

WOUND EDUCATION

CLINICAL TRAINING MADE EASY[©]

TRAINING SESSION 5

MODULE 3

SKIN FLAPS, GRAFTS & DONOR SITES

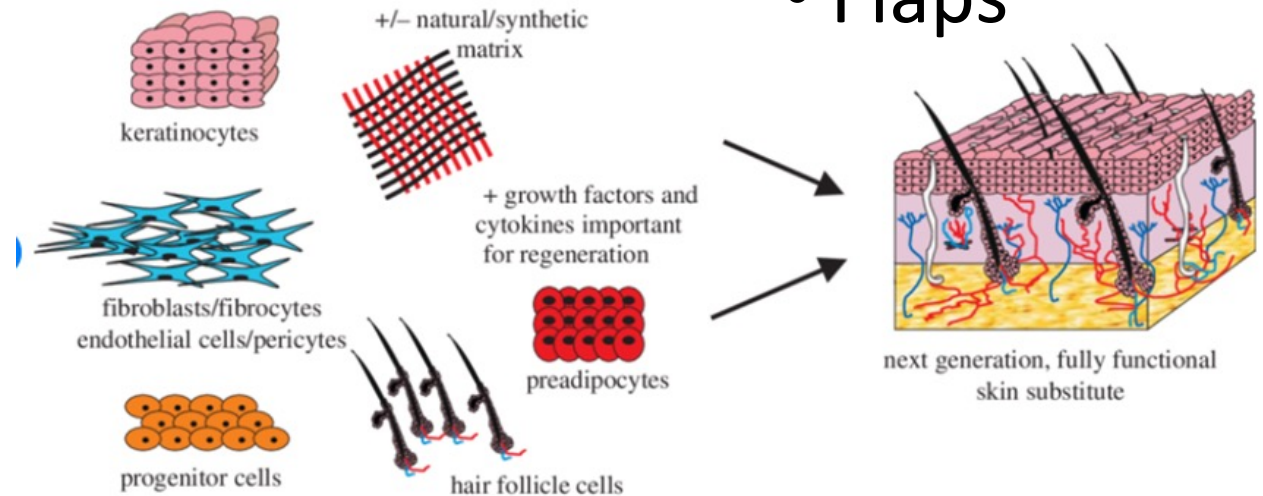
Outline

- Grafts

- Autograft
- Isograft
- Allograft
- Xenograft
- Split Thickness Skin Graft
- Full Thickness Skin Graft

