

Care of Burns in Scotland

National Managed Clinical Network

Paediatric Guideline Therapy Management of Burns

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NOTE

This guideline is not intended to be construed or to serve as a standard of care. Standards of care are determined on the basis of all clinical data available for an individual case and are subject to change as scientific knowledge and technology advance and patterns of care evolve. Adherence to guideline recommendations will not ensure a successful outcome in every case, nor should they be construed as including all proper methods of care or excluding other acceptable methods of care aimed at the same results. The ultimate judgement must be made by the appropriate healthcare professional(s) responsible for clinical decisions regarding a particular clinical procedure or treatment plan. This judgement should only be arrived at following discussion of the options with the patient, covering the diagnostic and treatment choices available. It is advised, however, that significant departures from the national guideline or any local guidelines derived from it should be fully documented in the patient's case notes at the time the relevant decision is taken.

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1) Aim

This is a standard designed to assist and guide therapists in the management of a child following a burn in Scotland. This includes therapy management in Intensive Care, High Dependency, ward settings and as outpatients.

2) Background

A burn is a very common injury and can have a significant impact upon the individual's functional ability. Patients often have complex rehabilitation needs and the therapist has a specialist role to play in achieving optimal outcome (Burn Therapy Working Group 2017).

This guideline covers all aspects of burn therapy commencing with the acute phase which could be in Intensive Care, High Dependency or in the ward progressing through the intermediate phase of rehabilitation and on to later rehabilitation to restore the child to their pre injury status or as near as possible. These phases are not distinct. Depending on the size, depth and location of the burn injury patients may not require all stages of therapy input (or any therapy input if they do not meet criteria below). To determine this all patients require an individual and continuously updated assessment (Burn Therapy Working Group 2017).

It should be noted if the child has any other injuries or pre-existing conditions and treatment adapted accordingly.

The roles of the Physiotherapist and Occupational Therapist often overlap and differ between hospitals. For the purpose of this standard the Physiotherapist and Occupational Therapist will be referred to as the Burn Therapist. The most important point is that burn rehabilitation is multi- disciplinary, co-ordinated, individualised and holistic to optimise functional and cosmetic outcome (Burn Therapy Working Group, 2017). It is also important that this standard is used in conjunction with the clinical reasoning skills of the Burn Therapist. Therapists working in burns services should have specific training and experience in the care of individuals with burns

3) Criteria for Therapy

Patients following a burn may present with a wide range of signs and symptoms potentially affecting their respiratory, cardiovascular, neurological and orthopaedic systems. These recommended criteria should be considered when making a referral to a Burn Therapist:

- Any patient who is/ has been intubated and ventilated
- Any patient who has a suspected/ known inhalation
- Any patient that has a pre-existing respiratory problem
- Any patient that has other respiratory problems as a result of the burn injury
- Any burn that is over a joint line or circumferential around a joint
- Any burn that will require pressure therapy e.g. following a skin graft
- Any patient developing or at risk of developing hypertrophic or keloid scarring
- Any patient with reduced mobility, range of movement and/ or muscle power since injury
- Any patient presenting with difficulties in Activities of Daily Living since injury
- Any patient following a burn that requires hand splinting
- Any patient that has hand function difficulties

It is acknowledged that patients presenting with burn injuries that do not fit this criteria may require therapy assessment and their management should be discussed with the Burn Therapist.

Therapists have a very important role to play in the burns team and where their input is required should be involved within 72 hours of admission to assess for appropriate therapy intervention and determine goals.

4) Recommended Therapy Intervention for the Acute Phase of Rehabilitation

In the acute phase the burn injury will be in the early stages of wound healing, undergoing frequent dressing changes and often requiring surgical intervention.

The therapeutic management of the burn patient is determined by thorough assessment and formulation of a detailed list of problems and treatment goals and a detailed treatment/ management plan. This is in line with the documentation standard produced by the Chartered Society of Physiotherapy and local documentation policies (CSP, 2013).

