Burns Injury & Rehabilitation
Information for Physiotherapists

Exceptional healthcare, personally delivered
The aim of this leaflet is to provide therapists with information on burns and rehabilitation.

**What is a burn and how are they classified?**

A burn may be classified as:

- Superficial
- Partial thickness
- Deep dermal
- Full thickness

Superficial and partial thickness burns affect the epidermal layer of the skin. They may look red and be very painful but normally heal within two weeks. Patients may not wish to move their effected joints through full range of motion and as a result can be prone to loss of movement due to joint stiffness, loss of soft tissue length and muscle strength.

Deep dermal burns affect the epidermis and dermis. The deeper the burn, the less likely the burn will heal in a reasonable length of time, conservatively. Patients may also be at risk of developing hypertrophic scarring if they take longer than three weeks to heal.

Full thickness burns affect the epidermis, dermis and may even be down to fat and bone. The burn may look black or white. There will be loss of structures such as sebaceous glands and hair follicles. In more superficial injuries, cells from the base of these structures migrate upwards and across the wound bed to close the wound. In full thickness burns (and some deep dermal burns) these structures may have been burned away. If the
wound is left to heal by itself, it may take a long time as healing can only occur from the outside edges in. After healing, the patient is also at an increased risk of developing hypertrophic scarring. This is commonly seen in injuries that take longer than three weeks to heal or require surgical intervention in the form of skin grafts.

**What surgical Interventions are used to manage deep burns?**

**Debridement**

Debridement is the removal of a patient’s dead, damaged or infected tissue to improve the healing potential of the remaining healthy tissue.

**Biobrane**

This is a bio-synthetic dressing comprising of silicone, a nylon mesh and collagen (derived from pigs). It is commonly used to manage superficial burns such as scalds. Biobrane dressings adhere to the burn wound and gradually lift as the patient’s skin heals underneath. The dressing helps to reduce pain as the nerve endings are sealed off from the environment.

**Split Skin Grafts (SSG)**

A SSG is a skin graft taken from the patients own body. The thickness of the graft is tailored to meet the individual needs of the patient. The graft can be processed through a mesher to make small apertures in the graft, allowing it to expand up to nine times its size. This is used if donor sites are sparse or the total burn surface area is large. Meshing can improve the ‘take’
of the graft but the mesh pattern is permanent and therefore the cosmetic outcome is not as good. Patients who require skin grafts are more at risk of developing hypertrophic scarring which tightens and contracts and if on or near a joint can result in loss of range of movement. Patients will often be immobilised for two to five days post skin graft to allow for the graft to establish a blood supply and adhere to the wound bed.

**Full Thickness Skin Grafts (FTSG)**

A full-thickness skin graft consists of the epidermis and the entire thickness of the dermis. The donor site is either sutured closed directly or covered by a split-thickness skin graft. FTSGs have a better colour match to the recipient site due to their thicker nature and inclusion of additional dermal structures. They tend to contract to a much lesser degree than SSGs, providing optimised cosmetic and functional results. FTSG are often used in burns reconstruction to release scarring that is contributing to loss of movement. Patients may be immobilised for up to two weeks post FTSG.

**Matriderm® / Integra™**

Matriderm® or Integra™ are “Dermal Regeneration Templates” that are used occasionally to improve outcome; they replace the missing, bottom layer of the skin (dermis). Both Integra and Matriderm need to have a thin skin graft to complete the process. Matriderm and Integra may require prolonged immobilisation and splintage prior to commencing physiotherapy. Although the results with all forms of artificial skin can initially be better than the preceding scar, there is still
a variable tendency for the reconstructed area to contract. Although better than split skin graft alone, the final result still does not look and feel the same as unburned, healthy skin.

**What is hypertrophic Scarring?**

Hypertrophic scarring is scarring that occurs at the site of the original injury. It is caused by an overabundance of collagen and other extracellular matrix components within the margins of the original wound. It is usually raised, red, firm, and itchy. Patients that have taken longer than 3 weeks to heal or have had a split skin graft are most at risk of developing hypertrophic scarring. Other risk factors include; pale skin, red/blonde hair, black or Asian skin, or those with a history of scarring.

Patients are at risk of developing hypertrophic scarring for 3 months post wound closure.
Patients that are identified as at risk of developing hypertrophic scarring will be referred to their nearest scar management team for assessment. Treatments commonly used include; creaming and massage, silicone creams, silicone dressings, pressure garments and face masks. If a patient has a pressure garment they are usually advised to wear it for 23hrs a day, only removing it for washing and creaming and massaging their healed areas.

