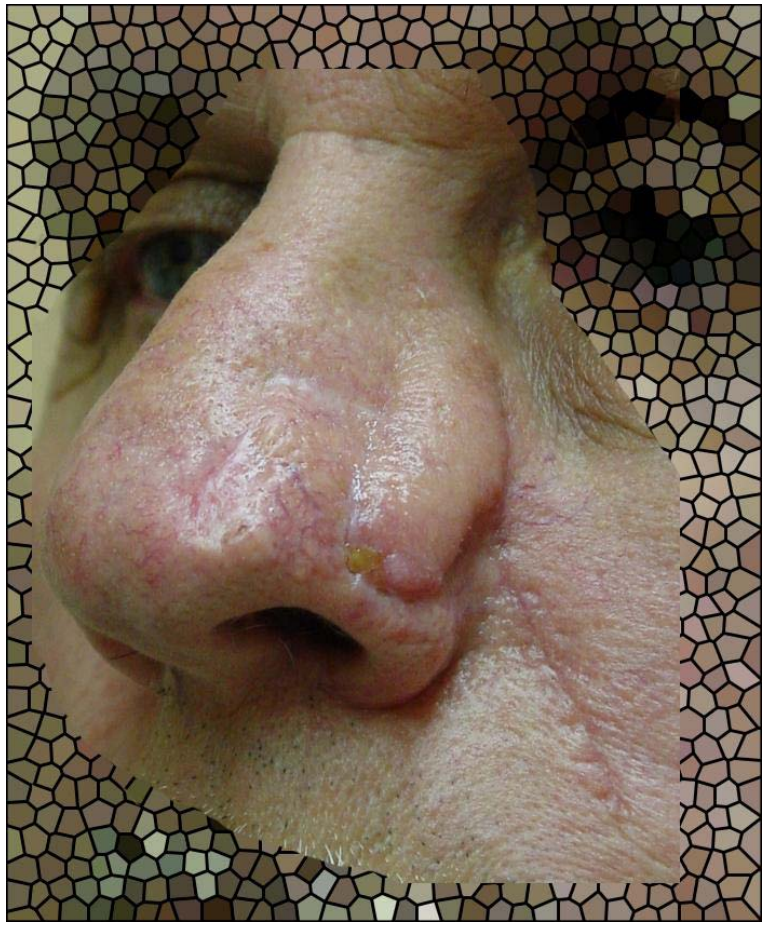
Immediate Postop Result



Five Days – Tip Necrosis

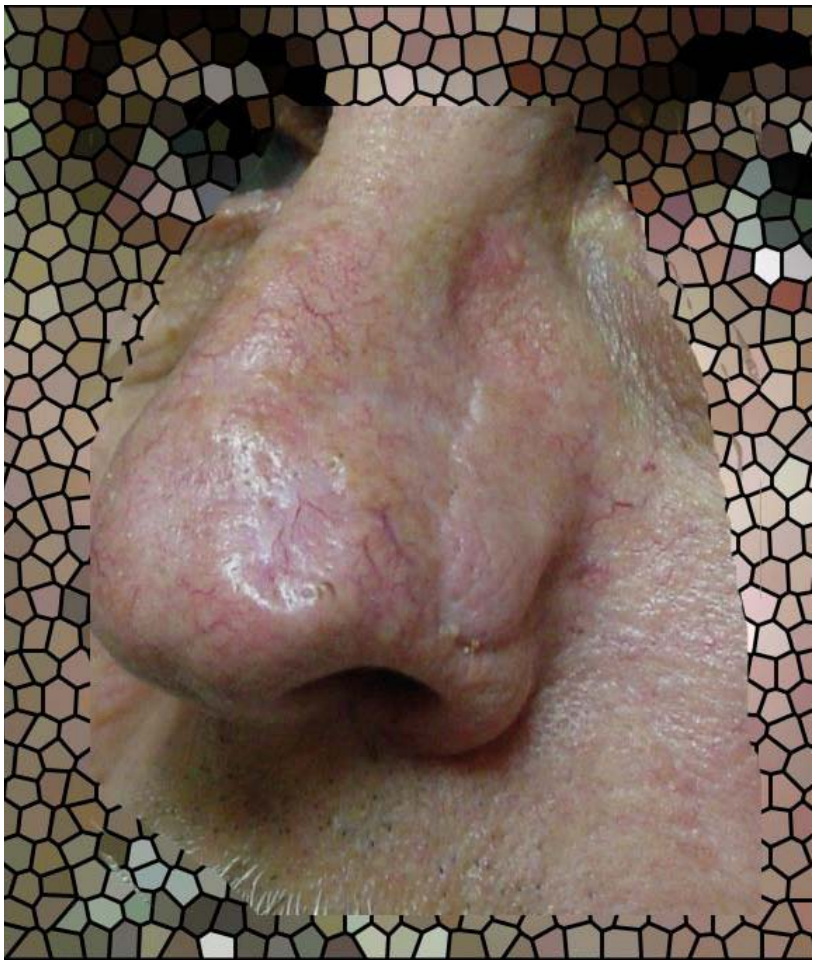
Nasolabial Flap





Three Week Postop, Note the Flap's Swelling

Nasolabial Flap



Nine Month Postop Result

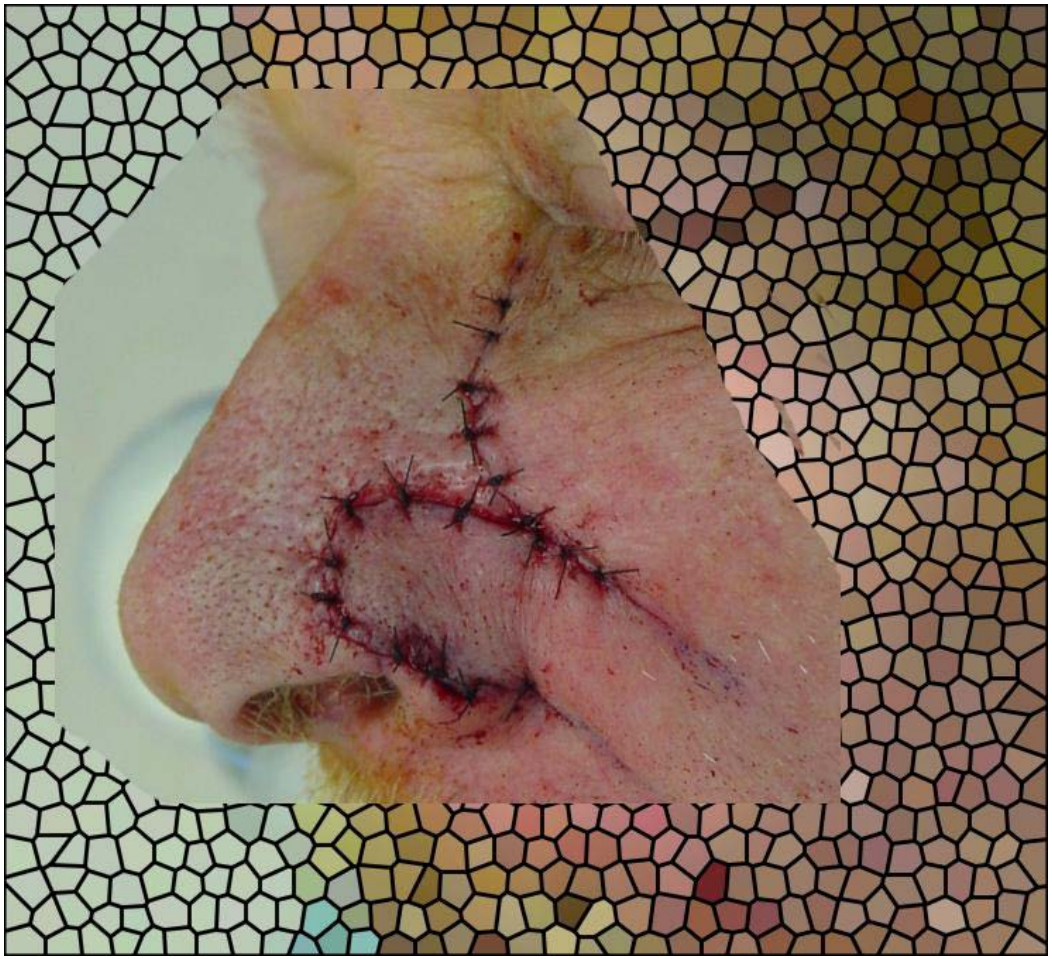
Nasolabial Flaps

- Inferiorly Based
  - Can be used to reconstruct some inferior or nasal alar defects.
  - Rotation is very acute and a dog ear forms, but this tends to blend into the nasal alar defect.

