

BURNS MANAGEMENT

PRACTICE GUIDELINE[®]

DOCUMENT SUMMARY/KEY POINTS

- Immediate assessment and treatment of burn injury, including first aid management
- General burn management
- Minor burn management
- Burn wound management
- Analgesia and sedation for burns dressing procedures
- Burns dressing product descriptions and application techniques for:
 - Bactigras[◊]
 - Acticoat[◊] and Acticoat^{◊7}
 - Mepilex[®] range
 - Biobrane[®]
 - Flamazine[◊]
 - Comfeel[®]
- Management of burn related pruritus
- Post burn wound healing care
- Wound management for non-burn major skin loss conditions

This document reflects what is currently regarded as safe practice. However, as in any clinical situation, there may be factors which cannot be covered by a single set of guidelines. This document does not replace the need for the application of clinical judgement to each individual presentation.

Approved by:	SCHN Policy, Procedure and Guideline Committee	
Date Effective:	1 st March 2019	Review Period: 3 years
Team Leader:	CNC	Area/Dept: Burns Unit

CHANGE SUMMARY

Aug 2019 – Minor review to remove Section 1 Anatomy and Physiology. No other changes.

Feb 2019:

- Updated burns dressing information including use of PPE
- Updated wound product information
- Updated procedural sedation guidelines for burns dressings and new formulary
- Updates to burns pruritus management protocol
- Inclusion of Child Life Therapy multidisciplinary burns management

READ ACKNOWLEDGEMENT

- All multidisciplinary clinical staff involved in the management of patients with a burn injury, including first aid, minor burns and major burns should read and acknowledge the document.

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1 Assessment of the Burn Wound

It is important to ensure that burn injuries are appropriately assessed and managed in order to promote the wellbeing of the child. In order to establish the seriousness of the burn injury you need to assess the size or extent of burn injury as a Total Body Surface Area (TBSA) % and assess the depth of burn injury.

1.1 Baseline Information

- It is important to obtain a clear history of the mechanism of injury, how, when and where the burn occurred, first aid given and duration, were clothes removed, etc.
- Obtain baseline vital information for subsequent comparison: temperature, pulse rate, respiration rate, blood pressure.
- An accurate bare weight must be recorded for:
 - calculation of medications
 - calculation of fluid resuscitation
 - baseline for monitoring weight loss

1.2 Burn Surface Area Assessment

It is important to accurately assess the TBSA% of burn injury involved and identify the depth of burn. The most experienced Medical Officer (MO) available should assess the patient. Following initial assessment by the MO in Emergency, the surface area and depth need to be charted on the Emergency Burns Assessment Form.

Emergency Burns Assessment Form

For assistance in assessing a burn injury and severity of the injury please see the Burns Assessment and Initial Management form available on the CHW intranet: [Burns Assessment and Initial Management form](#)

The Rule of Nines (and Modified Paediatric Rule of Nines for children up to 9 years of age) is the most common method used to assess TBSA%¹

The Palmar method is useful for assessing small scattered burn injuries.

See Appendices 1 to 3 for further information.

The NSW ITIM Trauma App is available to download onto smart phone devices and tablets and is useful to assist in the TBSA% assessment of burn injury.

After consideration of other factors outlined below, a decision is made regarding the need for either inpatient admission or outpatient management.

1.3 Assessment of Burn Wound Depth

An initial assessment of the burn wound depth should be made. It should be remembered that burn wounds are dynamic in nature and the clinical appearance of the burn wound may

change over several days. Re-assessment of burn depth after 48 hours may be necessary. Most burn wounds are generally heterogeneous (a mixture of depths).

Epidermal burns are excluded from the calculation of the TBSA% of burn injury.

Laser Doppler Imaging may be used to objectively assess burn depth at 24 to 72 hours post burn injury.

Depth	Colour	Blisters	Capillary Refill	Sensation	Healing
Epidermal	Red	No	Present	Present	Yes
Superficial Dermal	Pale Pink	Small	Present	Painful	Yes
Mid – Dermal	Dark Pink	Present	Sluggish	+/-	Usual
Deep Dermal	Blotchy Red	+/-	Absent	Absent	No
Full Thickness	White or charred	No	Absent	Absent	No

© EMSB Australian and New Zealand Guidelines for Burn Assessment¹

1.4 Definitions

The SCHN (Westmead) is the designated paediatric Burn Centre for NSW.

Major Burn Injuries

These are burn injuries which require admission to a specialised Burns Unit.

- Mid-dermal, deep-dermal or full thickness burns > 10% body surface area
- Any intubated patient
- Inhalational injuries with cutaneous burns
- Head and neck burns
- Any circumferential burn to the limbs or chest that compromises circulation or respiration
- Priority areas are involved, i.e. face/neck, hands, feet, perineum, major joints.
- Suspicion of non-accidental injury
- Chemical and electrical burn injuries
- Significant pre-existing medical disorder
- Associated trauma

Minor Burns

These are burn injuries, which can be managed in outreach hospitals /medical centres /GP's, or via the Burns and Plastic Surgery Treatment Centre (BPTC) at CHW.

A minor burn is generally defined as:

- less than 10% body surface area
- no full thickness skin loss
- no history of inhalation
- not caused by electricity
- no suspicious circumstances
- no adverse social circumstances to outpatient management

1.5 Special Considerations

If the child requires inpatient admission, the Emergency Department staff must liaise with Burns Unit staff prior to sending the child to the Unit.

Consider the need for a PICU consultation / admission if the burn injury is > 20% TBSA.

Child Protection Unit (CPU) involvement is required for all suspected non-accidental injuries.

If the child is suitable for outpatient management, a decision needs to be made on the most appropriate location to provide follow up. This may be the BPTC at CHW, a local Paediatric Ambulatory Care (PAC) Service / Outreach Service or a Local GP.

Please see Section 4: Management of Minor Burns, BPTC & Kidsburns for instructions on how to make appointments.

2 General Management

2.1 Airway Management

Priority is given to possible respiratory involvement. Children who have sustained a burn injury in an enclosed space (house fire or car) are at most risk. Scald burns involving the anterior neck may cause sufficient swelling of soft tissue to cause airway compression which may only become apparent after the commencement of resuscitation. Careful evaluation to anticipate airway obstruction is important. Prophylactic intubation may need to be considered.

The child needs to be observed closely for respiratory stridor, hoarseness of voice, oedema of the face, neck or chest, increased respiratory effort, presence of soot in the nostrils or mouth, carbonaceous sputum. Report any of the above to the MO. MO may order baseline chest x-ray, blood gases and a carboxyhaemoglobin and will make a decision regarding need for intubation.

2.2 First Aid Management

1. *Separate from heat source*

- Remove clothing from burn areas (clothing traps heat and prevents effective cooling)
- If the burn is chemical in nature the burning agent should be flushed off with a continuous stream of water.
- Flushing is particularly important in chemical burns to the cornea / eyes.

2. *Cool the area*

- Local cooling is effective if used in the first 3 hours post burn injury.
- Cool water should be applied for 20 minutes post burn. Cool running water is best. Children who have no potential or actual systemic compromise may be taken to the bathroom for cooling.
- As the burns are locally sterilised by the heat in the first instance. Ordinary tap water is suitable.
- Spraying water is also effective. Hand trigger spray bottles are available in the Emergency Department. Ensure that the bottles have not been used for any other purpose (i.e. contain cleaning fluids).
- Compresses soaked in water are the least effective and require continuous renewal in cool water.
- Do not cool the whole child as this will precipitate hypothermia. Keep unburned parts of the child wrapped/clothed and increase the ambient temperature (e.g. turn on the heat lamps in the resuscitation bay).
- Do not use ice packs or water cooler than 12 degrees Celsius. Vasoconstriction due to the cold inhibits adequate perfusion which can in turn affect the extent and depth of burn injury.
- Cooling should be completed before the patient leaves the Emergency Department for a ward admission. Prolonged cooling may place the child at risk of hypothermia.
- Following cooling the use of a hydrogel dressing (such as Burnaid®) is effective as an analgesic. **Hydrogels should not be used as a substitute for first aid as they are not effective acutely in cooling the burn wound.** They may also cause significant hypothermia in large burns.

3. *After cooling, cover the burnt area until the patient is assessed.*

- A simple non-stick dressing is suitable. Sheets of cling film may be placed over the burn surface, do not wrap it circumferentially around limbs or the torso. Bactigras[◇] may also be used.
- Facial burn areas can be left undressed.

2.3 Fluid Replacement - calculated by weight and size of the burn

All children must be weighed on admission for accurate calculation of Intravenous (IV) fluids and medications.

Burns involving greater than 10% body surface area require insertion of an IV cannula. If the child has burns 10 to 15% of body surface area and is drinking adequately, the decision for IV replacement may be postponed. The MO will make the decision for IV replacement.

Burns greater than 15% TBSA require IV fluid resuscitation. The amount required is calculated by using the **Modified Parkland Formula** (% TBSA Burn x Weight in kilograms x 3), the protocol is detailed in the [Burns Assessment and Initial Management form](#) available on the CHW intranet.

A Nasogastric tube should be inserted for the commencement of enteral feeding.

Strict monitoring of fluid balance is essential

2.4 Urine Output

Insertion of a urinary catheter with hourly urine measures is recommended for all burns greater than 15%TBSA and or when the perineum is involved. The urine output needs to be monitored **hourly** to allow for adjustment of the rate of IV fluid resuscitation. The desired hourly output = 0.5 to 1mL/kilogram/hour. When assessing adequacy of urine output, it is advisable to consider urine output over several hours.

2.5 Electrolytes and FBC

Are routinely taken by the MO on admission and monitored closely during the acute resuscitation phase (first 24 to 48hrs post burn injury)

2.6 Observations

Due to the inflammatory response to burn injury, most children with major burns have a disturbance in thermoregulation, often for a considerable length of time. High temperatures are managed with paracetamol, sponging non burnt areas and fanning may be useful.

Hyperthermia may not denote the presence of infection. Judicious use of antibiotics based on wound swab and blood culture results is mandatory. There is no place for prophylactic antibiotic use.

2.7 Pain Management

Opioids given intravenously are the drugs of choice during the acute period. A morphine or fentanyl infusion (NCA / PCA) is frequently required for burn injuries >10%TBSA. Intravenous opioids should be titrated to effect.

For minor burn injuries <10%TBSA an oral opioid can provide initial pain relief. Oxycodone and paracetamol are commonly prescribed. The Acute Pain Service at CHW is involved in

the management of inpatients in both the acute and post-operative phase, transitioning patients from IV infusions to oral analgesics. Weaning regimes for slow release analgesics are required prior to discharge. Follow up in the ambulatory care setting may be required for complex patients.

For further information please refer to Section 5.1 & 5.2 Pre-medications and preparation for a burns dressing procedure along with Procedural Sedation (Paediatric Ward, Clinic and Imaging Areas) Practice Guideline – Sedation for Burns Baths & Dressing Changes at CHW (Section 8.4) for analgesia and sedation pre-medication dosages and guidelines. [Procedural Sedation \(Ward, Clinic & Imaging areas\) Policy](#)

2.8 Circumferential Burn

Circumferential full thickness and deep dermal burns of limbs may result in a progressive rapid fluid loss into the subcutaneous tissue. The increase in tissue tension may result in compression of blood vessels in the limb and ischaemia both at the site of the burn and distally.

Affected limbs should be elevated and monitored with hourly circulation observations. It may be necessary to use a Doppler to adequately detect pulses. The Medical Officer will assess the need for surgical decompression (i.e. Escharotomy or Fasciotomy) and perform them if indicated.

Circumferential and significant burns of the chest and abdominal wall may result in respiratory compromise and may need intubation, ventilation and escharotomy.

Great care should be taken when applying burns dressings and outer bandaging to body sites with circumferential burn injuries – do not wrap tightly.

2.9 Head Burn

When the distribution of the burn wound involves the scalp, over lying hair must be shaved to expose the burn wound margins in order to accurately assess the full extent of the burn injury and allow for application of the appropriate burns dressing. Children with burns to the head and face should be nursed with the head of the bed elevated to about 30° to help reduce oedema during the resuscitation phase. **See Section 5.1 – Managing Specialised areas for further information.**

Under no circumstances should a crepe bandage be wrapped around a child's neck to secure dressings

2.10 Wound Management

In the Emergency department a decision will be made by the Registrar on call for Burns for the day regarding the appropriate burn wound dressing selection. The Burns Clinical Nurse Consultant is available for consultation regarding burns dressings and will attend ED and other areas of the hospital within business hours. For consultation please page 7240.

Please see Sections 4, 5 & 6 for further wound management information.

2.11 Immunisation

Immunisation status should be checked on admission and tetanus prophylaxis given if indicated.

2.12 Eye Care

Reflex generally prevents direct eye injury but oedema from burns to eyelids and the periorbital area rapidly results in the eyes closing. Prophylactic eye washes with normal saline to remove grit and a chloramphenicol eye ointment should be administered as soon as possible. An Ophthalmology consult is recommended to exclude more serious damage. Parents and the child should be warned that the eyes might close due to swelling.

2.13 Diet and Nutrition

Optimal nutrition is vital to maintain homeostasis, promote burn wound healing and maintain immunocompetence. A major burn injury results in 150% increase in energy requirements. Children with a burn injury need about 2 to 3 times more energy (calories) and protein than normal. Their need for vitamins and minerals also increases.

