

# TOP TIPS FOR SKIN GRAFT AND DONOR SITE MANAGEMENT

Although skin grafting has been associated with plastic surgery and specialist nursing historically, the procedure and postoperative management is not exclusive to the specialty and has been adopted by all fields dealing with skin defects. With the wider use of the technique and patients presenting to hospital and community-based settings for wound reviews, it is important for nurses in all areas to become familiar with the management of skin grafts and donor sites. This article provides the ten top tips in the management of each of these two wound types.

**S**kin grafting is a method that is used to close defects that cannot be closed directly (Thorne, 2007). This will include grafting wounds following debridement of traumatic or infected wounds, elective removal of skin lesions, and coverage of muscle flaps or their donor sites. A skin graft consists of the epidermis and varying depths of the dermis. It is the thickness of the dermis in the skin graft that constitutes its thickness, ranging from a split-thickness graft where all the epidermis and varying depths of the dermis are removed to a full-thickness graft that includes all the dermis (McGregor and McGregor, 2000). Patients undergoing skin grafting procedures will require wound management of both the actual skin graft and the donor site from where it has been removed. These wounds present very different challenges (Beldon, 2007).

## **Skin grafts**

The adherence of the skin graft to the recipient site is referred to as the 'take' of a skin graft (McGregor and McGregor 2000; Mathes, 2006), and relies on the uptake of a new blood supply from that area. The

physiological process outlined in *Figure 1* involves early skin graft nourishment by diffusion from the recipient site until revascularisation has occurred at 5–10 days, depending on the thickness of the skin graft (Mathes, 2006).

Irrespective of the type of graft or how it is applied, successful take needs a well-vascularised bed, close continuous contact between the graft and recipient site, and the absence of infection (McGregor and McGregor, 2000). The initial focus of the management of this type of wound is, therefore, on facilitating this process (Mathes, 2006). After approximately a week, any part of the graft that has not taken can be managed in line with the principles of wound bed preparation (European Wound Management Association, 2004).

## **Ten top tips for skin graft management**

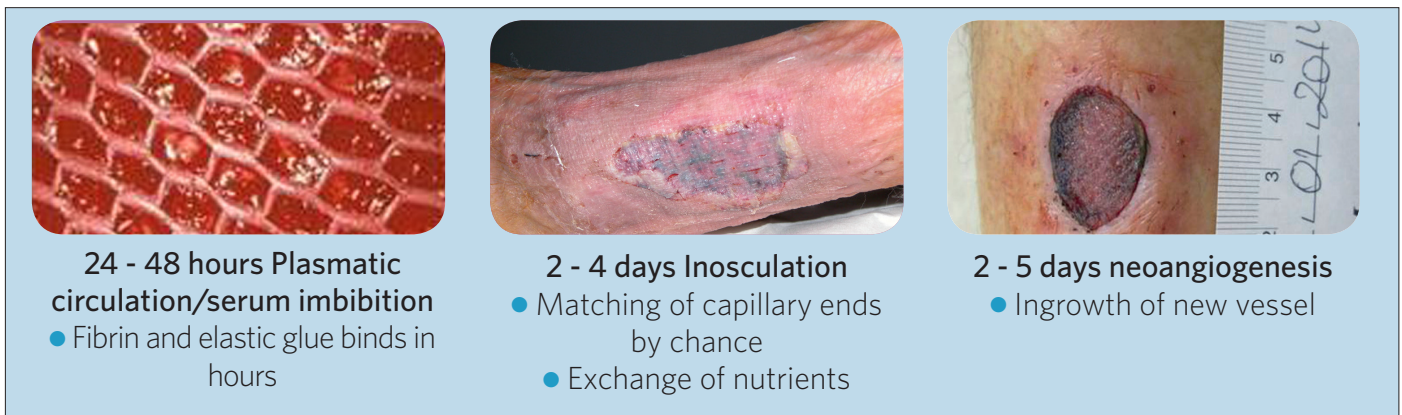
### **1 CONSIDER EARLY INSPECTION**

Although it is ideal to leave the graft undisturbed for the first 5 days to optimise graft 'take', if clinically