It is vital that the child and their family are educated regarding all aspects of the therapeutic treatment programme and are involved from the beginning in their child's treatment. Some parents/ families may find it distressing handling their child, especially if their injuries are extensive and/or disfiguring. It is therefore important to involve them as much as possible in the rehabilitation process. For example involving parents and families with daily passive movements and assisting with functional skills when appropriate. This will help to improve compliance with home exercise programmes and scar management treatments.

a) Respiratory

Assessment of the child's respiratory status should be carried out and documented within 24 hours of identification of respiratory risk or within 45 minutes in the event of acute respiratory deterioration (Burn Therapy Standards Working Group, 2017 & CSP, 2013). The Burn

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Therapist should clinically reason which physiotherapy chest treatment, if required is most appropriate depending on age, size and location of the burn and evaluate/adjust accordingly.

Ventilated patients

Some children following a burn may require to be ventilated. This could be required if the child is suffering from stridor, facial burns, facial oedema and/ or smoke inhalation.

The ventilated child may require chest physiotherapy. To clear secretions, manual chest physiotherapy techniques such as Autogenic Drainage (AD) along with manual hyperinflation may be considered. If the child has a chest burn use of any manual chest physiotherapy technique should be discussed with the relevant consultants. Following a skin graft, manual techniques are contraindicated due to the shearing forces, which can cause a graft to fail. For additional information, refer to the CoBIS standard for Airway Burns and Inhalation Injury in Children.

Non- ventilated patients

Prophylactic chest physiotherapy may be required for children that are at risk of developing chest symptoms. This is generally children that have prolonged reduced mobility, a pre-existing respiratory condition, chest wall burns or pain following surgical procedure. If the patient requires chest physiotherapy and is awake and compliant then non manual Airway Clearance Techniques (ACT) such as incentive spirometry, Autogenic Drainage (AD) and age appropriate blowing games are advised.

Respiratory assessment should be carried out as per ACPRC Guidelines (2009). It is recommended that respiratory assessment and treatment continue until the child is symptom free and mobilising fully.

If the child is identified as having or is at risk of developing oedema, consideration should be given to positioning, splinting and ROM exercises- both active and passive

b) Positioning

Early positioning is integral to the successful rehabilitation of a patient with a burn. The position of comfort after burn injury is typically the position that promotes deformity and therefore should be avoided. Therapeutic positioning is designed to reduce oedema by elevation of extremities and to preserve function by proper body alignment and the use of anti-contracture positions. To ensure this, positioning should be assessed and managed within 24 hours of the child's admission (Whitehead & Serghiou, 2009). Every patient with a burn over a joint should have a positioning programme provided by the therapist and assessed regularly .It is essential that nursing staff should be shown how to carry this out, to ensure correct positioning at all times. A positioning chart could be utilised if appropriate.

The optimum positioning for burn areas (anti-contracture positioning) is as follows:

- Head- elevated to reduce oedema.
- Neck- maintained in midline and if burns are sustained to the anterior surface of the neck they should not have pillows behind their head. To position the neck in more extension a small towel/ pillow can be placed behind their shoulders. There should be no rotation.

