













Our Lady's Children's Hospital, Crumlin		 <p>Ospidéal Mhúire na Leanaí, Cromghline Our Lady's Children's Hospital, Crumlin</p>
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CLINICAL GUIDELINES ON THE MANAGEMENT OF CHILDREN WITH BURNS							
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GUIDELINES ON THE MANAGEMENT OF CHILDREN WITH BURNS

PART A: GENERAL INFORMATION

A1.0 Introduction

Over 300 children are admitted to Our Lady's Children's Hospital, Crumlin (OLCHC) Burns & Plastics Service each year. A burn can have devastating and far-reaching consequences for a child who may require ongoing treatment and surgery. Effective burns management relies on a multidisciplinary approach to care. This guideline is intended to guide all healthcare professionals in relation to the management of a child with a burn in OLCHC.

A2.0 Definition of Guidelines

These Clinical Guidelines on the Management of Children with Burns represent the written instructions about how to ensure high quality care is provided. Guidelines must be accurate, up to date, evidence-based, easy to understand, non-ambiguous and emphasise safety. When followed they should lead to the required standards of performance.

A3.0 Applicable to

These guidelines are applicable to healthcare professionals in OLCHC involved in the management of a child with a burn.

A4.0 Objectives of the Guidelines

The purpose of the Guideline on the Management of Children with Burns is to promote safe, effective and consistent practice in relation to burn care in children in OLCHC.

A5.0 Definitions / Terms

Burn: A burn is "an injury to tissues caused by contact with dry heat (fire) moist heat (Steam / liquids), chemicals (e.g. corrosive substances), electricity (current or lightening), friction, or radiant and electromagnetic energy¹.

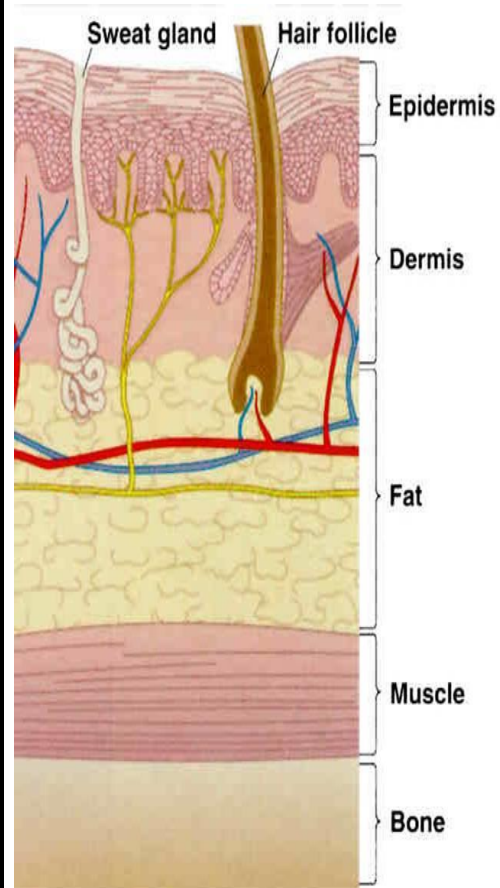



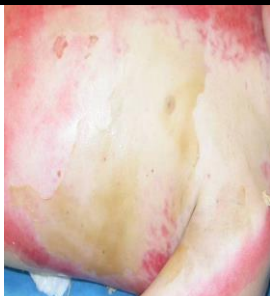
*In this guideline, the term 'burn' is used to describe all thermal injuries unless otherwise stated.

A6.0 Type of Burn Injury


Type	Cause
Scald	hot liquid or vapour e.g. tea, coffee, saucepan of water/liquid, steam.
Flame	exposure to a naked flame e.g. open domestic fire, bonfire, cigarette lighter.
Contact	contact with a hot surface e.g. iron, oven, hob, hair straightener.
Chemical	contact with a corrosive substance e.g. household cleaning agents, lab chemicals
Electrical	contact with exposure to an electrical current e.g. plug socket, electricity pole, lightening
Sunburn	over exposure to the heat from the sun.

A7.0 Classification of Burn Depth²

Note: Erythema is a superficial reddening of the skin, usually in patches, as a result of injury or irritation causing dilatation of the blood capillaries.¹ Following a burn injury, erythema may be present but **should not** be included in the calculation of the extent of the burn, i.e. Total Body Surface Area.

Tissue damaged	Depth	Description	Appearance of wound
	Superficial (epidermis)	Bright red in appearance Blisters may or may not be present. Tissue damage is minimal. On pressure the burn area will blanch and capillary return will be brisk Very painful. Usually heal within 7 – 10 days with no scarring.	
	Superficial partial thickness (epidermis and superficial dermis)	Pale pink in appearance Blisters present. Nerve endings, sweat glands and hair follicles generally remain undamaged, but some can be affected. On pressure the burn area will blanch and capillary return will be brisk. Very painful. Usually heals within 10 – 21 days with minimal scarring	
	Deep partial thickness (extends to deeper layers of the dermis including sweat and oil glands)	Blotchy red Blisters may be present Nerve endings, sweat glands and hair follicles are damaged. May be less painful. Usually takes greater than 14 days to heal with areas requiring skin grafting.	
	Full thickness (extends through epidermis, dermis and fat layers & may include muscle and bone)	Dry white / black in appearance. No blisters. Sweat glands and hair follicles completely destroyed. Insensate. Rarely heals and almost always requires skin grafting.	

(Hilliard 2014)

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A8.0 First Aid Management of Burns³

A8.1 Scalds & Contact Burns:

- Move child from hot surface or source of the scald.
- Do not remove clothing.
- Place injured area only under cool (not cold) running (ideal temperature being 15°C) water for **20 minutes**.
- Only place the affected area in water to prevent hypothermia. **Iced water & Frozen Products should never** be used as the child may become hypothermic and these can make the injury worse.
- Can use cooling gel if no clean running water available.
- Remove clothes when area cooled unless they are adhered to the skin.
- Seek immediate medical attention

A8.2 Flame Burn:


- Remove child from the fire or flames.
'Stop, Drop & Roll' **Stop** the child from running
Drop – place the child on the ground
Roll the child on the ground using coat, blanket, other large garment
- Protect your own hands using a sweater, towel, etc.
- Do not fan the flames or pat them with your hands as this will make them worse and may also cause you injury
- Place injured area under cool running water for **20 minutes**.
- Only place the affected area in water to prevent hypothermia. **Iced water & Frozen Products should never** be used as the child may become hypothermic and these can make the injury worse
- Do not remove clothing
- Seek immediate medical attention

A8.3 Chemical Burn:

- **Remove** clothing first
- Irrigate with cool running water for at least 20 minutes
- Seek immediate medical attention

A8.4 Electrical Burn:

- Turn off the source of electricity if possible
- If not possible, safely remove the child from the source of electricity.
- Seek immediate medical attention

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A9.0 Admission to hospital³

A9.1 Criteria for admission to hospital (N.B. All burns are to be assessed on an individual basis)

Department	Criteria
Intensive care	<ul style="list-style-type: none"> • Burns TBSA >20% • Inhalation injury • High voltage electricity or lightning • Associated life threatening injuries
Burns Unit	<ul style="list-style-type: none"> • TBSA >5% • Full thickness or partial thickness burns. • Chemical burns • Electrical Burns • Burns to primary areas – Face, hands, feet, perineum/genitalia & flexor surfaces of joints. • Poorly controlled pain. • Suspicion of non-accidental injury. • Inadequate social circumstances for out-patient management. • Outpatient burns unhealed by 10 days are to be reviewed by plastics consultant for possible admission and consideration of split skin grafting (SSG).
Out-patient dressing clinic	<ul style="list-style-type: none"> • Superficial partial thickness burns less than 5% TBSA and NOT involving the primary areas. • When the Plastics team are not available to review a burn in the Emergency Department, the Emergency Department Consultant ONLY, can refer a child to the dressing clinic.

