PLASTIC &RECONSTRUCTIVE SURGERY (2)

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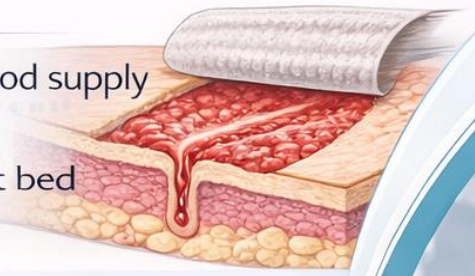
Lecture time : 50-60 min

GRAFTS

Grafts = Tissue transferred **WITHOUT** blood supply

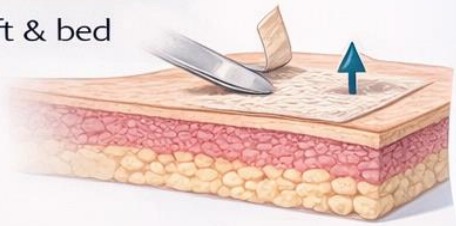
Survival depends on:

- Revascularization from recipient bed
- Angiogenesis



Requirements for Graft Survival

- Healthy, well-vascularized **wound bed**
- Good contact between graft & bed
- Immobilization of graft

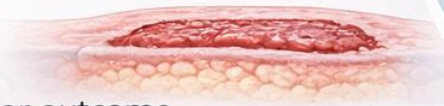


Causes of Graft Failure

- **Shear** forces (movement)
- **Infection** (esp. Group A β-hemolytic Strep)
- **Hematoma / Seroma** (separates graft)

Indications

- Large skin defects
- Primary closure not possible
- Secondary healing too slow / poor outcome



Types of Skin Grafts

- **Spiit-Thickness** Skin Graft (FTSG)
- Donor: thigh (common)
- Common donor sites: postauric groin

Composite Grafts

Lenge reclesis retrains sbow!

Graft classification:

- **Autologous**: The donor skin is taken from a different site on the same individual's body (also known as an *autograft*).
- **Isogeneic**: The donor and recipient individuals are genetically identical (e.g. monozygotic twins).
- **Allogeneic**: The donor and recipient are of the same species (human→human, dog→dog).
- **Xenogeneic (hetrograft)**: The donor and recipient are of different species (e.g. bovine cartilage).
- **Prosthetic**: Lost tissue is replaced with synthetic materials such as metal, plastic or ceramic (*prosthetic implants*).

TYPES OF SKIN GRAFTS

Split-Thickness Skin Graft (STSG)

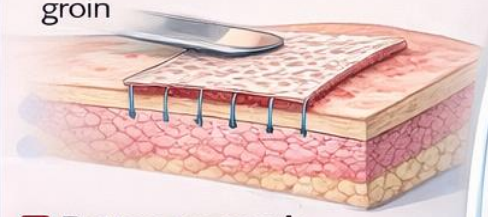
- Epidermis + part of dermis
- Donor: thigh (common)

Requirements for Graft Survival

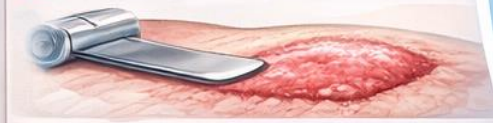
- Healthy, well-vascularized wound bed
- Good contact between graft & bed
- Immobilization of graft

Full-Thickness Skin Graft (FTSG)

- Epidermis + full dermis
- Donor: postauricular, supraclavicular, groin



- Better cosmesis
- Less contracture
- Limited size
- Needs primary closure



- Donor: postauricular, supraclavicula, groin

Composite Grafts

- **Skin** + other tissue (fat / cartilage)
  - Examples: Ear cartilage –nasal reconstructhy
  - Scalp graft → eyebrow

Other Grafts in Surgery

- **Tendon grafts**: palmaris longus. plantaris
- **Nerve grafts**: sural nerve, antebrachial cutaneous
- **Cartilage grafts**: ear, septum, ribs

Graft Types by Source

- **Autograft** (gold standard)
- **Allograft** (cadaver)
- **Xenograft** (porcine) + temporary coverage

Skin Substitutes

- Engineered materials (dermal/epidermal)

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  - Examples: Alloderm©, Integra®,
  - Avdantages:
    - No donor site.
  - Disadvantages
    - Expensive
    - Technique sensitive

Types of Skin Grafts

- Split-Thickness Skin Graft (STSG) Epidermis + part of dermis Donor: thigh (common) Advantages: Covers large areas Can be meshed Disadvantages: Contracture Fragile Donor heals in ~2 weeks (secondary intention)
- Full-Thickness Skin Graft (FTSG) Epidermis + full dermis Donor: postauricular, supraclavicular, groin Advantages: Better cosmesis Less contracture Disadvantages: Limited size Needs primary closure
- Composite Grafts Skin + other tissue (fat / cartilage) Examples: Ear cartilage → nasal reconstruction Scalp graft → eyebrow
- Other Grafts in Surgery Tendon grafts: palmaris longus, plantaris Nerve grafts: sural nerve, antebrachial cutaneous Cartilage grafts: ear, septum, ribs
- Graft Types by Source Autograft (gold standard) Allograft (cadaver) Xenograft (porcine) → temporary coverage
- Skin Substitutes Engineered materials (dermal/epidermal) Examples: Alloderm®, Integra®, Apligraf® Advantages: No donor site Disadvantages: Expensive Technique sensitive
- Tissue Expansion Subcutaneous balloon → gradual inflation Mechanism: Creep + stress relaxation ↑ vascularity Produces like-for-like tissue Used in: Scalp reconstruction Large defects