- Donor Site

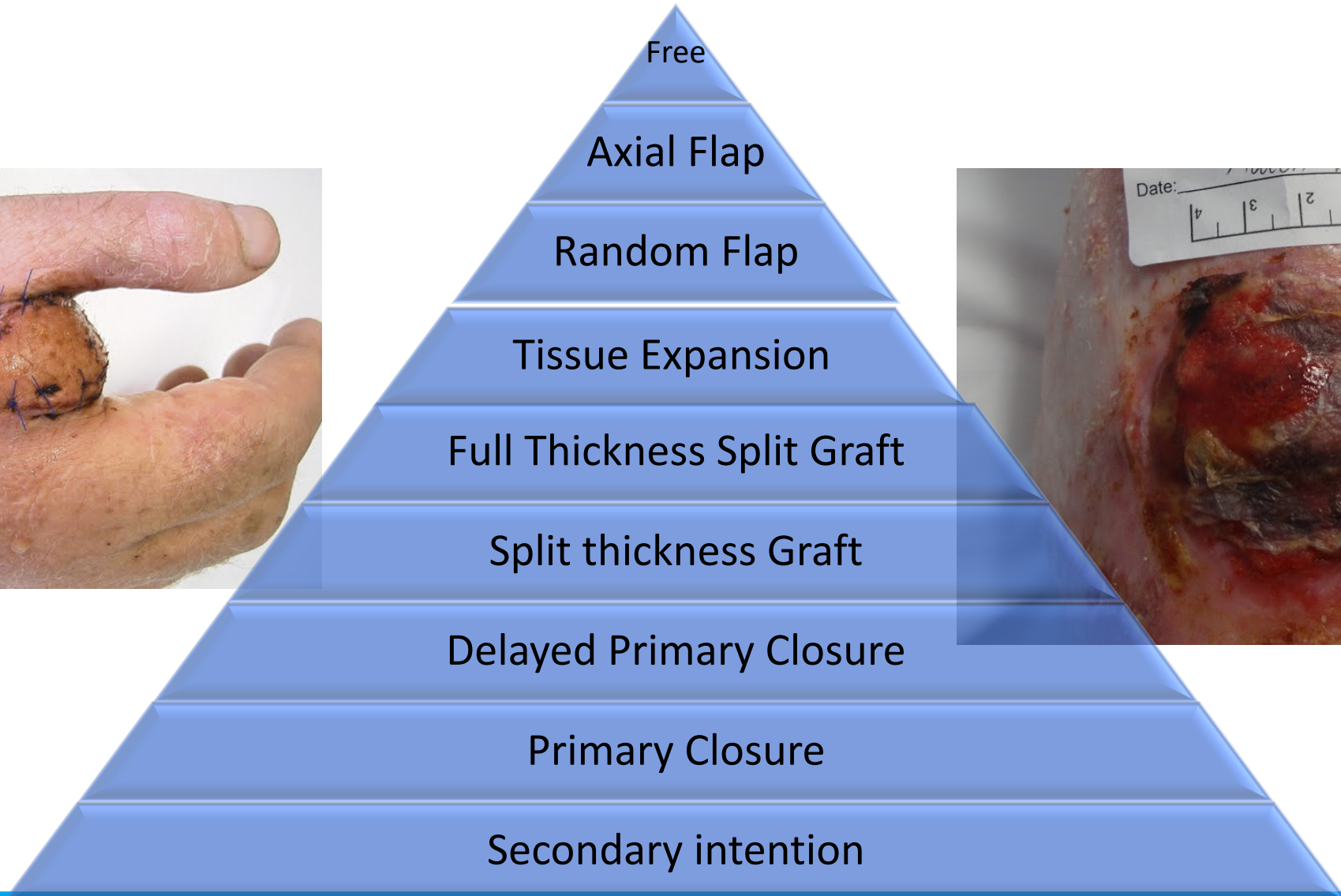
- Flaps



A schematic of the requirements to create a fully functional skin substitute.

Metcalf, Anthony & Ferguson, Mark. (2007). Tissue engineering of replacement skin: The crossroads of biomaterials, wound healing, embryonic development, stem cells and regeneration. *Journal of the Royal Society, Interface / the Royal Society*. 4. 413-37. 10.1098/rsif.2006.0179.

Reconstruction Ladder



Grafts

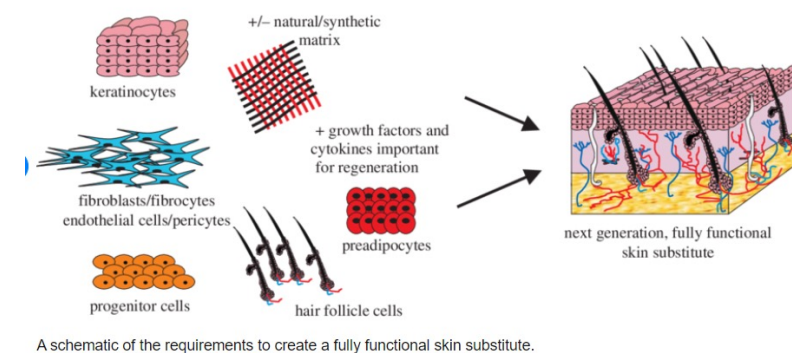
- Autograft
 - taken from 1 part of the body to a different part of the body.
- Isograft
 - graft from a genetically identical donor.
- Allograft
 - taken from another individual of the same species
- Xenograft
 - taken from a different species



<https://www.dermnetnz.org/topics/skin-grafting/>

Skin Substitutes *Wound Cover*

- Biobrane
 - Nylon mesh bonded to semipermeable silicone membrane. Barrier & protective function.
- Transcyte
 - Biobrane with neonatal fibroblasts seeded into collagen coated mesh.
- Cultured Allogenic Keratinocytes
 - Neonatal foreskin. Epidermal grafts.
- Oasis
 - Xenograft derived from porcine submucosa small intestine
 - Provides an acellular dermal scaffold. ECM
- Apligraf/Dermagraft
 - Bovine collagen gel overlayed with living neonatal fibroblasts & allogenic keratinocytes
 - stimulates ingrowth of fibrovascular tissue and reepithelization. Suitable for full thickness tissue loss.