A9.2 Contraindications to Admission to St. Anne's Ward

- Immunosuppressed children
- Infective Dermatology conditions
- Impetigo
- Scalded Skin Syndrome
- Cystic Fibrosis
- Cardiac conditions
- Acute Tonsillitis / Quinsy / Epiglottitis
- Chicken Pox
- Children requiring open orthopaedic surgery e.g. open reduction of a fracture, compound fracture etc

Note: Any non-burn patients who develop an infectious illness or become Immunosuppressed while on the unit will remain there and will be monitored closely so long as it is safe to do so.


A9.3 Requirements on Admission

On admission to OLCHC, children with burns require the following:

- **Bloods** – FBC + U&E (Blood gases & blood for carboxyhaemoglobin required in any child with a confirmed or suspected inhalation injury) Further or repeated bloods dependant on child's condition.
- **Swabs** – Wound swabs + a full M.R.S.A. screen to include nose, groin, axilla and throat.
- **Consults** – Some or all of the following may be requested:
 - Social Worker (**Refer to sections C9.0**)
 - Dietician (**Refer to sections C10.0**)
 - Physiotherapist (**Refer to sections C11.0**)
 - Occupational Therapist (**Refer to sections C12.0**)
- **Photographs** – please respect and protect the dignity and privacy of the child at all times when taking photographs. Hospital consent Form should be signed which includes consent for photographs.
- **Wound Care** – (**Refer to dressing section C5.0**)

A9.4 Delay in Treatment

If at any stage there is a significant delay in initiating treatment, inform the plastics consultant. Discuss the intention to contact the consultant with the registrar on duty.

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PART B: MANAGEMENT IN THE EMERGENCY DEPARTMENT

B1.0 Pre admission Procedure

B9.1 Medical advice over the phone to other centres on the management of a child with a burn

Advice and information on the management of a child with a burn should be given by a member of the plastics team or senior medical staff in the Emergency Department.

Determine by phone:

- Who is making the call
- Full name & age of the injured child.
- History of the burn to include the time of the injury.
- Extent, depth and distribution of the injury
- Risk of inhalation injury
- General condition of the patient – including other injuries

Advice to be given over the phone:

- Advice re fluid resuscitation if burn estimated >10% TBSA
(Refer to B3.0 – Fluid Resuscitation)
- Stress importance of adequate analgesia
- Ensure anaesthetic review prior to transfer, if there is any risk of airway injury.
- Tetanus toxoid to be given if child is not covered with appropriate vaccination (see Appendix 1)
- Dress the burn with cling film ONLY and a blanket for transfer. No topical cover to be used as it can affect assessment of the burn at a later stage)
- Advice on urgency of transfer depending on information obtained.

B9.2 Guidelines for accepting a transfer to OLCHC

Direct transfer to St Anne's Burns unit is possible under the following circumstances:

- Transfer from Children's University Hospital Temple Street, where the child has been reviewed by the plastics team there and resuscitation has commenced.
- A patient who has remained in any hospital nationwide overnight, is deemed stable and is transferred the following day, can be directly transferred to the burns unit.

Transfer to the Emergency Department


- Transfers of children from any other Emergency Department in the country are to be transferred to the Emergency Department in OLCHC for full assessment.
- Any child who remained in any hospital nationwide overnight but is deemed to be unstable is to be assessed in the Emergency Department upon arrival to the hospital.

Transfer to PICU

- Any child who remained in any hospital nationwide overnight but is critically unwell is transferred to the PICU (this should be discussed with Consultant Intensivist prior to transfer).

Plastics Registrar will notify the following people / departments prior to the child arriving in OLCHC:

- Bed Manager
- Emergency Department
- The burns unit – St Anne's Ward
- Consultant Intensivist if PICU admission is likely
- PICU department if transfer there is likely
- Anaesthetic consultant if it is anticipated that the child will need to go to the Operating Theatre

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B2.0 Assessment³

This assessment is to be completed by a member of the plastics team or senior medical staff in ED using the OLCHC ED standardised trauma assessment chart in addition to the Lund and Browder chart.

B2.1 Primary Assessment:

H - History of the injury

- Full name & age of the injured child.
- History of the burn to include the time of the injury.
- Extent, depth and distribution of the injury
- Is there any risk of inhalation injury?
- General condition of the patient – Any other injuries?
- Also: First aid carried out.
- Life threatening conditions determined and emergency management begun.

Conduct a brief review of the burn to determine the severity of the injury

A - Airway (To include cervical spine control if necessary)


- Ensure the airway is open – C-spine protection as appropriate.
C-spine injury from concomitant trauma (e.g.: fall or jump from a height, car accident etc...).
Unconsciousness and/or injuries above the level of the clavicle, e.g. facial injuries, are often associated with cervical fractures.
- Presence of facial or neck burns
- Risk of hot gas inhalation or upper airway burn – evident by singeing of nasal hair, red/swollen tongue or throat

B – Breathing

- Expose the chest – observing for adequate expansion on both sides of the chest
- Inhalation injury – did the burn occur indoors, in a closed space or was there an explosion? Is there evidence of soot around the nose and mouth?
- Presence of circumferential thoracic burns present – consider the need for an escharotomy
- Chest injury from concomitant injury
- Pneumothorax – increased risk with electrical injury.
- Blood gases & blood for carboxyhaemoglobin are required in any child with a suspected inhalation injury.

C – Circulation

- Monitor rate, rhythm and strength of the child's pulse.
- Assess the child's central capillary refill – this should be less than 2 seconds.
- Adequate IV access necessary
- Bloods required –FBC + U&E. (Group & hold / crossmatch only required if patient requires theatre within the first 24 hours or depending on child's clinical condition)
- Circumferential burns – Is an escharotomy necessary?
- Fluid resuscitation for a burn > 10%, calculated from the time of injury.
(Refer to Section B3.0 – Fluid Resuscitation)
- Signs of hypovolaemic shock are rarely due to the burn in the first 4 hours - therefore if signs are present, it is **essential** that another concomitant injury is ruled out
- Urinary catheter required for strict output monitoring in any burn > 10% who will require fluid resuscitation or a child with burns to the perineum.