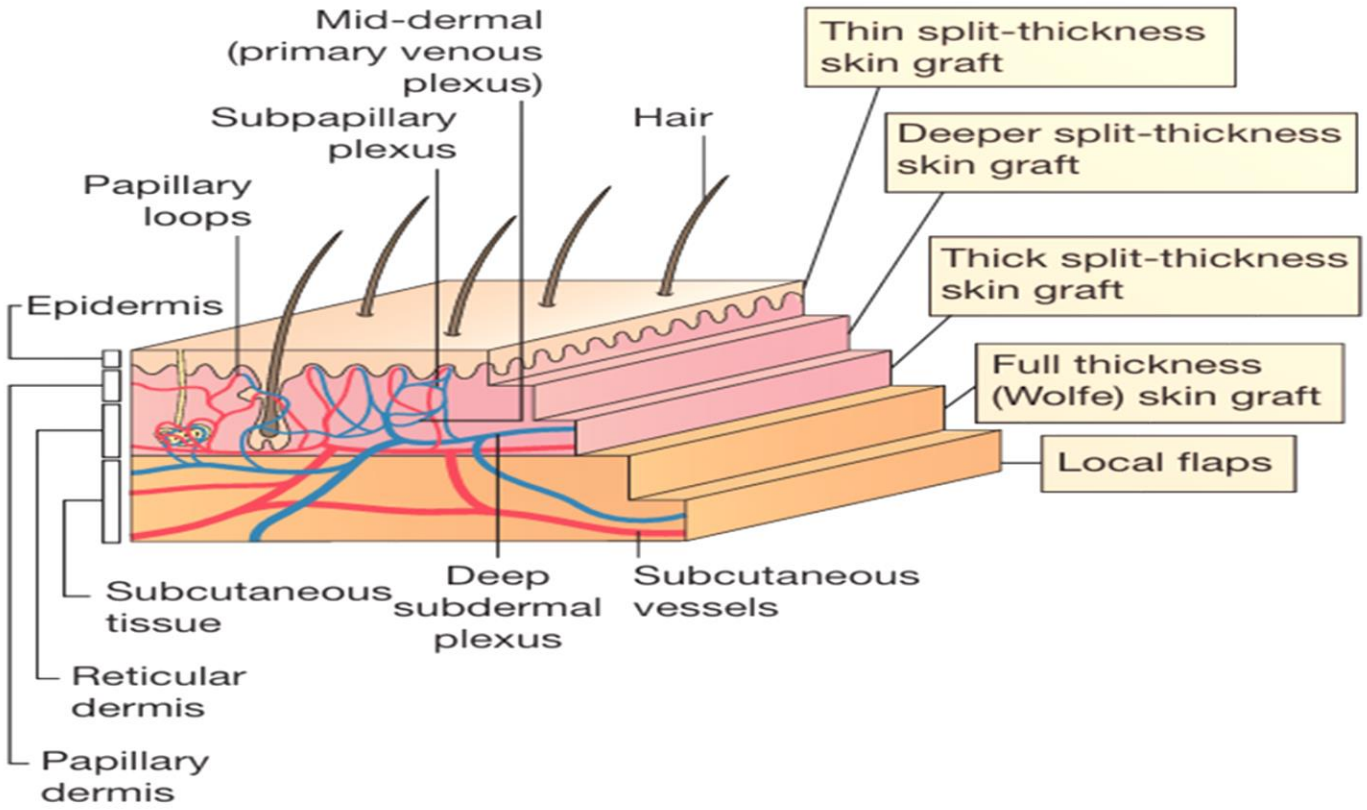


Figure 47.7 Schematic anatomy of the skin and its relationship to harvesting skin grafts (of varying thicknesses) and raising local flaps.

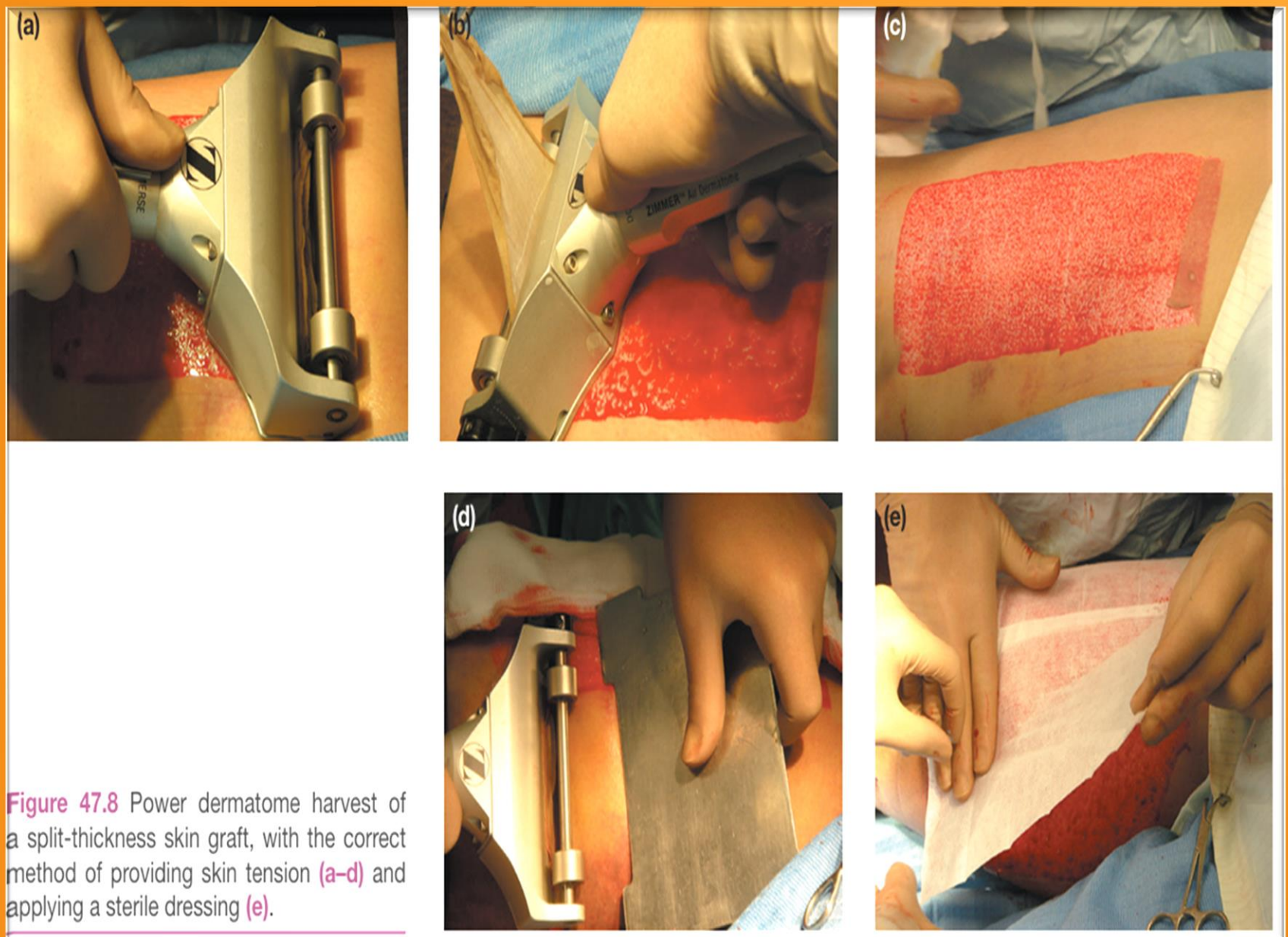


Figure 47.8 Power dermatome harvest of a split-thickness skin graft, with the correct method of providing skin tension (a–d) and applying a sterile dressing (e).