*“Patients undergoing skin grafting procedures will require wound management of both the actual skin graft and the donor site.”*

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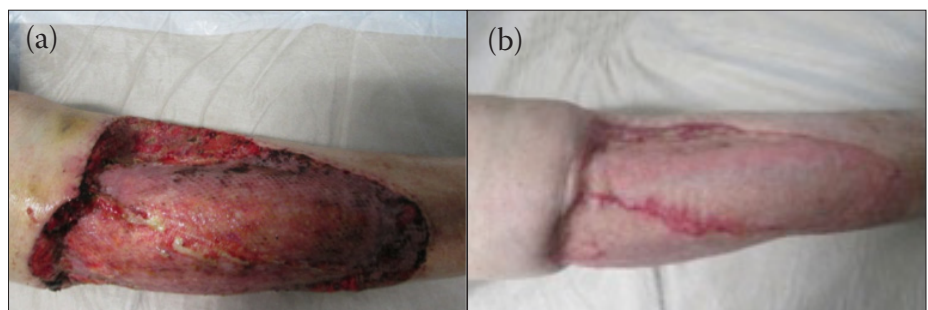
indicated inspection should occur before that. If bleeding occurs under the graft, the collection of fluid will prevent capillary link up and graft failure is inevitable (Mathes, 2006). This also applies to a seroma, which is a collection of serous fluid under the graft. The clinician should aspirate blood/seroma with a green needle and a 2 ml syringe by gently inserting the needle to pierce the skin graft, but not as far as the recipient bed. As the fluid is aspirated so the skin should lay back down in contact with the recipient bed. If the collection has formed a solid haematoma it is advisable to cut the skin to permit access to and manual removal of the haematoma. Once removed you can re-lay the skin against the recipient bed so that the potential for blood supply development is resumed.

Always inspect and assess a graft where there are clinical signs of infection. Just treating the patient with antibiotics without removing the dressing does not optimise management. Dressings soaked with purulent exudate will harbour pathogens and macerate a graft, so they need to be replaced in order to rescue it.

## 2 OPTIMISE GRAFT ADHERENCE

Take steps to reduce swelling with elevation, reduce mobility in areas where movement might disturb the graft, and ensure good fixation of the

**Figure 1.** The process of skin graft 'take.'



**Figure 2.** Maturation of a skin graft over time: (a) meshed split-thickness skin graft 1 week after application and (b) at 4 weeks after application.



**Figure 3.** (a) In undulated grafts with crevices, (b) the secondary dressing should be in contact with the entire wound surface, which can be achieved by fluffing or balling the gauze rather than laying it in sheets.

dressing to prevent shearing of the graft away from the newly-developing blood supply. Always use good secure bandages for grafted limbs from joint to joint. Careful handling can reduce graft disturbance. This should be achieved by soaking dressings and carefully removing them while firmly supporting the skin with a gloved finger beneath the dressing. The key is adopting a technique that removes the dressing from the graft without lifting the graft from the recipient site.

## 3 EXPECT GRAFT 'TAKE' TO EVOLVE AFTER THE FIRST INSPECTION

Great emphasis is placed on the 'take', but this is at best an estimate and may change at subsequent dressing changes because the timing that the final revascularisation occurs is variable (Mathes, 2006). Prepare the patient for this to avoid disappointment if some of the graft lifts after that first assessment. Even in situations where the graft

**Table 1. Primary dressing options in patients following a skin graft.**

Dressing type	When it should be used
Antimicrobial	Use if critical colonisation or infection is suspected
Foam	Foams are useful for small and indented grafts. They can be cut to size, with a second piece placed on top to provide a firm nonadherent dressing
Hydrocolloid	Hydrocolloids can be useful but only when grafts are very stable. They are useful on areas where fixation can be difficult, such as the face and ears
Paraffin gauze	An option for large grafts; should be changed every 24–48 hours
Silicone	For low-exuding skin grafts intact for at least 5 days.

viable graft or areas where the graft has not adhered.

