

Tissue expansion in the scalp summary

Background

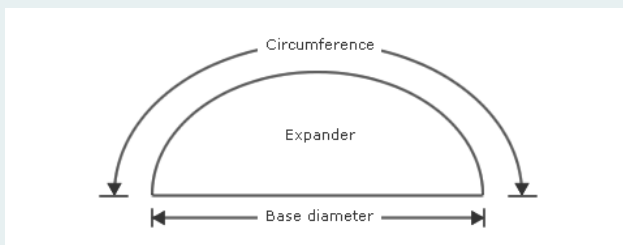
May be used to reconstruct defects covering up to 50% of the scalp. It recruits and expands hair-bearing skin, which can then be moved to adjacent areas of alopecia using modified flap designs.



A tissue expander and filling port. Reproduced with permission from Wellcome Images.

Mechanism

Mechanical creep (70% of tissue gain is due to stretch): when skin is under acute stretch forces. Collagen fibres realign and elastic fibres develop microscopic fractures, causing adjacent tissue to expand into the field.



Biological creep (30% of tissue gain is due to growth): cells in the skin are stretched, disrupting gap junctions and promoting cell proliferation to restore resting tension of the stretched tissue to baseline. The maximal effects seen at 6-12 weeks.

Stress relaxation: the force required to stretch the skin to a given length will decrease over time.

Indications

- **Congenital:** e.g. large congenital melanocytic naevus, congenital alopecia.
- **Trauma:** e.g. burn scarring, scalping injury requiring skin graft.
- **Neoplasia:** e.g. reconstruction following excision of skin tumour.
- Male pattern baldness.



Insertion

Incision:

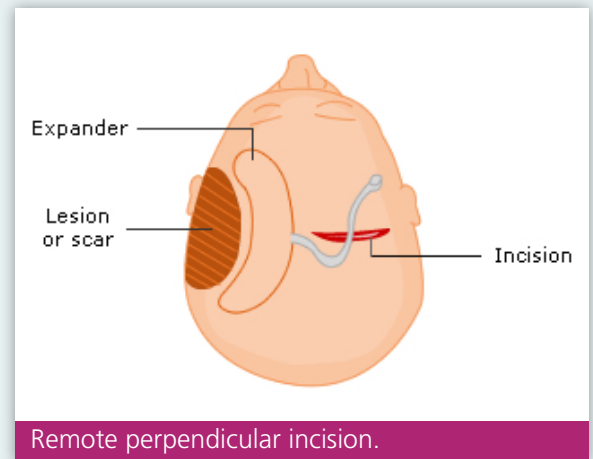
- local or remote
- Perpendicular (common), V or W-shaped described.

Pocket Dissections:

- subgaleal plane
- +/- smaller pocket for placement of remote filling port.

Expansion process:

- at time of placement(s), usually approx. 10-20% with saline
- expansion usually starts within 2 weeks slowly (often no more than 5-10 ml) and be repeated often (e.g. weekly or twice weekly)
- usually takes approx 6-12 weeks to achieve sufficient expansion



Remote perpendicular incision.

Complications

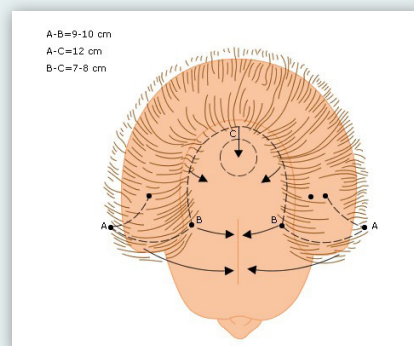
Site-specific complications:

- Temporary skull deformation - more likely in children, whose skulls are more deformable.
- Thinning of expanded hair - almost inevitable due to hair follicles becoming more widely separated during expansion.
- Future exposure of scars - important consideration in young males if they become bald and this must be included in preoperative counselling.

General complications:

- Major: infection, haematoma, implant extrusion and flap necrosis.
- Minor: transient pain following expansion, seroma development and adverse psychological reactions.

Bilateral advancement transposition (BAT) flap for male pattern baldness



Expander bilateral advancement transposition flap. The arrows show the direction of flap mobilisation.