The Dietitian has an automatic referral for burns $\geq 10\%$ TBSA, along with burns to areas which affect oral intake (regardless of %TBSA) e.g. face, hands, gastrointestinal tract

Enteral Nutrition is recommended for $\geq 15\%$ TBSA burns. This should commence as soon as possible after the burn injury. It will require the placement of a nasogastric or nasojejunal feeding tube.

Importance of nutritional management:

- Reduces hypermetabolic response
- Reduces muscle wasting
- Maintains gastrointestinal function
- Improves wound healing and prevent graft breakdown
- Maintains healthy growth and development

Oral intake can often be poor due to sedation, fasting, nausea and vomiting, medication related side effects, dislike of hospital food and fussy eating, long periods of sleep, preference for high sugar and high fat foods.

The Dietitian will conduct a full nutritional assessment including growth history, risk of re-feeding syndrome, theoretical calorie and protein requirements, need for calorie/ protein and or vitamin supplementation or enteral feeding.

The following is required to enable a correct nutritional assessment to be undertaken:

- Weight and height / length measurements on admission
- Ongoing monitoring of weight (ideally twice weekly bare weight without dressings)
- Ongoing monitoring of intake (detailed food and feed/ supplement record to determine quality and quantity of diet)
- Ongoing monitoring of output (urine, stools - diarrhoea/constipation, vomiting)

The Dietitian will provide High Energy & High Protein dietary education and nutritional support / supplement / recipes on discharge, if required.

If you are unsure about a patient's nutritional requirements prior to discharge please page the Dietitian for review.

2.14 Social Work

Social Work Intervention

Social Work psychosocial assessment and intervention forms part of the total multidisciplinary burns treatment plan for both inpatients and ambulatory care patients.

A referral needs to be made as soon as possible after admission (or at least within 24 hours)

Social Work assessment must include assessment for non-accidental injury and domestic violence in the home. Social work assessment and intervention aims to address the psychological, emotional and social impact on patients and their families or caregivers.

Social Work intervention may continue beyond patient discharge to ensure specialised burns support is available to the family – alternately referral to local resources may be made.

Principles of Social Work Intervention

- To assist patient/primary caregivers/significant others in dealing with the crisis and trauma following a burn injury.
- To obtain information regarding the circumstances of the burn injury.
- To identify psychosocial factors that will impact on treatment and compliance to achieve optimal treatment outcomes including: previous history of trauma/mental health history of both primary caregivers and patient/ drug and alcohol history of both patient and primary caregivers/general coping styles of primary caregivers/parenting style/developmental achievements of patient/school performance including learning difficulties and behavioural problems/self-concept of child/peer relationships/impact on siblings/cultural and environmental influences.
- To determine intervention goals with patient and primary caregivers.
- To provide education/information as appropriate to patient/primary caregivers/significant others regarding normal psychosocial responses to burns treatment, recovery and adjustment.
- To enhance the existing coping strengths and strategies of patient and primary caregivers to prevent development of maladaptive coping mechanisms.
- To identify patient/primary caregivers practical support needs and facilitate management or community referrals as appropriate.
- To participate in the development of discharge plans together with multidisciplinary team members.
- To prepare patient/primary caregivers for discharge by reviewing potential challenges/providing psychosocial skills training.
- To make arrangements for psychosocial follow-up post discharge as required.

For more detailed information please refer to the NSW Agency for Clinical Innovation (ACI) Social Work Paediatric Clinical Practice Guidelines document available online.

2.15 Physiotherapy

Scarring that results from a burn injury leads to many adverse consequences, including limitation of normal function and mobility, restriction of growth, altered appearance and adverse psychological effects.

Physiotherapists are involved in burns care from the time of admission (or first presentation to ambulatory care) and continue to provide treatment and therapy until scar maturation occurs - which is commonly 12 to 18 months post burn injury. The time it takes to reach scar maturity varies between individuals.

It is essential for the Burns Physiotherapist to be able to review the burn injury without a covering of dressings in order to properly assess the depth & location of the burn. This aids in decision making regarding the design & fabrication of splints, development of exercise regimes & application of pressure for scar management.

The Burns Physiotherapist must review all patients with:

- Burns to the anterior neck
- Burns on or near the axilla and over or near any joint
- Facial burns
- All hand burns, especially those with palmar involvement. All burns to the palmar surface need review, regardless of depth and healing time. They will usually require a burns specific plaster designed to maintain a good stretch over the palm while healing occurs and prevent contracture formation. Splinting also helps to keep the dressing in place.

All burn injuries taking less than 14 days to heal need to be reviewed at least once by a Physiotherapist. Some burn injuries that heal within 14 days can be very red & irritated looking and may require ongoing scar management.

All burn injuries taking longer than 14 days to heal or requiring a skin graft will need ongoing Physiotherapy review for scar management.

Role and responsibilities of the Burns Physiotherapist include the following:

- Decisions regarding splinting of joints (POP, soft cast, thermoplastic) and application regimes of splints
- Individualised positioning program for all Inpatients & PICU patients
- Assistance with mobilisation and exercise
- Measurement, fitting & education regarding custom made pressure garments
- Application of other forms of pressure
- Application of Silicone and scar softening products. The Physiotherapists need to be informed of all after hours calls concerning pressure garments, splints, & silicone products
- Assessment for Coban™ (self-adherent wrap) suitability, application of Coban™ and the education for family
- Selection of participants, administration and management of the annual burns camp

2.16 Child Life Therapy

Child Life Therapists are part of the allied health team, and have a professional qualification in child development and education. The Child Life Therapist aims to help children cope with their hospital experience by using medical play, procedural support and appropriate play experiences centred on the child's abilities and interests.

A core part of the Child Life Therapist's role is the provision of preparation prior to procedures through the use of developmentally appropriate teaching tools, this is often followed up with support and distraction during procedures and the facilitation of coping strategies

As clinicians we can remember to use ONE VOICE:

ONE voice at a time during the procedure

NEED to offer a role to the parent and or the patient eg read, hold hands, whisper reassurance. Encourage their involvement and acknowledge their capacity to assist the child in feeling calm and reassured.

EDUCATE the child and family before the procedure about what to expect.

VALIDATE the child with words and gestures. Encourage them and acknowledge behaviours that are helpful to completing the procedure. Otherwise acknowledge what it was difficult for them.

OFFER the most comfortable, non-threatening position. Children often feel more in control and less anxious when they are sitting up.

INDIVIDUALISE your game plan. Find out what has worked well before and what hasn't, especially for special needs children.

CHOOSE appropriate distraction to be used.

ELIMATE unnecessary people not actively involved with the procedure. Less people and less noise means that the process is less intimidating.

3 Minor Burn Management

If the child meets the criteria for a minor burn injury and has been assessed as being suitable for outpatient management, a decision needs to be made on the most appropriate location to provide follow up. This may be the BPTC at CHW, a local Paediatric Ambulatory Care (PAC) Service, Outreach Service or a Local GP.

Please see below for instructions on how to make appointments.

Established PAC centres that are linked to the CHW Burns Service currently exist at the following NSW Health Facilities:

- Fairfield Hospital
- Campbelltown Hospital
- SCHN, Randwick
- Wyong Hospital

- Wagga Wagga Hospital
- Bathurst Hospital

Prior to Discharge from ED:

- Parents/ carers need to be instructed to leave their child's dressing intact and keep it clean and dry. For sponge bathing in non-bandaged areas.
- Various Fact Sheets for Burns Care / Dressings are available on the CHW Intranet. They can be located by selecting Burns Unit - Resources tab - Factsheets.
- Simple analgesia (paracetamol & ibuprofen) is recommended for pain relief. This will also help with management of high temperatures.
- A normal well-balanced nutritious diet high in protein is recommended with encouragement of extra fluid for the first few days following the injury.
- Follow-up is arranged as ordered by the Burns / Plastics team.
- Parents are informed that they need to contact the BPTC or the Burns Unit should their child develop persistent high temperatures, the dressings become wet / soaked with excessive exudate, or the bandages become dislodged.

3.1 Burns and Plastic Surgery Treatment Centre and Kidsburns

The BPTC provides outpatient paediatric burns and associated wound care for Plastic surgery outpatients. This service is the only Nurse Practitioner (NP) led multidisciplinary outpatient clinic in the country for specialist paediatric burns care and management. This also encompasses the Kidsburns telehealth service, a digital referral and consultation service for paediatric burns across NSW. These services support greater collaborative management of children in Local Health Districts (LHD's) across the state.

As dressing technologies have advanced and the ability to safely administer analgesia and conscious sedation in the outpatient setting has improved, there has been a significant shift in the number of patients no longer requiring hospital admission (or a reduced length of admission) for the provision of specialist burns care.

The benefits of treatment in the outpatient setting for the paediatric patient include decreased time required to be spent in the hospital environment, decreased disruption to the family unit and the provision of timely and coordinated outpatient holistic care delivery by the BPTC multidisciplinary team.

BPTC operating hours are Monday to Friday 0730 to 1600hrs (excluding Public Holidays). Appointments are required to attend the clinic. Appointments may be made directly in business hours on 9845 1044. After hours, Clubbe Ward nursing staff (9845 1114) will take booking information and a call back service is provided the next business day by the BPTC clerk to make the appointment.

Kidsburns is an NP led 24 hour paediatric state-wide burns referral and consultation service utilising telephone, email and digital photographic image review to provide burns advice and management recommendations. In business hours this service is managed by the NP. After hours the on call Registrar for burns (Paediatric surgery/ Plastic surgery) provides service support.

See BPTC / Kidsburns Practice Guideline for further information.

Contacts: Burns Nurse Practitioner: 9845 1850 / page 7038
CNS2 Burns and Plastics: 9845 2160 / page 6153
BPTC: 9845 1044 (Business hours)
Kidsburns: Kidsburns@chw.edu.au

4 Routine Burns Dressing Change

A Burns dressing change needs to be performed in a clean, timely and safe manner and involve the use of appropriate analgesia and sedation in order to minimise pain, anxiety, and the potential risk of hypothermia and wound infection.

A Burns dressing change is a complex procedure that requires clinical skills mastered through instruction and practice. Careful planning and organisation is required.

The procedure has the potential to be a traumatic one for all concerned and should ideally be attended to by experienced staff in an environment geared to meeting the needs of the child, parents and nursing staff.

An experienced Burns Nurse should be present during the burns dressing change. Less experienced staff may attend to a burns dressing change with the support and guidance from more experienced RN's.

Depending upon the TBSA% or burn distribution involved, you may choose to utilise the Burns Shower Trolley or attend to a burns dressing change with the patient positioned on a treatment table using a wash bowl.

Nursing staff from the Burns Service (Clubbe Ward & the Burns and Plastic Surgery Treatment Centre) are available for consultation or assistance when nursing staff from other areas are not familiar with the procedure.

Prior to attending to a burns dressing change, all areas in the designated treatment room must be adequately cleaned (refer to Section 5.6 Cleaning the Treatment room)

4.1 Pre-medications

Prior to all burns dressing change procedures, it is essential that an assessment is made regarding the child's need for analgesia and sedation.

Pre-medications need to be administered at the appropriate timeframe prior to the procedure to allow for optimal efficacy. Verbal consent is gained from the child's parent / carer for administration of a premedication.

The Burns Anaesthetic Fellow will review each patient and prescribe an appropriate pre-medication. The drug/s of choice are determined on an individual basis and may include an opiate such as morphine or oxycodone, along with paracetamol. Midazolam may also be used for its dissociative, anxiolytic and sedative qualities. Inhaled nitrous oxide may also be administered during the burns dressing change procedure.

More complex burns dressing procedures may require the use of additional medications.

Please refer to Appendix 4: CHW oral sedation drug formulary for a burns dressing change for more information.

In some situations it may be necessary to book patients onto the Burns Procedure List in the operating theatre for their dressing change – please refer to the Burns Service departmental document Business Rules for the Burns Procedure List.

For patient safety, children must be fasted prior to the administration of pre-medications and use of nitrous oxide. **Please refer to [CHW Pain Management Practice Guideline](#) and [Procedural Sedation \(Ward, Clinic & Imaging areas\) Policy](#) for fasting instructions.**

Once pre-meds have been administered, patients need to be monitored as per above policies, and observations recorded until they have returned to their pre-sedation state.

Pain scores and efficacy of pre-meds need to be documented.

4.2 Preparation for a burns dressing change

The child (when age appropriate) along with parents / caregivers need to be given an adequate explanation of the procedure that is to take place. Verbal consent is gained for the procedure to be undertaken. Parents / caregivers are encouraged to be present during the procedure and may require the support of the Burns Social Worker.

Involve the Child Life Therapist when appropriate in the preparation phase. Their involvement aims to minimise stress and anxiety related to the change of burns dressing and helps the children to cope positively by using age appropriate play and procedural support. Older children are involved, wherever possible, in deciding the timing of the dressing change as having input into this helps to give them a sense of control.

Prepare environment:

- Ensure treatment room has been cleaned
- Check emergency equipment, ensure suction and oxygen systems are set up, connected and working
- If nitrous oxide is to be administered, check that a nitrous oxide circuit, filter and appropriate sized mask is available
- Patient monitor is turned on, appropriate size oxygen saturation probe ready
- Pre warm treatment room using overhead heating panels / lights as required.
- Use warm blankets throughout procedure to minimise heat loss & hypothermia. For patients with a larger TBSA% burn consider a staged approach to the dressing change exposing smaller sections at a time. Due to the disruption in thermoregulation patients with a large TBSA% burn injury are at risk of hypothermia.
- Have distraction / Child Life Therapy interventions at hand as required

Prepare Burns Dressing Trolley:

- Using an aseptic technique, set up the burns dressing trolley with all required dressing products and consumables.
- Fully open a sterile plastic dressing sheet and place on top of the dressing trolley in order to create a sterile field.