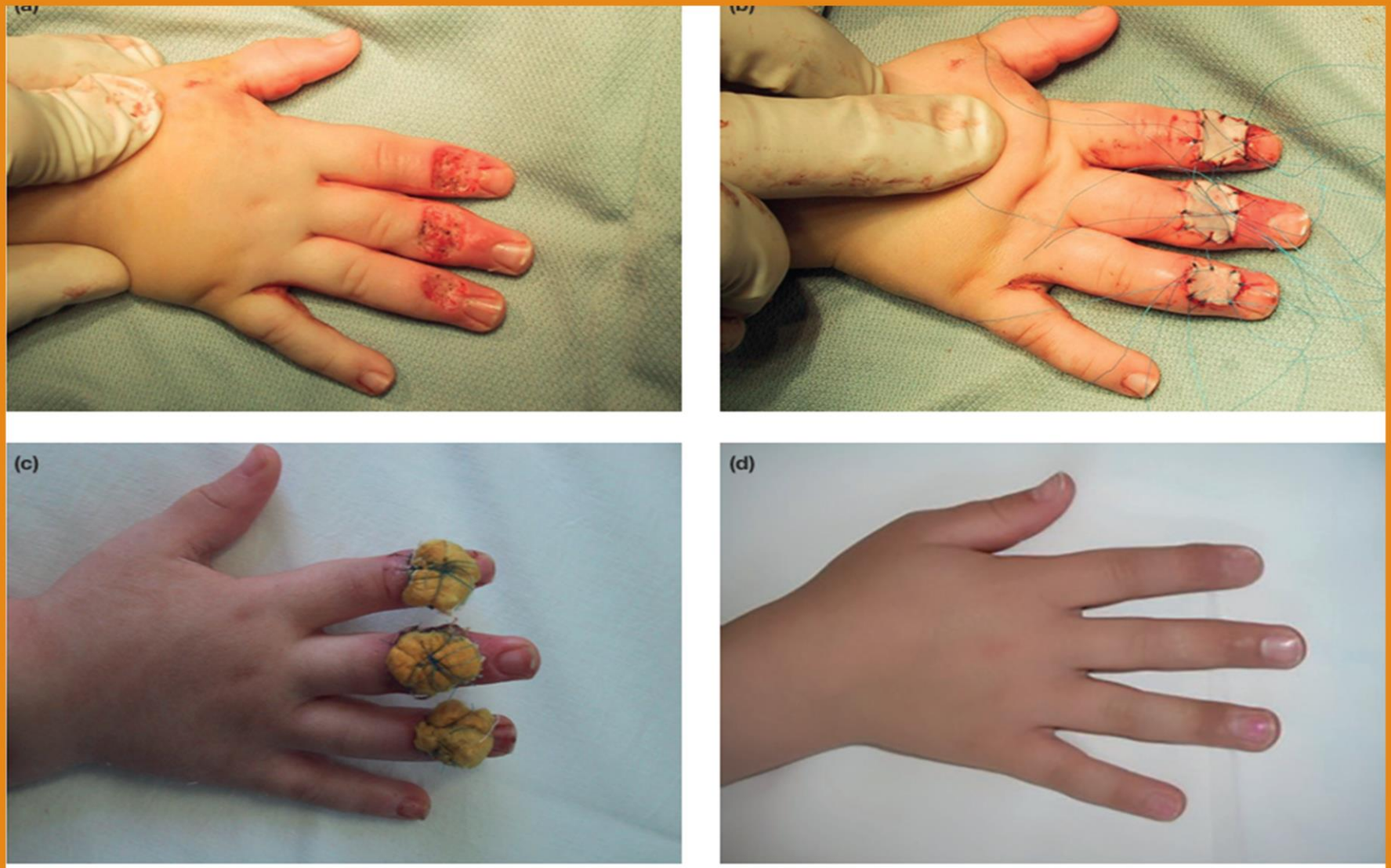


Figure 47.10 Full-thickness skin graft reconstruction of a contact burn to the dorsum of the digits. (a) Post excision of burn wounds. (b) Full-thickness skin grafts from the groin sutured to the wounds. (c) Tie-over dressings applied to avoid shearing of the graft off the wound bed. (d) Postoperative appearance at 1 year.