Primary dressing options are outlined in *Table 1*. Alginate and hydrofibre dressings should be avoided in the first week, as the gel formation of the dressing on any adhered graft has the potential to macerate it. Antimicrobial dressings are useful if there may be critical colonisation or infection of a graft. In these cases, topical treatment should be considered promptly. Foams are useful for small and indented grafts. They can be cut to size, with a second piece placed on top to provide a firm nonadherent dressing.

Although its use is strongly discouraged by some (Edwards, 2007), paraffin gauze can be the preferable and more practical option for large grafts. If this type of dressing is used, however, it requires changing at 24- to 48-hour intervals as the paraffin will be absorbed, with the potential that the remaining gauze will stick to the wound. It has the benefit of being a cheap medication carrier if creams are used.

For low-exuding skin grafts that have been intact for at least 5 days, silicone dressings are a useful low-adherent option. Silicone dressings should be avoided if the graft is meshed or highly exuding because exudate can get trapped under the dressing, causing maceration.

does not appear to have adhered, epithelial cells may have attached to the wound bed and can be seen as developing islands of epithelium throughout the wound on subsequent reviews. Even with complete graft loss, it is usually possible to manage the wound with dressings and leave it to heal by secondary intention without the need to re-graft the site.

**4 PREPARE YOUR PATIENT FOR WHAT THEY WILL SEE**

Skin grafts do not mirror the surrounding skin and patients need to be prepared for this (Fowler and Dempsey, 1998). There is no need to rush the patient to look at the wound in the first few weeks, as its appearance will change significantly

over that period. Be aware, however, that irrespective of when the patient first looks at the wound, it will have an impact. Patients can be reassured that as the graft matures, the colours settle and the area contracts (*Figure 2a and 2b*).

**5 WHAT TO APPLY ON THE GRAFT AFTER THE FIRST DRESSING CHANGE WILL DEPEND ON THE GRAFT ITSELF**

Primary and secondary dressing selection is dependent on the stability of the graft, the amount of exudate and the presence of infection. The priority remains on continuing adherence and ongoing vascularisation of the graft while simultaneously catering for a non-



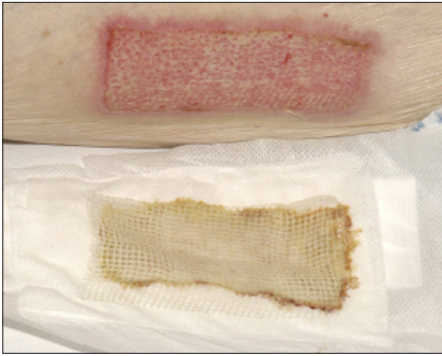
**Figure 4.** Cut foam to the size of a concave defect and apply it in layers.



**Figure 5.** Excess, overlapped dry skin needs to be trimmed.



**Figure 6.** Loose skin and debris should be lifted with tweezers.



**Figure 7.** Paraffin gauze dressing after 1 week with no evidence of re-epithelialisation.

Topical negative pressure is only useful for the initial splinting of a newly-applied skin graft (Schneider et al, 1998) and on a continuous setting. Continuous setting on the topical negative pressure device should be used if the system has one as opposed to intermittent setting where the changes in the application of negative pressure would fail to splint the graft and result in movement of the skin graft from the recipient bed, thus interfering with the process of graft take.

Early inspection is advised in skin grafts where a topical negative pressure has been applied and there is a loss of seal and, therefore, loss of suction. The advice is to remove and not reseal dressings in such instances, as the reapplication of suction may dislodge the graft. Application after the initial dressing is not advised because in the author's experience it causes maceration and graft loss.