Skin Substitutes – *Wound Closure*

- Cultured Epithelial
 - Keratinocytes grown in vitro. Spray on cells.
- Integra
 - Bovine collagen/glycosaminoglycan/silicone
 - Silicone acts as the epidermis, separates and sloughs off.
- Alloderm
 - Human cadaveric skin, epidermis removed and dermal cells extracted

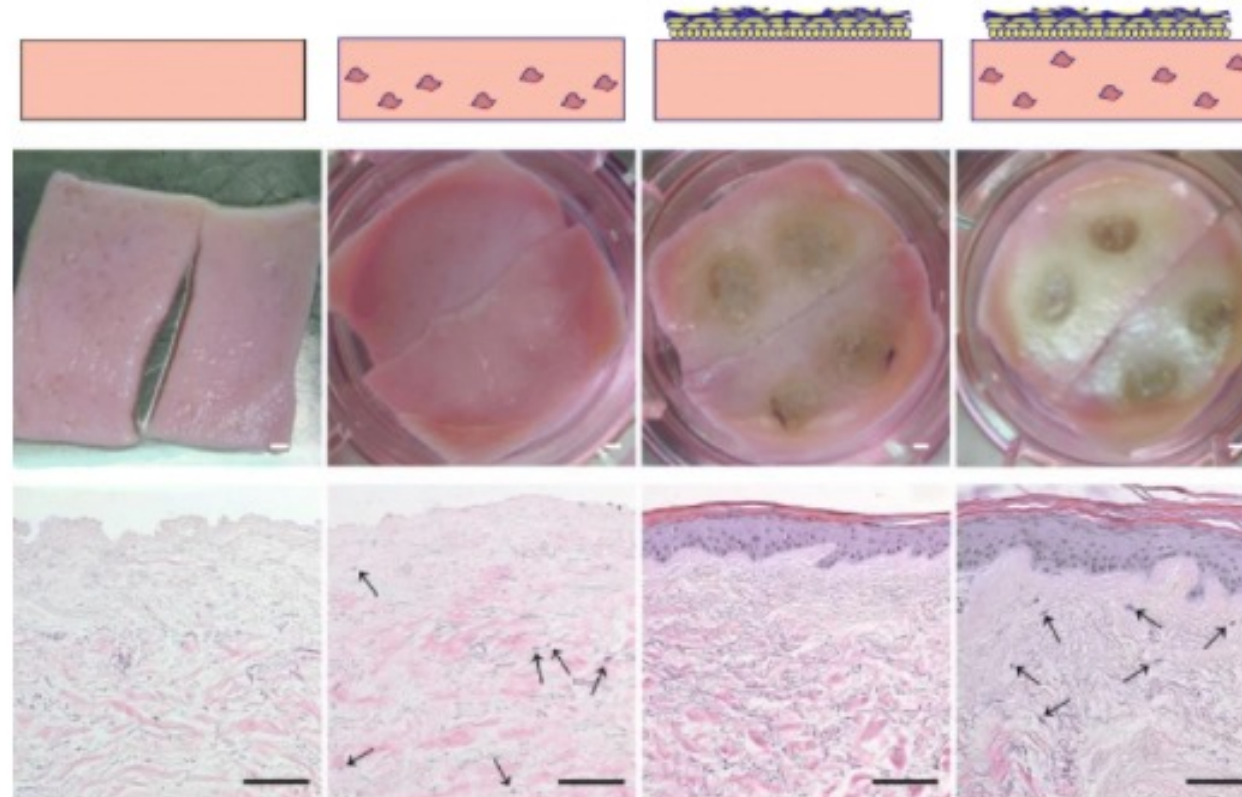


Alan J. Russell, Timothy Bertram, in Principles of Tissue Engineering (Third Edition), 2007

Skin/Dermal/Epidermal Substitute Comparisons

From: [Skin substitutes are more potent than dermal or epidermal substitutes in stimulating endothelial cell sprouting](#)

acellular donor dermis (AD) dermal substitute (DS) epidermal substitute (ES) skin substitute (SS)