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- Axilla- maintained at 90° abduction using pillows, ensuring no pressure points exist, which may produce brachial plexus compression/ulnar nerve palsy at the elbow. There should be 10° of shoulder flexion to prevent brachial plexus injury. Positioning of the axilla can be difficult if the chest has also been grafted. An alternative can be to position the upper limb in a Bradford sling ensuring the elbow is mobilised regularly throughout the day.
- Shoulder and chest- if the patient is adopting a protracted/ flexed posture then if possible they should spend some time in prone lying. Maintenance of a semi-erect position will assist in movement of oedema away from the chest wall to more dependent tissues.
- Elbow- burns to the flexor aspect of the joint should be positioned in extension and supination on either pillows or in splints. If the arms are elevated in a Bradford sling they should be removed for 10 minutes every hour and stretched into extension.
- Hand- all burns (unless superficial) should be elevated on pillows to help reduce oedema. The wrist should be maintained at 30 degrees extension and the MCPs at 80-90 degrees flexion (to maintain collateral ligaments on full stretch) and IPs in full extension (to prevent contracture of volar plate). Thumb in palmar abduction. Thermoplastic splints can be used to attain this position (Position of Safe Immobilisation).
- Trunk- should be in midline.
- Hips- should be positioned in neutral and in 20° abduction. This can be achieved with pillows /towels/foam wedges.
- Genital area- lower limbs should be positioned as for hip/ knee burns because patients will tend to adopt the foetal position with hips and knees flexed.
- Knees- should be positioned in extension. There should not be a pillow underneath the knee joint.
- Ankles/ feet- plantar-grade. This is usually achieved by a pillow at the base of the foot holding the position or splints. The foot should be checked daily for pressure sores at the heels (even if distal extremities are not involved good positioning is paramount to prevent TA shortening).

These positions may have to be adapted depending on the location and size of the burn and whether or not the young person has had skin grafts.

c) Splinting

Splinting is an extension of the therapeutic positioning programme and should be utilised when:

- A child is unable to voluntarily maintain optimum positions
- Positioning is not effectively preventing contractures
- Immobilisation is required after skin grafting- this is particularly important at the axilla as contracture of the axilla following a skin graft is a common complication and a major concern for rehabilitation (Vehmeier- Heeman et al, 2005)
- Full active range of movement is not being maintained with positioning and exercises
- The hands which are high risk for adopting poor postural positions

(Whitehead & Serghiou, 2009)

Burns to the neck are prone to contracting and splints such as soft and hard collars may be required if an optimal position cannot be maintained with pillows. These may have to be adapted if the child has a tracheostomy, central line or if the child has a splint for the axilla (Sharp et al, 2007).

Splints may be made by the Burn Therapist, Medical Staff or Orthotic/ Orthopaedic Technicians and may require to be made in theatre.

It is vital that splinting regimes are adhered to and there should be detailed instructions on how and when to apply the splint, how long it should be worn for and to observe for any signs of pressure areas. This information should be given to nursing staff that are caring for the patient, parents/ family and the child where appropriate.

d) Mobilisation

Assessment of the child's Range of movement (ROM) in area affected by the injury should be carried out within 72 hours providing there are no contraindications. Findings should be accurately recorded to determine immediate needs of the child ROM should be assessed and recorded on a daily basis until full active range of movement is achieved (Burns Therapy Working Group 2017).

Where possible all joints including the affected and non- affected joints should be moved actively through their full range of motion during change of dressings. This should be done passively if the child cannot manage the full range of motion actively. This could take place in theatre or on the ward. In some instances the range of movement exercises of the affected joints will occur only in theatre during dressing changes. Undertreated pain can result in non-compliance and therefore The Burn Therapist may have to liaise with the pain team to ensure adequate analgesia prior to physiotherapy intervention. Both pharmacological and non-pharmacological options for pain management should be considered (Gandhi, 2010).

Individual exercise programmes should be issued as appropriate and family members should be educated in these to involve them in all aspects of the child's therapy.

Particular attention should always be given to a burn injury of the hand. Assessment should include grip strength including gross grasp and pinch, functional grasps and bilateral use of hands.

Mobilisation should commence once the child is medically stable and this can be when the child is in the Intensive Care and High Dependency settings. This should be discussed with the relevant consultants. In preparation, the child should have spent some time upright in bed to reduce any vasovagal response to standing. If the child is too weak to commence mobilising then the use of hoists to transfer into a chair and the use of tilt tables/ standing frames should be considered.

If the child has had their burn grafted then mobilisation of that area is contraindicated until the skin graft is stable. This normally takes 5 -10 days to occur, but will differ between patients. During this time the grafted area is immobilised often in a splint, if over a joint. The wounds are normally inspected 3-5 days post-op and the consultant will document how well the graft

has 'taken' to the underlying tissue. Once the graft has taken 100% and/or the consultant has confirmed the graft is stable, range of movement exercises and mobilisation can occur. The Burn Therapist should ensure that the weight bearing status is discussed with the relevant consultant.