## 6 THE SECONDARY DRESSING IS IMPORTANT

Secondary dressings hold the graft in place and soak up the exudate that transfers through the primary dressing. Undulated grafts with crevices need the secondary dressing to come into contact with the whole surface of the wound bed. This can be achieved by using gauze and fluffing it (Mathes, 2006),



**Figure 8.** Use adhesive tapes over a donor site dressing to prevent slippage once patients are mobile.

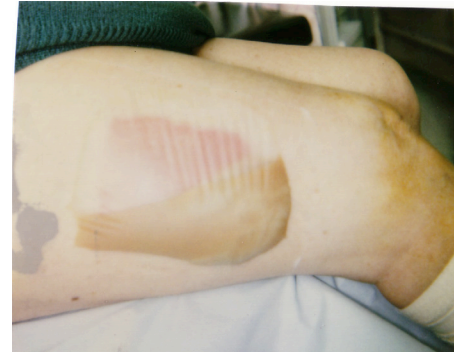
(Figure 3a and 3b), as opposed to laying it in flat sheets. These balls of gauze should be applied over the primary dressing. In concave wounds that have a flat surface at the base, using a foam dressing cut to the size of the defect with subsequent layers on top can be a useful way to apply pressure to the area (Figure 4).

## 7 GOOD FIXATION IS IMPORTANT

All dressings must be well secured to prevent the primary and secondary dressings from slipping. Bandage limbs joint to joint, and if clinically appropriate consider compression bandages for lower limbs. When using adhesives, ensure they are adequate to secure the dressing. With the patient's consent, remove hair when using adhesives because poor fixation will cause friction and graft loss.

## 8 REMOVE DEBRIS AFTER A WEEK

Debris that should be removed at this time includes staples or stitches, including dissolvable ones used to anchor the graft, as they no longer have a role (Beldon, 2007). In addition to this, excess skin beyond the recipient bed that has dried (Figure 5) needs to be removed by lifting with tweezers and cutting along the edge. Within the graft there will be loose skin and debris that will lift spontaneously



**Figure 9.** Avoid the use of films as secondary dressings until the volume of exudate has reduced.

with moisturising or can be gently removed with tweezers (Figure 6).

## 9 APPLY THE PRINCIPLES OF WOUND BED PREPARATION

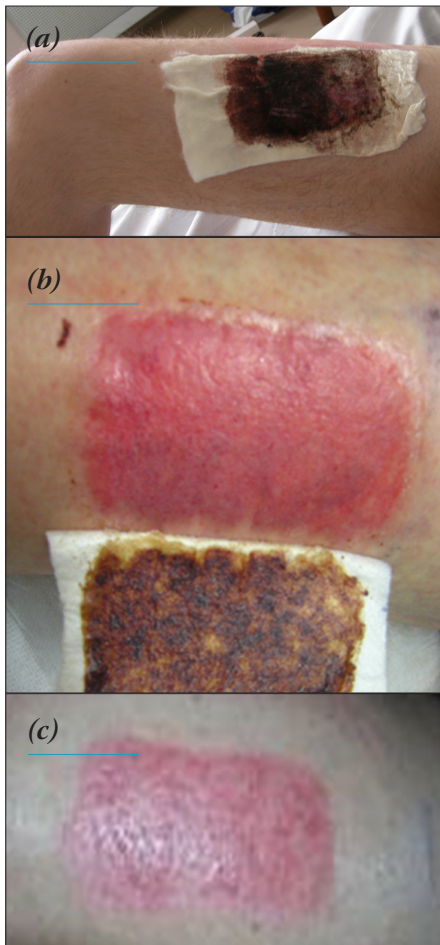
In grafted wounds where take of skin is less than 100%, the aims of care focus on facilitating healing in the areas where the graft take has not been successful and promoting maturation of the skin graft that has adhered. Areas of adhered graft are managed as newly-epithelialised tissue and action should be taken to protect them from maceration (European Wound Management Association, 2004). Simultaneously, techniques should be employed to debride non-viable tissue (Chadwick et al, 2013) and encourage the re-epithelialisation of any raw areas.

## 10 PATIENT EDUCATION IS IMPORTANT

Patient education needs to focus



**Figure 10.** The application of a film over dry alginate increases moisture and facilitates spontaneous separation of the alginate from the wound.



**Figure 11.** (a) A dry blood-soaked alginate had film applied for 1 week, leading to separation (b) and good healing (c).