Nasolabial Flaps

Nasolabial Flaps

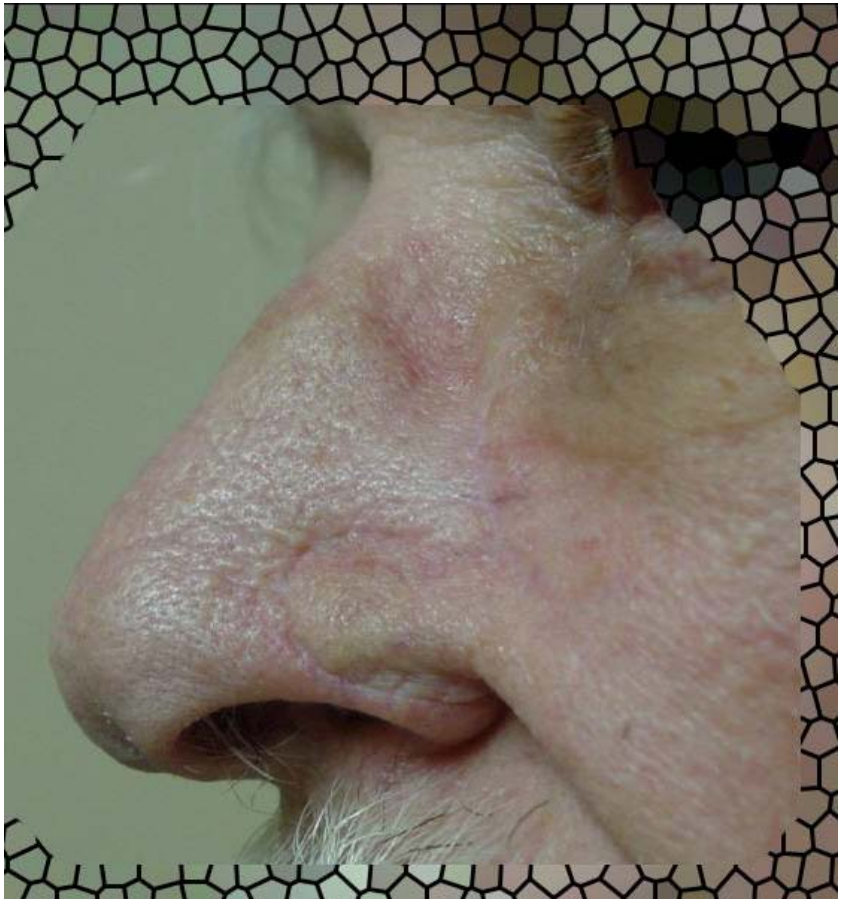
Note the crease in the midportion of the flap and the purplish hue of the distal ½ of the flap



Nasolabial Flaps

At one week postop, the distal ½ of flap is viable but is dusky and NOT healthy.

Nasolabial Flaps



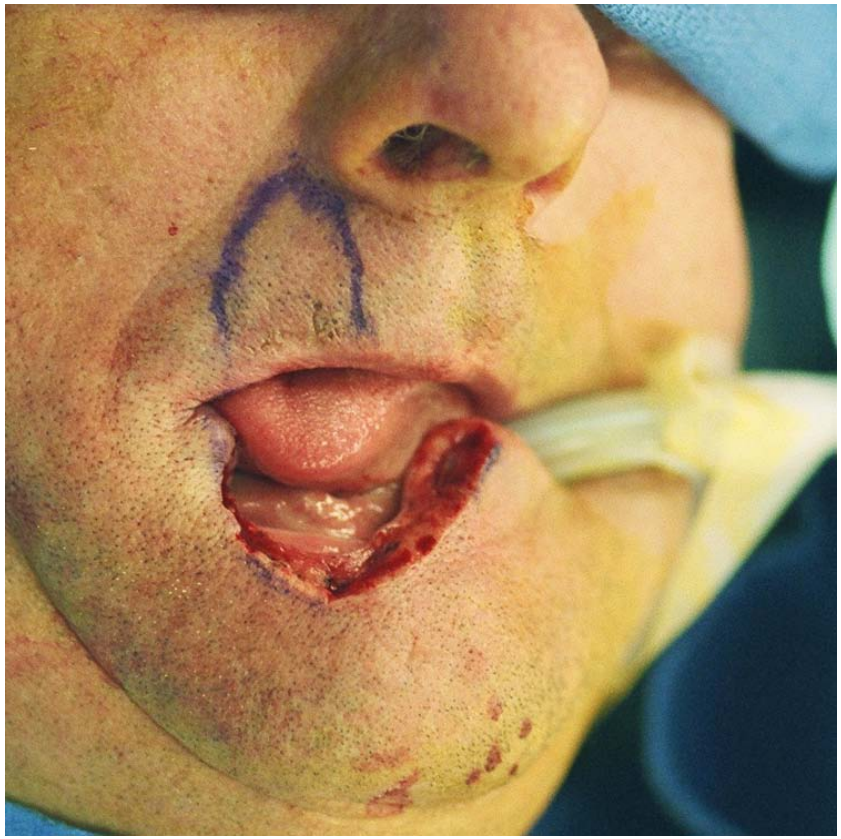
Abbe Estlander Flap

Used to reconstruct defects between 1/3 to 2/3 of the lip.