Most burns will cause pain, some will cause altered sensation, hypersensitivity and/or itch, and therefore careful assessment should be conducted during therapy sessions. Liaison with MDT members is necessary to implement appropriate treatment (Burn Therapy Working Group 2017).

5) Recommended Therapy Intervention for the Intermediate Phase of Rehabilitation

This stage of rehabilitation predominantly occurs when the child has transferred from Intensive or High Dependency Care to a ward setting or occasionally home. Children will transition into this phase when they are medically stable and the amount of therapy that they require will vary depending on many factors such as burn location and size.

Multi-disciplinary team working is vital at this point to ensure effective planning for discharge (Burn Therapy Standards Working Group, 2017). Interventions such as respiratory physiotherapy, positioning and splinting will still be required in this phase and will continue until the child has regained full active range of movement and full mobility. Therapy management in this stage will focus more on restoring function and commencing scar management.

Clinical Psychology may be of benefit at this stage or in the later phase if the child or family require help coping/ adjusting with what has happened. Any changes to the child's psychosocial status should be accurately recorded and shared with the MDT.

Referral to relevant charity organisations may be considered at this stage e.g. Scottish Burned Children's Club (theburnsclub.org.uk) as they provide a network of support to burn survivor children and their families

a) Further Mobility

Where appropriate the therapy sessions will be based in the therapy department in the gym. Active and passive ranges of movements are vital in the acute phase of rehabilitation and may still be required in the intermediate phase. Deconditioning and reduced physical activity is a common complication of a burn injury due to the hypermetabolic response of a larger burn, pain and prolonged bed rest. Therefore, at this stage of rehabilitation it is important to consider incorporating sporting activities and the use of technology such as the Wii. The amount of therapy input will be assessed on a daily basis and decreased as the child improves and progresses to discharge home.

b) Activities of Daily Living (ADL) and Occupational Performance Skills

At this stage the Burn Therapist should complete an assessment of the child's functional activities of daily living such as dressing, feeding and hygiene, if appropriate. Depending on the results, input will be given to relearn/ adapt skills and/ or educate new strategies. Depending on the area involved, some activities of daily living may become difficult without the aid of specialised equipment e.g. supported seating, adapted cutlery etc. Early

assessment of the patient's functional ability will highlight any possible equipment that is required and allow time to ensure this is in place when required. These devices should be weaned as soon as able.

The child's ability to participate in leisure activities should also be assessed and if required a developmental assessment of play skills completed. Liaison with the play therapist can be very beneficial. The aim is to return to previous level of function with regards education, hobbies and social integration.

c) Scar Management

There are many risk factors that can lead to scarring following a burn injury. Once the burn has almost healed and resultant swelling has resolved the Burn Therapist will consider scar management treatments. These include pressure garments, scar massage and silicone therapy. These are thought to have an influence on the collagen remodelling phase of wound healing and therefore improve the appearance of the scar (Bloemen et al, 2008). Pressure garments and silicone therapy can be used in combination and this occurs when:

- The area has been grafted
- If hypertrophic scarring is evident /or identified as a risk over area of burn or donor site once healed

Pressure garments are custom made for each child. When the burn/ graft site has healed the child will be measured for a pressure garment. Pressure garments must be worn for 23 hours daily until the scar is mature and may be worn for up to 18 months from injury or until scar is fully matured (Bloemen et al, 2008). It is vital that this is educated to parents and the child to increase compliance. Typically, two sets of garments will be supplied. The child should be reviewed approximately every three months to ensure that the garment is providing adequate pressure and continues to fit well as the child grows. It also gives the therapist an opportunity to review the scar and evaluate treatment efficacy. Silicone therapy on its own should be considered when:

- The surface area of the burn injury is small with minimal hypertrophy
- The location of the burn is an anatomical flexure or area of high movement
- The child may not be compliant with wearing a pressure garment

Silicone therapy comes in the form of sheets, gel and a spray. The format that should be prescribed depends on the age of the child, area and size of the burn. Parents should be educated to monitor for any signs of allergic reaction to the silicone and to discontinue use and contact their Burns Therapist should this occur. Silicone products must be used as prescribed for a minimum of 3 months to gain beneficial effect on scar appearance.