**Why does my patient have a splint?**

**Splints in burns are used to:**

- Immobilise joints post SSG to help improve the take of the skin graft
- Help protect the length of tendons and ligaments in the acute stage of injury where the patient is not moving a joint well
- To counteract the contraction of hypertrophic scars and prevent loss of range of motion

**Patients will be advised whether to:**

- Wear the splint full time
- Remove the splint for exercise only
- Wear the splint at night time only

If you are concerned about the fit of a splint please contact the burns therapy team.

Splinting regimes may need to continue until scarring is starting to soften and ROM is being achieved with little effort. Splinting
may need to be introduced as hypertrophic scarring develops as part of their outpatient treatment programme.

What instructions should be given to patients about creaming and massage?

Once fully healed patients should be encouraged to cream and massage their skin with a non-perfumed moisturiser (e.g. aqueous cream, E45, Epaderm, Diprobase etc), ideally for 5 minutes 2-3 times a day. Specific moisturisers are not prescribed. Patients may need to try and find what suits their skin and some are available from their GP on prescription. Areas including skin grafts, donor sites and scars should be creamed once healed. This is to prevent the area from drying, cracking and becoming sore. If any blisters develop they should be advised to avoid these areas until the blisters have healed.

I have no experience of managing burns what should I be looking out for?

If possible aim to review patients within 1 week of discharge. Physiotherapy Interventions may include a combination of active/assisted ROM exercises and passive stretches with the goal to achieve full range of movement as quickly as possible.

Patients should be instructed to ensure they have taken adequate pain relief prior to the physiotherapy session. Physiotherapy can be very painful but they should be encouraged to push themselves with their exercises as much as they can.

If the patient is at risk of developing hypertrophic scarring, it is important that they are not discharged until the therapist is
sure it is having no effect on range of movement. Movement can be lost very quickly as the hypertrophic scar tightens and contracts. Consider which movements may be effected perhaps in combination. An example would be burns to the neck. Does closing the mouth when extending the neck lead to a better stretch?

Where the patient has hypertrophic scarring effecting movement, soft tissue techniques such as creaming and massage along and across bands of scarring can help to improve movement. If blistering occurs avoid these areas.

Recent research has shown a cardiovascular exercise programme alongside a traditional range of movement programme improves long term outcomes in burn injury patients. If possible a cardiovascular exercise programme should be incorporated into rehabilitation programmes.

Burns patients who are at risk of or have developed hypertrophic scarring will be referred to the scar management service within the burns service. Patients may be offered pressure garments, silicone creams or silicone sheets to help soften, flatten and pale their scarring over time.

**Will the scar tissue split if I stretch the patient too hard?**

It is important to ensure stretches are performed which help to lengthen the tissues. If a split occurs please contact the burns team for advice. In most cases where there are small tears in the skin the team would advise to continue with exercises and stretches until reviewed by the team.
My patient has informed me that they are having flash backs / bad dreams / difficulty coming to terms with the injury / appearance concerns. What help is available for them?

The burns team has a Psychologist who can arrange to speak with the patient to discuss any difficulties they may be experiencing. Please contact the burns team for any specific patient advice or to ask for a review.

My patient wants to return to work. What specific advice does the burns team give?

Ideally patients are advised to remain off work until healed where possible. We recognise this is difficult for some patients but it is important where the patients job places them at risk of infection or could impose a risk to others e.g. working with food. Other considerations include the patient’s ability to perform the tasks required safely e.g. lifting heavy equipment, the ability to wear health and safety clothing as specified by their employers e.g. work boots, gloves and fatigue. It is normal for patients to feel more tired than usual and they therefore may not be able to do a full days work initially. For specific patient advice regarding return to work please contact the burns team. Patients should be advised to contact the employer’s occupational health department for specific work related concerns.
My patient enjoys participating in sporting activities. When can he return to them?

We advise avoiding contact sports until healed. The skin thereafter will be more fragile but will toughen up over time. Cardiovascular exercise such as exercise bikes are good for our patients and should be encouraged.

What complications can occur with burns?