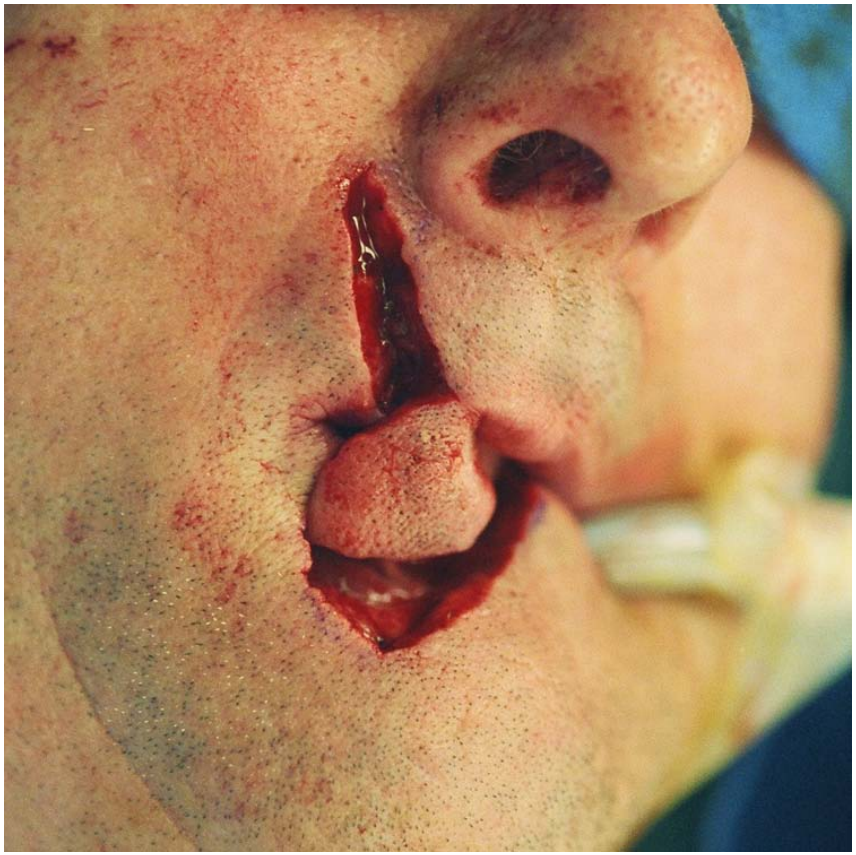
Axial flap – based medially. A portion of the opposite lip equal to ½ the defect is rotated into the defect.

If you base the flap laterally – more likely to cut artery and may not have enough room to rotate flap into position.