- Open sterile gloves, dressing scissors and appropriate primary and secondary dressing products (if known) onto dressing sheet. Have external crepe bandages and tapes to fix and secure them in place at hand.
- If the patient is colonised with a multi-resistant organism such as MRSA all excess equipment and dressings are to be removed from the room in order to decrease the risk of cross contamination.

4.3 Removal of Dressings

When removing soiled dressings, the aim is to use a technique that:

- Does not disrupt re-epithelialisation (cause damage to the healing burn wound)
- Minimises trauma wherever possible
- Does not contaminate “clean” areas with dirty dressings.

Process:

- Hand hygiene
- Adhere to Personal Protective Equipment (PPE)
- A clean impervious gown must be worn by all clinicians involved in the procedure.
- Use non-sterile gloves to remove dressings
- Outer bandages are removed either by un-wrapping them or use blunt tipped scissors to cut through them.
- Soiled dressings are then removed and discarded (as per CHW Waste Management Policy) into a bin taking care not to contaminate the floor and surrounds. Heavily soiled or contaminated dressings should be discarded into a contaminated waste bin.
- It is normal procedure to only remove those dressings that are easily removable. If dressings are well adhered to the wound consider sponging area with water or soak dressings off in the bath in order to minimise trauma.
- An adhesive remover product such as De-Solv-It can be used to aid in the removal of adhesive tapes (Hypafix®).

CAUTION: Do not spray De-Solv-It onto an open burn wound. Avoid prolonged contact of De-Solv-It against the skin, prevent De-Solv-It becoming soaked into a child's nappy or surrounding clothing, prolonged contact against the skin may cause severe redness and skin breakdown.

- In order to reduce this potential risk of harm to patients please take note of the following:
 - Encourage removal of all clothing from nearby areas when attending to a burns dressing change or procedure that involves the removal of Hypafix®.
 - Use a towel to provide coverage & maintain modesty.
 - If De-Solv-It is used near the abdomen or thighs of younger children who are in nappies, either remove the nappy or ensure that a nappy change is attended to at the end of procedure.

- When using De-Solv-It please select the stream option on the trigger nozzle rather than spray. By applying the De-Solv-It directly onto the Hypafix® in a stream it will avoid unnecessary spray coming into contact with surrounding skin.
- At all times please ensure that any skin that has come into contact with De-Solv-It is thoroughly washed with soap & water and rinsed at the end of the procedure.
- Alternatively, an adhesive remover wipe such as Remove[◊] wipes may be used for smaller surface areas. This too will need to be washed off the surrounding skin surface.

4.4 Burns Dressing Change Procedure

Equipment required:

- Clean impervious gown
- PPE
- Clean draw sheet for shower trolley / treatment bench
- Bath towels
- Absorbent underpads (Bluey's)
- Clean wash bowl / bowl stand
- Dressing trolley
- Sterile plastic sheet / cover for dressing trolley
- Rediwipes for cleaning (disposable wash cloths)
- Non sterile gloves for removal of dressings and cleansing
- Sterile gloves for application of dressings
- Scissors (Blunt tip, Dressing & Iris)
- Appropriate cleansing solution
 - Chlorhexidine gluconate 5% solution (standard)
 - Acetic acid solution (for pseudomonas infection)
 - Other (Polyhexanide & Betaine surfactant, Betadine®)
- Wound swab sticks
- Sterile water bottle to moisten Acticoat[◊] (if Acticoat[◊] dressing required)
- Nitrous oxide circuit, filter and mask (if required)
- Appropriate waste bins

Process:

- Hand hygiene
- Adhere to PPE (protective eyewear is mandatory when incising and de-roofing fluid filled blisters)

- A clean impervious gown must be worn by all clinicians involved in the procedure.
- Set up dressing trolley and prepare Treatment room as listed in 5.2 Preparation
- Remove old dressings as above in 5.3
- Hand hygiene and don clean non sterile gloves for wound cleansing
- Cleansing the burn wound aims to optimise the healing environment and decrease the bacterial burden from the wound surface. Cleansing washes away residual topical agents from previous dressings, wound exudate, blistered skin and necrotic non-viable tissue along with biofilm.²⁶

Chlorhexidine gluconate 0.05% aqueous solution is the SCHN standard cleansing solution for burn wounds. Use a 1:100 dilution of the 5% chlorhexidine gluconate concentrate. For example add 10mLs of the concentrate to every Litre (1000mLs) of tap water used.²⁷ Avoid the use of chlorhexidine around the eyes, ears and mucous membranes.

- Chlorhexidine gluconate is a topical antiseptic and antimicrobial disinfectant which provides fast acting activity against a wide range of microorganisms, especially against those commonly present on the skin.²⁷
- Use a Rediwipe (disposable wash cloth) soaked in the chlorhexidine gluconate cleansing solution to clean the burn wound surface. Wipe firmly in order to remove loose blistered skin, wound exudate and devitalised tissue. A few firm wipes are preferable to a repeated number of dabs and soft wipes. Take care not to damage newly re-epithelialised areas.
- Cleaning should cease if excessive bleeding or pain occurs.
- Other cleansing solutions may be ordered by the treating team. For example acetic acid solution to treat pseudomonas infections. When requested, patients will require a daily change of dressing and acetic acid soak prior to application of dressings.
 - Clean burn wound surfaces as above
 - Place Rediwipes soaked in dilute acetic acid solution (concentration of 1.5%) over the affected burn sites – avoid the eyes, ears and mucous membranes.²³⁻²⁵

Please Note: CHW pharmacy currently supplies a 3% acetic acid solution. To make a 1.5% solution - dilute 1 part of 3% acetic acid solution with 1 part of sterile water for irrigation ie. 1:1 dilution.

- Leave acetic acid soaks in contact with the burn wound surface for 5 minutes (prepare burns dressings during this time)
- Remove acetic acid soaks and apply burns dressings
- Use fine tipped Iris scissors to incise and de-roof blisters / trim blistered skin – please refer to section 5.5 on Blister management
- Once cleaning is complete dry surrounding non burnt areas with a towel (adhesive tapes used to secure primary and secondary dressings will not adhere to moist / wet surfaces)
- Take burn wound swabs of each affected body site. Swabs are used to monitor the presence of infection.

- Take digital photographs of the burn wound areas – ensure a consent form for clinical photography has been completed.
- Each burns dressing change allows you to monitor the progression of burn wound healing. Take the time to thoroughly assess the burn wound, calculating the TBSA% if required, noting burn depth/s, burn wound appearance and test for capillary refill.
- A Laser Doppler Imaging (LDI) scan may also be attended (up to 5 days post-acute burn injury). The LDI scan is a diagnostic tool used to assess blood flow within the area of burn injury and helps predict healing potential.
- Where possible, in the case of a major burn injury, a bare weight of the patient should be obtained.
- Contact appropriate multidisciplinary burns team members to review the patient during the dressing change.
- A Doctor from the treating team may wish to be present to review the burn, make a skin grafting decision for a deep burn wound and / or discuss the treatment plan with the child's parents / caregivers. In the BPTC the Nurse Practitioner will assess the acute burn presentation and formulate a treatment plan.
- The Burns Physiotherapist utilises the dressing change time to assess the areas of burn injury and provide therapy as required. This may include active and passive exercises and decision regarding the necessity and type of splinting.

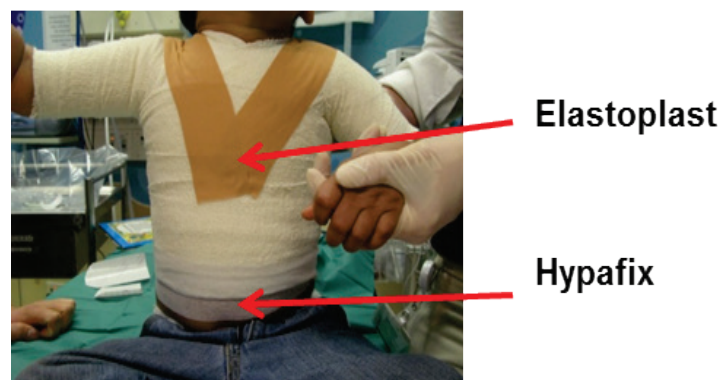
Ensure gloves are changed after cleansing the wound and sterile gloves are donned prior to the application of the new burns dressing. It is important to maintain an aseptic technique at all times.

- Apply required dressing products to the burn wound, securing each layer as you go to prevent slippage. Multi-layered and combination dressings may be required. **Refer to Section 6: Dressing Specialised**

Areas and Section 7: Burns Dressing Materials for further information.

- Ensure that all external crepe bandages are well secured.
- Elastoplast® tapes may be applied to fasten the ends of crepe bandages – take care to avoid the application of Elastoplast® tapes directly on the skin. Use strips of Hypafix® to anchor the edge of the bandaging to the skin (especially over the lower abdomen and upper thighs). See Picture 3.
- Clips or safety pins are not recommended for use in securing bandaging – these are a hazard to young children and should be discarded in a sharps container.
- The Burns Physiotherapists often need to apply plaster slabs +/- soft cast or thermoplastic splints over the external bandages and may make some suggestions regarding bandaging technique.

Picture 3





- Top up analgesia and sedation may be required during some procedures. Post procedural pain relief may be required for some patients. Discuss any concerns regarding analgesia and sedation with the Burns Anaesthetic Fellow.
- A burns dressing change creates the opportunity for staff to provide education to the child (age appropriate) and family members in regards to the burn injury.
- At completion, document the events of the procedure along with your burn wound assessment in the patient's medical record, include efficacy of pre-medication in your report. Also include a plan for the next dressing change.

4.5 Burn Blister Management

- Currently, there is no world-wide consensus amongst Burn care professionals on how to manage a burn blister. The argument for maintaining an intact blister is based on the idea that the intact blister provides a natural biological protective cover to the burn wound. However, you cannot access the wound bed base to assess burn depth in this situation.
- Those that are advocates for debriding the burn blister base their argument on the notion that it decreases the risk of wound infection and complications.
- The management of burn blisters should take into consideration the following: infection, healing rate, functional movement, aesthetic outcome, patient comfort, ease of dressing care and cost efficiency ¹¹
- Best practice for burn blister management at The Children's Hospital at Westmead supports de-roofing and full debridement of the burn blister. This allows for visualisation of the wound bed, assessment of burn depth, direct application of dressing to wound bed and correct positioning & alignment for splinting. With the use of appropriate pre-medications issues relating to pain management can be overcome.
- **Refer to the Blister Consensus document: Appendix 5.**

Process:

- Clean the burn wound
- Use fine tipped or Iris scissors to incise the blister head and drain fluid (See Picture 4)
- Trim around the edges of the blister to enable you to fully de-roof and remove the devitalised tissue. Trimming decreases the amount of pain associated with the procedure as opposed to giving a firm wipe of the area to remove the devitalised tissue. (See Picture 5)
- Dress the burn wound with an appropriate wound dressing – see **Section 6 Burns Dressing Materials**

<p><i>Picture 4 : Intact fluid filled blister</i></p> 	<ul style="list-style-type: none"> • Incise and drain blister fluid • Trim around the edge of the blistered area to remove blistered skin
<p><i>Picture 5 : De-roofed blistered area</i></p> 	<ul style="list-style-type: none"> • The wound bed is visible • Burn depth assessment can now be made • The burns dressing product will now have direct contact with the wound bed

4.6 Infection Control – Cleaning the Treatment room area

- At the completion of each dressing change, Nursing staff are responsible for thoroughly cleaning the shower trolley / bath / treatment bench / dressing trolley and surrounding areas. This is done to minimise the risk of cross contamination for the next patient to use the treatment room.
- Wash hands and don disposable gloves to protect yourself against contamination and the irritant effect of the cleansing agent. Goggles are available and should be worn by staff.
- Remove all debris from the shower trolley / bath, including particles in the strainer and chains. Rinse surfaces of the shower trolley / bath with the shower hose.
- Apply cleaning solution to all areas including pillow, plug, strainer and chains. With a Rediwipe spread the solution all over the bath, plug, chain and bath pillow and clean thoroughly.
- Difficult stains are removed by Cleaning Services at the end of each day.
- The dressing room treatment bench, weigh scales and dressing trolley are wiped thoroughly with large alcohol impregnated bactericidal wipes (Isowipes®). A clean drawsheet is placed on the treatment table / shower trolley in preparation for the next procedure. Gloves are disposed of and cleaning solutions placed in a high storage cupboard out of the reach of children.

If the patient is colonised with a multi-resistant organism such as MRSA, Cleaning Services need to be instructed to do a terminal clean of the room prior to the next procedure.