If the patient is complaining of any of the following and have unhealed wounds they should be advised to contact the burns service for advice:

- High temperature/rigours
- Skin rash
- Vomiting/ diarrhoea

If dressings become:

- Wet/dirty/smelly
- Loose/slips/falls off
- The wound ooze through the dressing

If wound is not covered with a dressing and becomes:

- Red/inflamed
- Painful
- Moist / bleeds
What is scar management?

Scar management can commence as soon as the patient is healed. Patients who are most at risk of developing hypertrophic scarring include:

- Patients who required a Split Skin Graft, Full Thickness Skin Graft, Matriderm or Integra
- Patients who have taken longer than three weeks to heal
- Patients with certain characteristics such as pale skin, red hair, freckles, black or Asian skins
- Previous history of hypertrophic or keloid scarring

The patient is assessed by a scar management therapist and a treatment plan developed based on factors including the size and position of burn, severity of scar and patients lifestyle.

My patient is complaining of itch? Is there anything the team can offer?

Itch is a common problem and help is available. Patients should be advised to make sure they are creaming their healed areas well. They should try different non-perfumed moisturising creams to see if the itch reduces. If itch is causing the patient distress the burns team on review may suggest medication such as Piriton or Gabapentin. If your patient would like further advice on managing itch, please contact the burns team for advice.
What treatment options for scarring are available?

All patients are advised once healed to cream and massage their healed scars with a non-perfumed moisturiser such as E45 for five minutes, twice a day. This will help to improve the quality of the skin and prevent dryness. Patients are also advised to be careful in the sun for two years by wearing a high factor sun cream with UVA and UVB protection and ideally keeping the area covered. Patients who are risk of developing hypertrophic scarring will be reviewed in the scar management clinic.

One option for managing scarring is a pressure garment. This is a garment such as a glove, vest or sock which is made to measure and is thought to exert a pressure on the skin equal to that of the capillaries. It is believed pressure helps to reduce the vascularity of the scar, switching off the process of laying down excess collagen. This over a period of 12 to 18 months helps to soften, flatten and pale scars. If the scars are itchy or uncomfortable this can be improved too. Pressure garments are worn for 23 hours a day, removed only for creaming and massage. Patients will normally be provided with three sets of garments which are replaced every three months (the lycra in the garment lasts around this time).

Silicone sheeting (Dermatix, Cica care) can be used for small scars that are moderate in severity or in conjunction with pressure for more severe scarring. Patients initially build their tolerance to wearing the silicon sheet, aiming to wear it for 23 hours a day.

Silicone cream is used often when scars are located on faces,
with less severe scarring or in conjunction with pressure can be used for small scars. The cream is applied twice a day to the scars after creaming and massage with a non-perfumed moisturiser. Silicone cream and sheets is thought to help improve the moisture content of the scar, reduces vascularity and switches off the process of laying down excess collagen. Over time it will help to soften, flatten and pale scars.

If a patient is using silicone they will have been advised to get their repeat supplies on prescription from their GP.

Scar maturation can take 2 years and for some patients longer. Their scar management treatment may be required for this period of time. Patients are reviewed by the team around every three months.

If your patient is struggling with their scar treatment regime or has developed hypertrophic scarring and as not seen the scar management team please contact them on 0117 414 3114.

**When can my patient return to activities such as driving or sporting activities?**

Patients should be advised to check with their insurance company before returning to driving as wounds can invalidate their insurance. They should only return to driving once they are able to control the vehicle safely and perform an emergency stop.

We encourage patients to return to sporting activities as soon as they feel comfortable enough to do so, remembering that their level of fitness or ability may have declined. If the patient has had a skin graft we advise them to avoid contact sports until healed and the graft has had time to toughen up.
My patient's hand or foot is extremely sensitive, swollen, red, shiny, has abnormal hair growth, discoloured and they are having difficulty moving it. Should I be concerned?

Although rare some patients can also develop Complex Regional Pain Syndrome (CRPS). If you are concerned this may be the case for your patient please contact the burns therapy team who will aim to review the patient with the burns doctors.
Further reading


If you require any further information on burn injury and rehabilitation or would like to discuss any specific patients please contact the burns physiotherapy team on 0117 414 3114.

NHS Constitution. Information on your rights and responsibilities. Available at [www.nhs.uk/aboutnhs/constitution](http://www.nhs.uk/aboutnhs/constitution)
If you or the individual you are caring for need support reading this leaflet please ask a member of staff for advice.

© North Bristol NHS Trust. This edition published April 2016. Review due April 2018. NBT002874