Massage and moisturising is an important part of scar management and parents should be educated to moisturise and massage the burn x3/4 daily, once it has healed. They should use an emollient cream such as E45 or Diprobase and apply firm pressure.

Advice should be given on sun protection. It is advised that there is no sun exposure to the area that has been burnt for 9 months and high factor sun protection should be used along with minimal sun exposure for up to 2 years post injury.

d) Discharge planning

The Burn Therapist along with the MDT is expected to ensure that transition from hospital to home is as seamless as possible and ensure ongoing care is in place for discharge. The therapist must ensure that the following occur:

- Participation in medical case conferences/ ward rounds
- Refer to/ liaise with local Physiotherapists/ Occupational Therapists as required
- Ensure a follow-up therapy appointment has been given for on-going scar management
- Ensure the child has the appropriate equipment to enable mobility/ functional independence while at home/ school
- Ensure parents/ guardians have received all appropriate advice for home including provision and education of a home exercise programme where appropriate
- Returning to school may require liaison between school and the Burn Therapist.

It is important to liaise closely with the parents/ carers as well as the child to ensure that all are fully involved and informed of plans for discharge. If appropriate, this may require liaison with the Discharge Co-ordinator.

6) Recommended Therapy Intervention for the Later Phase of Rehabilitation

This is the phase of scar maturation and during this time the Burn Therapist continues to assess, treat and provide support to both the child and family.

If this phase of rehabilitation is being continued by another hospital, a telephone referral and a detailed discharge summary should be sent. Both should be documented in the therapy notes. If the child is to wear a pressure garment then the pressure garment and the measurement sheets/details of order should be sent. If geographically possible the first garments should be fitted by the Burn Therapist that measured and then the child's care transferred.

Once discharged from Dressings clinic the child will be given a review appointment with the consultant. If continued physiotherapy is required the child will be seen at this review appointment.

Once the child has regained maximal/ complete functional activity they will need to continue to see the Burn Therapist on a less regular basis for scar management. At this stage parents will be encouraged and supported to allow their child to reach their pre burn level of activity/play. Current evidence outlines the benefits of an exercise programme aimed at strengthening/conditioning post hospital discharge and where indicated patients should be referred to local physiotherapy services to allow them to reach their full potential.

The child should now be established with wearing their pressure garment and/ or silicone therapy. The child should be reviewed every three months to monitor their scar and to re-assess their therapy input. When the scar has fully matured or cosmetically has a good appearance (scar is flat, pale and soft) the child can stop pressure garment therapy. Parents should be educated to monitor for signs of the scar becoming hypertrophic and if observed

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should contact their Burn Therapist. Children should be reviewed by either the Burn Therapist after discontinuing pressure garment therapy or by medical staff. If the scar shows no signs of deterioration the child can be discharged from the Burn Therapist but may well have ongoing review by the Consultant especially if scar is over a joint. The time to reach scar maturation varies between individuals.

7) Discharge

When the scar has fully matured and the child is ready to be discharged from clinic, a copy of the discharge letter should be sent to the GP and to the relevant Consultant.

Parents should always be advised that if they have any concerns with the appearance of the scar in the future they should contact their GP for re- referral to the Burns Clinic. In some centres the family may be advised to contact the hospital Burns team in the first instance. Children may be re-referred to the Burns Therapist in the future if they have reconstructive surgery and require re- assessment and treatment.

8) References

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Useful resources

British Burns Association

COBIS (Care of Burns in Scotland)

https://www.hand-therapy.co.uk/health_professionals/education_courses/course_calendar