Abbe Estlander Flap

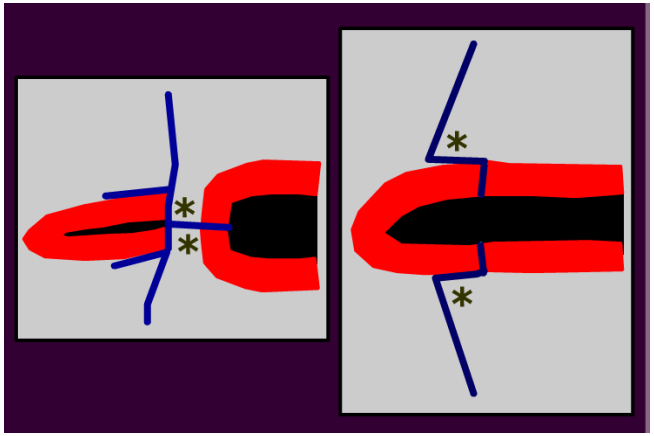


Abby Estlander Flap

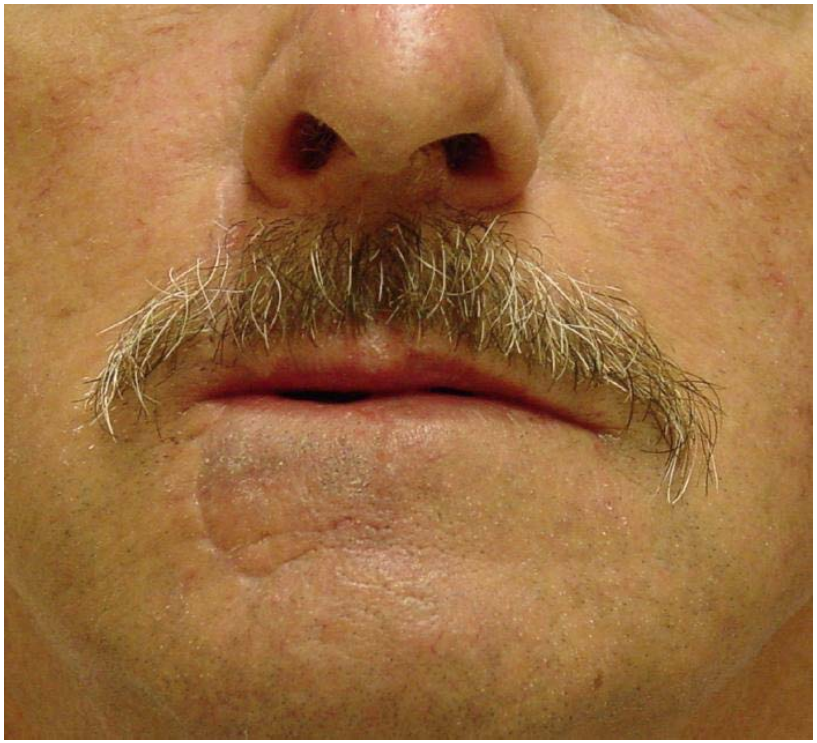


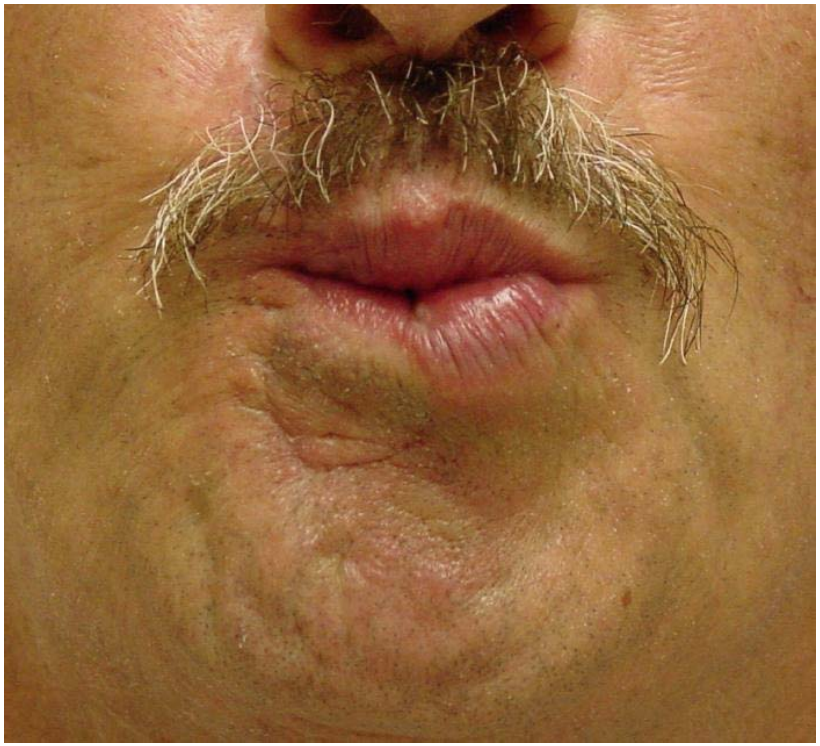
Abbe Estlander Flap

Lip is divided and the vermillion portion of the lips are rotated into position.



Abbe Estlander Flap



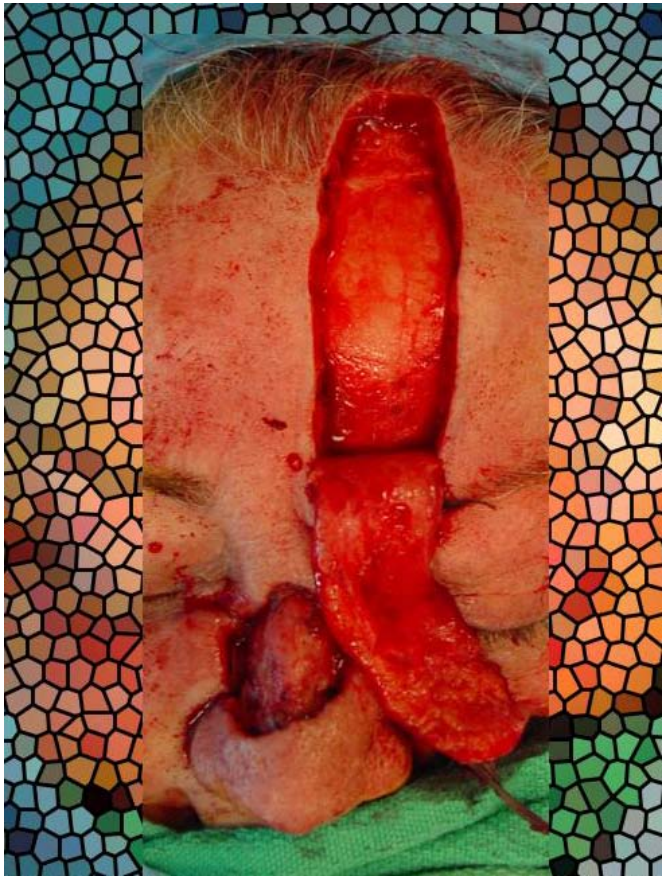


The three month postoperative result is shown above. Note that the flap has reinnervated and the patient is even able to whistle.

Forehead Flap

➢ Nasal reconstruction with the forehead flap was believed to originated in India in 700 BCE

- The flap is a paramedian axial flap based upon the supratrochlear artery.
- If the flap's pedicle is wider than 2.5 cm, closure may be difficult.