**Figure 12.** Management of over-grafted donor sites should be the same as for other donor sites.



**Figure 13.** Newly-healed and fragile donor sites need to be protected.

on the vulnerability of the newly-healed graft. Protection depends on the part of the body affected, so dressings may be needed in certain areas even once the wound has healed until such time as it is less fragile.

### **Management of full-thickness donor sites**

The donor sites for full-thickness skin grafts are directly closed and are managed in the same way as any other surgical wound healing by primary intention. Split-thickness skin graft donor sites heal by secondary intention, where re-epithelialisation occurs from the edges and via the epidermal appendages left in the remaining layers of dermis (McGregor and McGregor, 2000). Consequently, the more of the dermis that is removed, the longer the healing time. The expected healing trajectory will range from 7 to 21 days, depending on the thickness of the graft taken (Mathes, 2006) and patient factors that impact on healing, together with how the wound is managed (McGregor and McGregor, 2000).

The author continues to witness documented recommendations to leave donor sites intact for 2 weeks, which has been accepted practice, historically (Coull, 1991). However, the challenges presented by this wound mean that this is not a practical or appropriate recommendation to be universally applied. High exudate and the management of pain are priorities (Beldon, 2007; Edwards, 2007). Dressings need to be firmly secured to avoid slippage and trauma to the wound. In clinical practice, therefore, dressings applied to the donor site may require earlier intervention/redressing in response to the clinical needs and nurses need to act on this. Subsequent management is of an itchy wound that is drying out. It will have fragile skin that needs protecting

and moisturising (McGregor and McGregor, 2000).

### **Top tips for split-thickness donor site management**

#### **1 THERE IS NO IDEAL DRESSING FOR THE DURATION OF HEALING**

A variety of recommended dressing regimens have been reported (Hornbrey et al, 2003; Edwards, 2007; Terrill et al 2007; Voineskos et al, 2009), and nurses may experience a variety of combinations in practice. Alginates have improved the management of this type of wound (McGregor and McGregor, 2000). From experience, in the immediate postoperative period the author recommends an alginate or hydrofiber, with or without some gauze, all held in place with adhesive, such as Hypafix® (Smith & Nephew) or Mefix® (Mölnlycke Health Care) tape. After the first few days, simple re-padding once, with gauze placed over this dressing, can be acceptable and does not disturb the primary dressing. This should only occur, however, if there are no clinical indications to inspect the wound sooner, such as dressing slippage, high levels of exudate or signs of infection.

Although routinely used in the past, paraffin gauze should not be used for donor site management (Storch and Rice, 2005). The reasons for this are that it becomes hard and adherent, and removal is painful and traumatic (McGregor and McGregor, 2000), or the wound fails to re-epithelialise (Figure 7). It can, however, be used as a medication carrier if topical steroids or antimicrobial creams are used at any stage where the frequency of dressing change is daily.

#### **2 PREPARE PATIENTS FOR WHAT TO EXPECT FROM THE DONOR SITE**

Patients need to be made aware that the wound can be painful and measures must be taken to

address this, with analgesics and secure fixation of the dressing. The potential for dressings to become wet with a slight odour needs to be explained (Fowler and Dempsey, 1998), and advice provided to patients discharged from hospital on what action needs to be taken should this occur.

### 3 USE THE CORRECT FIXATION AT THE RIGHT TIME

Avoid bandages in dressing fixation on a thigh donor site as the thighs are funnel-shaped and do not lend themselves to circumferential bandaging. If bandages are applied intra-operatively, they will start slipping once the patient starts to mobilise. Removing these bandages and re-securing the dressing with adhesive tapes, such as Mefix or Hypafix, if possible (Figure 8), can prevent the slippage caused by heavy dressings and gravity once the patient is mobile. Films should be avoided as a means of fixation in the first week as exudate levels are too high (Figure 9).