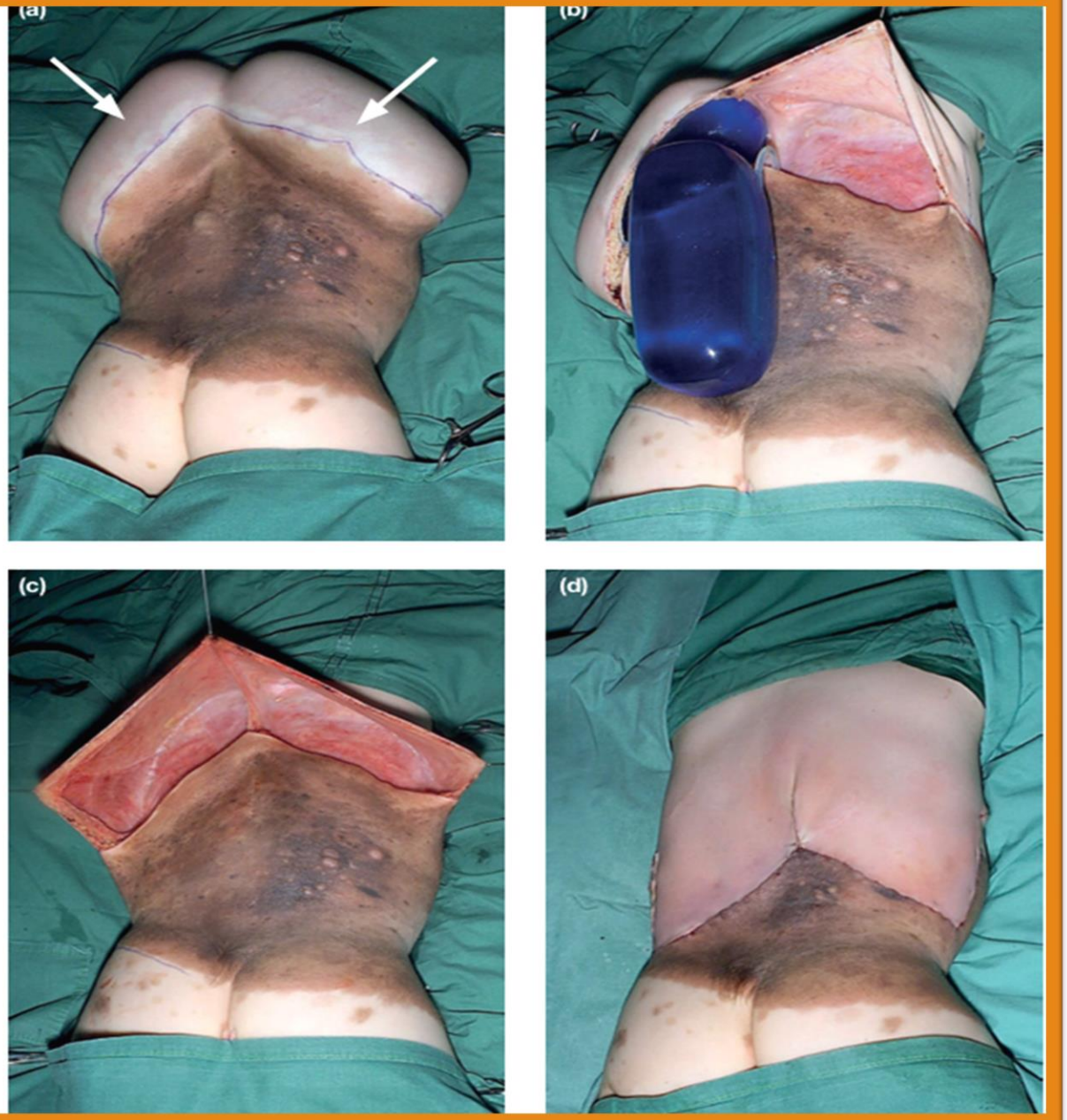


Figure 47.11 Tissue expansion provides local autologous tissue for reconstruction of large defects. **(a)** Extensive congenital melanocytic naevus of the back with tissue expanders *in situ* (arrows). **(b)** Explantation of inflated tissue expanders. **(c)** Advancement of expanded skin flaps to determine the extent of naevus excision. **(d)** Immediate postoperative appearance after partial excision of the naevus and skin flap closure. The flaps were subsequently re-expanded to facilitate excision of the residual naevus.

Stages Of Graft Intake

1. Stage of Plasmic Imbibition:

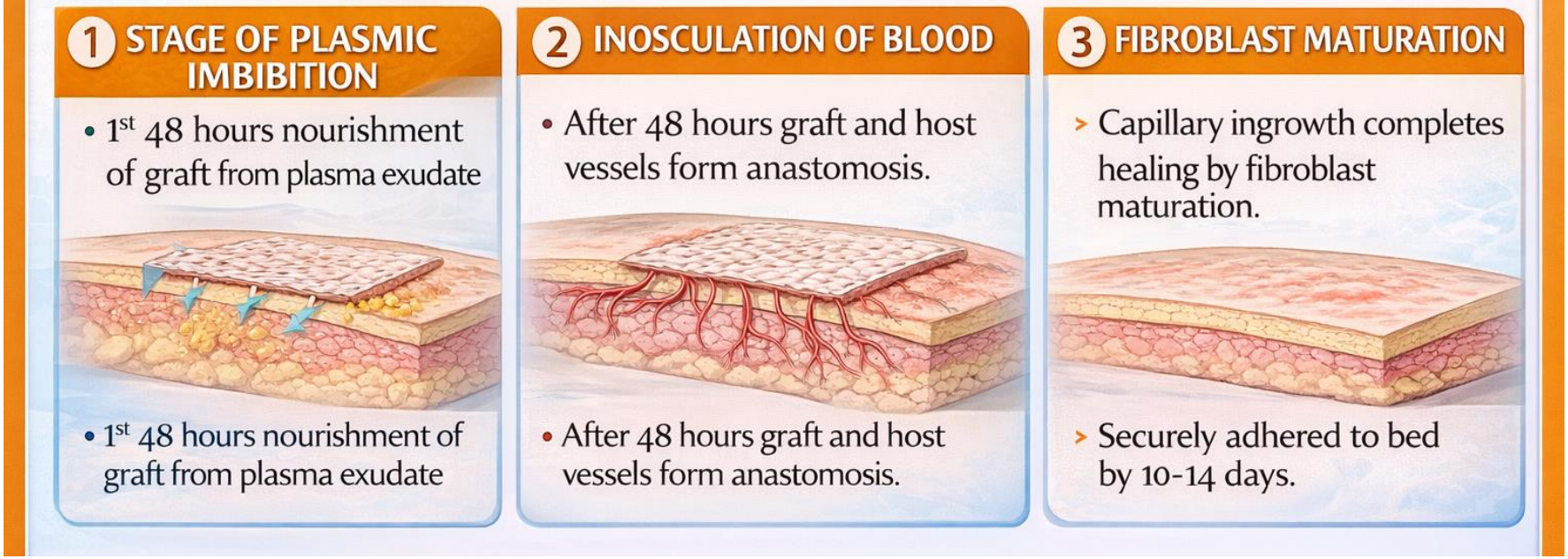
   During 1st 48 hours nourishment of the graft occurs from plasma exudate from host bed capillaries.

2. Inosculation of blood:

   After 48 hours graft and host vessels form anastomosis.