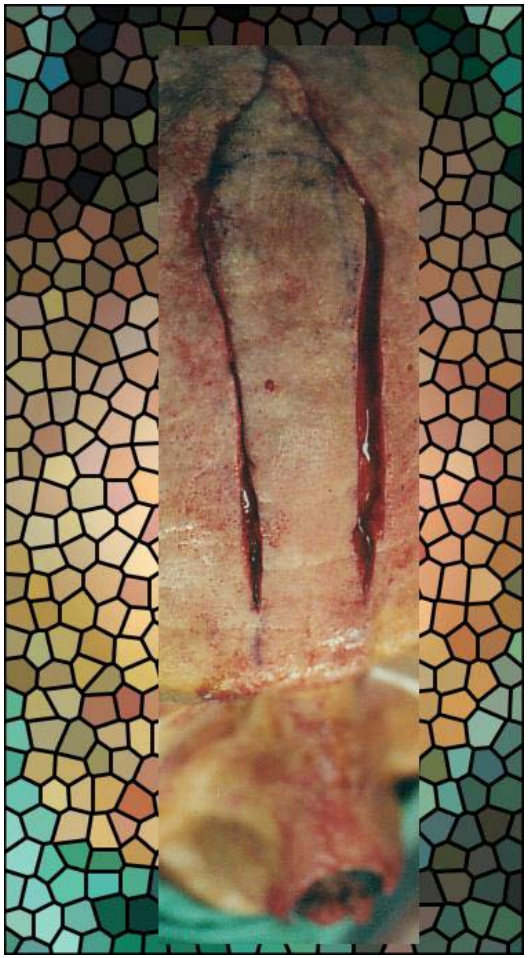


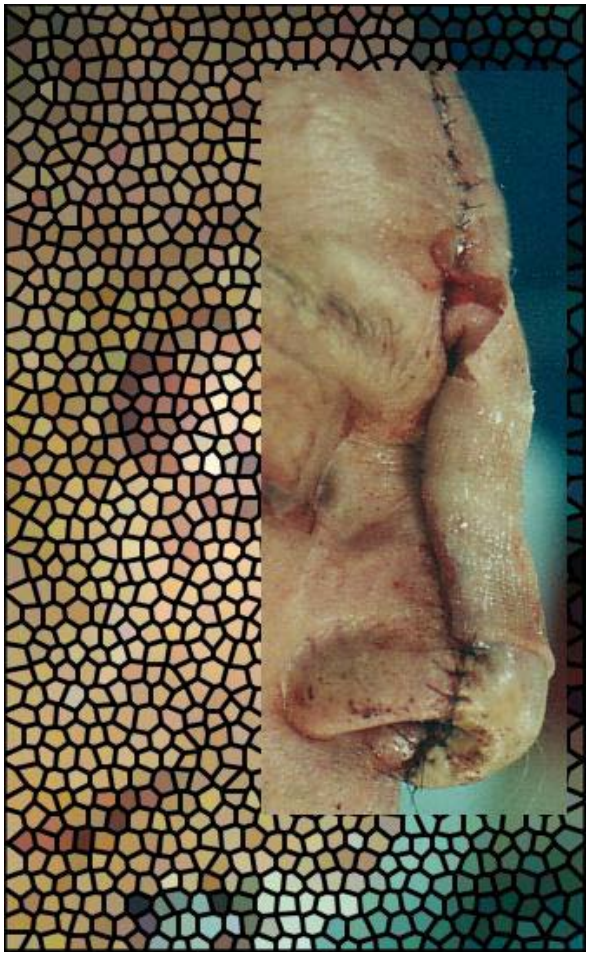
Forehead Flap – Defect

Forehead Flap – Operation

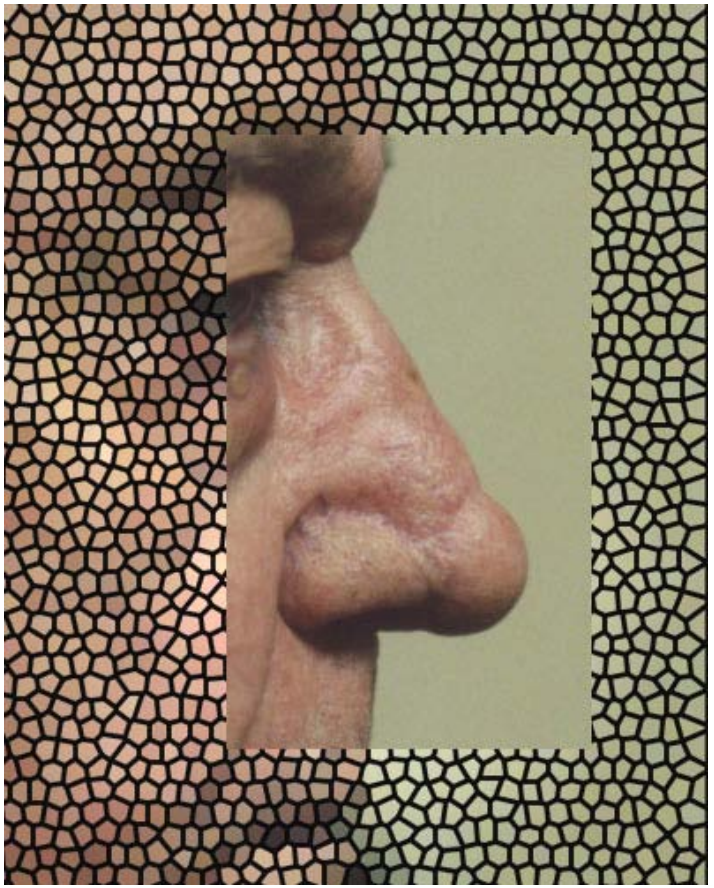
Note that the flap's pedicle is narrower than the tip. This is to aid in closure of the forehead. The tip will be used for the nasal reconstruction.

If necessary, the artery can be found using a doppler.





Forehead Flap – 5 Month Result

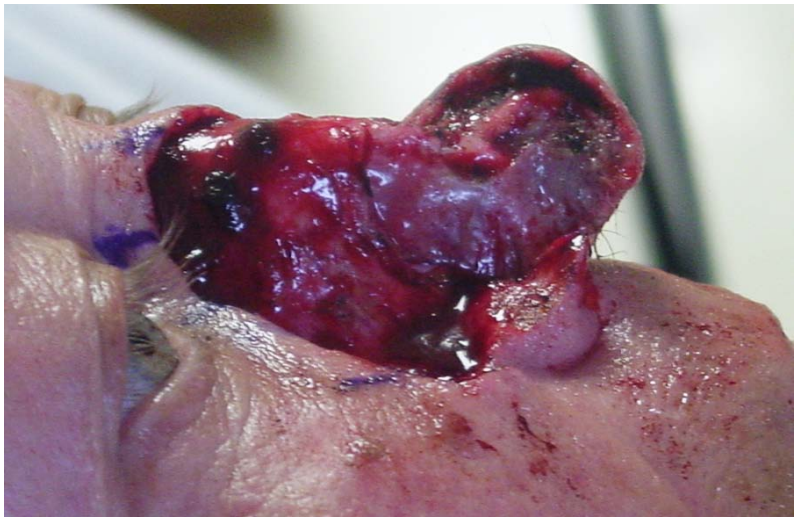


Nasal Reconstruction

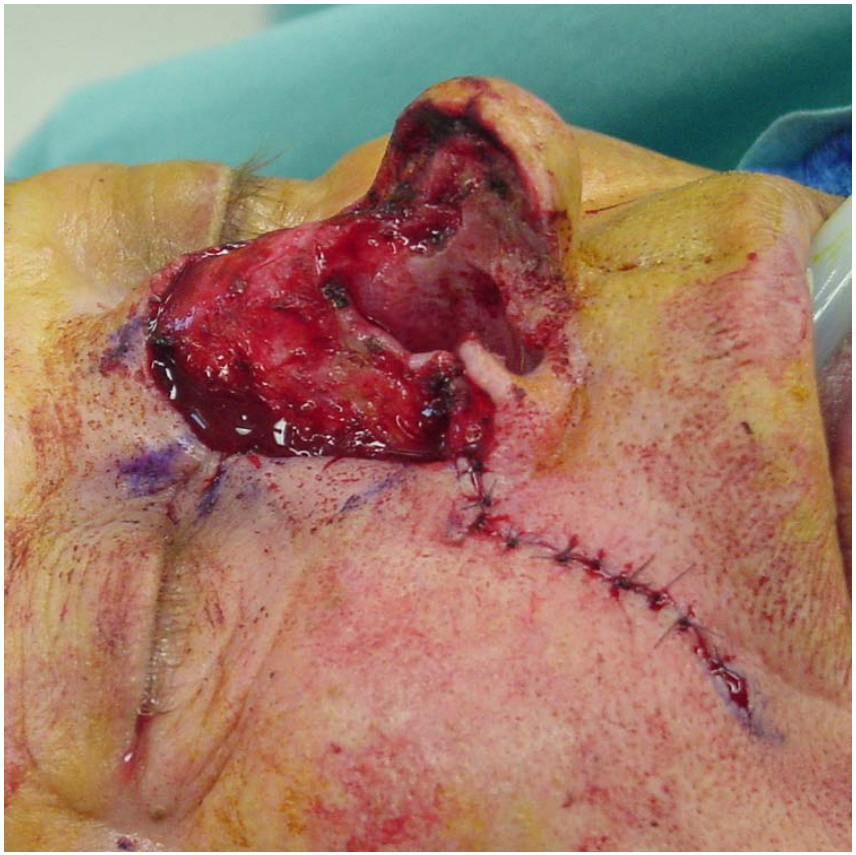
This patient underwent Moh's surgery for a basal cell carcinoma.

