



Allograft in Burn Management

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Allograft or cadaver skin is harvested from recently deceased human donors, usually in conjunction with other tissue or organ harvest. Once harvested, rigorous testing is performed to ensure that the graft tissue is free of potential infective pathogens. It is then either preserved in glycerol (as in South Africa) or cryopreserved for future use. The low metabolic rate of adequately preserved human skin allows it to remain viable during this time. When required, the tissue is thawed and washed for use, usually in the setting of large burn injuries.

Once applied and adequately secured to a wound, the tissue will derive nutrients and blood supply from the host bed, allowing it to survive and incorporate into the host via the same process as with autografts (using the patient's own skin). Immunological incompatibility with the host means that the tissue will eventually be rejected, but in the interim, it will function as an autograft would. This assists in stabilizing the patient in preparation for future reconstructive procedures.

There uses of allograft in burn victims are numerous:

- 1. Temporary wound coverage after eschar excision and wound bed preparation:** In this setting, the allograft is removed, usually after about one week, and the wound is autografted. If adequately incorporated, removal of the allograft reveals a vascular wound bed, ideal for autografting.
- 2. Testing of the adequacy of a wound bed for autografting:** In some situations, it may be difficult to decide whether a wound bed is adequately debrided or vascularized to accept an autograft. Allografting the wound allows one to test the adequacy of the wound bed. If the allograft takes, then autograft is likely to take. Similarly, allografting also allows the surgeon to determine if a patient is adequately nutritionally resuscitated and physiologically stable for an autograft to take.
- 3. Coverage of widely meshed autograft or Meek autograft:** Meshing the autograft cuts it into a net-like configuration, while the Meek technique produces tiny autograft squares equidistantly dispersed on a carrier sheet. Both these methods allow autograft (of limited supply) to cover a larger surface area. In these instances, the interstices between the graft edges take time to epithelialize. Cadaver skin placed on top of the autograft, the so called sandwich technique, projects the remaining exposed wound bed and provides the ideal environment for the epithelialization of the residual wound from the autograft edges. Although other biological and biosynthetic skin substitutes have been successfully used as a sandwich technique, allograft is far superior.
- 4. Dermal replacement in deep burns:** The epidermal component of skin is much more immunogenic than the dermal component. The epidermis of allograft gradually rejects, but the dermis may survive indefinitely, the so call Cuono effect. This residual dermis can then be covered

with cultured epithelial autograft (CEA) to achieve a stable reconstruction. CEA sheets are grown over two-to-three weeks in a laboratory from a sample of the patients own skin. These sheets will not reject as they are immunologically compatible to the host. CEA on its own is a poor reconstructive option as it is very unstable and prone to shearing and scarring, but works well when combined with allograft dermis. CEA is very expensive to produce and is not currently available in South Africa.

Allograft is in short supply in South Africa, mostly due to the reluctance of family members to donate tissues from their deceased loved ones. Cultural, religious and personal reasons all contribute to this reluctance, as do misconceptions regarding the harvesting process. Family members fear that skin harvesting will disfigure the body. Cadaver skin is harvested from the posterior surfaces of the donor, and these donor sites are hidden when the body is displayed in an open casket. The face is left untouched by the harvesting process. Another common misconception is that there has to be a colour match between the donor and recipient. This is untrue as all the pigment containing tissue rejects and leave no evidence of the donor's skin tone.

Due to the current shortage of donor skin, most allograft is prioritized for the management of severely burnt children. Donor skin from one adult may be sufficient to save the lives of two-to-three children. There are numerous other biological, synthetic, and mixed (bio-synthetic) skin substitutes available, but all are inferior to cadaver skin. With sufficient donations, severely burnt adults may also benefit from skin allografting.

Those interested in donating their organs or tissues can register with the organ donor foundation either online at odf.org.za, or by calling the toll-free number 0800 226611. It is crucial that your intent to donate tissues is discussed with your family members, as South African law will not allow tissue donation without familial consent, regardless of your registration as a donor.