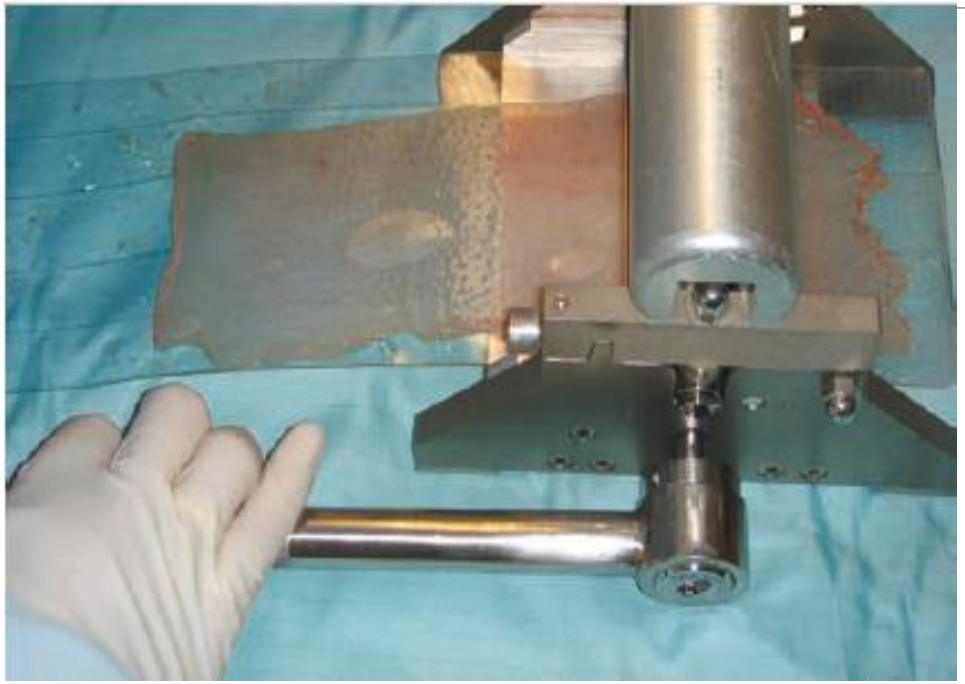
3. Fibroblast Maturation:

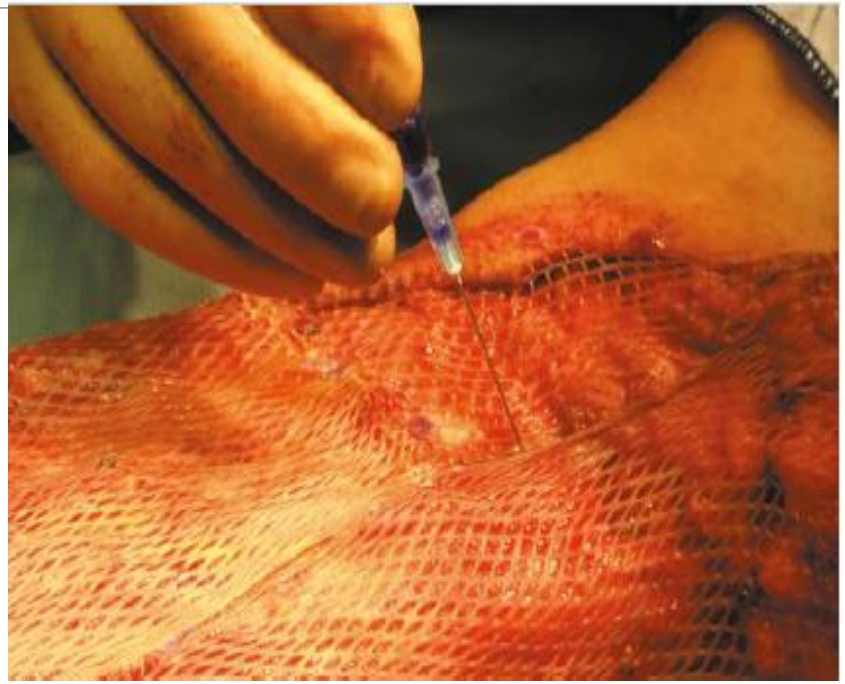
- Capillary ingrowth completes the healing by fibroblast maturation.
- The grafts are securely adhered to bed by 10-14 days.



Complications and treatment

1. Graft failure is commonly caused by **pus**, **exudate** or **residual dead tissue** beneath the skin, **haematoma** or **shearing forces**.
2. The group A b-haemolytic Streptococcus can destroy split skin grafts completely (and also convert a donor site to a full-thickness defect).
3. Treatment by ensuring clean healthy wound bed with a meshed graft tied in place to stop movement.