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D – Disability (Neurological status)

- Establish level of consciousness using the AVPU scale –
 - A** – Alert – Fully awake, eyes open and alert although not necessarily orientated
 - V** – Voice responsive –child makes some response when spoken to. E.g. grunt/moan
 - P** – Painful stimuli- child responds to painful stimuli only e.g. sternal rub
 - U** – Unresponsive
- Assess the child's Glasgow Coma Scale (GCS) if AVPU scale abnormal.
- Examine pupillary response
- Observe for signs of hypovolaemia and shock as these can cause restlessness and unresponsiveness.

E – Exposure with environmental control

- Remove all clothing and jewellery (if clothing is adhered to the skin – to be removed in theatre)
- Keep the child warm at all times.

F – Fluid resuscitation

- (Refer to Section B3.0)

P – Pain:

- Burns are very painful
- Assess pain using locally used validated pain scales.
- Appropriate analgesia is administered based on the child's pain score (Refer to Section B4.0)

X – X-ray:

- Investigate suspected fractures (Spine, skull, chest etc)

B2.2 Secondary Assessment:

This is a comprehensive head to toe examination which commences after all life threatening conditions have been treated or excluded.

- H** – History
- A** – Allergies
- M** – Medications
- P** – Past illness
- L** – Last meal
- E** – Events related to injury

Mechanism of injury:

Burn:


- Duration of exposure
- What type of clothing was worn?
- If a scald – the temperature and nature of the fluid
- First aid measures received.
- Is the injury consistent with the description given – any child protection concerns?

Penetrating injury:

- Type and length of implement used.
- Distance and direction inserted.

Blunt:

- Height of fall
- Type of explosion and distance thrown
- What was the angle of impact?

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Examination:

- Head to toe examination
- Search for concomitant injuries
- Evaluate risk of electrocution
- Recheck burn area and depth and plot on Lund & Browder chart.
- Further assess circumferential burns and determine need for escharotomy.
- Is there any suspicion of non-accidental injury
- Re – evaluate condition and investigations required throughout.

Head:

- Check eyes for thermal or penetrating injuries. This examination can be completed by the plastics team or a member of the ophthalmology team. Consider the need for an ophthalmology consult.
- Check the scalp for lacerations or boggy areas which may indicate a skull fracture.

Face:

- Are there any teeth missing?
- Is there evidence of CSF leaking from nose or ears?
- Is there evidence of soot around the mouth or nose?
- Any blisters or oedema of the tongue / pharynx?
- Eye examination ideally before swelling otherwise it is impossible until swelling decreases.

Chest:

- Examine from front to back.
- Assess for circumferential burns and the need for an escharotomy.
- Is the child's voice altered or does the child have a brassy cough- which may indicate an inhalation injury.
- Is there evidence of soot in the sputum?

Abdomen:

- Assess for evidence of swelling or tenderness and frequently re-evaluate.
- If there are severe burns to the abdomen and a risk of other injuries a CT scan may be necessary to assess fully.

Perineum:

- Any evidence of bruising or meatal bleeding – if present, do not insert urethral catheter. Suprapubic catheterisation is advisable.

Rectum:

- A rectal examination should only be carried out if specifically indicated in children presenting with evidence of bleeding, bruising, lacerations or loss of sphincter tone and should only be carried out by a senior paediatric surgeon to avoid repetition.

B2.3 Burn Assessment – Lund & Browder⁴

Depth and extent of the burn injury is assessed and recorded on the Lund & Browder chart. The total body surface area (TBSA) is to be determined by the doctor assessing the child (Preferably at the initial assessment).

Do not include areas of erythema in the assessment of the extent of the burn as this will overestimate the TBSA.

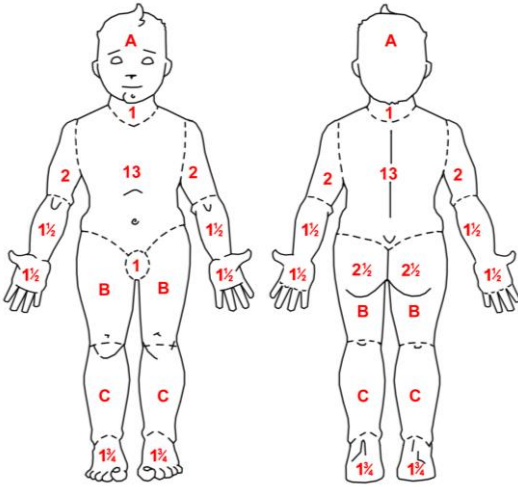






A Lund & Browder Chart must be completed on **EVERY** patient

Note: Conclusive assessment of depth is difficult within the first 48 hours

Our Lady's Children's Hospital, Crumlin. Lund & Browder Burns Classification	
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Name: <input type="text"/>	Unit Number: <input type="text"/>	Age: <input type="text"/>
Ward: <input type="text"/>	Date: <input type="text"/>	DOB: <input type="text"/>

*****Simple erythema not included*****

	<table style="width: 100%;"> <tr> <td style="text-align: center;">Superficial</td> <td style="text-align: center;">Deep</td> </tr> <tr> <td style="text-align: center;"></td> <td style="text-align: center;"></td> </tr> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 80%;">Region</th> <th style="width: 20%;">%</th> </tr> </thead> <tbody> <tr><td>Head</td><td></td></tr> <tr><td>Neck</td><td></td></tr> <tr><td>Ant. trunk</td><td></td></tr> <tr><td>Post. trunk</td><td></td></tr> <tr><td>Right arm</td><td></td></tr> <tr><td>Left arm</td><td></td></tr> <tr><td>Buttocks</td><td></td></tr> <tr><td>Genitalia</td><td></td></tr> <tr><td>Right leg</td><td></td></tr> <tr><td>Left leg</td><td></td></tr> <tr><td>TOTAL BURN</td><td></td></tr> </tbody> </table>	Superficial	Deep			Region	%	Head		Neck		Ant. trunk		Post. trunk		Right arm		Left arm		Buttocks		Genitalia		Right leg		Left leg		TOTAL BURN	
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Area	Age:0	1	5	10	15	Adult
A = ½ of head	9 ½	8 ½	6 ½	5 ½	4 ½	3 ½
B = ½ of one thigh	2 ¼	3 ½	4	4 ½	4 ½	4 ¾
C = ½ of one leg	2 ½	2 ½	2 ½	3	3 ¼	3 ½

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B3.0 **Fluid Resuscitation**^{5,6,7,8}

Fluid resuscitation

Fluid resuscitation is required for any child with a burn over 10% TBSA. Calculate the TBSA using the **Lund & Browder** chart ([refer to page 14](#)).

Children require more fluid than adults with a similar injury size, and this is thought to be because children's body surface area to weight ratio is higher than adults.⁶

Note: use caution when determining the need for additional fluid boluses and consider whether fluid boluses need to be included within the overall fluid resuscitation.

Bloods: Check FBC and U&E on admission and repeat thereafter depending upon child's condition.

Fluids:

Hartmans fluid is used for both the resuscitation & maintenance fluids and therefore only one infusion and one cannula is required.
(Unless large volumes are being infused in which case a second line may be required)

The amount of resuscitation fluid required is calculated using the following formula:

Modified Parkland Formula: 3 x weight (kg) x % burn

100% maintenance fluids are also required and are calculated using the following formula:

100 ml / kg x First 10kg
50 ml / kg x Second 10kg
20 ml / kg for each kg in excess of 20kg.