5 Managing Specialised Areas

5.1 Face, Head and Neck

- Small surface area burn wounds to the face may be left exposed (especially those around the eyes and over the nose and lips). These areas will require regular application of soft white paraffin in order to keep the burn surfaces moist and prevent them from drying out. The wounds should be cleaned with water or normal saline prior to application – avoid the use of chlorhexidine gluconate solution around the eyes, ears and mucous membranes.
- Chloramphenicol ointment may be used in place of soft white paraffin for burn wounds over the peri-orbital region. This must be prescribed by a Medical Officer on the Medication Administration Record (MAR).
- Burn wound dressings (as described in Section 7) can be applied to larger surface area burn wounds over the face, neck and scalp. Select dressings that conform to the contours of the face and minimise bulk. Cotton wool wadding (Webril™) can be applied over the primary and secondary dressing layers and secured in place with a crepe head bandage.
- Biobrane® is commonly used to treat mid dermal facial burns. The Biobrane® may be left exposed or it may be covered with secondary dressing layers and secured with a head bandage. If left exposed the patient will require daily facial cares – see Sections 6 and 6.5
- When the distribution of the burn wound involves the scalp, over lying hair must be shaved to expose the burn wound margins in order to accurately assess the full extent of the burn injury and allow for application of the appropriate burns dressing. The rationale for shaving hair must be discussed with parents. Sometimes religious beliefs preclude cutting of the hair under normal circumstances, and this may cause great distress for parents if they have not been informed or do not understand the rationale.
- When facial burns prevent the use of routine fixation (Comfeel® and Hypafix®), tracheostomy tape may be used to tie and secure a nasogastric tube in place.
- Securing dressings to burn wounds over a child's neck can be difficult. A suitable primary dressing, such as Acticoat^o covered by Mesorb®, Webril™ and Hypafix® or the Meplix® range of products secured with and Hypafix® can be successfully used to dress burn wounds over the neck. The dressings are best applied when fashioned as a "collar" and secured in place with small strips of Hypafix®. A foam collar may be used to help keep primary and secondary dressings in place. This should be discussed with the physiotherapists prior to application.

Under no circumstances should a crepe bandage be wrapped around a child's neck to secure dressings.

5.2 Ears

- **It is important to separate 2 burnt surfaces.** If the ear and the area behind the ear are burnt, both areas should be dressed and padded to avoid the 2 burnt surfaces coming into contact with each other. Ideally, when there are significant surface area burns to the face, scalp and ears, burn wounds to the ears and the area need to be incorporated into the head dressing and bandage if appropriate. Bactigras[◊] or Jelonet[◊] are the dressings of choice for ears.
- For small surface area burn wounds to the ears it is appropriate to leave them exposed and apply soft white paraffin.
- Foam doughnuts made of Meplix[®] can be made to fit around the ear to help prevent pressure on the external ear. To protect the helix (cartilage) of the ear, the ear must lie in a natural position and the padding must be high enough so that any pressure from the bandaging is borne by the padding.

5.3 Arms

- It may be necessary to elevate the arms in the acute period post burn injury in order to reduce oedema, especially when the patient has circumferential burns of the fingers, hand or upper limb. This may be achieved by resting arms up on a pillow or by the application of a thermoplastic splint by the Physiotherapist.
- When bandaging the upper limbs, application should commence distally (at the fingers) and move proximally up the arm (towards the body).

5.4 Hands & Fingers

- If there is concern in the first 24-48 hours post burn injury re the formation of oedema and the impact on circulation, hand dressings must be applied in such a way as to allow for viewing the fingertips and conducting circulation observations.
- It is usual practice to dress each finger individually (separating burnt surfaces) with a dressing such as Bactigras[◊] and covering loosely with Webril[™]. The fingertips and nail beds need to be left exposed. The whole hand is then bandaged as shown in Figure 1A
- A flap style dressing is then applied to the fingertips to allow easy access for circulation observations. See Figure 1B
- Once oedema has subsided / resolved, the fingers can be individually dressed with an appropriate long term dressing then wrapped using Webril[™] and a 2.5cm width conforming elastic gauze bandage. See Figure 1C. Use a 5cm width conforming elastic gauze bandage or a crepe bandage to wrap the remaining palmar surface and hand.

Care must be taken when applying individual finger conforming elastic gauze bandages. DO NOT PULL THE BANDAGE TIGHTLY DURING APPLICATION. Just lay the bandage on top of the surface to be wrapped and overlap each layer slightly. Do not pull circumferentially around the fingers, hand or wrist. Take care not to cause pressure areas. A layer of cotton wool wadding (Webril[™]) must be insitu prior to the application of finger bandages.



Figure 1A



Figure 1B



Figure 1C

The Burns Physiotherapist needs to review patients who have a hand burn. It may be necessary to apply a hand splint over the dressing to maintain the hand in a neutral but functional position. When no Physiotherapist is available to make the splints, nursing staff can use a temporary plaster back slab.

5.5 Torso

Burns dressings to the torso need to be secured with a “T-Shirt” style outer bandage.

Start bandaging by anchoring the bandage on an upper arm. It is important to bandage "away from yourself" (start from the anterior aspect of the arm and wrap from front to back in a figure of 8 style) going over the shoulders. This technique encourages correct posture. Avoid making the axilla area bulky and difficult to mobilise. Arms should be positioned at 90° when bandaging the torso or >90° if an axilla splint is required.

5.6 Legs

If the upper thigh is involved, the outer bandage should incorporate and be anchored around the waist to avoid slippage. Securing each dressing layer with strips of Hypafix® helps to minimise slippage.

Legs should be bandaged in extension (straight) and splints may be necessary. When bandaging the legs, start distally (from the toes) and move proximally (upwards towards the body). Incorporate the feet in your leg bandage, even if they are not burnt, to avoid oedema formation.

Arms need to be positioned at 90 degrees (at least) when bandaging the torso, this allows for easy mobility, exercises and potential application of axilla splint.

5.7 Feet

Once again, it is important to separate 2 burnt surfaces. Ensure the web spaces between the toes are separated and dressings placed over each individual toe. It is often difficult to bandage toes separately due to their size. A large supportive dressing allows for mobilisation and helps keep the toes in a normal position.

The Burns Physiotherapist needs to review patients who have a burn injury to their foot / ankle / toes. Splints may be required.

5.8 Perineum

Children who have sustained a burn injury to the perineum are generally catheterised. This allows for monitoring of urine output, minimises pain and enables the area to be kept as clean as possible.

Dressings to this area need to be changed daily or more frequently when soiled or contaminated.

Males: If the penis and/or scrotum are burnt, apply a Bactigras[◊] dressing using double layers and cover with Webril™. A scrotal support may be necessary. Soft white paraffin or chloramphenicol ointment can be applied to small surface area burns over the male genitals. After 24-48hrs, an Acticoat[◊] dressing may be applied if deemed appropriate.

Females: Dressing the female perineum is more difficult but the type of dressing is the same as for males. The bandages from the abdomen and upper thighs can be adapted to keep the dressing in place. A combine pad or feminine hygiene pad can be used to help keep Bactigras[◊] dressings in place.

For young infants and children still in nappies: strips of Bactigras[◊] can be cut to size and placed over burn wounds within the nappy area. When there are significant deep surface area burns to the buttocks and perineum a faecal management system may be required.

Please see Appendix 6: Faecal management and rectal irrigation regime for the management of faecal incontinence in patients with a burn injury.

6 Dressing Products

Effective burn wound management requires the selection of the most suitable burns dressing product and application technique in order to promote the healing of burn wounds, prevent infection and minimise pain.

There are an ever-increasing number of burns dressings that can be used to treat burn wounds. Below is a list of the current burns dressing products used in the Burns Unit at CHW and throughout the SCHN Network. A description of each product is provided along with its action and clinical use. For application instructions please refer to each individual dressing in the following Sections: 6.2 – 6.6.

Acticoat[◊] and Acticoat[◊] 7

Acticoat[◊] and Acticoat[◊] 7 are nanocrystalline silver impregnated antimicrobial barrier dressings. When moistened with sterile water for irrigation they release silver directly onto the burn wound surface. This action provides a barrier to bacteria, reducing the risk of

wound colonisation. Acticoat[◊] and Acticoat[◊] 7 need to be kept moist in order to maintain the continued release of silver from the dressings. This is achieved through a multilayer closed dressing system which maintains a moist wound healing environment. Acticoat[◊] and Acticoat[◊] 7 are used in the acute stage of burn injury and are appropriate for mid dermal, deep dermal and full thickness burn wounds. They are appropriate for use on burns of indeterminate depth in the initial stage of injury.

Available[◊] as Acticoat[◊] - application for 3 day efficacy and Acticoat[◊]7 - application for 7 day efficacy¹⁶. Both types are available in sheets of various sizes.

Biobrane[®]

Biobrane[®] is a biosynthetic wound dressing constructed of a silicone film with a nylon fabric partially embedded into the film. The wound contact layer of the nylon fabric has been chemically bound (coated) with collagen. Blood & serous fluid clot in the nylon matrix thereby firmly adhering the dressing to the wound until epithelialisation occurs.¹⁶

Biobrane[®] is a temporary skin substitute. It is a flexible product. It has been shown to reduce pain and reduce healing times when compared with traditional treatments.¹⁶

The 2 main uses for Biobrane[®] in the acute management of burn injuries at CHW are:

1. A definitive dressing for mid dermal burns. Application of Biobrane[®] should take place within the first 24-48 hours post burn injury following initial wound debridement. Application may occur in the operating theatre. Experienced Burns Nursing staff (NP / CNC / BSRN) may apply Biobrane in the ward or BPTC setting.

Avoid the application of Biobrane[®] to facial burns around / below the mouth & chin (especially in toddlers).
2. To provide a temporary wound coverage following surgical debridement of a deep dermal – full thickness burn. In this instance all eschar must be removed. Biobrane[®] will not adhere to dead tissue and any remaining necrotic tissue may cause infection.¹⁶ The Biobrane[®] will be left insitu until skin grafting occurs.

Mepilex[®] product range

The Mepilex[®] range of dressing products consist of a soft polyurethane foam pad, an outer backing film, and a non-adherent silicone based wound contact layer. They are available in different sizes and thicknesses to accommodate different levels of wound exudate and application use. They are conformable to all surface areas and their flexibility allows for a full range of movement.

Mepilex[®] Ag is a polyurethane absorbent foam pad that contains silver particles in the foam layer. As the foam absorbs wound exudate, silver ions are released within the foam providing an antimicrobial barrier, thus reducing the risk of wound colonisation. Mepilex[®]Ag provides a moist burn wound healing environment and is appropriate for use on superficial to mid dermal burn wounds. It should not be used on deep dermal or full thickness burn wounds. Mepilex[®]Ag may be used in the initial acute stage of injury, or may be used following an initial application of Acticoat[◊]. Mepilex[®]Ag maybe left intact for 5 to 7 days dependent upon the level of wound exudate.

Mepilex® is a plain polyurethane absorbent foam pad with a silicone based wound contact layer. This product is the same thickness as Mepilex®Ag however it does not contain silver particles. It has no antimicrobial cover. It is primarily used to dress fresh donor site wounds following harvesting of skin for skin grafting. It can be left intact for 5 to 7 days. Strikethrough of exudate should be monitored in the post-operative period. Mepilex® may also be used to treat superficial dermal burn wounds that no longer require an antimicrobial coverage.

Mepilex®Lite is a thinner version of Mepilex®. It has no antimicrobial cover. It is primarily used for the protection of newly healed fragile skin towards the end stage of healing. It is useful in dressing fingers and toes due to its thin and conformable nature. It may also be used to dress small raw wounds under pressure garments.

Mepilex®Lite has a much lower absorbency capacity than Mepilex®, therefore it should not be used on highly exuding wounds.

Mepilex®Lite may be left intact for up to 5 to 7 days.

Bactigras[◇]

Bactigras[◇] is a non-adherent tulle gras impregnated with soft white paraffin and chlorhexidine acetate 0.5%. It provides an antibacterial coverage. It can be used as a short term dressing for an acute burn wound and may be left intact for 2 days. Bactigras[◇] may be left intact for up to 5 days over a skin graft. Bactigras[◇] may be applied after initial assessment in CHW ED where debridement +/- Laser Doppler Imaging scan (LDI) and application of Acticoat[◇] is planned for the following day. Bactigras[◇] is the preferred dressing prior to theatre for ease of removal. It is available in different sized sheets or rolls.

Jelonet[◇]

Jelonet[◇] is a non-adherent, non-medicated tulle gras dressing impregnated with soft white paraffin.

Jelonet[◇] can be used as a substitute dressing for Bactigras[◇] on patients who have a known chlorhexidine allergy or where antimicrobial action is not required.

Jelonet[◇] is used as a post-operative dressing over wide meshed split skin grafts or Meek grafts when cultured epithelial cell suspension spray is used.

Flamazine[◇]cream

Flamazine[◇] is a topical antibacterial cream containing silver sulphadiazine 1%. It can be used on all burn types and burn depths – avoiding use around the eyes, ears and mucous membranes.

Daily dressings with Flamazine[◇] cream may be requested by the treating Burns Surgeon for an infected burn wound.

Flamazine[◇] is available in 100gm tubes or 500gm tubs. In order to prevent cross contamination, one tube or tub of Flamazine[◇] should be reserved for use for one patient only.

Atrauman®/ Atruaman®Ag

Atrauman® in a non-adherent triglyceride impregnated hydrophobic polyester tulle dressing³⁰.

It is indicated for use in the treatment of exuding wounds, abrasions, wounds post Plastic Surgery procedures, end stage healing of donor sites and skin grafts.

It is a short term dressing, may be left insitu for 2-3 days.

Also available as Atrauman®Ag

Comfeel® Plus Transparent

Comfeel® is a thin flexible hydrocolloid dressing. It consists of moisture absorbing sodium carboxymethylcellulose (CMC) particles²⁸. It provides a moist wound healing environment and is able to absorb low levels of wound exudate. It has no antimicrobial action. Comfeel® is suitable for use on small scattered superficial dermal burn wounds and can remain intact for 3 to 5 days (dependent upon level of exudate). It may be used at the end stage of burn wound healing and is also used for scar management (as directed by the Burns Physiotherapist).