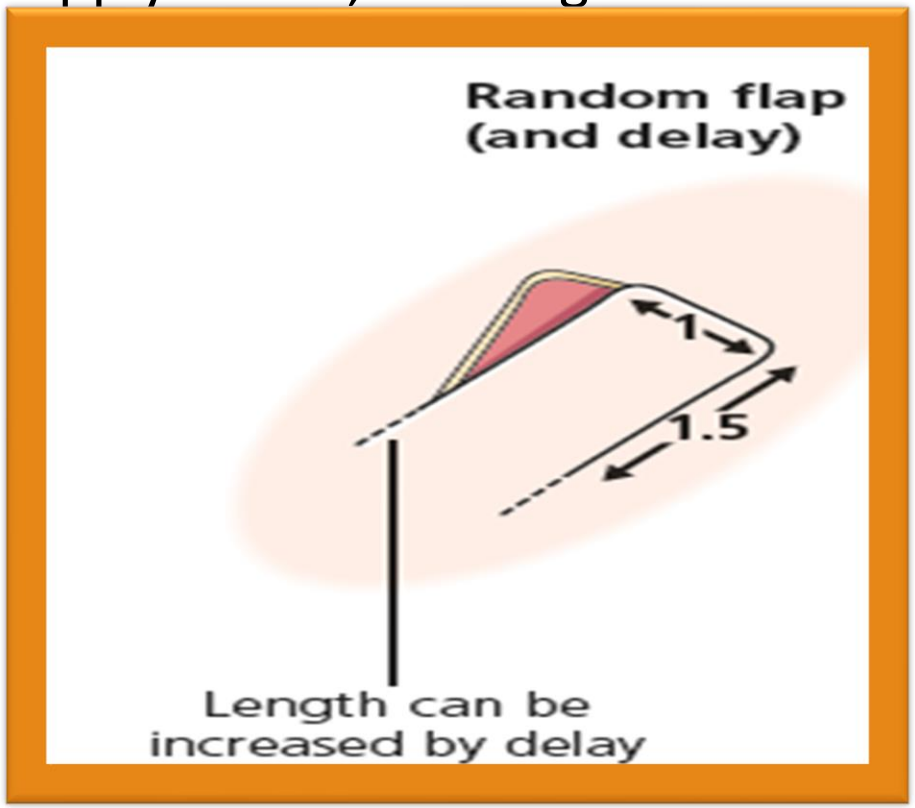
Mesher

Flaps

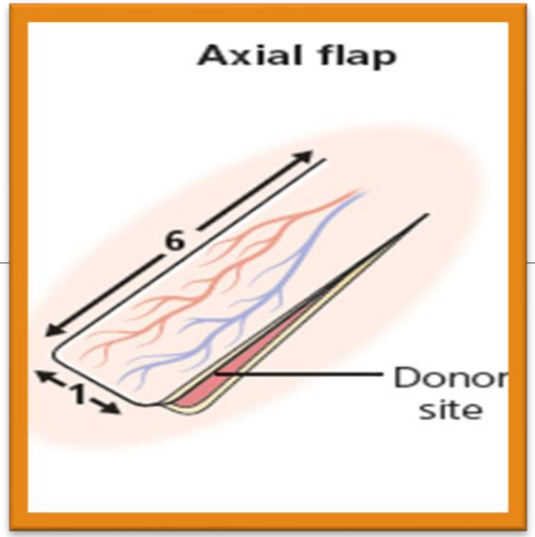
- Flaps are tissues that are transferred with a blood supply.

Types of Flaps:

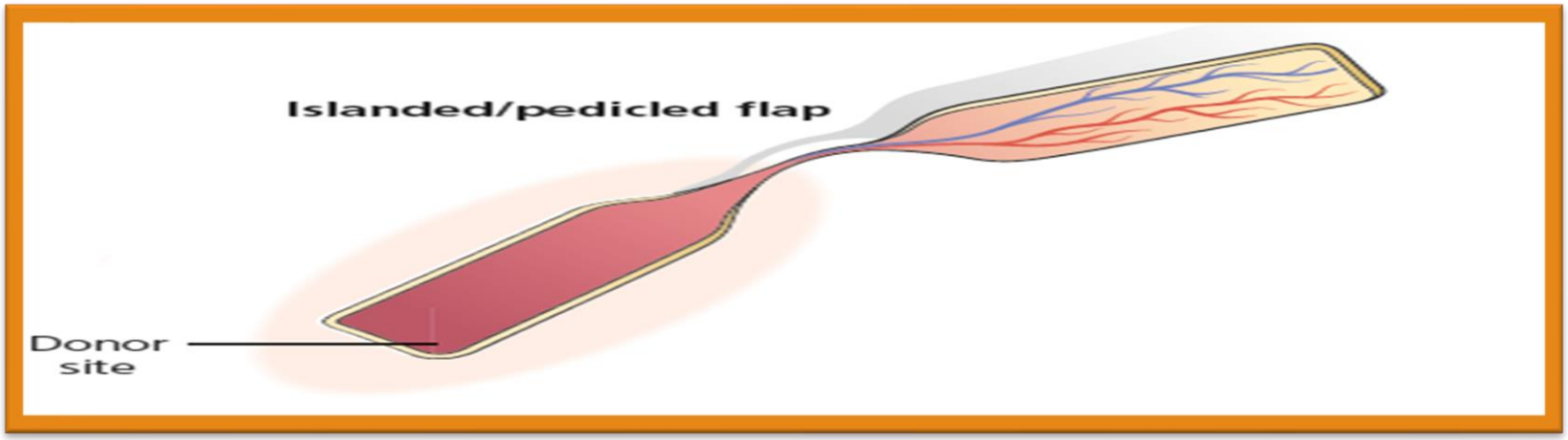
- ***Random Flaps:*** Three sides of a rectangle, no specific relationship to where the blood supply enters, the length to breadth ratio is no more than 1.5:1.



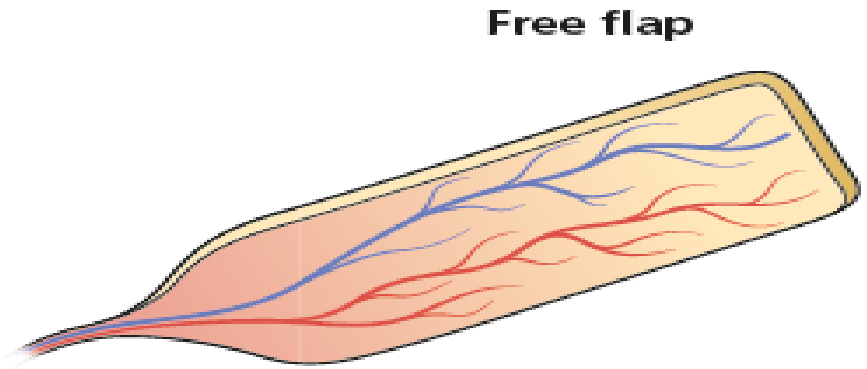
- ***Axial flaps:*** Much longer flaps, based on known blood vessels supplying the skin.



- ***Pedicled /islanded flaps:*** The axial blood supply of these flaps means that they can be swung round on a stalk.



- ***Free flaps:*** The blood supply has been isolated, disconnected and then reconnected using microsurgery at the new site.