Both totals are added together to give the total amount of fluids the child requires for the first 24hours following the burn injury.

This total is divided in 2 with the first half given over the first 8 hours and the remaining half given over the following 16 hours.

NB: The first 8 hours starts from the time the injury occurs.


Example

A 2year old child is admitted with 12% scalds. The burn occurred at 14.00 hrs. The child weighs 15kgs. The time is now 15.00 hrs

- **Resuscitation fluids =**
4 x 15 (weight) x 12(% burn) =720ml **Total Resuscitation Fluids:** 720mls
- **Maintenance fluids =**
100 ml x 10 (kg) =1000mls
50 ml x 5 (kg) = 250mls **Total Maintenance Fluids:** 1,250mls
- **Total fluids = 720mls (resus) +1,250mls (maintenance) =1,970mls over 24hours**
(Then divide by 2: 1,970mls / 2 = 985mls per period)
- **First 8hour Period:** 985mls. As only 7 hours remaining until the 8 hour period has elapsed, the hourly rate 985mls / 7hrs= 140.7mls/hr
- **Second 16 hours Period:** 985mls also. 985mls /16hrs = 61.5mls/hr

Note: The fluids should be adjusted accordingly to ensure a urinary output of

1-2mls/kg/hr in children < 8years of age &
0.5-1.5 mls/kg/hr in children > 8 years of age

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B4.0 **Pain Management in the Emergency Department** (See also Section C4 for further information on the management of burn related pain)

Burn injuries result in significant pain and anxiety at the time of the burn and during subsequent treatment and rehabilitation^{9,10}. Developmentally appropriate pain assessment and pain management is essential in the management of burned children^{9,10,11}. Burn pain may be constant or related to activity or procedures and is further compounded by anxiety and post-traumatic stress symptoms^{9,12}.

A number of factors, including the extent and severity of the wound, mechanism of injury, surgical procedures, physical and occupational therapy, will affect the amount of pain experienced by a child with a burn injury^{9,13,14}. Because of the multifactorial nature of pain in burned children, a multidisciplinary approach to pain management must include non-pharmacological and pharmacological approaches to relieving pain and anxiety.

B4.1 **General Principles of Pain Management**

The general principles of pain management can be summarised as follows:

- **Evaluation and assessment:** A comprehensive assessment and physical assessment is important. Pain must be assessed using developmentally appropriate pain assessment tools and the results of this assessment must be documented in the child's Health Care Record^{9,10,13}.
- **Non-pharmacological pain management strategies** should be used in addition to pharmacological methods whenever available and appropriate^{9,11,12}. In addition, it may be appropriate to consider psychological support for individual patients.
- **Explanation and reassurance:** Explanation and reassurance about the child's condition is important in alleviating anxiety¹². Other disciplines have a role in the management of children's burn pain: Refer child to play specialist, psychology, occupational therapy, physiotherapy, and music therapy for support in managing burn pain.
- **Prior to procedure** review infant/child's analgesia and sedation. Ensure intervention such as dressing change is timed to coincide with peak analgesic effect of both current regular agents and any supplementary agents given.
- **Note:** Paracetamol PO/PR/IV, NSAIDs, Oramorph, Midazolam (oral) and Clonidine if used should be given at least 30-45minutes pre-procedure. The peak effect of these agents ranges generally between 1-3 hours

Analgesics are most effective when given on a scheduled regular basis (not as required)¹⁰. Supervision necessitates review of analgesic medication regularly. Ensure patient is tolerating medicine, dose is sufficient and side effects are being treated. Pain Service referral should be made to the Acute Pain Team within 24 hours of admission for children requiring intravenous opiates or where pain is difficult to control.

B4.2 **Pain Assessment**


Assess and record pain scores on a regular basis using developmentally appropriate pain scoring tools following consultation with the child and parents (See Appendix 2 – Pain Assessment Tools), e.g.

- Wong and Baker Faces¹⁵.
- FLACC¹⁶ and FLACC-Revised for children with intellectual disabilities
- Numeric or Visual Analogue Scale for pain intensity¹⁰.
- Manchester Pain Ladder (ED)

(A range of pain assessment tools are available in the nursing practice guidelines on the hospital intranet, including multilingual pain assessment tools.)

Based on the score obtained, offer appropriate analgesia as outlined below.

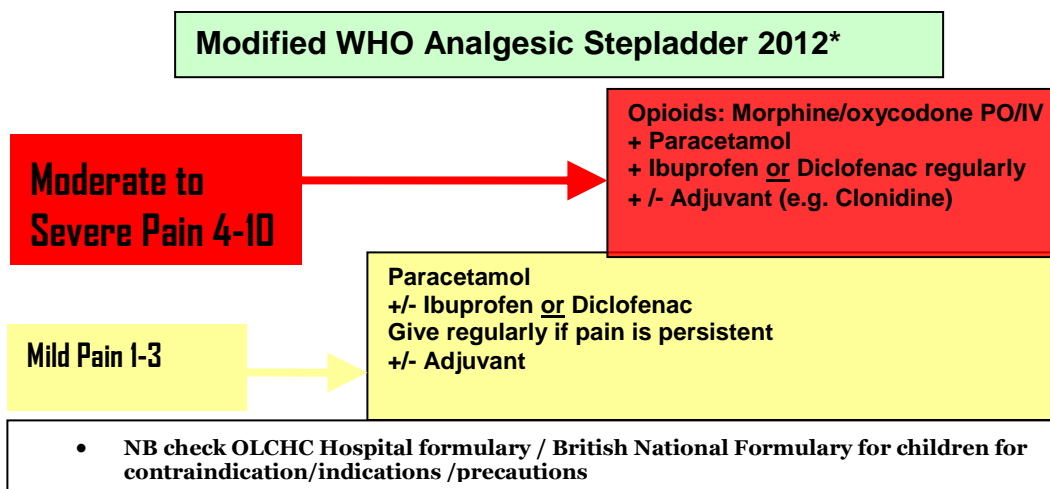
Assess and record pain scores before, during and after all potentially painful procedures. This will help to guide provision of optimal analgesia for individual patients and assess efficacy of the various analgesic regimens used by individual service providers.

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B4.3 Analgesia for Burn Injured Children

Multimodal analgesia is important i.e. analgesic drugs are used in combination to maximize their impact¹².

The World Health Organisation have redefined their pain ladder into a 2-step approach. Analgesia therapy regimens should be based on a 'step-down' ladder rather than a 'step-up' ladder until analgesia is achieved.



*WHO 2012¹⁷

Consider starting with intravenous opiate until adequate analgesia provided. Addition of regular, simple analgesics (paracetamol, NSAIDs) may give useful additional analgesia and allow change from parenteral to enteral opiate. Reduction and cessation of opiate analgesia should occur before reduction and cessation of paracetamol and/or NSAIDs.