### 4 INSPECT LAYERS OF DRESSINGS BEFORE AUTOMATICALLY RE-PADDING

The outer layers of the dressing can become stained and re-padding is acceptable in the first 24 hours. After this time, however, further strikethrough needs to be investigated as exudate trapped against the wound bed may prevent re-epithelialisation and optimise the environment for bacteria (Wounds UK, 2013a). A balance needs to be struck between leaving dressings intact and ensuring that moisture levels are managed appropriately. Careful removal of each layer allows the inspection of every level of dressing, which if dry can be left intact and re-padded. If a secondary dressing is wet, this indicates that the primary dressing has reached its optimum saturation point and needs replacing.

### 5 DO NOT PULL OR SOAK OFF DRIED ALGINATE OR HYDROFIBER PRODUCTS

If alginates or hydrofiber products have been used as primary dressings and have dried out, it is less traumatic to apply a film to help increase moisture levels to facilitate spontaneous separation than it is to soak the dressing off (Figure 10).

The only time one would soak off dry alginate or hydrofiber is if the wound has become infected and needs all of the dressings to be removed and replaced. If this is not the case, it is best to let it separate in its own time. A dried, bloody soaked dressing can also be managed in this way by trimming the edges of the alginate and applying a film to promote separation (Figure 11).

### 6 BE AWARE THAT SOME DONOR SITES MAY BE OVER-GRAFTED

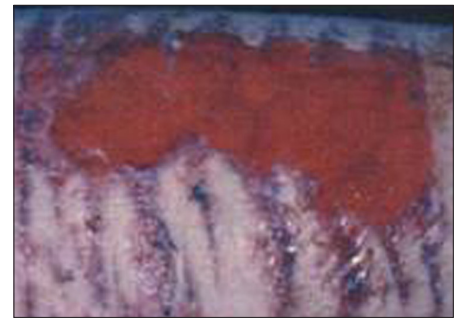
If the surgeon has extra skin once the recipient site is covered, it may be applied on top of the original donor site (Figure 12). Manage over-grafted donor sites primarily as a donor site to promote re-epithelialisation throughout the wound.

### 7 FRAGILE DONOR SITES NEED PROTECTION

Some newly-healed donor sites (Figure 13), need to be protected by dressings for an extended period. Simple regimens involving the application of liquid paraffin in soft paraffin moisturiser with a low-adherent dressing, gauze and tape can be used for as long as there is concern the wound may break down.

### 8 MANAGE THE BIOBURDEN

Signs of elevated bioburden in the wound, such as non-healing, an unhealthy wound bed (Figure 14) and odour (Wounds UK, 2013b) should be treated with topical antimicrobials (Fowler and Dempsey,



**Figure 14.** Unhealthy donor wound beds such as this one should be treated with topical antimicrobials.



**Figure 15.** Increased bioburden may affect parts of a wound.



**Figure 16.** Treat over-granulation in a donor site promptly.



**Figure 17.** Hyperkeratosis in a donor site due to poor moisturisation.

1998). Increased bioburden may be problematic in the entire wound or just in part(s) of the wound (Figure 15).

Failure to treat this promptly will at worst lead to infection and at best result in an extended inflammatory phase in a non-healing donor site. It is the author's opinion that if healing is not almost complete at 3 weeks that a referral is made to a plastic surgery clinical nurse specialist or a tissue viability nurse, depending on local resource availability.

## 9 TREAT OVER-GRANULATION PROMPTLY

In instances where there is over-granulation of the wound (Figure 16), topical steroid cream/ointment with a low-adherent dressing may facilitate re-epithelialisation.

## 10 MOISTURISE

Once healed, donor sites need regular moisturising to improve integrity or they will develop hyperkeratosis (Figure 17) with the potential for wound breakdown. Maturation of the scar will continue as with any wound and the patient must be educated in aftercare (Fowler and Dempsey, 1998), including normal cleansing, moisturising and protection. Patients can be reassured that the colour will change over time.

### Summary

This paper outlines tips in the management of skin grafts and donor sites that the author hopes will assist healthcare professionals dealing with these wounds. It highlights the importance of having

knowledge of the physiology of 'take' and wound healing to direct nursing management to optimise outcomes. Patient support and education is essential in preparation for what to expect, as well as the ongoing care of the maturing scars. **WE**

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