

# Flaps in Facial Reconstruction

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Grand Rounds Presentation

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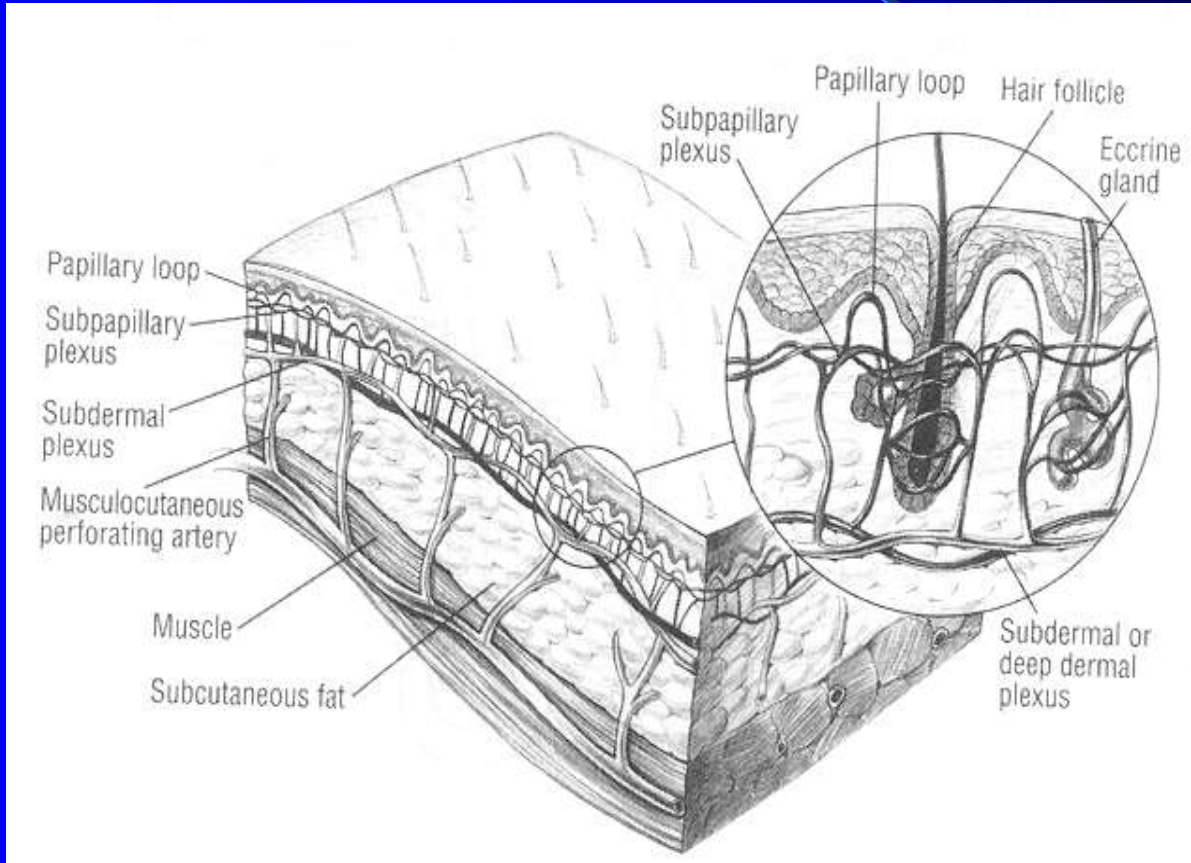
# Introduction

- Many Options for Facial Defects
  - Secondary intent
  - Primary closure
  - Skin grafts
  - Local and regional flaps
  - Free tissue transfer
- Advantages of Local Flaps
  - Color and texture match
  - Single stage
  - Primary closure of donor sites

# Vascular Anatomy

- Superficial Vascular Plexus
  - Nutrient supply to skin
  - Superior aspect of reticular dermis
- Deep Vascular Plexus (Subdermal Plexus)
- Musculocutaneous vs. Direct Cutaneous Arteries

# Vascular Anatomy



# Vascular Anatomy

- 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
  - PMFF (supratrochlear artery), nasolabial flap (angular artery)

# Flap Physiology

- Blood Flow to Skin 10X that Required for Nutritional Support
- Arteriovenous Shunts Determine Flow through Capillaries
  - Thermoregulation
  - Systemic blood pressure
  - Under sympathetic control (Norepinephrine)

# Flap Physiology

- First 48 Hours: Vasoconstriction, Inflammation, and Ischemia
- Neovascularization at 3-7 Days
- Tip Necrosis affected by Length and Tension
- Undermining not always helpful (4 cm)