B5.0 Wound Management in the Emergency Department

(See also Section C5.0 for further information on Burn Wound Management)

Note: Children being admitted to St Anne's Ward should have their dressings applied on the ward. If, for whatever reason, the dressing needs to be applied in the ED (this would be the exception rather than the norm), liaise with the ward re availability of support to the ED. If staffing unavailable, seek advice re a temporary non-adherent dressing prior to transfer (Refer to Sections C5).

Procedure

- Give a full explanation to the child and parents prior to attending to the wounds.
- The child must receive adequate analgesia as per Sections B4.0 & C4.0 prior to any dressing change / wound assessment.
- The burn extent and depth is to be determined by the plastics team / senior medical staff in ED and documented using the Lund and Browder chart. (Refer to Section B2.3)
- Derroof blisters where possible, especially those over joints.
- Debride dead skin.
- Take photographs where possible (Contact St. Anne's to see if nurse available to take photos).
- Perform wound swabs after burn is cleaned.
- Dressing choice is determined by the burn depth and location of the wound and the child's clinical condition

PART C: MANAGEMENT OF BURNS AS AN INPATIENT / OUTPATIENT

C1.0 Introduction

Irrespective of whether the child with a burn is care for as an inpatient or an outpatient, his or her effective burns management relies on a multidisciplinary approach to care. Part C contains guidelines to support the multiplicity of disciplines who treat and care for the child with a burn.

C2.0 Burn Assessment – Lund & Browder⁴


Depth and extent of the burn injury is assessed and recorded on the Lund & Browder chart. The total body surface area (TBSA) is to be determined by the doctor assessing the child (Preferably at the initial assessment). Do not include areas of erythema in the assessment of the extent of the burn as this will overestimate the TBSA.

A Lund & Browder Chart must be completed on **EVERY** patient

Note: Conclusive assessment of depth is difficult within the first 48 hours

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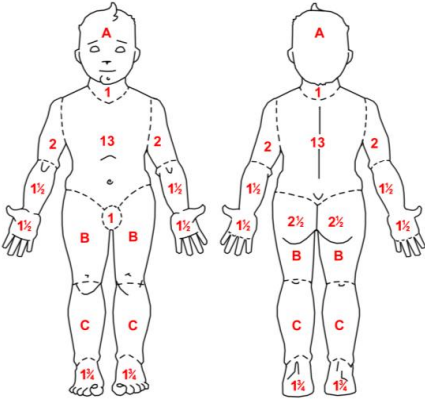
Lund & Browder Burns Classification



Name: Unit Number: Age:

Ward: Date: DOB:

Simple erythema not included




Superficial **Deep**

Region	%
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Ant. trunk	
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Total Resuscitation Fluids: 720mls

■ **Maintenance fluids =**

$100 \text{ ml} \times 10 \text{ (kg)} = 1000\text{mls}$

$50 \text{ ml} \times 5 \text{ (kg)} = 250\text{mls}$

Total Maintenance Fluids: 1,250mls

■ **Total fluids = 720mls (resus) + 1,250mls (maintenance) = 1,970mls over 24hours**

(Then divide by 2: $1,970\text{mls} / 2 = 985\text{mls per period}$)


■ **First 8hour Period:** 985mls. As only 7 hours remaining until the 8 hour period has elapsed, the hourly rate $985\text{mls} / 7\text{hrs} = 140.7\text{mls/hr}$

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C4.0 Pain Management

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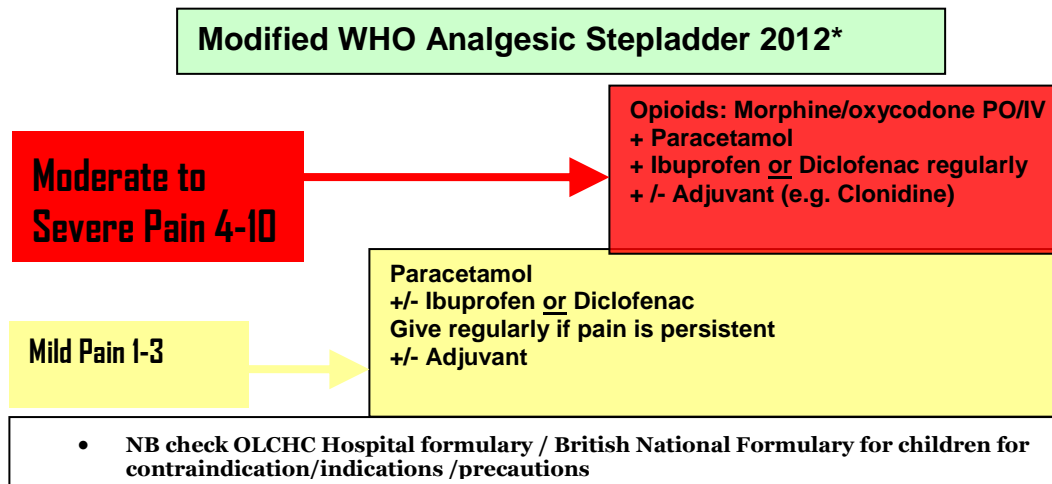
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C4.3 Analgesia for Burn Injured Children

Multimodal analgesia is important i.e. analgesic drugs are used in combination to maximize their impact¹²Error! Bookmark not defined.

The World Health Organisation have redefined their pain ladder into a 2-step approach. Analgesia therapy regimens should be based on a 'step-down' ladder rather than a 'step-up' ladder until analgesia is achieved.



*WHO 2012¹⁷

Consider starting with intravenous opiate until adequate analgesia provided. Addition of regular, simple analgesics (paracetamol, NSAIDs) may give useful additional analgesia and allow change from parenteral to enteral opiate. Reduction and cessation of opiate analgesia should occur before reduction and cessation of paracetamol and/or NSAIDs.

C4.4 Opioids

Early and repeated consideration should be given to provision of regular opiate analgesia by the most appropriate route and method of administration.

Consideration may need to be given to provision of parenteral opiate by either patient or nurse controlled intravenous opiate analgesia (PCA/NCA).

If several doses of oral opiate are given on an 'as required' prescription, it may be more appropriate to prescribe a regular, time related dose of opiate. This may be in the form of regular doses of oral morphine sulphate (e.g. Oramorph™ or Sevredol™) or Oxycodone (OxyNorm™), or twice daily modified release morphine sulphate (e.g. MST™) or other similar opiates (Oxycontin®).


When prescribing regular opioid analgesic medication, a Laxative and an anti-emetic should also be prescribed. (see BNF for children/Hospital drug Formulary for doses).

C4.4.1 Fentanyl Transmucosal Preparations: (see pharmacy guideline)

Fentanyl oral preparations such as fentanyl Lozenge (Actiq®), Buccal Fentanyl (Effantora®) preparations can be used for procedures that are painful e.g. dressing change.

In the Emergency Department, fentanyl may be administered intranasally using the M.A.D (Mucosal Atomization Device). (see nursing practice guideline)

Do not administer Fentanyl transmucosal preparations in addition to another sedative agent for burn dressing changes, as cumulative doses of more than two sedative agents increases the risk of

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excessive sedation and loss of protective airway mechanisms.

However, if a child is receiving another opioid regularly e.g. Oromorph® / MST® the child should continue to receive this at the prescribed time regardless of when the Fentanyl Transmucosal preparation is administered.