Hypafix®

Hypafix® is a self-adhesive woven retention tape with a one way stretch. It is used to fix and anchor dressings and external bandaging. It may also be used as a primary method of fixation over skin grafts.

Hypafix® is available in rolls of different sized widths.

Care must be taken not to tightly wrap Hypafix® circumferentially around fingers and toes.

Care needs to be taken when removing Hypafix® – especially when it is the primary dressing over a skin graft. Utilise an adhesive remover such as De-Solve-It, Remove^o wipes or olive oil. A gentle hypoallergenic product that does not need to be washed off such as Niltac™ may be indicated for use. See Section 5.4 for more detail on removing Hypafix®.


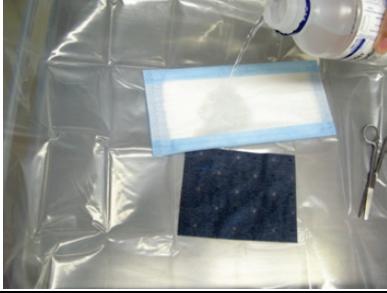
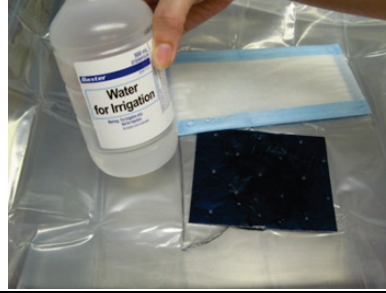





Sorbolene

When a burn wound has re-epithelialised (healed) it no longer requires a burn wound dressing. The surface of a healed burn should be dry to touch. In this situation, a moisturiser such as sorbolene with 10% glycerine cream is recommended for use on all healed areas. Use a small amount and fully massage into the healed burn areas 4 to 5 times per day. This aids in maintenance of the skin's elasticity and will also help to relieve itch. Application of the cream will decrease over time with the introduction and application of scar management products as directed by Physiotherapist.

Paraffin

Soft white paraffin is applied topically over exposed facial burns to keep the wound surfaces moist. Frequent reapplication throughout the day is required to ensure a moist wound surface is maintained.

6.1 Acticoat^o and Acticoat^o7 application technique

<i>Picture 6 : Application of ACTICOAT^o dressing</i>		
		
Clean the burn wound	Moisten Acticoat ^o & Mesorb ^o with sterile water	
		
Apply Acticoat ^o to wound - blue side down	Cover Acticoat ^o layer with moistened Mesorb ^o pad	Apply a layer of cling film (or Op-Site ^o / Tegaderm TM)
		
Seal edges to secure in place. This prevents evaporation of moisture.	Wrap with a layer of Webril TM (cotton wool padding)	End with a crepe bandage. Tape securely in place

Procedure:

1. Wash the burn wound in chlorhexidine gluconate 0.05% solution (see section [4.4 for dilution details](#)), and pat dry. Remove any dead tissue and debride blisters to ensure a clean wound bed.
2. Select the appropriate size and type of Acticoat^o or Acticoat^o7. Acticoat^o or Acticoat^o7 may contract on the wound site so there should be about a 2 to 5cm overlap around the wound margins. This varies with the size of the child and the site of the wound.
3. Moisten the Acticoat^o or Acticoat^o7 with sterile water (remove excess water prior to application) as this activates the release of nanocrystalline silver from the dressing.







4. **It is important to only use sterile water for irrigation to moisten Acticoat[◊] - DO NOT USE SALINE** as this can cause adverse effects with the silver in the Acticoat[◊].
5. Place the Acticoat[◊] or Acticoat[◊]7 on the wound (blue side down). Make sure all areas of the burn wound are covered with Acticoat[◊] or Acticoat[◊]7 and there is suitable overlap. For areas where the Acticoat[◊] dressings are at risk of slippage, anchor them in place with strips of Hypafix[®].
6. Moisten Mesorb[◊], or similar secondary dressing, with sterile water (remove excess water prior to application). Apply moist Mesorb[◊] (white side down) over the Acticoat[◊] or Acticoat[◊]7; making sure that the Acticoat[◊] or Acticoat[◊]7 is well covered.
7. Cover the Acticoat[◊] and Mesorb[◊] layers with either cling film or Tegaderm[™] / OpSite[◊]. This helps to maintain the moisture content of the dressings and prevents evaporative loss. Seal the edges with Hypafix[®]. Do not apply cling film or Tegaderm[™] circumferentially around non-burnt limbs or torsos.
8. Wrap the areas with a layer of Webriil[™] (cotton wool wadding) and secure in place with an outer crepe bandage.
9. Leave dressings intact until further review. Acticoat[◊] can remain intact for up to 3 days. Acticoat[◊]7 may be left intact for up to 7 days.

Caution: Do not use on patients with a known sensitivity to silver.

Do not use on patients who require MRI scans.

Care must be taken not to tightly wrap primary or secondary dressings circumferentially around burn wound areas, including fingers, limbs and the torso.

6.2 Mepilex® range application technique

<i>Picture 7 : Application of Mepilex® Ag dressing</i>		
		
Clean the burn wound	Remove all blistered skin	Apply Mepilex® Ag to wound
		
Secure in place with Hypafix™	Cover with a layer of Webril™	Finish with a crepe bandage and tape securely.

Procedure:

1. Wash the burn wound in chlorhexidine gluconate 0.05% solution (see section [4.4 for dilution details](#)), and pat dry. Remove any dead tissue and debride blisters to ensure a clean wound bed.
2. Select the appropriate size of Mepilex® / Mepilex® Ag / Mepilex® Lite in order to cover the wound allowing for a 2 to 5cm overlap around the wound edges. This may vary with the size of the child and the site of the wound.
3. Peel away the outer plastic backing layer of the Mepilex® dressing and apply silicone wound contact layer down onto the wound bed.
4. Secure dressing in place with Hypafix™.
5. Apply a suitable secondary dressing such as Webril™ and finish with a crepe bandage.
6. Leave dressings intact until further review. Mepilex® / Mepilex® Ag / Mepilex® Lite can remain intact for up to 5 to 7 days – dependent upon level of exudate.
7. Instruct parents to keep the dressing areas dry.

Care must be taken not to tightly wrap primary or secondary dressings circumferentially around burn wound areas, including fingers, limbs and the torso.

6.3 Bactigras[◇] application technique

- All burns types from superficial to full thickness when alternate dressings are contraindicated.
- Grafted areas, immediately post-op and in the healing stages.
- Burns to specialised areas such as face, hands, perineum where alternate dressings may be difficult.
- Packing for escharotomy sites.
- **Jelonet[◇]** is used on patients who have a chlorhexidine allergy or where antimicrobial action not required.

Procedure:

1. Wash the burn wound in chlorhexidine gluconate 0.05% solution (see section [4.4 for dilution details](#)), and pat dry. Remove any dead tissue and debride blisters to ensure a clean wound bed.
2. Select the appropriate size of Bactigras[◇]. It is important to cover the whole wound area. Slightly overlap the wound site to allow for slippage and movement.
3. In the initial stages of injury it is necessary to apply at least two layers of Bactigras[◇] to the wound bed. For areas with very high exudate such as the face it is necessary to apply 3 to 4 layers to ensure the underlying tissue is not damaged on removal.
4. As wound heals, less dressing is required as the healing skin may become clogged with excess moisture. Use only a single layer of Bactigras on small open wound areas.
5. Surrounding healed areas of skin need moisturising with sorbelene (or appropriate moisturiser). Use a small amount, ensure cream is rubbed in until fully absorbed.
6. Apply a suitable external dressing such as Webril™ and crepe. These outer dressings must not come in contact with the wound as they may adhere and cause trauma on removal.
7. Bactigras can remain intact for 1 to 3 days on acute burn wounds (depending on the wound and the need for further review). During the postoperative period following skin grafting, Bactigras[◇] is routinely left intact for 5 -7 days.

Care must be taken not to tightly wrap primary or secondary dressings circumferentially around burn wound areas, including fingers, limbs and the torso.

6.4 Atrauman[®] / Atrauman[®]Ag application technique

1. Wash the burn / wound in appropriate cleansing solution and pat dry. Remove any dead tissue or blistered skin to ensure a clean wound bed.
2. Select the appropriate size and type of Atrauman[®] dressing
3. Remove the dressing from the sterile peel pack with both backing papers insitu, cut dressing to size as required, allow for 2cm border of wound overlap.

4. Remove the backing paper and apply dressing to wound.
5. Place an absorbent secondary dressing on top of the Atrauman® to absorb exudate and secure in place.

6.5 Biobrane® application technique

1. Burn wound debridement generally takes place in CHW operating theatres (manual / Versajet / surgical). Haemostasis must be achieved prior to application of Biobrane®. Manual debridement may also take place in Clubbe Ward or the BPTC
2. Swab burn wound surfaces prior to application.
3. Biobrane® is applied under slight tension (stretch) and is placed dull side down with the nylon fabric layer in contact with the wound surface.^{16, 17} Ensure that there are no wrinkles across the surface of the Biobrane®. See Pictures 8 and 9.
4. Biobrane® may be secured in place with thin strips of Hypafix™. Skin glue or steri-strips may be used to secure the edges of Biobrane® applied over facial burns.

Picture 8



Picture 9



Nursing Management

Torso & Limbs

- When Biobrane® is applied to burns over limbs and areas on the torso it is covered with routine Acticoat® / Acticoat®7 dressings.
- Each surgeon will determine the exact length of time in which dressings are to remain intact. Check post-operative orders for instructions.
- At the first dressing change post application, the main aim is to check for adherence of the Biobrane® layer to the wound surface.
- Once adherence is achieved, the method used to secure the Biobrane® may be removed (Hypafix™ / Steri-strips / sutures) and the Biobrane® trimmed back to the edge of the burn wound. See Pictures 10, 11 and 12.

Picture 10



Picture 11



Picture 12



- Once adhered, the burn areas covered with Biobrane® can be washed / bathed as per general burn wound cleansing procedure (see section 4.4).
- If there are any areas of non-adherence of Biobrane® with fluid collection underneath, or any areas of purulent collection seek Medical review of the patient. Pockets of fluid may require aspiration, or entire sheets of Biobrane® may require removal if infection is present.³

The Face

- When Biobrane® is applied to facial burns it may be left open to the air. Secondary dressings are generally not required. If infants, toddlers or younger children start to pull at the Biobrane® dressing, appropriate areas may be covered with a routine head dressing and bandage. Within the first 24 to 48 hours post application serous ooze may seep through the small perforations in the Biobrane®.
- Children with Biobrane® insitu over the face should have daily face care attended to.
- As re-epithelialisation occurs, the Biobrane® will spontaneously separate from the skin surface. During this process of separation, use a fine pair of Iris scissors to trim back any edges of Biobrane® that have lifted. See Pictures 13 and 14. Once the Biobrane® is well adhered the face can be washed with normal saline or water. Exposed healed

areas can then be moisturised with sorbelene lotion. Continue to apply soft white paraffin to any raw, moist areas that have not yet epithelialised.

Picture 13



Picture 14



- If a wound swab (pre-application of Biobrane®) results in a positive growth, the outer dressings should be taken down to the Biobrane® layer in the affected areas and observations made for the following:
 - If the Biobrane® is adhered to the wound and no fluid accumulation or purulent exudate is present, re-dress with Acticoat®. Continue to monitor patient for signs of infection (temperature / wound odour / exudate).
 - If the Biobrane® is loose and there is purulent exudate underneath +/- signs of infection, (see Pictures 15 and 16) remove purulent non-adherent areas of Biobrane®, take a wound swab, clean wound surface with dilute antiseptic solution (chlorhexidine gluconate 0.05%) and apply antimicrobial dressing.

Picture 15



Picture 16



6.6 Flamazine® application technique

- Clean the burn wound as per section Section 5.4 and pat dry.
- Flamazine® cream needs to be applied to a sterile hand towel (Rediwipe) prior to placing it on the burn wound.

- Open enough sterile handtowels on to a sterile dressing sheet that will cover the size of the burn wound to be dressed. Squeeze Flamazine[◊] cream from a tube onto the dressing sheet or use a sterile spatula or sterile glove to remove Flamazine[◊] from a tub. The Flamazine[◊] cream then needs to be smeared (using a generous amount) over the complete surface of a single layer of the sterile hand towel. When only dressing small surface areas, sheets of Jelonet[◊] or Bactigras[◊] may be used in place of a sterile hand towel.
- Cut the Flamazine[◊] covered sterile hand towel down to size. Allow for an overlap of 5cm around the burn wound as slippage is likely to occur. Apply the Flamazine[◊] covered sterile hand towel over the burn with the cream side in direct contact with the burn wound. Make sure all the burned areas are covered with Flamazine[◊] and there is suitable overlap.
- Cover with an appropriate secondary absorbent dressing such as Webril™ and apply a crepe bandage to secure in place.
- Flamazine[◊] cream dressings should be changed daily – unless otherwise directed by the treating Burns surgeon.

Care must be taken not to tightly wrap primary or secondary dressings circumferentially around burn wound areas, including fingers, limbs and the torso.