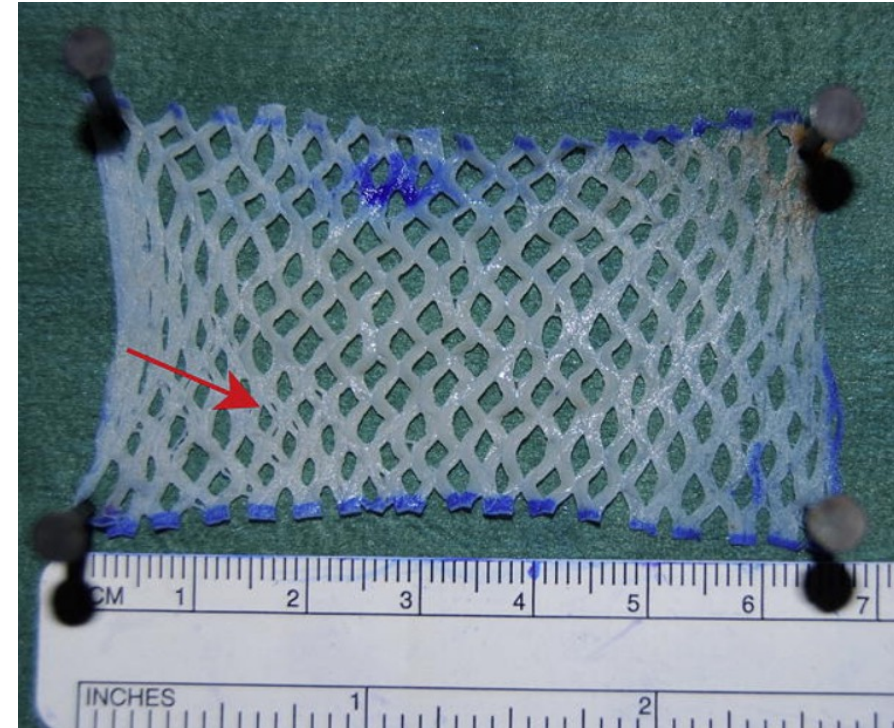


Overview of the skin substitutes. Upper panels show macroscopic view and lower panels show haematoxylin and eosin staining of tissue sections of AD, DS, ES and SS. Arrows indicate fibroblasts in the dermis. White bars represent 1000 μm and black bars 100 μm

Monsuur, H.N., Weijers, E.M., Gibbs, S. et al. Skin substitutes are more potent than dermal or epidermal substitutes in stimulating endothelial cell sprouting. BMC biomed eng 1, 18 (2019). <https://doi.org/10.1186/s42490-019-0018-8>

Split Thickness Skin Graft (STSG)

- Epidermis and a variable amount of dermis
- A dermatome shaves skin from a donor site
- Excision is a large surface area
- Often applied after excision of lesions

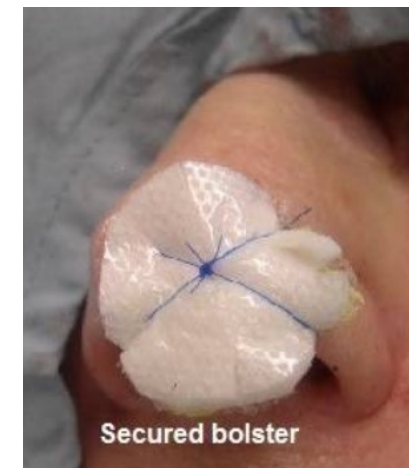
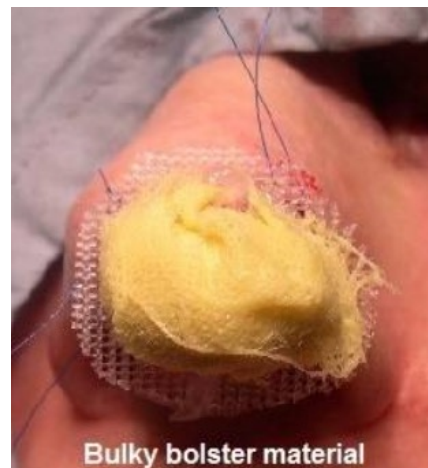


James Henderson, Reza Arya, Patrick Gillespie,
Skin graft meshing, over-meshing and cross-meshing,
International Journal of Surgery, Volume 10, Issue 9, 2012, Pages
547-550,

Burn Mesh Graft



Step by Step Procedure FTSG



Ramsey ML, Walker B, Patel BC. Full Thickness Skin Grafts. [Updated 2021 Feb 25]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2021 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK532875/>

Full Thickness Skin Graft (FTSG)

- All of the dermis as well as the epidermis
- Thick layer of skin required
- Hand or face wounds
- Donor site arm, neck or behind the ear.