# Flap Physiology

- Surviving Length of Flap Determined by Perfusion Pressure within Arterioles and Intravascular Resistance
- Length:Width Ratio of 3 or 4:1
  - Widening base beyond certain point does not help

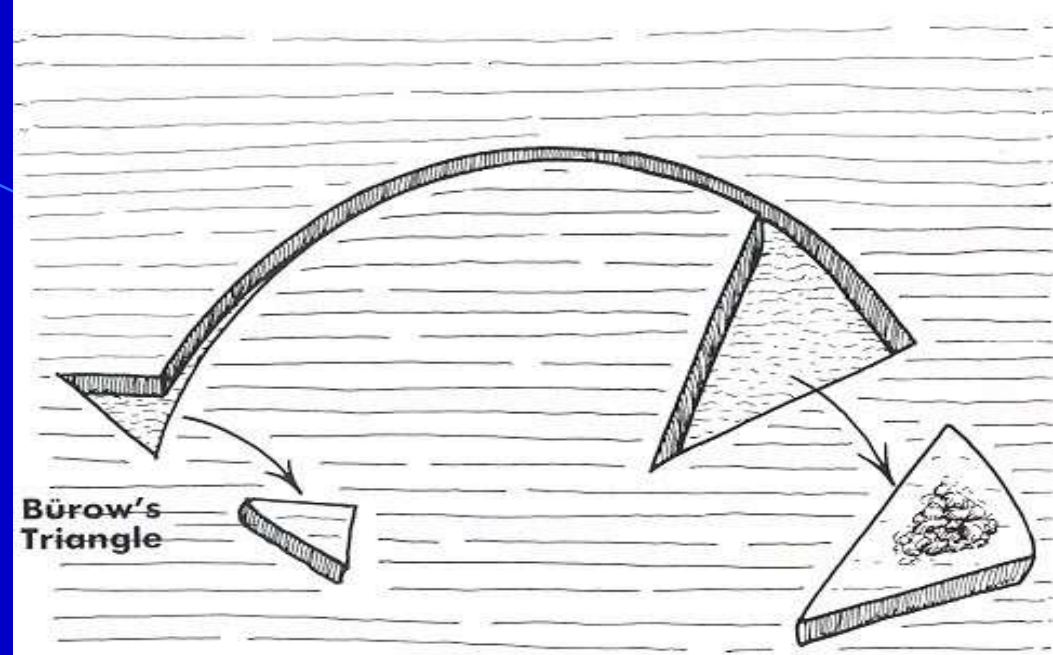


# Flap Physiology

- Delay

- Random – undermine without dividing either end of flap
- Axial – incise along all margins without undermining
- Inset at 1-2 weeks
- Benefit lost beyond 3 weeks-3 months
- Thought to close AV shunts

# Rotation Flaps



- Triangular Defect Adjacent to Flap
- Rotates in Arc about Pivot Point – curvilinear movement
- Flap Shortens as Rotated
- Bürow's Triangle at Base of Flap
- Advantage – only 2 sides

# Transposition Flaps

- Type of Rotation Flap – linear Axis
- Area of Partially Intact Skin between Donor and Defect
- Advantage – transfer of tension to repair of secondary defect
- Trapdoor Defect Common
  - Avoid with wide undermining around defect, vertical mattress sutures