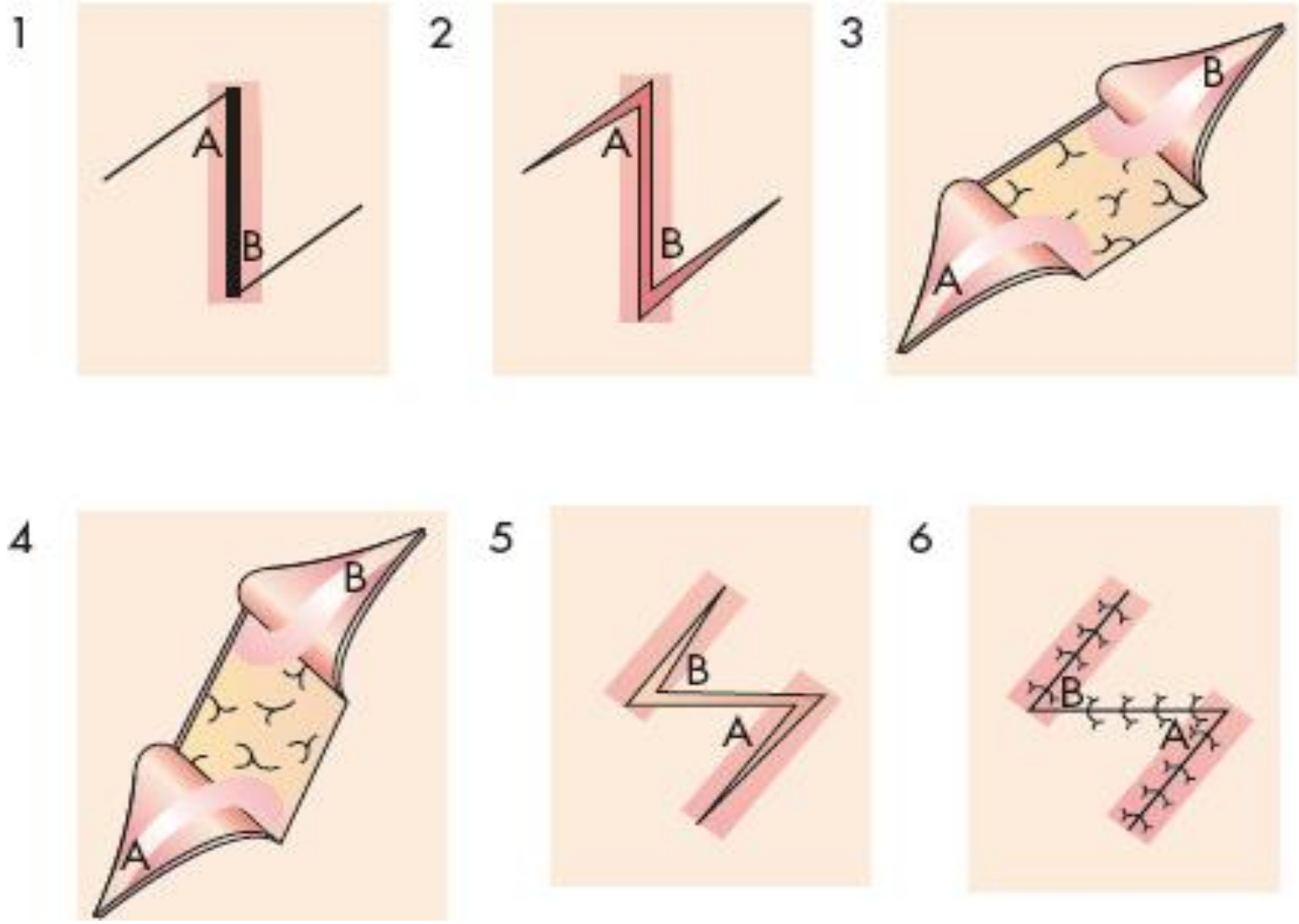
- ***Composite flaps:*** Various tissues are transferred together, often skin with bone or muscle.
- ***Perforator flaps:*** tissues are isolated on small perforating vessels that run from more major blood vessels to supply the surface.

Local Flaps: It is raised next to a tissue defect in order to reconstruct it.

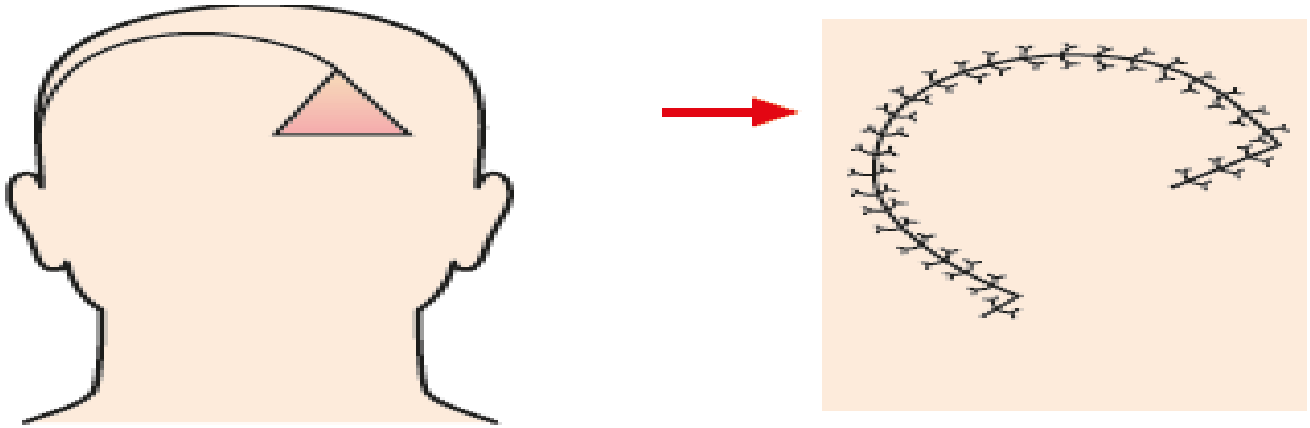
Types:

- ***Z-plasty:*** For lengthening scars or tissues.
- ***Rotation flap:*** For convex surfaces.
- ***Advancement flap:*** For flexor surfaces, may need triangles excised at the base to make it work.
- ***V-to-Y advancement:*** Commonly used for fingertips & extremities.

