Principles of Skin Grafts

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Skin

**EPIDERMIS**

- No blood vessels.
- Relies on diffusion from underlying tissues.
- Stratified squamous epithelium composed primarily of keratinocytes.
- Separated from the dermis by a basement membrane.
Skin

DERMIS

- Composed of two “sub-layers”: superficial papillary & deep reticular.
- The dermis contains collagen, capillaries, elastic fibers, fibroblasts, nerve endings, etc.
Definitions

**Graft**

A skin graft is a tissue of epidermis and varying amounts of dermis that is detached from its own blood supply and placed in a new area with a new blood supply.

**Flap**

Any tissue used for reconstruction or wound closure that retains all or part of its original blood supply after the tissue has been moved to the recipient location.
Graft vs. Flap

**Graft**
Does not maintain original blood supply.

**Flap**
Maintains original blood supply.
1. **Autografts** – A tissue transferred from one part of the body to another.

2. **Homografts/Allograft** – tissue transferred from a genetically different individual of the same species.

3. **Xenografts** – a graft transferred from an individual of one species to an individual of another species.
Types of Grafts

Grafts are typically described in terms of thickness or depth.

**Split Thickness (Partial):**
Contains 100% of the epidermis and a portion of the dermis. Split thickness grafts are further classified as *thin* or *thick*.

**Full Thickness:**
Contains 100% of the epidermis and dermis.
<table>
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<tr>
<th>Type of Graft</th>
<th>Advantages</th>
<th>Disadvantages</th>
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<tr>
<td>Thin Split Thickness</td>
<td>-Best Survival</td>
<td>-Least resembles original skin.</td>
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<td>-Heals Rapidly</td>
<td>-Least resistance to trauma.</td>
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<td>-Poor Sensation</td>
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<td>-Maximal Secondary Contraction</td>
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<td>Thick Split Thickness</td>
<td>-More qualities of normal skin.</td>
<td>-Lower graft survival.</td>
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<td>-Less Contraction</td>
<td>-Slower healing.</td>
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<td>-Looks better</td>
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<td>-Fair Sensation</td>
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<tr>
<td>Full Thickness</td>
<td>-Most resembles normal skin.</td>
<td>-Poorest survival.</td>
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<td>-Minimal Secondary contraction</td>
<td>-Donor site must be closed surgically.</td>
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<td>-Resistant to trauma</td>
<td>-Donor sites are limited.</td>
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<td>-Good Sensation</td>
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<td>-Aesthetically pleasing</td>
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What factor determines the degree of primary contraction?

The amount of primary contraction is directly related to the thickness of dermis in the graft.
The Process of Take

**Phase 1 (0-48h) – Plasmatic Imbibition**
Diffusion of nutrition from the recipient bed.

**Phase 2 – Inosculation**
Vessels in graft connect with those in recipient bed.

**Phase 3 (day 3-5) – Neovascular Ingrowth**
Graft revascularized by ingrowth of new vessels into bed.
Requirements for Survival

- Bed must be well vascularized.
- The contact between graft and recipient must be fully immobile.
- Low bacterial count at the site.
Other Factors that Contribute to Graft Failure

- Systemic Factors
  - Malnutrition
  - Sepsis
  - Medical Conditions (Diabetes)
- Medications
  - Steroids
  - Antineoplastic agents
  - Vasonconstrictors (e.g. nicotine)
What are unsuitable sites for grafting?

- Bone
- Tendon
- Infected Wound
- Highly irradiated
Indications for Grafts

- Extensive wounds.
- Burns.
- Specific surgeries that may require skin grafts for healing to occur.
- Areas of prior infection with extensive skin loss.
- Cosmetic reasons in reconstructive surgeries.
Split Thickness

Used when cosmetic appearance is not a primary issue or when the size of the wound is too large to use a full thickness graft.

1. Chronic Ulcers
2. Temporary coverage
3. Correction of pigmentation disorders
4. Burns
Full Thickness

Indications for full thickness skin grafts include:

1. If adjacent tissue has premalignant or malignant lesions and precludes the use of a flap.

2. Specific locations that lend themselves well to FTSGs include the nasal tip, helical rim, forehead, eyelids, medial canthus, concha, and digits.
Donor Sites

The ideal donor site would provide skin that is identical to the skin surrounding the recipient area.

Unfortunately, skin varies dramatically from one anatomic site to another in terms of:

- Colour
- Thickness
- Hair
- Texture
Donor Site Selection

- What would be the best donor site for a graft of the cheek?

A donor site above the clavicles would provide the best color and texture match. In particular, the postauricular area is a good choice.
Harvesting Tools

- Razor Blades
- Grafting Knives (Blair, Ferris, Smith, Humbly, Goulian)
- Manual Drum Dermatomes (Padgett, Reese)
- Electric/Air Powered Dermatomes (Brown, Padgett, Hall)

Electric & Air Powered tools are most commonly used.
Padgett Dermatome
Goulian Blade