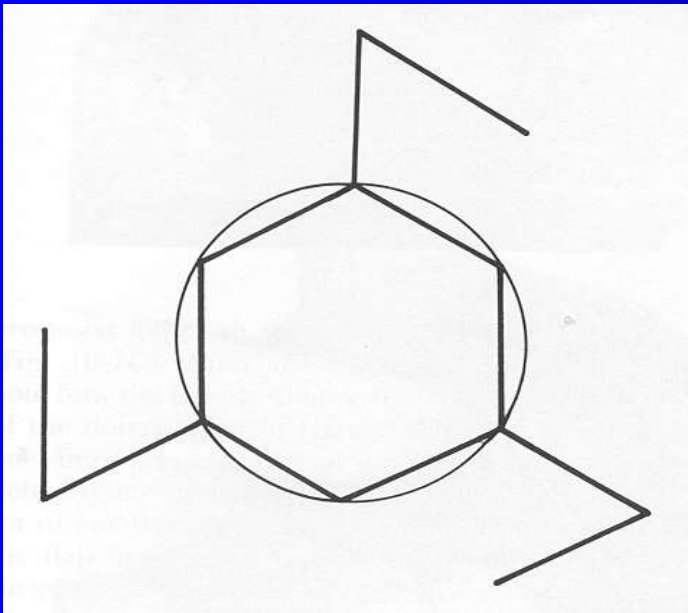
# Transposition Flaps

## Rhomboid Flap

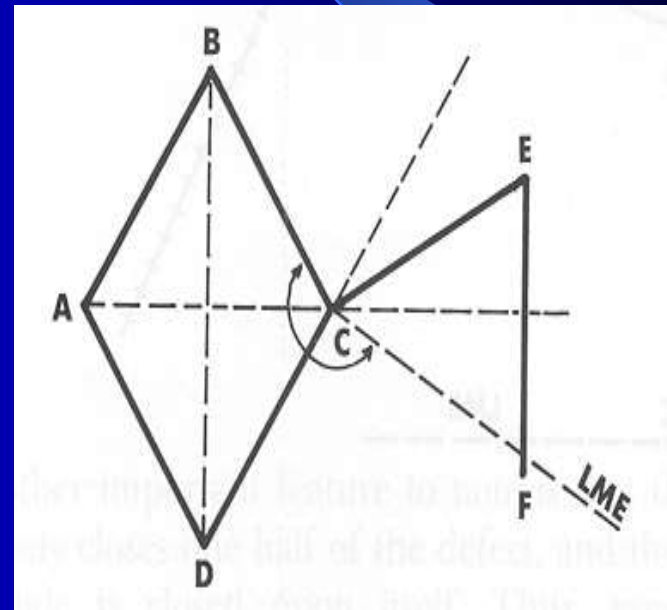


# Transposition Flaps

## Triple Rhomboid



## Dufourmental



# Transposition Flaps

## Bilobed Flap

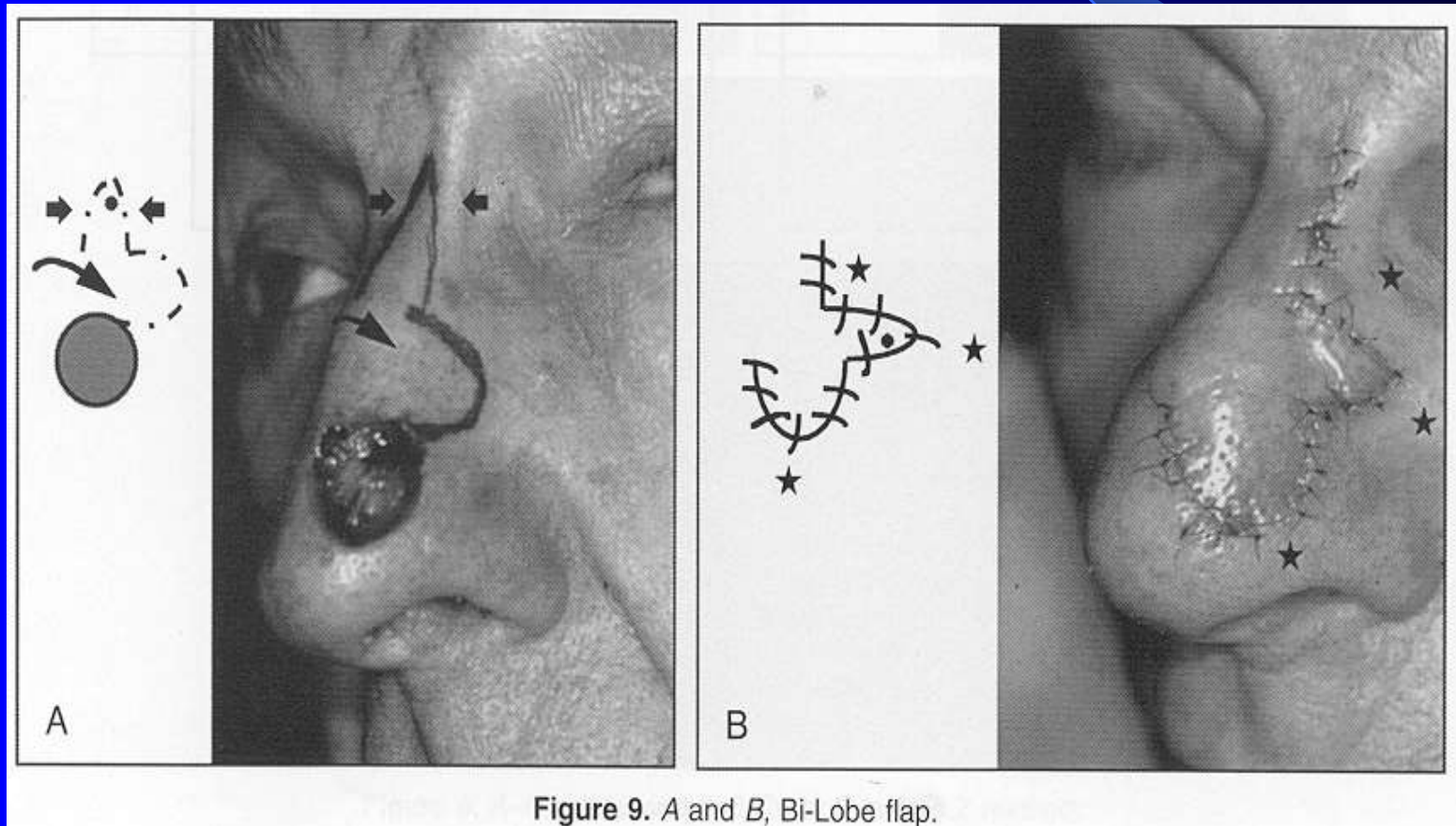


Figure 9. A and B, Bi-Lobe flap.