Two small lesions are seen.

Nasal Reconstruction



Nasal Reconstruction – Part I



Nasal Reconstruction – Part II

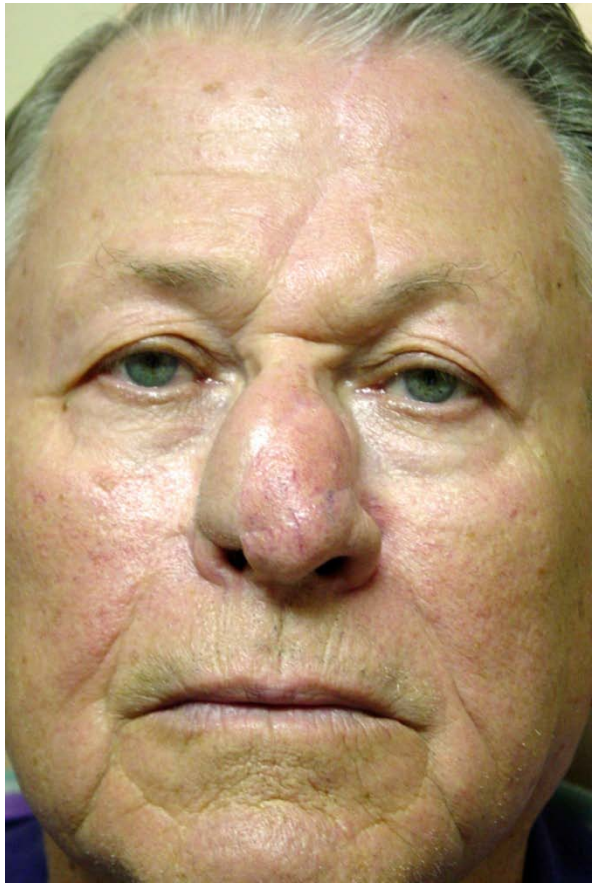
Nasal Reconstruction – Part III

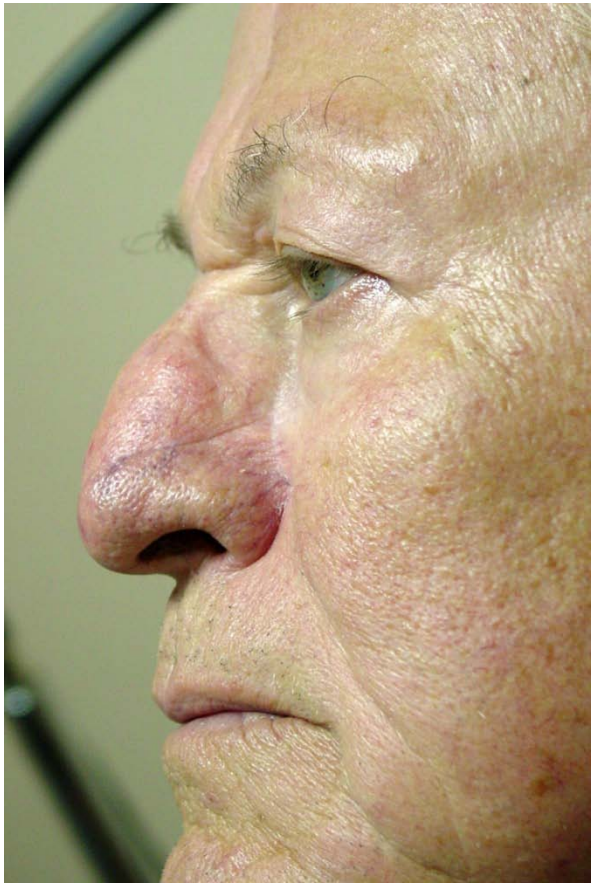
Nasal Reconstruction – Part III

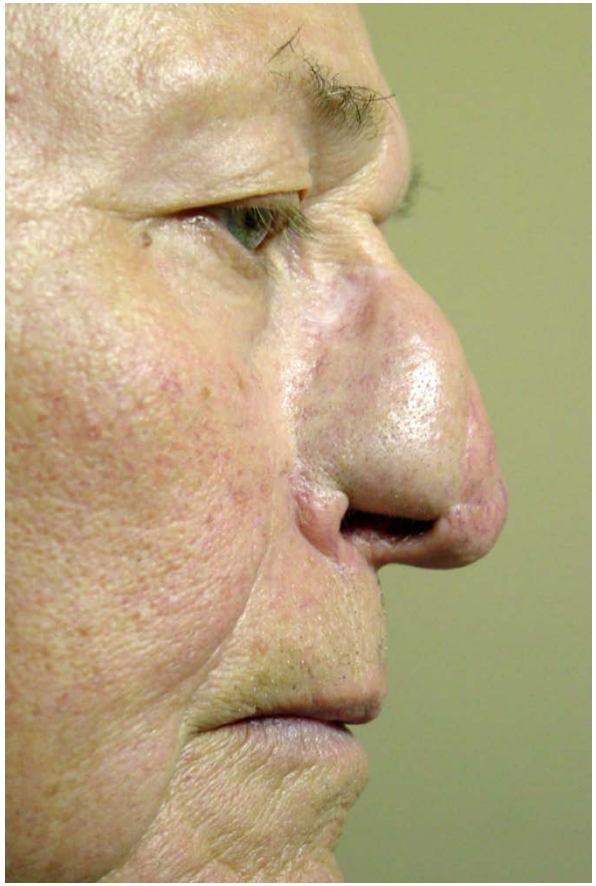
Immediately After Surgery

10 Days Postop

Nasal Reconstruction



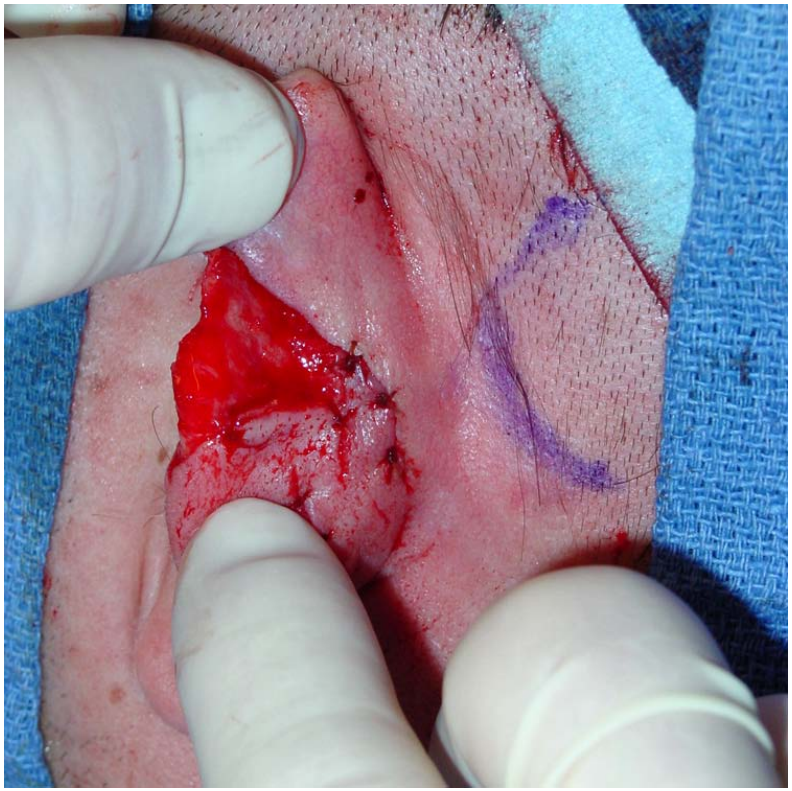




Ear Reconstruction

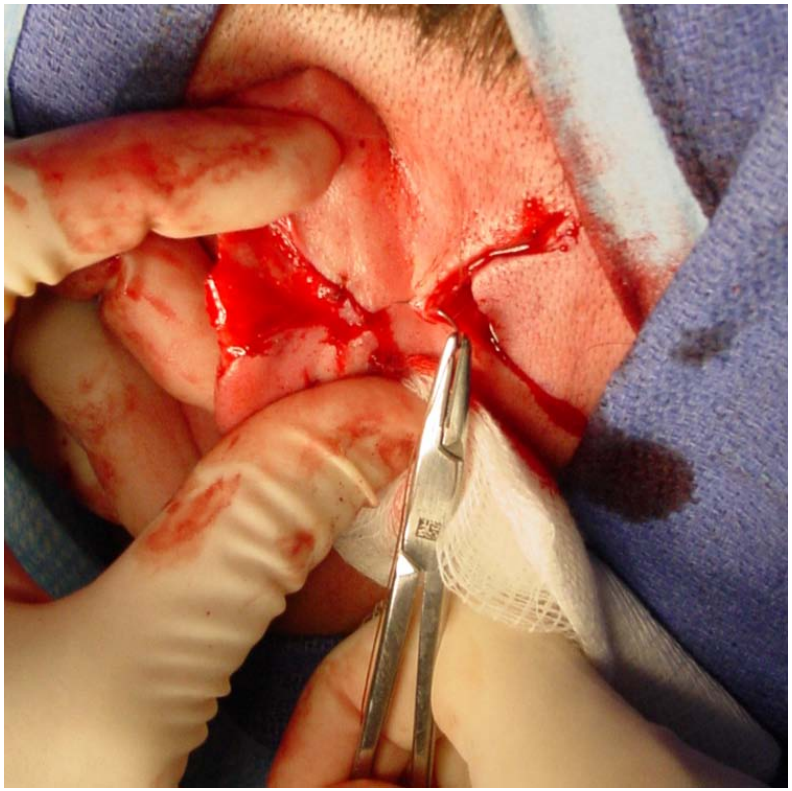
The patient was a 40 year old whose ear was bitten by a police dog.