6.7 Comfeel[®] Plus Transparent application technique

- Select the appropriate size of Comfeel[®] for the burn wound surface. A large wafer may be cut down to size. Round the corners as this helps to prevent the dressing from peeling back. Allow for at least a 2cm overlap of the burn wound margin.
- Remove the plastic peel backing of the dressing and apply the Comfeel[®] to a clean burn wound surface – place the adhesive side down to the wound bed. Press gently to ensure that the dressing has good contact with the wound surface and smooth out any visible bumps and ridges.
- When the dressing comes into contact with the burn wound, it absorbs wound exudate within the dressing – its initial transparent appearance will change from clear to opaque. A whitish gel is formed - do not mistake this for “pus” or infection – this change is normal.
- Monitor for other signs of infection such as offensive wound odour, excessive wound exudate, fevers etc.
- Comfeel[®] may be left in place for 3 to 5 days (dependent upon level of wound exudate). Change the Comfeel[®] earlier if leakage of wound exudate occurs – or consider use of another dressing type.
- A layer of Hypafix™ may be applied over the top of the Comfeel[®] wafer in order to secure the dressing in place.
- To remove Comfeel[®], lift and pull one corner of the dressing towards you whilst applying tension to the opposite side / corner. This will lift the dressing away from the wound

surface and allow you to gently peel it away. Alternatively a medical adhesive remover such as "Niltac™" may be sprayed over the Comfeel® surface prior to removal.

7 Burn related Pruritus

Treatment Protocol for Burn related Pruritus

Pruritus in burns patients is common and distressing. It is reported in up to 87% of patients at 3 months, 70% of patients at 12 months, and 60% of patients at 24 months post burn injury. It is severe in up to 16% of patients. It can last years after the initial injury.^{40,41,42,43}

Predictors of severe and/or prolonged pruritus include ^{42,43,44}:

- Greater total body surface area
- Deeper burns
- Post skin grafting (particularly over donor site)
- Hypertrophic scars
- Female gender

The mechanism of itch is complex and can be:

- Pruritogenic (initiating stimulus within skin)
- Neuropathic (initiating stimulus within peripheral nerves)
- Neurogenic (originating from the central neural mechanisms) or
- Psychogenic (associated with psychiatric conditions)

Of note, a sub-set of C primary afferent nerve fibres specifically transmit pruritus.

Early detection of the above predictors and early / aggressive (and in some cases pre-emptive) therapy is strongly advocated.

Always investigate new, severe or escalating itch.

Exclude infection, allergy, renal / liver failure or graft failure as possible causes

Assessment in the paediatric population is challenging. The Itch Man scale (Figure 2 below) is a suggested tool. This should be a **ROUTINE** part of caring for children with burns. All children with burn injuries should have an itch score documented at least once per shift and more regularly if pruritus is moderate/severe or distressing.

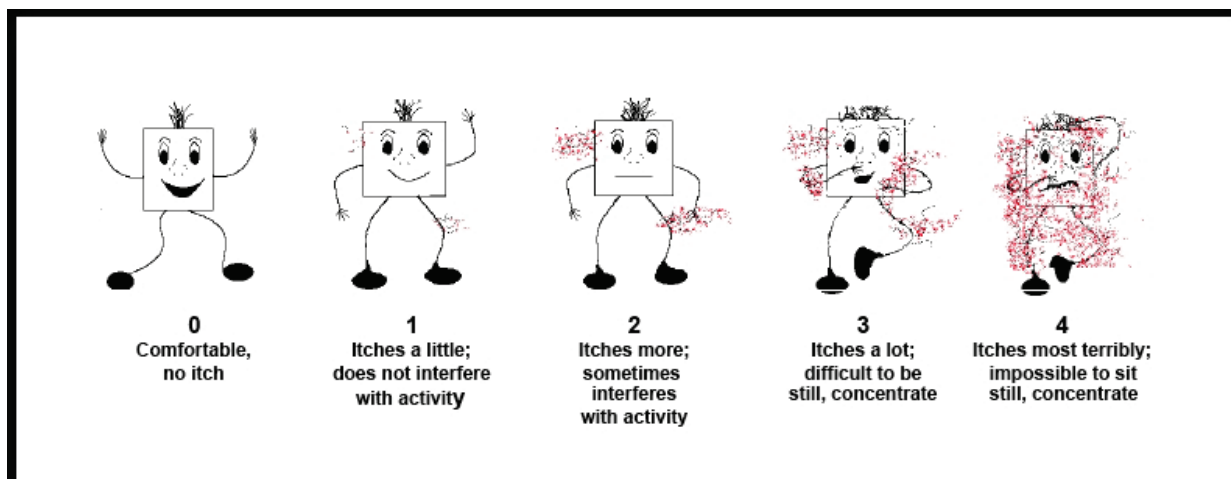


Figure 2. Itch Man Scale (© 2000, Balkeney and Marvin)

Suggested Antipruritic Treatment Ladder

The doses are as per The Australian Medicines Handbook, Children's Dosing Companion (AMH-CDC) and the Meds4Kids Dosing Guide.

NB. All medicines are given orally, except for naloxone which is given IV

Calculate drug doses using ideal weight in obese children

1. Inpatients with Burns <15%TBSA without skin grafting

Antipruritic therapy offered on PRN basis.

Step 1: Ondansetron.

Dose: 0.1 mg/kg/dose every 8 hours, prn (maximum dose: 8mg/dose).

If no response within 4 hours try trimeprazine / alimemazine.

Step 2: Trimeprazine / alimemazine.

Dose: ≥6 months, 0.25 to 0.5 mg/kg/dose every 6 hours prn (maximum dose: ≤6 years: 60 mg/DAY; >6 years: 100 mg/DAY)³⁸

CAUTION: Risk of excessive sedation especially in children under 2 years of age and when combined with opioid and other sedating drugs (e.g. anti-epileptics).

Step 3: Ranitidine.

If after 2 doses of trimeprazine / alimemazine, pruritus is persistent, add **ranitidine**.

Dose: 2 to 5 mg/kg/dose every 12 hours prn (maximum dose: 150 mg/dose)³⁶

If pruritus is disrupting burn management, make trimeprazine / alimemazine regular.

Dose 0.25mg/kg every 8 hours, but can later on be increased to every 6 hours.

Note: Gabapentin is not a routine part of the initial pruritus therapy in smaller, un-complicated burn injuries.

If, within 48 hours of regular trimeprazine / alimemazine, pruritus is still problematic, investigate the cause and change over to protocol for **Inpatients with Burns >15%TBSA or post skin grafting**

2. Inpatients with Burns >15%TBSA or post skin grafting

1st Line:

Gabapentinoids. Therapy is commenced pre-emptively.

Gabapentin dose: 5 mg/kg/dose every 12 hours but later on can be increased to every 8 hours (maximum dose: 15 mg/kg/day).

Pregabalin dose: 1 mg/kg/dose every 12 hours (maximum dose: 100mg/day)

Note: Cease gabapentinoids if behavioural changes noted.

Ranitidine: Dose: 2 to 5 mg/kg/dose every 12 hours (maximum dose: 150mg /dose)

Ondansetron. Dose: 0.1mg/kg every 8 hours, prn (maximum dose: 8mg/dose).

2nd Line:

If within 48 hours of 1st Line therapy pruritus is persistent, continue the above 1st Line therapy and add regular **Trimeprazine / alimemazine**. Dose: ≥6 months, 0.25 to 0.5 mg/kg/dose every 6 hours (maximum dose: ≤6 years: 60 mg/DAY; >6 years: 100 mg/DAY)

Continue with ondansetron prn.

3rd Line:

Naloxone. Naloxone is reserved for disruptive / distressing pruritus after at least 48 hours of the above 1st and 2nd Line therapies. In these severe cases naloxone may be given as a low dose infusion. Dose: 0.5 to 1.5 micrograms/kg/hr.

3. Outpatients undergoing procedural sedation in the BPTC.

General Considerations:

- These patients are often prescribed oral sedative agents (with or without N₂O) on an outpatient basis.
- Sedative medicine combinations need to be carefully assessed and monitored.
- If oral sedating medicines (opioids, benzodiazepines, ketamine) are used for procedural sedation. Avoid sedating anti-histamines for 24 hours following the procedure.
- Do not prescribe trimeprazine / alimemazine or cyproheptadine if the child is receiving oral opioid analgesia (including codeine formulations) unless already safely established on them as an inpatient with regular review by the GP.

Suggested prescription to give to parents / carers:

If oral opioids are not used for on-going analgesia at home:

- **Trimeprazine / alimemazine.** Dose: ≥6 months, 0.25 to 0.5 mg/kg/dose every 6 hours prn (maximum dose: ≤6 years: 60 mg/DAY; >6 years: 100 mg/DAY). Dose to start 24 hours after receiving procedural sedation.
- **Ranitidine.** Dose: 2 to 5 mg/kg/dose every 12 hours prn (maximum dose: 150 mg/dose).

- **Ondansetron.** Dose: 0.1 mg/kg/dose every 8 hours, prn (maximum dose: 8 mg/dose)

If still on oral opioids under regular GP review, omit trimeprazine / alimemazine.

In resistant cases, consider escalation of therapy by adding pregabalin but after 24 hours from the procedural sedation and with the above sedation precautions / general considerations in mind. See dosing instructions above. If this is being prescribed on an outpatient basis, trimeprazine / alimemazine should be withheld / ceased to avoid over sedation. See notes on gabapentanoids below.

4. Pruritus developing during later stages of healing (after re-epithelialisation)

Minor:

- Use of adjuncts (see below) *except for* of EMLA / Lignocaine cream
- Trimeprazine / alimemazine: Dose: ≥ 6 months, 0.25 to 0.5 mg/kg/dose every 6 hours prn (maximum dose: ≤ 6 years: 60 mg/DAY; >6 years: 100 mg/DAY)³⁸

Moderate:

- Make trimeprazine / alimemazine regular
- Add regular gabapentinoids

Severe:

- Add ranitidine, dose: 2 to 5 mg/kg/dose every 12 hours prn (maximum dose: 150mg/dose)
- Add ondansetron, dose: 0.1 mg/kg/dose every 8 hours (maximum dose: 8mg/dose)
- Consider laser therapy

5. Suggested adjuncts to be considered whenever surgically and age appropriate:

- Frequent use of emollients. The regular and frequent use of topical hypoallergenic emollients is more important than the actual content of the emollient agent. Sensitivity to such topical agents may develop over time.
- TENS therapy
- Capsaicin
- Massage therapy/devices
- Distraction techniques.
- EMLA cream over healed skin is effective and safe when used over specific / small surface areas for short, intermittent courses (3 to 4 days). Reserved for inpatient use to be applied by nursing staff and not carers.⁴⁵
- Consider seeking input from clinical psychology and dermatology in resistant cases

Please Note:

Central acting antihistamines:

Peripheral (non-sedating) antihistamines are ineffective in the context of burns pruritus. Combination of a (central-acting) H₁ histamine blocker (eg trimeprazine / alimemazine) and H₂ histamine blocker (eg ranitidine) has been shown to add additional benefit.

Cyproheptadine is another central H₁ histamine blocker with additional antiserotonergic activity that can be an alternative to trimeprazine / alimemazine in children above the age of 2 years. The starting dose for cyproheptadine is 2 mg every 8 hours (maximum daily dose 12mg) for children between 2 to 7 years, or 4mg every 8 hours (maximum daily dose 16mg) in children older than 7 years

Gabapentinoids: pregabalin v's gabapentin:

Gabapentinoids have been shown to significantly reduce and in some studies completely abolish long-term pruritus associated with burns.

A small cohort of children with pre-existing attention deficit hyperactivity disorder (ADHD) on methylphenidate (Ritalin™) was reported to exhibit aggressive behaviour when treated with high doses of gabapentin. Such behavioural issues resolved when gabapentin was ceased. For the purpose of this protocol, gabapentinoids are capped at low doses.

Gabapentinoid weaning regime:

If gabapentinoids are used for > 3 week period they must not be stopped abruptly.

The process for weaning involves decreasing the frequency of doses. Patients on TDS doses should be weaned to BD doses for 7 days then a daily dose for a further 7 days prior to cessation (ie wean over a 2 week period).³⁶

8 Post Burn Wound Healing Care & Physiotherapy

- Physiotherapists are involved in the management of patients with a burn injury from the time of initial presentation and continue to provide treatment until burn scar maturation occurs. The Physiotherapists utilise splints and exercise regimes to ensure that full range of movements are maintained. These regimes need to be attended as instructed by the Physiotherapist to ensure the child has the best opportunity of maintaining and returning to a full range of movement in the affected areas.
- The Physiotherapist may measure and fit the child with pressure garments to help minimise the amount of scarring. These garments are to be worn at all times except for bathing and showering. Children will be supplied with 2 sets of garments. Whilst one garment is being worn, the other is being washed to be worn the following day. They need to be hand washed daily with a liquid detergent and hung to dry in the shade.
- Physiotherapists may introduce other forms of scar management which may include softening products like silicone and hydrocolloids. The decision and direction for use of these products will be determined by the Physiotherapist.