# Transposition Flaps

## Dorsal Nasal Flap

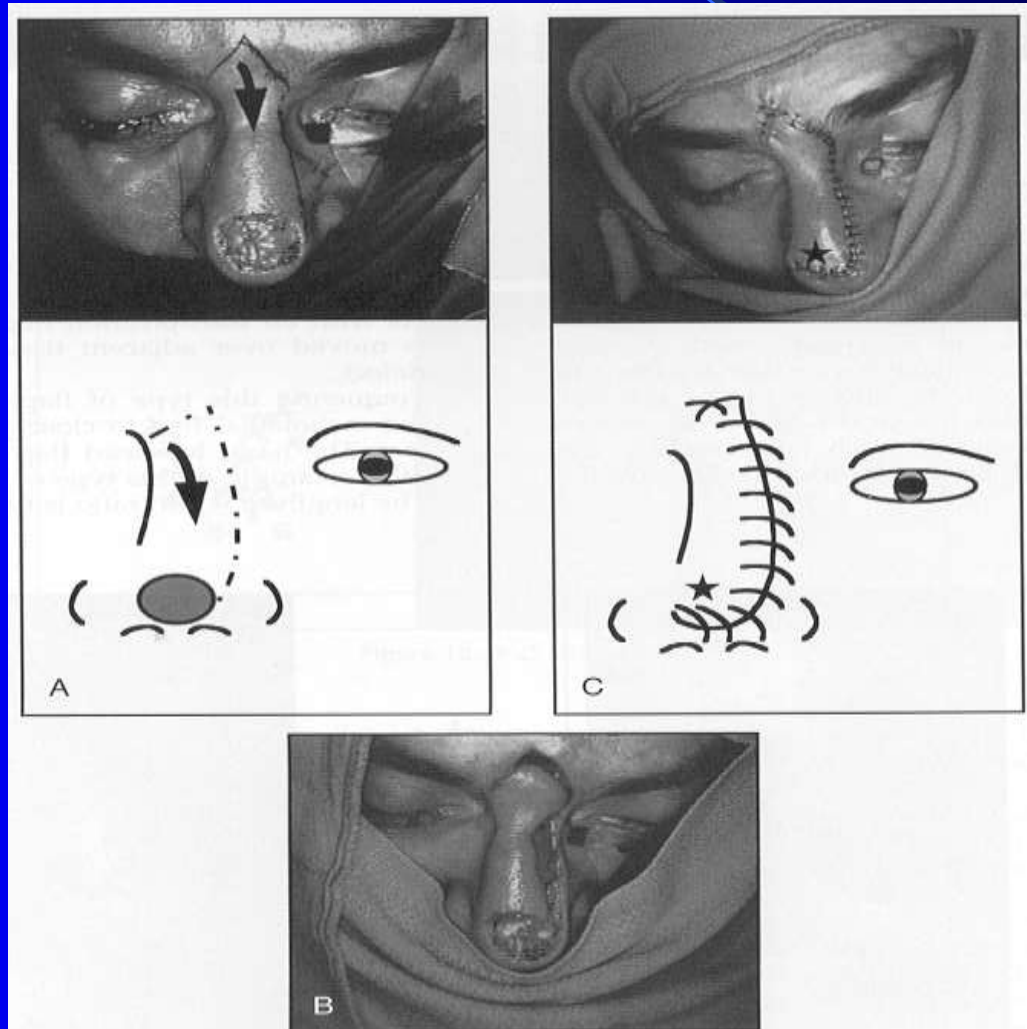


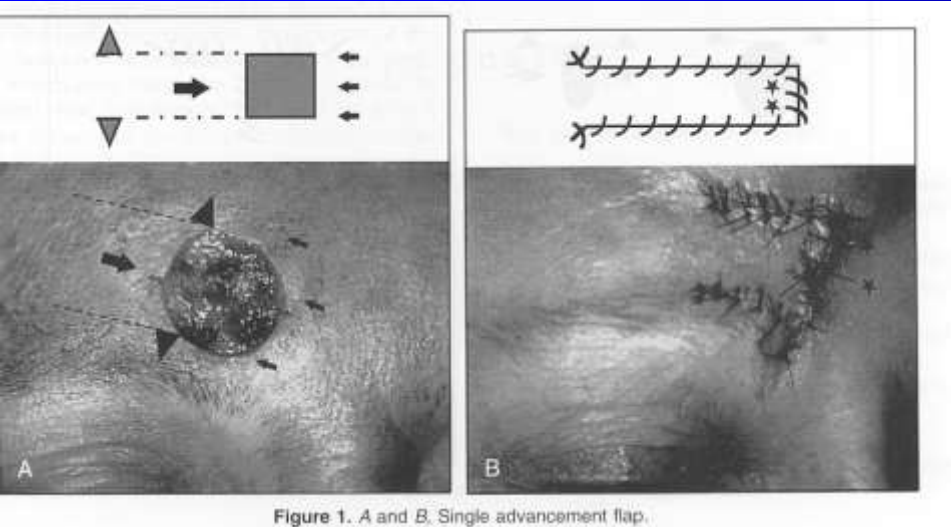
Figure 7. 4-C. Dorsonasal flap

# Advancement Flaps

- Linear Movement
- Burow's Triangles at Base
- Length:Width Ratio 1:2
- Good for Forehead and Brow