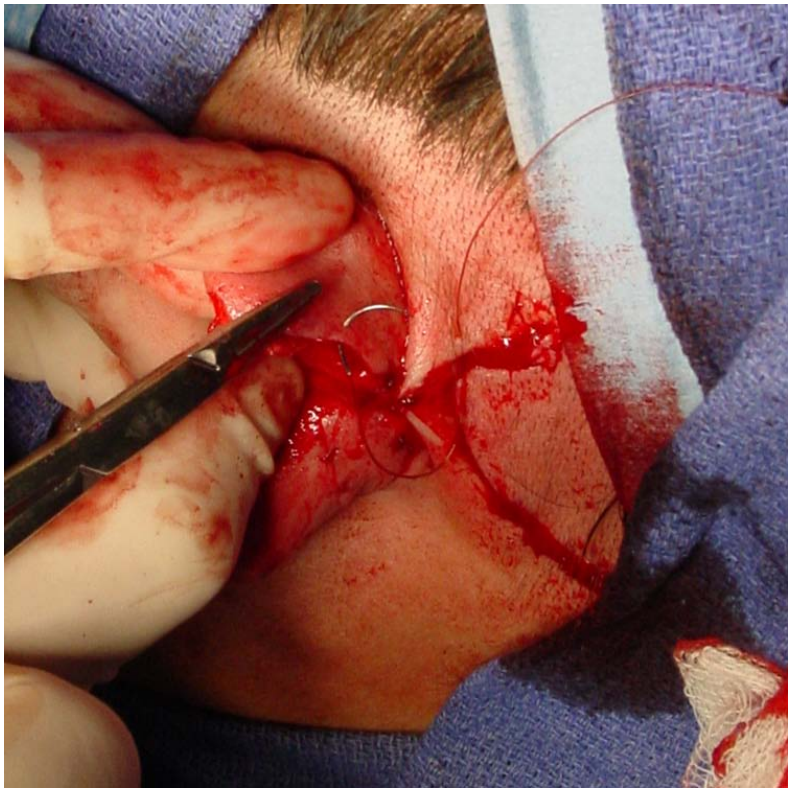
Ear Reconstruction



The patient lost part of his ear cartilage and a significant amount of ear skin. A flap to cover the ear is outlined on the patient's scalp.

Ear Reconstruction





The flap's donor site is sewn to the undersurface of the ear.

Ear Reconstruction

The flap is then placed over the anterior surface of the auricle and sewn into position.

Ear Reconstruction

The one month result is shown to the left. Tragically, the patient died of an unrelated event.