C4.4.2 Opioid Titration

Opioid dosing **must** be adjusted for each child until their pain is controlled, taking in account the child's level of pain and any side effects of the opioid.

A **Breakthrough** dose of the opioid at 1/6th of the Total Daily Dose should also be prescribed 4 hourly prn in addition to regular opioid dosing. If a breakthrough dose of opioid is given, the regular dose is still given on time.

Review after 24 – 48 hours and adjust regular dose according to breakthrough requirements. If more than 4 breakthrough doses are required, the child's opioids may need to be increased, including the breakthrough dose.

Notes:

If a child is fasting for theatre administer the opioid on time and note this on the anaesthetic sheet.

If renal function is impaired (i.e. moderate to severe impairment), consider halving the starting dose or use the lower dosing range. (Seek advice from Acute Pain Service).

C4.4.3 Side Effects

All patients must be assessed for side-effects of treatment and suitable therapeutic adjustments or interventions made. Opiate analgesic drugs can cause significant respiratory depression.

Opiates are associated with an increase in incidence of nausea and vomiting. Any nausea and vomiting should be treated urgently and effectively. Prescription of regular antiemetics may be required as reduction in opiate dose may not be possible¹⁰.


Opiate analgesic drugs can cause significant **constipation** which may cause distress and may hinder the provision of adequate nutrition^{9,10,12}. It is recommended that all patients receiving regular doses of opiate analgesic drugs be prescribed appropriate aperients (e.g. senna, lactulose).

Opiates are associated with **itching** and any change in perception of itching should be noted when opiate doses are started or changed. Treatment should be directed to the relief of itch as reduction in opiate dose may not be possible. It is treated with antihistamines and usually subsides within 3 – 4 days. Anthisan® cream applied topically may be prescribed for a troublesome nasal itch.

C4.4.4 Opioid Toxicity

Signs of toxicity include:

- Sedation level ≥ 3
- Drowsiness and or Confusion
- Pin-point pupils
- Myoclonic jerks
- Hallucinations or Nightmares, bad dreams
- Vomiting

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C4.4.5 Management of opioid Toxicity

If the child is over sedated, reduce or stop IV opioid. If on oral opioids, hold the next dose, encourage PO fluids or provide a fluid bolus. Contact medical staff, CNS Acute Pain. The dose of opioid must be reviewed and where necessary reduced.

If **respiratory depression** is evident:

- Provide Oxygen, stimulate the child by talking etc.
- Seek medical support using ISBAR or emergency bleep 2222. Stop the opioid infusion.
- Naloxone is the treatment for opioid induced respiratory depression. (see H ospital formulary or BNF for children)

C4.5 Non Opioids: (See BNF for Children, Hospital drug Formulary for doses)

Paracetamol: all patients should receive regular doses of paracetamol unless contraindicated. There is good evidence for the efficacy and safety of regular paracetamol in treatment of acute pain¹⁰. Paracetamol given regularly and in appropriate dose can give significant additional analgesia in combination with opiate and may have an opiate sparing effect¹⁰.

Non-Steroidal-Anti-inflammatory Drugs (NSAID'S e.g. Ibuprofen, Diclofenac): Consideration should be given to prescription of regular doses of a non-steroidal anti-inflammatory drug (NSAID) to augment the analgesia provided by paracetamol unless contraindicated.

There is good evidence that the provision of a regular NSAID to regular paracetamol has a useful additional analgesic effect and an increased opiate sparing effect¹⁰. Individual clinical judgement will be required to determine the impact of any relative contraindication e.g. asthma, renal impairment (or risk of), gastric erosion (or risk of), increased surgical bleeding.

Evidence from NSAID use in asthmatic patients suggests that worsening of bronchospasm is unlikely unless the patient's asthma is brittle or difficult to control. Close observation of all asthmatic patients given NSAIDS is advised. A history of previous uneventful use of NSAIDs in each individual patient is reassuring.

Adverse effects on renal function rarely occur in therapeutic doses unless other risk factors coexist. These would include hypovolaemia, pre-existing renal impairment and the presence of other nephrotoxic agents¹⁰.

Sucrose 24%: can be used for neonates and infants less than 6 months undergoing painful procedures.

C4.6 Adjuvants

An adjuvant analgesic is a medication that is not primarily designed to control pain, but can be used for this purpose. Examples of adjuvant analgesics drugs include: Clonidine, Gabapentin, Amitriptyline, or Diazepam.

Clonidine as an adjunct to analgesia may be prescribed to reduce opiate requirements, reduce anxiety and improve pain management.


Gabapentin: as a supplement to the pain and itch management regimen. Experience of and evidence for the use of gabapentin in the treatment of acute burn related pain is evolving rapidly both nationally and internationally¹⁰.

C4.7 Entonox® St Anne's Ward

Entonox® is indicated to provide short term analgesia during burns dressing changes. Entonox® is self-administered and so provides the child with control over their own pain relief. Please refer to the Nurse Practice Guideline on "**The self-administration of Entonox® by children during dressing-changes on St. Anne's Ward**" prior to administering Entonox®.

Entonox® should only be prescribed after a thorough risk assessment.

Prescribed as Nitrous Oxide/ Oxygen 50% (Entonox) Inhalation prn for dressing changes.

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C4.8 Administration of sedation for burn dressing changes in children > 4 months on St Anne's Ward

This information related to the administration of sedation to children undergoing painful procedures on the burns unit. It should only be used by staff who are deemed competent to administer sedation and who perform the procedure on a regular basis.

Ward-based procedural sedation should only apply to generally healthy patients or those who have only mild systemic disease.

Patient with other healthcare needs should not be sedated without the involvement of staff from the Pain Management/ Anesthesia Service. If in doubt, discuss with Pain Management/ Anesthesia Service.

All children who require sedation for burn dressings should be assessed and a pre-sedation checklist should be carried out before administering sedative medication for change of dressings on St Anne's ward. **(See Appendix 3 – pre sedation checklist)**

Please also refer to the OLCHC Sedation Guidelines which are available on the hospital intranet. http://olchcnet.hse.ie/OLCHC_Clinical_Guidelines/A-Z_List_of_Guidelines/Sedation_General_.html

Sedatives used on St Anne's Ward for change of Burn Dressings

Generally, the agents used for sedatives on St Anne's include the following:

- Nitrous Oxide (Entonox®)
- Oral agents e.g. Choral Hydrate®, PO Midazolam, PO Promethazine (Phenergan®), PO Alimemazine (Vallergan®), Sucrose 24%

See hospital Formulary, BNF for Children for dosing guidelines, side effects and contra-indications.

C4.8.1 Fasting prior to sedation.

Children having burn dressings on St Anne's Ward, are **NOT** routinely fasted pre sedation for change of dressing on the ward.

C4.9 Weaning

Psychological dependence (addiction) to opioids is not seen in clinical practice in children with burn injury. Physical dependence does occur but withdrawal symptoms can be avoided by a gradual reduction of dose over five days. A small number of patients will require two to three weeks to reduce and stop^{10,11}.