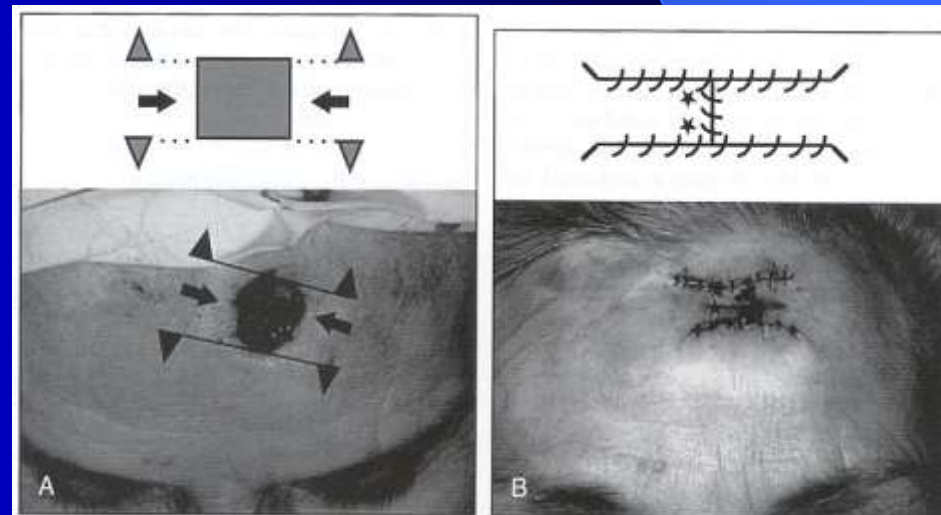


# Advancement Flaps



## Single Advancement

## Double Advancement



# Advancement Flaps

## Island