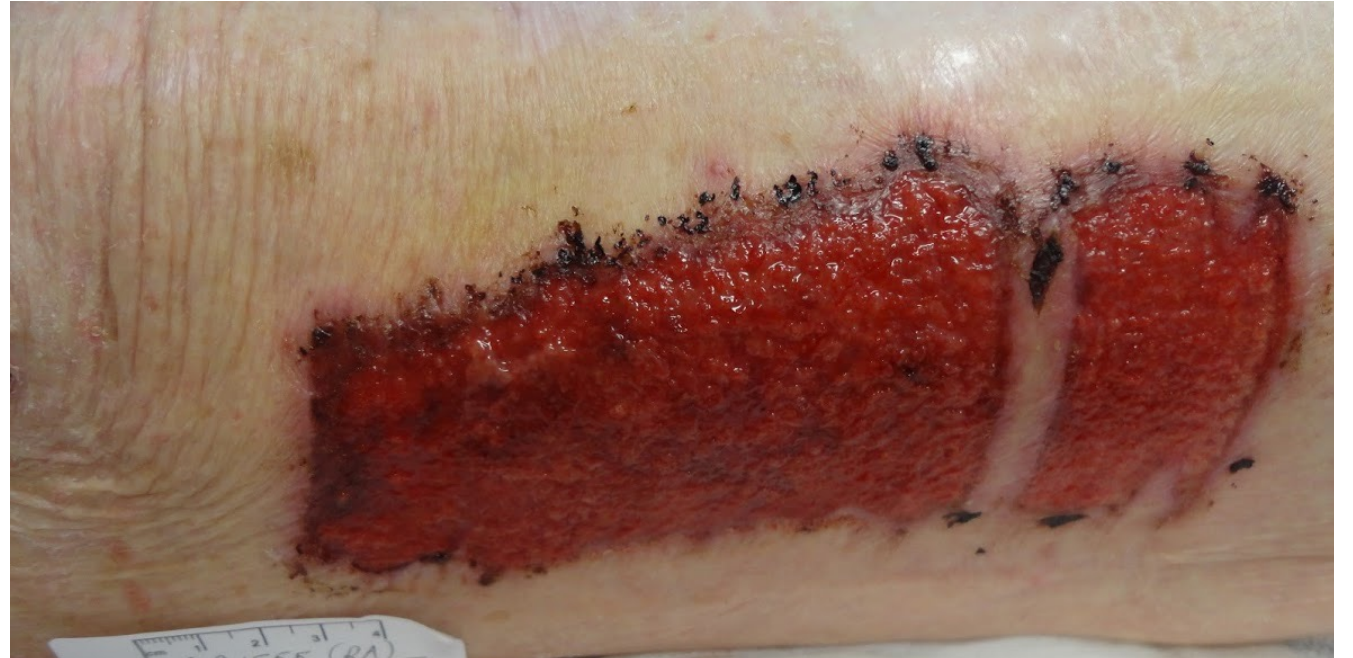
Process of Graft Take

1. Fibrin Adhesion
2. Plasmatic imbibition
ischemic phase
3. Revascularisation –
48 hours vascular network
Inosculation (connection) &
capillary ingrowth
4. Remodelling –
recipient bed & graft vessels form
open channels
blood flow & profuse graft