- It is important to protect newly healed burn wound areas from the sun, even on an overcast day, as the newly healed skin is very fragile and susceptible to sunburn and damage. Instruct patients, parents / carers to apply a high SPF sunscreen for sensitive skin to all exposed areas and always wear a hat when outdoors. Pressure garments alone will not protect the skin from the sun. Cover with suitable clothing. Instruct patients, parents / carers not to apply sunscreen under pressure garments.
- Pimples can occur over the surface of a newly healed area due to damage to the sweat glands, this is normal. If the surrounding healed burn area breaks down, protect the area with a non-stick dressing as you would any other open area. When moisturising healed burn areas with sorbolene lotion, always ensure the sorbolene is properly absorbed, as this may also be the cause.
- Healing burn wounds can be very itchy. Monitor children to ensure they are not scratching at their newly healed skin. Antihistamines such as alimemazine / trimeprazine can be prescribed as required as they can help to manage itch. More frequent application of small amounts of moisturisers (sorbolene or vitamin E cream – additive & perfume free) can also help to alleviate itch. Massaging is also effective. Itch may occur from the use of silicone products. If this occurs cease using the silicone immediately.

9 Non-Burn Major Skin Loss Conditions

The Burns Unit at the Children's Hospital at Westmead provides treatment for the following non-burn major skin loss conditions:

1. Staphylococcal Scalded Skin Syndrome (SSSS)
2. Stevens-Johnson Syndrome (SJS)
3. Toxic Epidermal Necrolysis (TEN)

These patients will often have a Burns Consultant listed as a Co-Consultant (which will be allocated on the day of admission according to the on-call roster for Burns).

Whilst an inpatient at CHW, the Burns CNC will be responsible for providing consultation and assessment in regards to wound management needs.

Patients with the above conditions commonly sustain epidermal skin loss and from a wound management perspective are treated in an equivalent way to that of a superficial dermal burn wound. Antimicrobials are not usually required.

Mucous membrane involvement is seen in SJS & TEN.

Patients with these conditions often require intensive care management (PICU / NICU).

Appropriate pain management is vital prior to attending to any wound management interventions. At times, debridement and change of dressings may be required to be carried out in the operating theatre environment.

Epidermal re-epithelialisation is generally achieved within 7 days for SSSS and 10 to 14 days for SJS & TEN. Complete healing of mucous membranes will take much longer.

Suggested wound management products are as follows:

Neonates with SSSS

Body Site	Product	Frequency
Scalp, limbs, torso	Mepilex [®] Lite	Change every 3 to 5 days
Face	Soft white paraffin	4 th hourly
Perineum / buttocks	Jelonet [◊] or Bactigras [◊]	Every nappy change

Children with SSSS, SJS & TEN

Body Site	Product	Frequency
Scalp, limbs, torso	Mepilex [®] Mepilex [®] Lite	Change every 5 to 7 days, dependent upon exudate
	Bactigras [◊]	Change every 2 nd day
	Mepilex [®] Ag Acticoat [◊]	Use only when clinically indicated, or in presence of positive wound swab
Face	Soft white paraffin	4 th hourly
Perineum / buttocks	Bactigras [◊] or Mepilex [®] Ag	prn, following toileting

10 Websites

- NSW State-wide Burn Injury Service:
<http://www.aci.health.nsw.gov.au/networks/burninjury>
- Australian New Zealand Burn Association <http://www.anzba.org.au>
- Journal of Burn Care & Research: www.burncareresearch.com
- International Society for Burn Injuries: <http://www.worldburn.org>
- Annals of Burns and Fire Disasters: <http://www.medbc.com/annals/>
- Management Guidelines for People with Burn Injury: www.health.nsw.gov.au/public-health/burns/burnsmgt.pdf
- Resident Orientation Manual - Acute Burn Management:
www.totalburncare.com/orientation_acute_burn_mgmt.htm

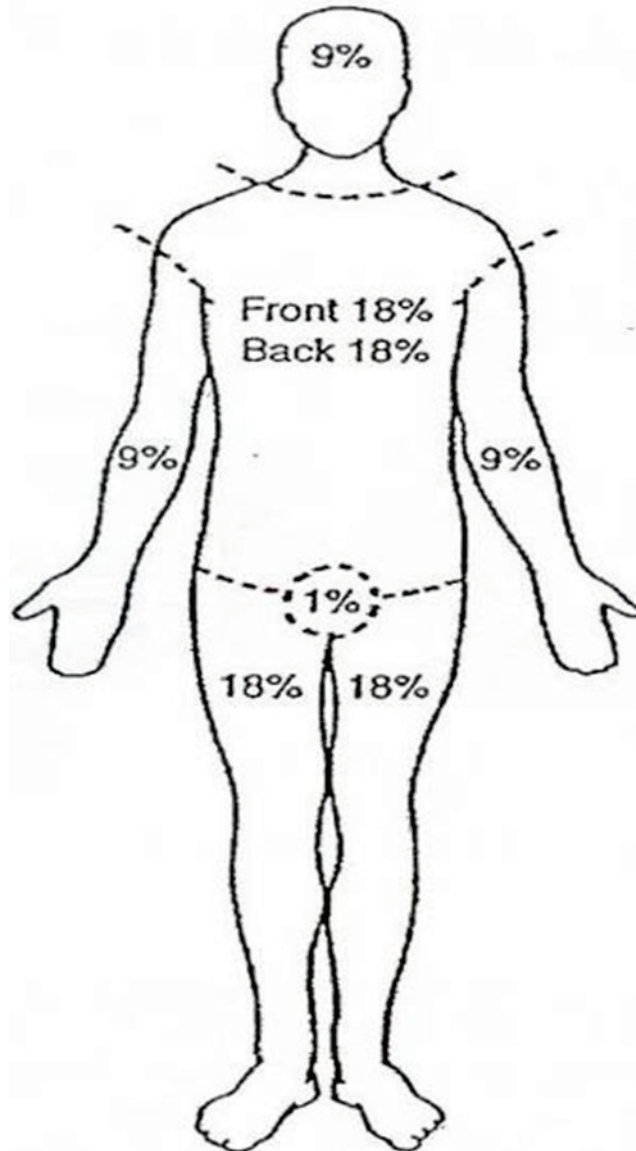
Skin Information

- http://www.skinhealing.com/3_1_burntreatments.shtml
- http://www.essentialdayspa.com/Skin_Anatomy_and_Physiology.htm
- <http://www.meddean.luc.edu/lumen/MedEd/medicine/dermatology/melton/skin/skini.htm>
- <http://www.nurse-prescriber.co.uk/education/anatomy/anatomy2.htm>
- <http://reference.allrefer.com/encyclopedia/S/skin.html>
- <http://www.swiss-creations.com/sc-14story.htm#The%20Human%20Skin>

11 Appendices

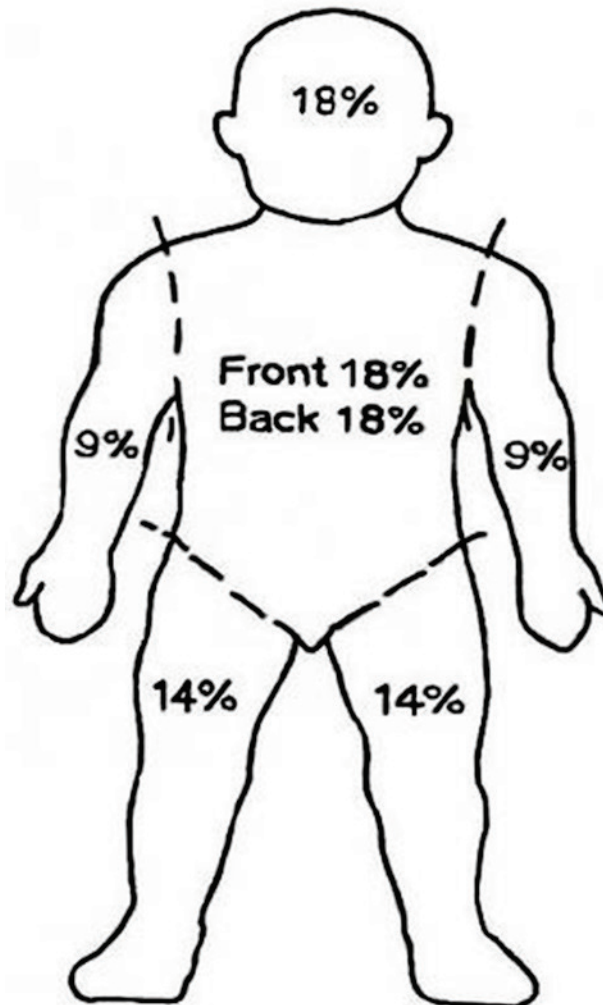
1. Burn Surface Area Assessment - Rule of Nines
2. Burn Surface Area Assessment – Paediatric Rule of Nines
3. Burn Surface Area Assessment – Palmar method
4. CHW oral sedation drug formulary for a burns dressing change
5. Blister Consensus Document
6. Faecal Management System

Appendix 1: Burn Surface Area Assessment - Rule of Nines



Head and Neck	9%
Right Arm	9%
Left Arm	9%
Anterior Trunk	18%
Posterior Trunk	18%
Right Leg	18%
Left leg	18%
Perineum	1%
TOTAL	100%

Appendix 2: Burn Surface Area Assessment - Paediatric Rule of Nines

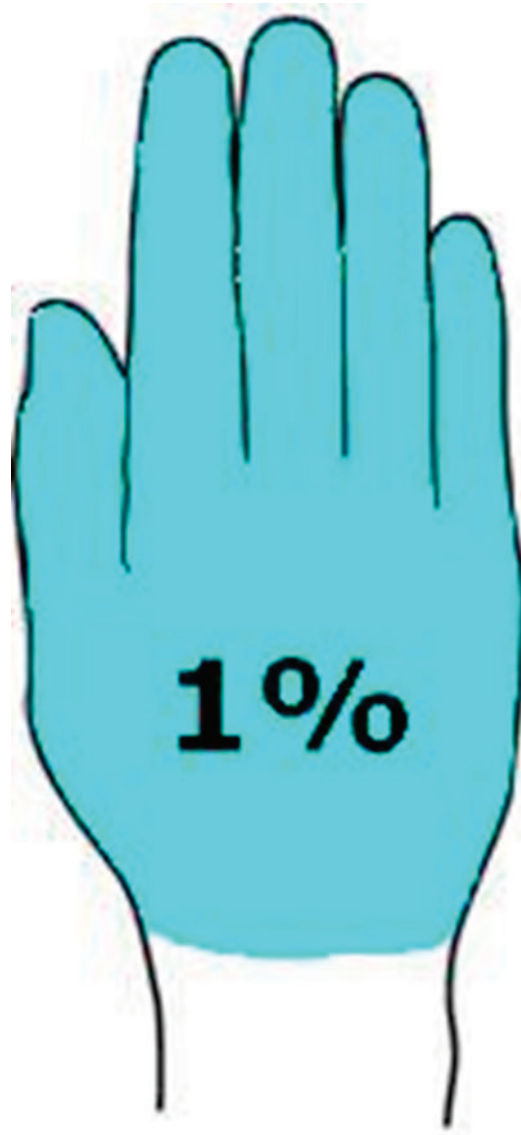


The above diagram depicts the surface area assessment at birth.

After every year (12 months) of life,
deduct 1% from the head and add $\frac{1}{2}\%$ to each leg.

When a child reaches the age of 9 years,
they will have the same body proportions as an adult.

Appendix 3: Burn Surface Area Assessment - Palmar method



The surface area of the palm and fingers **of the patient** = 1% TBSA

This method is most useful in calculating the surface area of small and scattered burn wounds.

Appendix 4 CHW oral sedation drug formulary for a burns dressing change

Please see guide below before all prescriptions

	Pre-procedure simple analgesia		Opioid analgesia	Adjuncts			Top-up
	Paracetamol	Ibuprofen	Oxycodone	Ketamine	Clonidine	Midazolam	Intranasal Fentanyl
Age	<ul style="list-style-type: none"> • Birth to 18 years • Caution less than 1 month old. 	<ul style="list-style-type: none"> • 3 months to 18 years 	Inpatients <ul style="list-style-type: none"> • 1 month to 18 years Outpatients: <ul style="list-style-type: none"> • At least 6 months and 5kg. 	<ul style="list-style-type: none"> • ≥1 year to 18 years 	<ul style="list-style-type: none"> • ≥1 year to 18 years 	Inpatients: <ul style="list-style-type: none"> • 6 months to 18 years Outpatients: <ul style="list-style-type: none"> • At least 12 months and 10 kg. • 9-12 months or less than 10kg on case by case basis 	<ul style="list-style-type: none"> • ≥ 1 year
Timing of administration pre procedure	1 hour	1 hour	30 mins	30 mins	90 mins	30 mins	<ul style="list-style-type: none"> • Onset 2 to 3 minutes
Notes	<ul style="list-style-type: none"> • Check drug history and timing of last dose. • Refer to maximum daily doses. 	<ul style="list-style-type: none"> • Check drug history and timing of last dose. • Do not use pre-operatively 		<ul style="list-style-type: none"> • Usually given in combination with midazolam • Will need extended recovery 	<ul style="list-style-type: none"> • Caution adverse effects: bradycardia and hypotension • Will need extended recovery 	<ul style="list-style-type: none"> • Outpatients 9 months to 1 year will need extended recovery 	<ul style="list-style-type: none"> • Administer via mucosal atomiser device attached to 1ml syringe. Divide dose between both nostrils.
Indication for use	Use for all cases unless contra-indicated	Use for all cases unless contra-indicated	Use Oxycodone when significant pain is expected.	Useful for larger or more complex dressings. Reduce opioid and benzodiazepine dose when adding ketamine.	Useful when behavioural issues are problematic.	First dressing / Initial debridement Useful when anxiety is problematic.	Used as 'top-up' during prolonged, painful or difficult dressing. Use intranasal fentanyl if oral analgesia is refused.
Suggested dose	Oral dose: Inpatients 15mg/kg Outpatients 20mg/kg Maximum dose: 1 gram Please see AMH for dosing less than 1 month.	Oral dose: 5 to 10 mg/kg Maximum dose 400mg	Oral dose: 1 to 12 months: 0.05 to 0.1mg/kg 1 year to 18 years: 0.1 to 0.2mg/kg Maximum dose <50kg: 10mg/dose ≥50kg: 15mg/dose	Oral dose: 3mg/kg Maximum dose 150mg	Oral dose: Consider 2 micrograms/kg Maximum dose 100 micrograms	Oral dose: 0.25 to 0.5mg / kg Maximum dose 15mg Intranasal dose: 0.2 to 0.3mg/kg Maximum dose 10mg Use mucosal atomiser device.	1.0 micrograms /kg/dose, 5 to 10 min intervals up to a max dose of 3micrograms/kg Maximum total dose: 75micrograms