Pedicle Flap

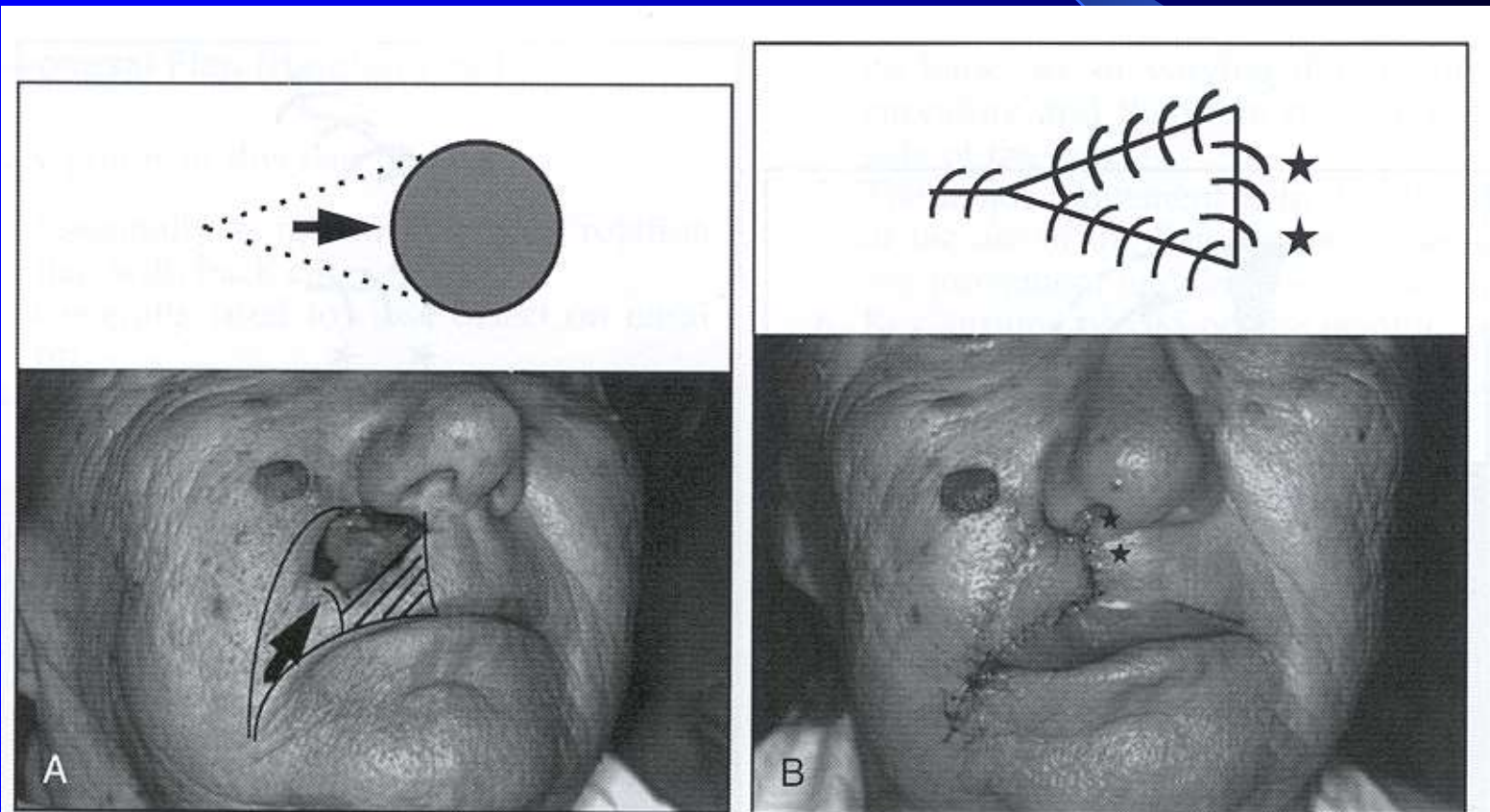
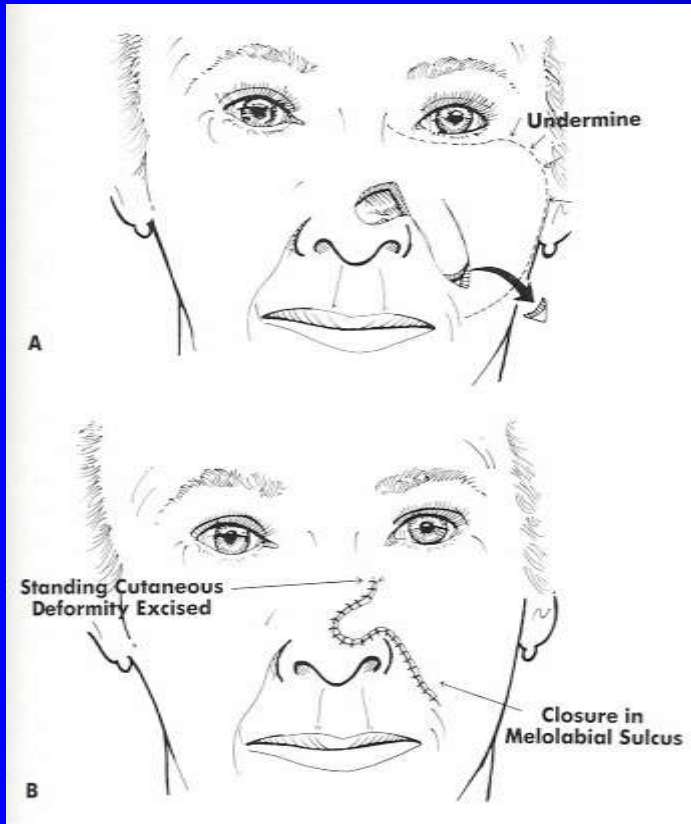


Figure 4. A and B, Island pedicle flap.