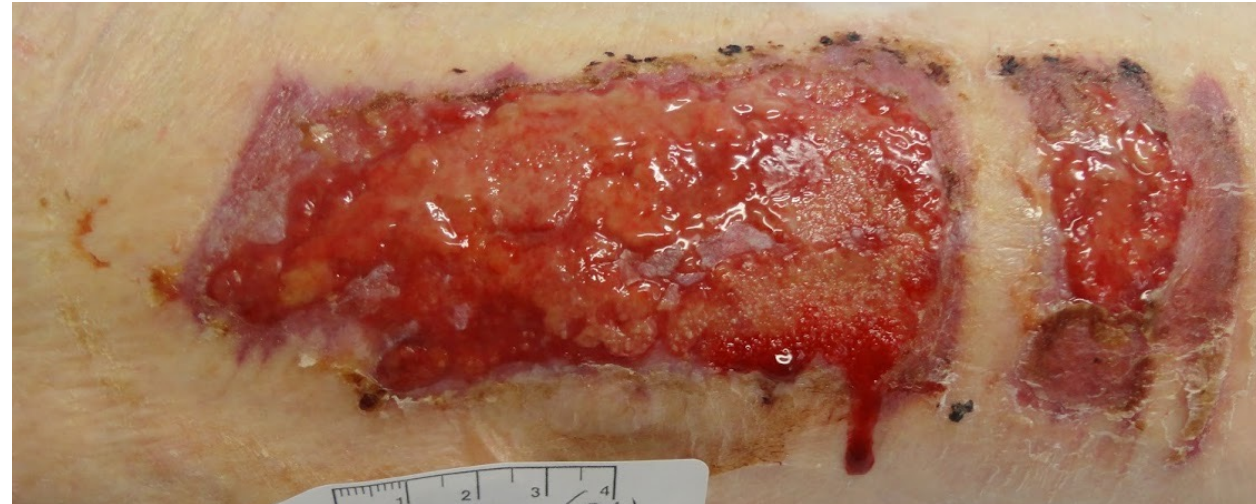
Donor Site Management

- Preparation Phase
- Wet Phase
- Dry Phase



Donor Site Complications

- Bleeding
- Pain
- Dressing trauma – adherence
- Moisture Balance
- Infection
- Scarring
- Itch



Case Study Donor Site

4th Feb 2021

9th March 2021

Surgery September 2019

90 year old lady

Issues

Pain

Itch

Non-healing

Anxiety

Provisional Diagnosis

Fungal colonisation

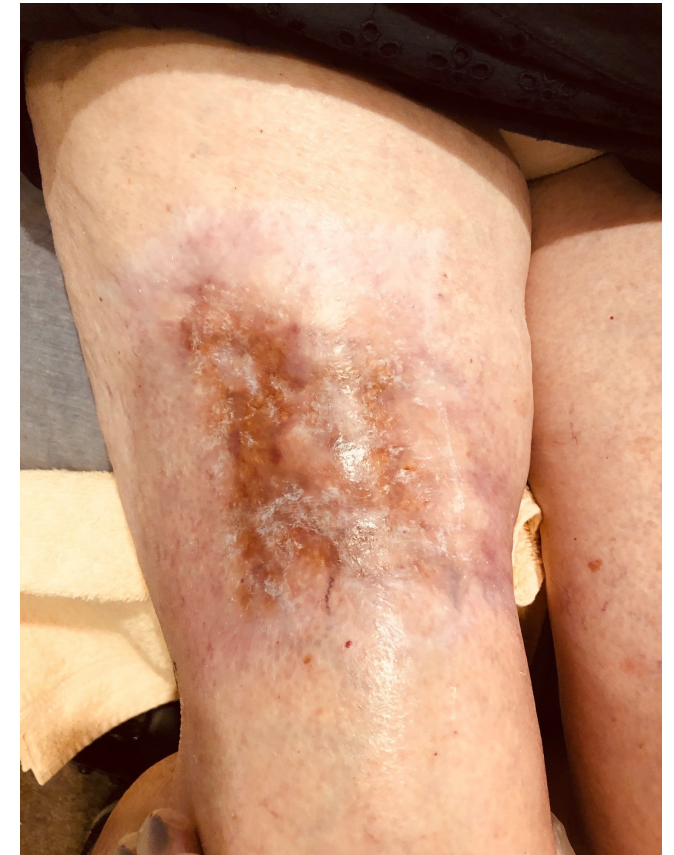
Plan

Skin hygiene

Wound cleansing

Soft debridement

Topical antifungal/steriod



Graft Failure

- Haematoma
- Infection
- Seroma
- Mobility
- Inappropriate wound bed
- Weight bearing
- Arterial compromise
- Venous hypertension
- Lymphatic stasis
- Surgical technique, upside-down



Skin Flaps

- A portion of tissue repositioned with original blood supply maintained.



<https://www.slideshare.net/drpouriamoradi/nsw-plasticnurses>

When is a skin flap the preferred procedure?

- Own blood supply
- Full thickness
- Muscle can be transferred.

Key Points

- Donor site and graft site preparation to improve outcome
- Managing the risks to avoid graft failure
- Understand how a graft “takes” and increasing the adhesion and perfusion
- Wound assessment & changing wound care accordingly
- Patient education pre/intra/post & long term