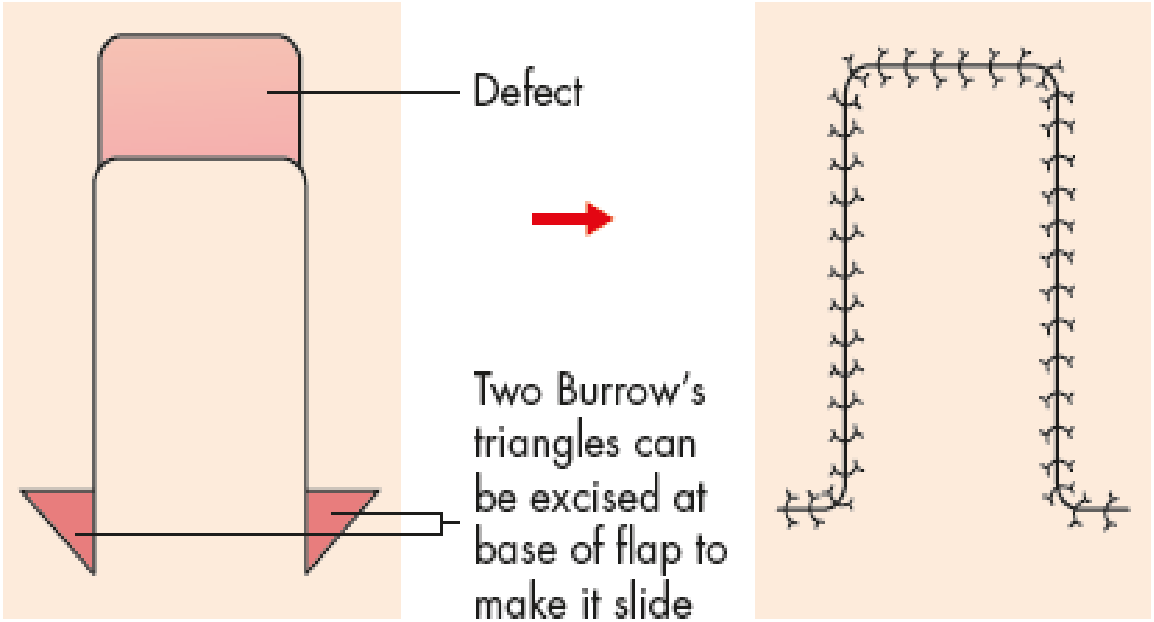
Z- Plasty:



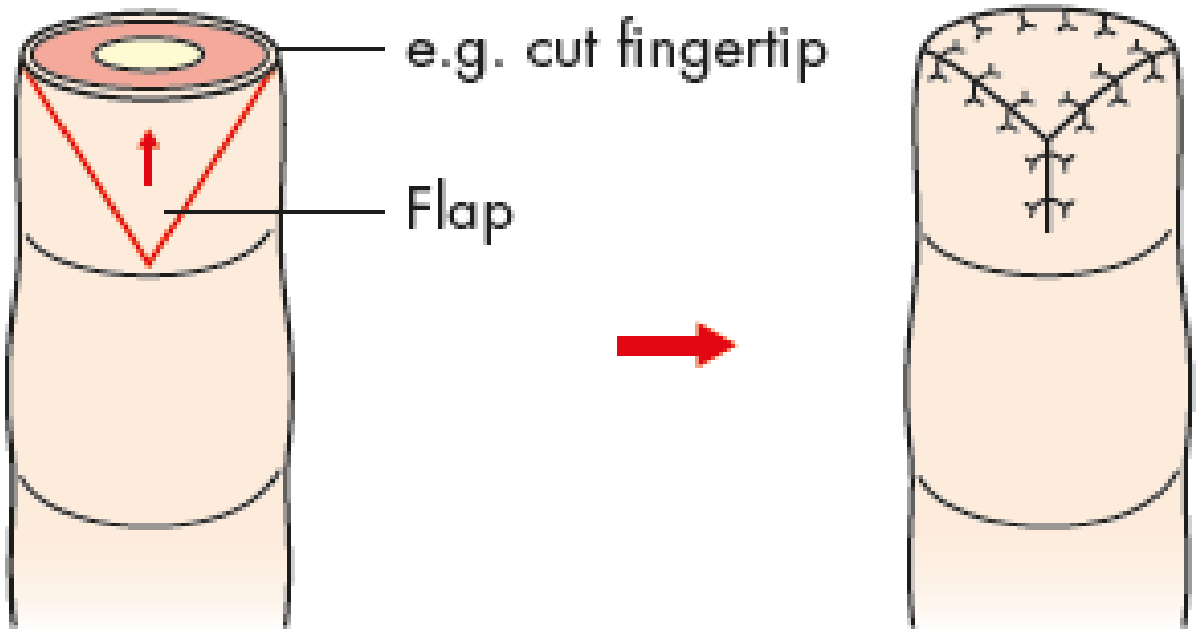
ROTATION FLAP:



ADVANCEMENT FLAP:



V-to-Y advancement Flap:

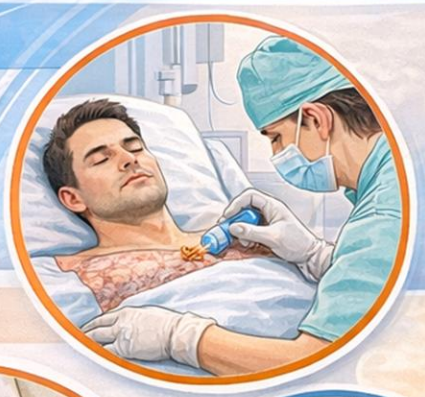


Advantages and Care of Local Flaps

After microvascular **free-flap** reconstruction, close monitoring in the first 48 hours is crucial for detecting and treating vascular compromise in the flap.

ADVANTAGES

- ✔ High-dependency unit / ICU
- ✔ "Wet, warm, and comfortable" (optimizing perfusion)
- ✔ Local or regional anaesthesia option.



DISADVANTAGES

- ✖ Possible local tissue shortage.
- ✖ Scarring may exacerbate the condition.
- ✖ Surgeon may compromise **local resection.**

CARE & MONITORING

- ✔ Observe tissue colour, warmth, turgor
- ✔ Press to assess blanching, capillary refill time
- ✔ Arterial inflow loss: Pale, cold, flaccid tissue
- ✔ Venous outflow loss: Blue, congested tissue

⚠ Arterial inflow loss results in pale, cold, flaccid tissue; venous outflow loss results in blue, congested tissue, increased turgor, rapid capillary refill.

-Wet, warm and comfortable: This means that the patient should be well hydrated with a hyperdynamic circulation, a very warm body temperature and well-controlled analgesia to reduce catecholamine output.

Flaps failure: causes:-

1. Poor anatomical knowledge when raising the flap (such that the blood supply is deficient from the start).
2. Flap inset with too much tension.
3. Local sepsis or a septicaemic patient.
4. The dressing applied too tightly around the pedicle.
5. Microsurgical failure in free flap surgery (usually caused by problems with surgical technique).
6. Smoking.

THANK YOU

for Listening