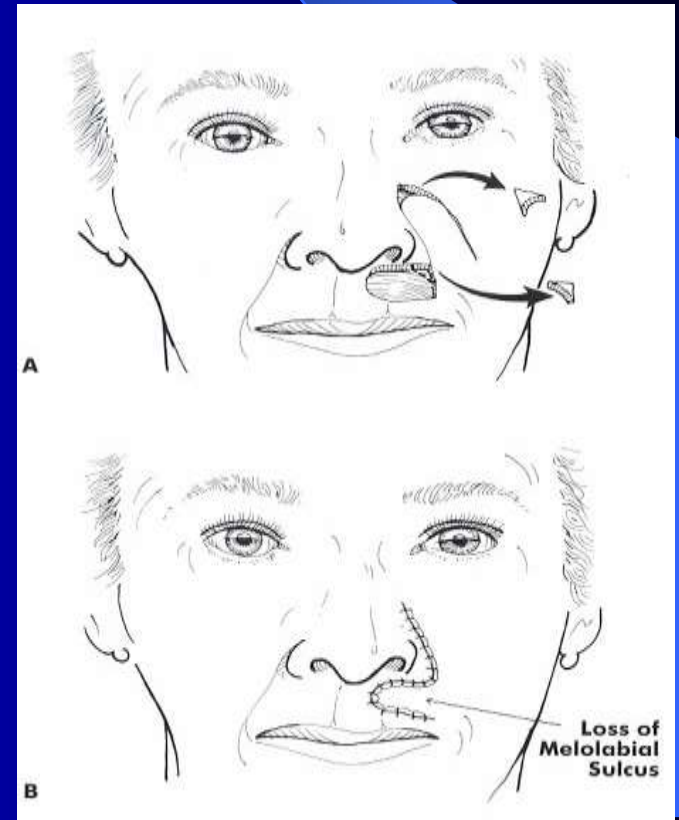
# Interpolated Flap

## MELOLABIAL FLAPS

### Superiorly Based

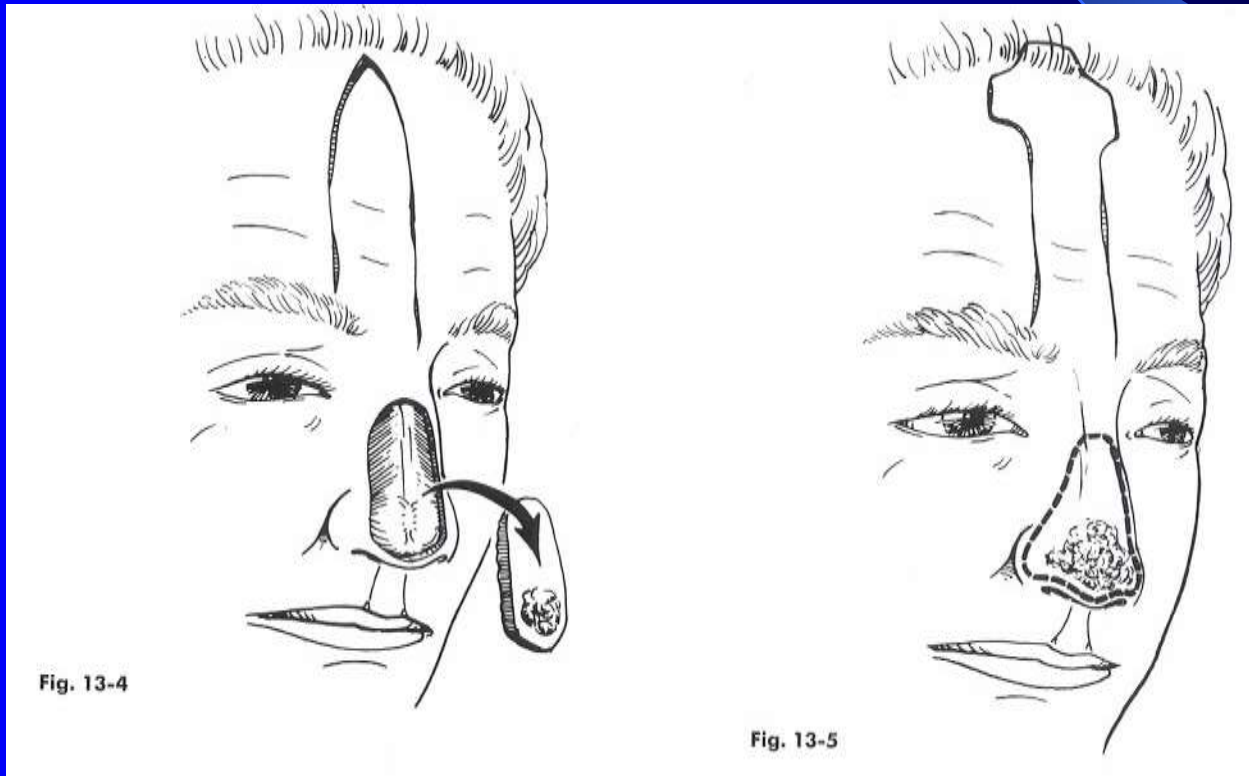


### Inferiorly Based



# Interpolated Flaps

## Paramedian Forehead Flap



# Planning and Technique

## ● Patient Factors

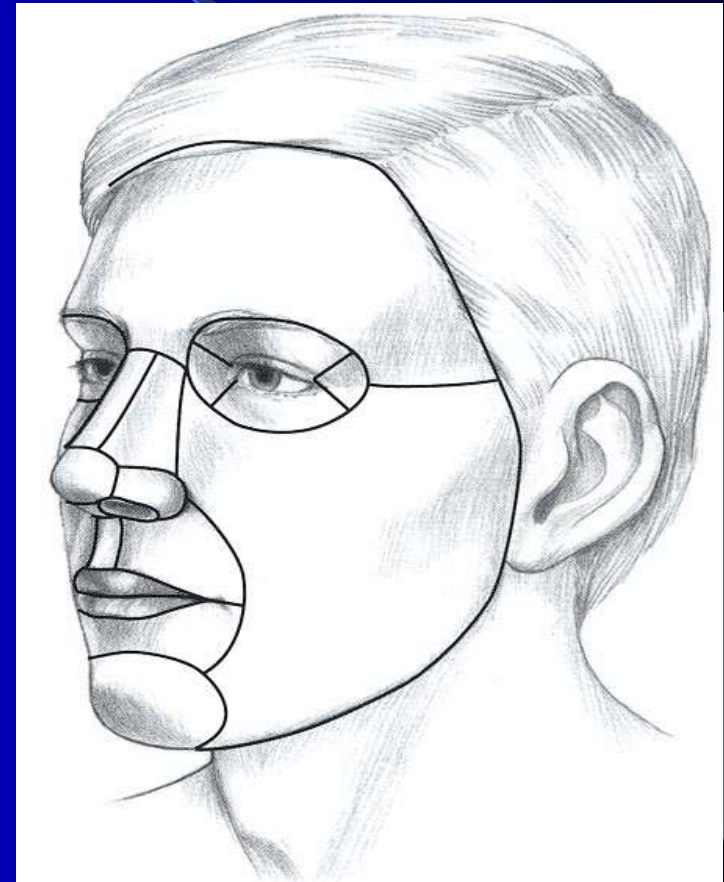
- Age
- Malnutrition
- Diabetes Mellitus
- Hypertension
- Peripheral Vascular Disease
- Hyperlipidemia
- **Smoking**
- Immunosuppression
- XRT

# Planning and Technique

- Surgical Factors
  - Thinning
  - Electrocautery
  - Rough handling
  - Damage to axial vessels
  - Tension

# Planning and Technique

- Incisions in RSTL
- Tension in LME
- Junction of aesthetic units best for scar
- Compartmentalize defects crossing subunits



# Planning and Technique

- Forehead
  - Small: Primary closure
  - Larger: A-to-T flap, other advancement flaps
  - Avoid distortion of eyebrow
  - Use hairline
- Medial Canthus
  - Secondary intent if 1 cm or less
  - Glabellar transposition flaps



# Planning and Technique

- Nose

- Upper 2/3: Bilobed flap, rhomboid flap
- Mid-dorsum: Dorsal nasal flap
- Lower 1/3 nose
  - Bilobed flap if 1.5 cm or less
  - PMFF is the workhorse

# Planning and Technique

- Cheek – many options