Ear Reconstruction

Four Days Postop

Six Weeks Postop

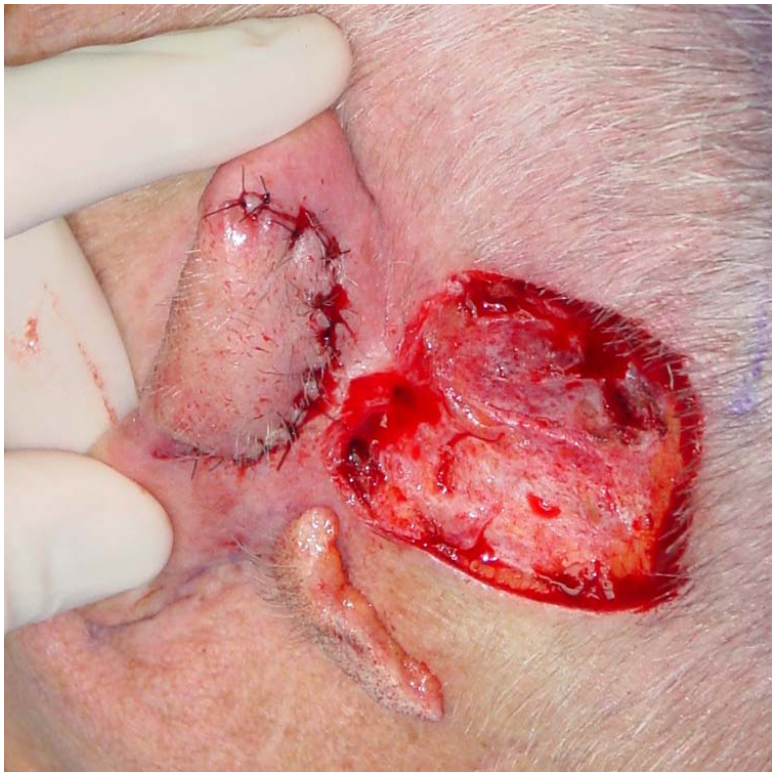
This patient had a large portion of his ear resected to remove a melanoma.

Ear Reconstruction

The flap used for the reconstruction is outlined, The donor site is closed with a superior rotation advancement flap and inferior advancement flap.

Ear Reconstruction

The flap is elevated.



The flap is trimmed and sewn into position.

Note, this flap is grasped at its tip, which will be resected. Never CLAMP a flap.

Ear Reconstruction

The rotation advancement flap is elevated.

The flaps are sewn into position.

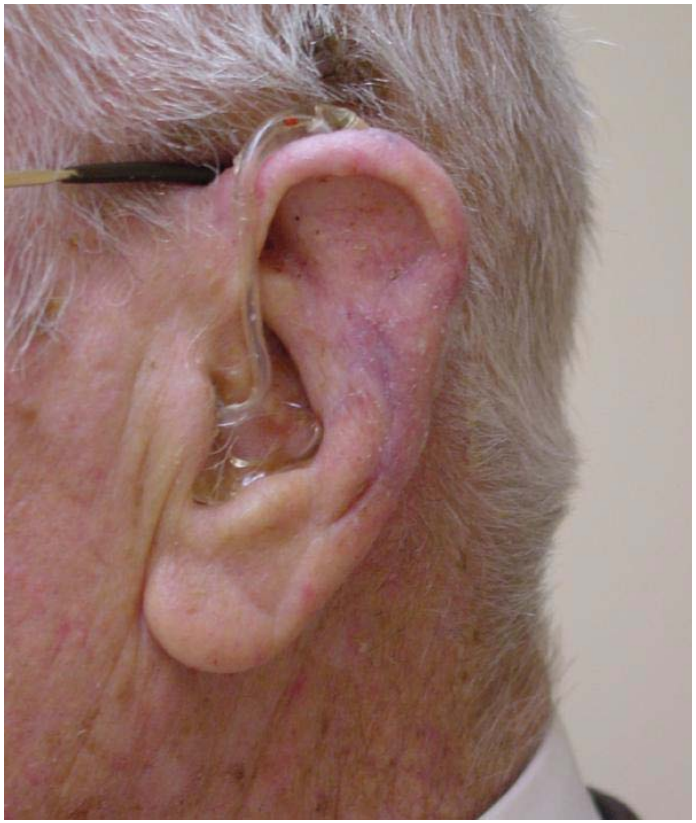
Ear Reconstruction

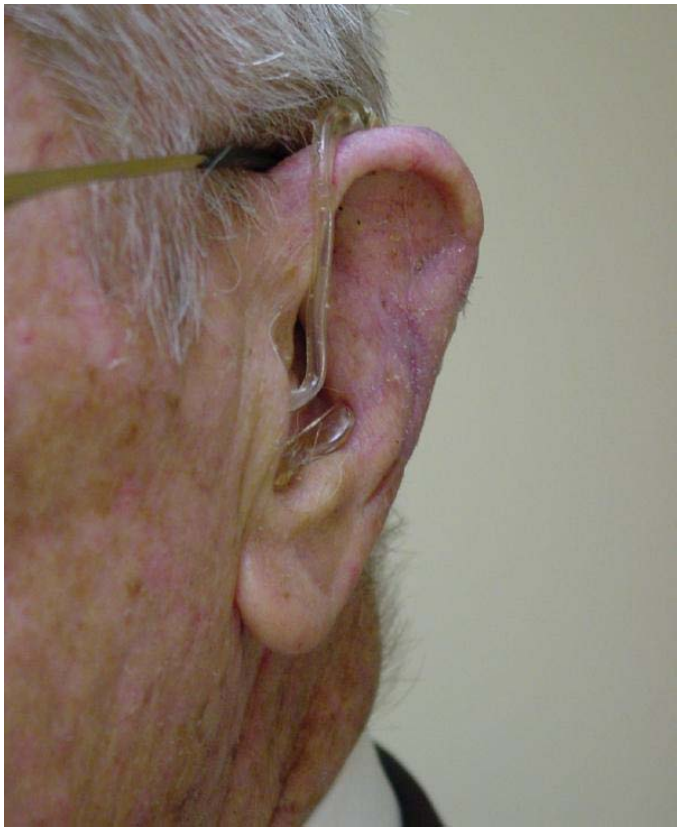
Two week postop result.

Ear Reconstruction



Ear Reconstruction





One Year Post Operative Result.

Flap Necrosis

Nasal Dorsal Flap which is based on the left side.

When flaps are folded, creased, or cross the midline there is a risk of necrosis.

Cheek advancement flaps which cross the nasal-labial fold onto the nose also have an increased risk of necrosis.

Flap Necrosis

Random flaps that are too long have an increased risk of necrosis.

To improve chances of survival:
-- No Smoking
-- Use pentoxifylline (Trental)
-- Leeches

Flap Necrosis

Immediate Postop

Two Week Result

Two Month Result

Treated with pentoxifylline (Trental) 400 mg T.I.D.