Once wounds begin to heal start to wean opioids **(See Appendix 4)**. If necessary convert from MST to oromorph to assist with weaning medication **(See Appendix 5)**.

Note: **N.B.** Any child on opioid /sedative analgesia > 5 days or if withdrawal suspected should have withdrawal scores done 12 hourly **(See Appendix 6)**

Aim: to stop opioids before discharge

C4.10 Pain Management in the Dressing clinic

Children who are deemed suitable to attend St Anne's dressing clinic are those whose dressings take approximately 15 – 20 minutes and only require paracetamol and / or ibuprofen for pain relief. Parents should be advised to administer the analgesia approximately 30 - 45 minutes prior to their appointment time. The clinic is not in a position to monitor children requiring opioids or sedation and therefore children requiring either opioids or sedation must remain as an inpatient for dressing changes.

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C4.11 Itch

In addition to pain, children with burns also experience intense itch due to the effects of histamine released during wound healing¹⁸. Itch can be described as distressing for patients and frustrating for nurses, as it is notoriously difficult to manage¹⁹.

Therefore itch should be scored and recorded on a regular basis using the itch assessment chart (**See Appendix 7**). Based on the score obtained, appropriate treatment in the form of anti-histamines will be offered.

As opioids can also contribute to itching, any changes in the child's itch pattern should be noted when an opioid is started or a dose changed.

Note: Protocol for the Management of Itch to follow

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C5.0 Wound Management⁴³

C5.1 Wound Management in the Emergency Department.

Note: Children being admitted to St Anne's Ward should have their dressings applied on the ward. If, for whatever reason, the dressing needs to be applied in the ED (this would be the exception rather than the norm), liaise with the ward re availability of support to the ED. If staffing unavailable, seek advice re a temporary non-adherent dressing prior to transfer.

Procedure

- Give a full explanation to the child and parents prior to attending to the wounds.
- The child must receive adequate analgesia as per **Section C4.0** prior to any dressing change / wound assessment.
- The burn extent and depth is to be determined by the plastics team / senior medical staff in ED and documented using the Lund and Browder chart. (**refer to Section B2.3 & C2.0**)
- Deroof blisters where possible, especially those over joints.
- Debride dead skin.
- Take photographs where possible (Contact St. Anne's to see if nurse available to take photos).
- Perform wound swabs after burn is cleaned.
- Dressing choice is determined by the burn depth and location of the wound and the child's clinical condition

C5.2 Dressing Changes on St. Anne's Ward

All burns dressings should be done as a planned procedure. The nurse manager / nurse in charge should anticipate the duration of the dressing change in order to consider the service needs of the ward and assess if additional staffing is required for this period.

If a burn dressing is to be changed and assessed out of hours, this should be a consultant decision and the registrar should liaise with the consultant on call.

C5.3 Dressing Changes in the Operating Theatre


An assessment of the child's clinical needs must be undertaken to determine the most suitable location in which to do the dressing change. The child may require dressings changed under anaesthetic if they have extensive burns or if there are difficulties in managing pain control during a procedure.

Children requiring dressing changes in the Operating Theatre will need to fast as per OLCHC Fasting Guidelines³⁹:

- Fast from solids and enteral feeds: 6 hours prior to surgery
- Breastmilk: 4 hours prior to surgery
- Clear fluids (i.e. flat 7-up or water): 2 hours before surgery.

C5.4 Properties of the ideal wound dressing²⁰:








- Maintains moist wound healing but will absorb excessive exudate
- Provides thermal insulation to maintain wound temperature at 37°C
- Permits gaseous exchange so that oxygen, water vapour and carbon dioxide can pass into and out of the dressing
- Impermeable to micro-organisms to minimise contamination of the wound
- Will be free from either particulate or toxic contamination
- Non-adherent to allow atraumatic removal from wound
- Is comfortable and permits patient to perform activities of daily living
- Cost-effective and convenient
- Secure but not constrictive


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C5.5 Wound management following skin grafting:

Grafted Site	Dressing choice immediately post-operatively	<p>Dressing of choice: Adaptic Touch®.</p> <p>This is a non-adherent silicone dressing. It has no therapeutic properties, other than to protect the wound and it will not stick to the graft when being removed at the first dressing change.</p> <p>A Negative Pressure Wound Therapy (N.P.W.T.) system may also be used at this time. (See section C5.8)</p>
	Frequency of dressing change	<p>This dressing is usually not changed until day 5 following surgery unless there is a clinical indication to do so sooner e.g. clinical signs of infection, temperature, wound odour etc.</p>
	First dressing change	<p>At day 5 the grafted area remains quite delicate. It is often quite moist in appearance.</p> <p>DO NOT BATHE THE CHILD AT THE FIRST DRESSING CHANGE. Assess the wound for presence and integrity of the graft.</p> <p>A gentle shower may be given only in exceptional circumstances if the wound is very sloughy. Do not rub the grafted area at this stage as there is still a risk of removing the graft.</p>
	Dressing choice after first dressing change	<p>Wound is dry: use a non adherent dressing such as Adaptic Touch®</p> <p>Wound is moist and / or sloughy: use Inadine™ or Acticoat® 3 or 7 with Adaptic Touch® applied first over the grafted area</p>
Donor Site	Dressing choice immediately post-op	<ul style="list-style-type: none"> • Infants aged under 1 year: Aquacel®^{21,22} • Children aged 1year and older: Kaltostat®^{22,23} <p>Note: Apply the dressing with a 2.5cm overlay beyond the wound margins to allow for shrinkage of the dressing as absorbs exudate</p>
	Management of the donor site post-operatively	<p>The donor site may require re-padding or changing due to the high volume of exudate, especially within the first 24-48 hours²².</p> <p>Do not re-pad the dressing more than once. If a donor site is re-padded once and continues to ooze through, remove the secondary dressing leaving the primary dressing intact and reapply a new secondary dressing.</p> <p>Change / Repad a wound dressing as little as possible to reduce the child's procedural pain and anxiety, particularly as donor sites are noted to be very painful wounds due to their depth and the presence of exposed nerves.</p>
	First dressing change	<p>A donor site dressing can remain in situ for 7-10 days unless it is soiled, leaking or dislodged, or if the child is showing signs of infection (Refer to Section C8.0).</p> <p>On Day 7-10 post-operatively, the dressing can be soaked off in a bath. If areas remain unhealed, cream the healed areas and apply Mepilex® / Mepilex lite® to the unhealed areas. Cream all healed areas with Aveeno® cream (or a similar moisturiser) three times a day.</p>

C5.6 Dressing Selection Guide - Note: Please refer to **Section C5.7** for use and properties of the dressings.