  - Rhomboid, bilobed, cheek advancement, cervicofacial rotation
  - Hide incisions along edge of nose, nasolabial fold, infraorbital rim, preauricular skin crease
- Chin
  - Use sublabial crease for scar camouflage
  - Avoid webbed scar

# Complications

- Venous Congestion – Edematous, purple/blue, dark colored blood on pinprick
  - Remove tight sutures
  - Multiple punctures with 22-gauge
  - Heparin soaked gauze/medicinal leeches
- Ischemia – Pale flap, poor cap refill, cool, absence of bleeding w/ pinprick
  - Loosen dressing, drain hematoma, correct kink
  - Delay (Do BEFORE leaving OR)
  - HBO

# Complications

- Dehiscence

- Simple dehiscence within 24 hours – repair; otherwise, local wound care
- Wound weakest at 1 week: Steri-strips advised

- Scar/Cosmesis

- Steroid injection (hypertrophic scar, trapdoors)
- Dermabrasion (height differences) – 6-9 weeks post-op
- Scar revision – at least 6 months post-op

# Hyperbaric Oxygen

- Proven Benefit with Ischemic Flaps in Animals and Humans
- 100% Oxygen at 2-3 ATM
- Increases Dissolved Oxygen in Plasma
- Retards Cellular Death until Neovascularization Begins (72 hours)
- Complications: Middle ear, pneumothorax, seizure, pulmonary toxicity, myopia, cataracts