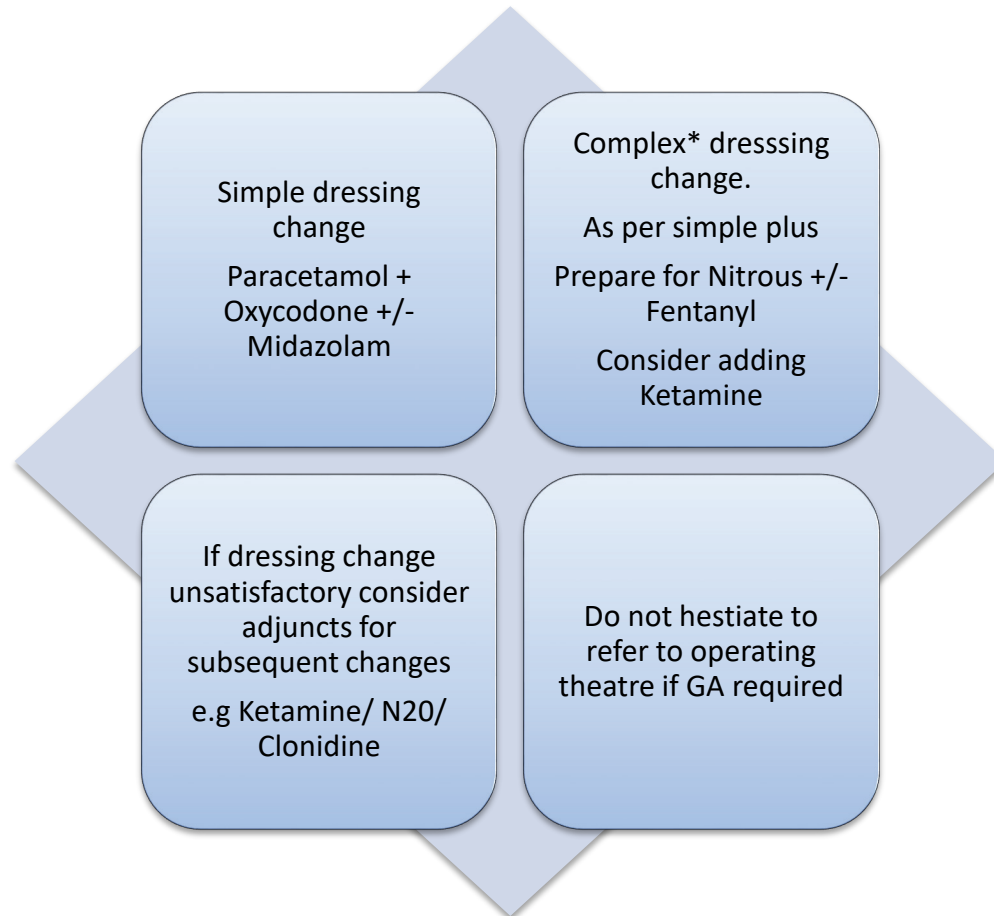
Guide to prescribing:

- **Dose ranges** are **suggestions only** and should be adjusted after taking into account the nature of the procedure and the physical status of the patient.
- Calculate drug doses using **ideal weight** in obese children.
- Inpatients and outpatients will have different needs and also have different levels of monitoring post procedure. Please consider this when making your prescriptions.
- Oral midazolam can be used from 6 months of age onward. Outpatient midazolam is not usually prescribed for children less than 12 months of age or less than 10 kg. Outpatients in the 9 month to 12 month age group can have midazolam when considered on a case by case basis. This will require a recovery space in Clubbe ward (i.e. 'extended recovery') until discharge criteria are met. Please discuss any cases aged less than 12 months with Ian Miles (Anaesthesia Burns clinical lead), Lucy Kelly (Staff Specialist Anaesthetist) , or the anaesthetic consultant on call via pager 6777, and consider use of the Burns Procedure List (for oral sedation or GA if required).
- Oral oxycodone can be used from 1 month of age onwards. Outpatient oxycodone is not usually prescribed for children less than 6 months or less than 5 kg. Please discuss any cases outside this range with Ian Miles (Anaesthesia Burns clinical lead), Lucy Kelly, or the anaesthetic consultant on call via pager 6777,
- Complex patients or those who may need to have their dressing change completed in the operating theatre should be discussed with the designated burns registrar or plastics registrar (to notify the treating AMO).
- On weekends please contact the on-site Anaesthetic fellow (0800-1600) via switch for any advice or assistance with inpatient sedation (this may require a booking on the emergency list)

Fasting: The following fasting guidelines have been copied from the SCHN procedural sedation guidelines (5.1 Page 11).

Sedation Agent	Fasting Time
Oral agent only	2 hours for solids and fluids (including breast milk).
Nitrous Oxide only	2 hours for solids and fluids
Combination of Nitrous oxide with any one of the following: i) oral agent ii) opioid PCA/infusion, iii) intra-nasal fentanyl	4 hours for solids and 2 hours clear fluids
*Consider a longer fasting time (6 hours for solids and 2 hours for clear fluids) for children with risk factors for delayed gastric emptying and when 3 or more sedating agents are to be administered.	

CHW sedation guidelines for burns dressing change



Specific sedation requirements will depend on individual assessment of:

1. The child

- Age
- Anxiety level
- Previous experiences
- Co-morbidities

2. The burn

- Number of days post burn
- Burn depth
- Burn wound location (dressings to hands and feet tend to take longer and are technically more difficult)
- Healing stage

3. The procedure

- Predicted duration
- LDI scan required
- Scalp shave required
- Type of dressing to be applied
- Staff experience

4. Other

- More complex cases (opioid tolerant patients or long term patients) should be discussed with the Burns CNC, CNS, NP and Burns anaesthetic fellow.

**If a dressing change is underway and assistance is required:
Usual escalation strategy involves addition of nitrous +/- intranasal fentanyl.
Procedure can be abandoned and referred to OT if required.**

***Dressings may be 'complex' for reasons including the nature of the burn, the child and the type of dressing to be performed.
Please discuss with the Burns CNC/ CNS/ NP if any questions or concerns.**

Appendix 5: Consensus on Burn Blister Management



Consensus on Burn Blister Management

Blisters are formed when there is separation of the epidermal and dermal layers, often with fluid present. The management of these blisters is generally guided by specialist clinician or institutional preference. For the non-burn clinician there may be conflicting recommendations which can lead to confusion on the best management plan.

The ACI Statewide Burn Injury Service (SBIS) recommended management for burn blisters is 'de-roofing' (removal of skin and fluid).

Rationale for de-roofing is to:

- remove of non-viable tissue
- Prevention of uncontrolled rupture of blister
- Avoidance of risk of blister infection
- Relief of pain in tense blisters
- Reduction of restriction of movement of joints

This option allows the assessment of the burn wound bed

Procedure for de-roofing blisters:

Obtain consent from the patient/family.

Administer appropriate analgesia and allow time to take effect prior to procedure

Take digital image before and after de-roofing procedure if possible

Burn blisters ≤ 6 mm can be left intact

Burn blisters > 6 mm should be

- de-roofed either with moist gauze (for thin-walled) or forceps and scissors (for thick-walled)
- dressed appropriately with a non or low-adherent dressing (see Clinical Practice Guidelines: Burn Wound Management for specific dressing information)
- referred to local ED/ burns service if your facility does not have the resources to 'de-roof' blisters

Consideration should be given to:

- The risk/ benefit of removing blister skin when infection may occur (i.e. in remote area)
- The risk/benefit of 'de-roofing' blisters on the palmar surface of the hand and the plantar aspect of the foot
- Patient compliance with the procedure and on-going care when considering the management of small, non-tense blisters i.e. patients with dementia, learning difficulties, etc.

References:

Refer to Clinical Practice Guidelines: Summary of Evidence, available via the website for supporting material for this document.

Blister Management Example



Blister insitu



Carefully trim blister skin



Clean wound bed. Dress

Contacts:

Royal North Shore Hospital
Ph: (02) 9463 2111 (Burn Unit)
Ph: (02) 9463 2110 (Ambulatory Care)
NSLHD-BurnsConsult@health.nsw.gov.au

Concord Repatriation General Hospital
Ph: (02) 9767 7776 (Burn Unit)
Ph: (02) 9767 7775 (Ambulatory Care)
CRGH.BurnsUnit@sswhs.nsw.gov.au

The Children's Hospital at Westmead
(all paediatrics <16yrs)
Ph: (02) 9845 1114 (Burn Unit)
Ph: (02) 9845 1850 (Ambulatory Care)
kidsburns@chw.edu.au

ACI Statewide Burn Injury Service
resources available at:

www.aci.health.nsw.gov.au/resources/burn-injury

Appendix 6: Faecal management and rectal irrigation regime for the management of faecal incontinence in patients with a burn injury – CHW Burns Service

Burn wounds over the buttocks, perineum, upper thighs and lower back are frequently exposed to continual faecal contamination which may result in delayed wound healing, graft loss or sepsis.

A faecal management system is a temporary containment system designed to contain and divert faecal matter, protect burn wounds / skin grafts and dressings from faecal contamination and reduce the risk of infection and skin breakdown. The system involves the insertion of a soft catheter into the rectum which has a retention balloon and separate irrigation port insitu. The catheter is then connected to drainage tubing and a collection bag.

31-35

A faecal management system is often indicated in the clinical care of patients with a burn injury who:

- have burns to the buttocks, perineal and or genital region
- have had placement of skin grafts to the buttocks, perineum, upper thighs or lower back
- have had donor skin harvested from the buttocks, perineum, upper thighs or lower back
- or the patient has faecal incontinence of liquid to semi liquid stool and there is a clinical need to keep burns dressings clean and dry and prevent soiling from faecal matter in the acute or post-operative period.

A faecal management system is commonly required for the above patient group who are sedated, intubated and ventilated in PICU.

PRINCIPLES

The need for placement of a rectal tube / faecal management system and commencement of an irrigation regime should be discussed with the treating Burns Consultant.

Rectal irrigation procedures (including insertion of rectal tube) tube must be ordered by a General Surgical Registrar. If the patient is being managed by a Plastics Consultant, the Plastics team will be required to request a consult from the General Surgery team on call.

The General Surgery team should indicate the type of rectal tube or faecal management system required, the volume of fluid to be instilled in the balloon and the frequency and type of solution to be used for irrigation.

Once ordered, Registered Nursing staff will perform the rectal irrigations following the guidelines in this document.

The irrigation solution must be lukewarm in order to prevent colonic spasm.³¹⁻³⁵

The patient should be placed in the left lateral position with knees flexed to facilitate insertion of the rectal tube and delivery of solution.

The patient should be prescribed aperients (PO or via NGT or TPT) in order to keep the stool soft

If the patient is not intubated and ventilated, they may require appropriate analgesia prior to the procedure.

EQUIPMENT REQUIRED

- Prescribed rectal tube or faecal management system
- Water soluble lubricant
- Gloves / PPE
- 25FG 3 way Foley catheter or Faecal management system
- 30 mL syringe & fluid to inflate balloon
- 50 mL syringe & prescribed solution for irrigation – **must be lukewarm**
- Faecal fluid collection bag / tubing / connectors

GUIDELINES FOR RECTAL IRRIGATION

Surgical Intervention	Dietary Restrictions	Site & Frequency	Solution	Volume	Evaluation
Rectal irrigation	Nil Needs aperients prescribed	Per rectum Frequency to be determined by the General Surgery team	Lukewarm Sodium Chloride 0.9%	Volume to be determined by the General Surgery team	Free drainage of faecal fluid into collection bag Burns dressings remain clean & dry

PROCEDURE

- Explain the procedure to the child and/or parent/carer.
- Warm irrigation solution in a bowl / jug of hot water until lukewarm. Do not heat in the microwave as the fluid becomes unevenly heated and may cause burns.
- Place the child in the left lateral position with the upper leg flexed at the hip and knee. This position facilitates introduction of the solution due to the anatomical position of the descending colon.
- **Surgical Registrar is to insert required rectal tube / faecal management system.**
- **Surgical Registrar to document amount of fluid instilled in balloon and the frequency and type of solution to be used for irrigation.**
- Leave the child clean and comfortable.
- Dispose of equipment and waste appropriately.
- Document the procedure, results of washout (return and drainage) monitor after effects and report abnormal findings immediately.
- **Ensure burns dressings immediately adjacent to the buttocks, upper thighs, and lower back are protected with an outer layer of OpSite[®] or Tegaderm[™].**
- Faecal collection bag to be emptied as required and changed daily

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