Type of burn	PICTURE	Aim of dressing	Dressing type
<u>SUPERFICIAL</u>		<ul style="list-style-type: none"> • Protect wound bed • Absorb exudate • Prevent infection • Promote epithelialisation 	Adaptic Touch®
<u>SUPERFICIAL PARTIAL</u>		<ul style="list-style-type: none"> • Protect wound bed • Absorb exudate • Prevent infection • Promote epithelialisation of superficial & partial thickness areas 	Aquacel Ag®
<u>DEEP PARTIAL</u>		<ul style="list-style-type: none"> • Protect wound bed • Debride and deslough wound • Prepare wound bed for skin grafting if needed 	Acticoat®
<u>MIXED THICKNESS</u>		<ul style="list-style-type: none"> • Protect wound bed • Absorb exudate • Prevent infection • Promote epithelialisation of superficial & partial thickness areas 	Aquacel Ag® / Acticoat®
<u>FULL THICKNESS</u>		<ul style="list-style-type: none"> • Protect wound bed • Prevent infection • Debride and deslough wound • Prepare wound bed for skin grafting if needed 	Skin Grafting Acticoat® if grafting is delayed
<u>HAND BURNS (MAY APPLY TO SOME FEET BURNS)</u>		<ul style="list-style-type: none"> • Protect wound bed • Debride and deslough wound • Promote epithelialisation of superficial & partial thickness areas • Prepare wound bed for skin grafting if needed. 	Flamazine™ applied hand (or foot) and placed in a plastic bag.
<u>FACE, NECK & EARS (SUPERFICIAL GENITAL AREAS ALSO)</u>		<ul style="list-style-type: none"> • Protect wound bed • Prevent infection • Promote epithelialisation of superficial & partial thickness areas 	Polyfax™ ointment
<u>PERINEUM & BUTTOCKS</u>		<ul style="list-style-type: none"> • Protect wound bed • Prevent infection • Promote epithelialisation of superficial & partial thickness areas • Prepare wound bed for skin grafting if needed 	Flamazine™ applied to Jelonet®. Change at each nappy change.
<u>EYE CARE</u>	Consider the need for a review by Ophthalmology team for all children with facial burns involving the eye region. Ideally within the first 24hours prior to swelling.		

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C5.7 Overview of Dressings: Note: Product information obtained from the product manufacturers, published articles and/or <http://www.dressings.org/dressings-datacards-by-alpha.html>

Primary dressings protect delicate tissue by maintaining a non-adherent layer on the wound.			
Dressing	Description	Frequency of change	Comments
Adaptic®	Cellulose mesh coated in petroleum emulsion	Every 3-5 days Change secondary layer as required	<ul style="list-style-type: none"> Low adherence Choice of secondary dressing depends on level of exudate of wound
Adaptic Touch®	Flexible polyamide net coated in silicone	Every 5-10 days Change secondary layer as required	<ul style="list-style-type: none"> Very low adherence. Do not use on a wound requiring frequent inspection as is expensive Choice of secondary dressing depends on level of exudate of wound
Kaltostat®	Calcium Sodium Alginate	Can stay in place for 7 – 10 days	<ul style="list-style-type: none"> As the wound heals underneath the dressing should lift and be cut away. Has a maximum absorbency level and so when this is reached it leaks Choice of secondary dressing depends on level of exudate of wound
Jelonet®	Tulle dressing coated in soft paraffin	Daily/alternate days	<ul style="list-style-type: none"> The paraffin can occlude the spaces in the dressing, rendering it semi-occlusive. This can prevent excess exudate moving from the wound leading to maceration. Granulating tissue can grow up through the spaces in the tulle, creating a characteristic grid pattern on the wound. Very difficult to remove if it dries in. Jelonet is only used with silver cream i.e. flamazine

Medicated, Anti-bacterial or Therapeutic Primary dressings – to treat infected / problematic wound and provide further protection to the wound			
Dressing	Description	Frequency of change	Comments
Aquacel Ag®	Hydrofibre dressing which contains ionic silver	Use gauze as a secondary dressing	<ul style="list-style-type: none"> Aquacel contains ionic silver which has antimicrobial properties The dressing adheres to wound. It gradually detaches as the wound epithelialises. Can stay in situ up to 14 days. Aquacel must be checked for adherence 48 hours following application. It may need to be reapplied for a second time before it adheres fully
Acticoat® or Acticoat 7®	3-ply dressing which contains nanocrystalline silver	Acticoat 3 can be left in place for 3 days. Acticoat 7 can be left in place for 7 days. Use gauze as a secondary dressing.	<ul style="list-style-type: none"> The nanocrystalline silver in Acticoat acts as an antimicrobial also. Moisten with water before applying. Saline will inactivate silver. Can sting initially if dressing is too moist when applied. Sticks to a wound – must be soaked off Always apply acticoat 3 for 1st application
Flamazine™	cream containing 1% w/w silver sulphadiazine	Alternate days Use with Jelonet as a primary dressing	<ul style="list-style-type: none"> Antimicrobial cream – Used as prophylaxis in full or partial thickness burns: infected burns. Superficial/partial thickness scalds which convert to full thickness Manufacturers recommend a 3 – 5mm thickness of flamazine is to be used

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Polyfax ointment™	Topical antibacterial agent containing Polymyxin B Sulphate & Bacitracin zinc	Applied in a thin layer 3 times a day	<ul style="list-style-type: none"> Promotes debridement of dead tissue and helps prevent infection Using an aseptic technique, always clean the area first using saline and then apply the ointment in a thin layer over the affected areas. The affected area is best left exposed
Inadine™	Non adherent dressing – impregnated with 10% povidone iodine.	Alternate days	<ul style="list-style-type: none"> Indicated for infected wounds. If a wound shows signs of infection, i.e. smell, redness, ooze, Inadine is a useful choice. Must be used with a secondary dressing, i.e. gauze. Do not use in a patient with a known iodine sensitivity. Use cautiously in patients with thyroid problems.
Intrasite™	Aqueous gel	Alternate days. Allevyn is a suitable secondary dressing for use with Intrasite gel.	<ul style="list-style-type: none"> Promotes debridement of sloughy or necrotic wounds by facilitating rehydration and autolysis of dead tissue.
Bactigras™	Tulle impregnated with Soft Paraffin & containing Chlorhexidine	Daily/alternate days depending on the extent of the infection	<ul style="list-style-type: none"> Indicated for infected wounds. If a wound shows signs of infection, i.e. smell, redness, ooze, Bactigras is a useful choice. Must be used with a secondary dressing, i.e. gauze.
Activon Tulle®	Tulle dressing coated with Manuka Honey	Antimicrobial- also helps to deslough and debride wound bed. Increases blood-flow in wound	<ul style="list-style-type: none"> Use for chronic or non-healing wounds. Can also be used in infected wounds. Can be left in situ for 3-7 days –will depend on how quickly the honey is used up. Do not use on children with bee / honey allergies

Secondary dressings provide further protection to the wound & absorb exudate if necessary.

Dressing	Description	Frequency of change	Comments
Allevyn™	Very absorbent foam dressing with an outer pink semi-permeable film	Change PRN depending on the volume and nature of exudate	<ul style="list-style-type: none"> Used for exuding wounds. Of limited value on dry wounds with no exudates, as will adhere to wound. Secure in place with tape, Mefix or bandaging.
Gauze	Non fibre-shedding gauze e.g. “Burns gauze” 100% cotton	Change PRN depending on the volume and nature of exudate	<ul style="list-style-type: none"> Used to hold primary dressing in place, provide protection for the wound, and to absorb exudate. Secure in place with tape, Mefix or bandaging
Exu-dry™	A highly absorbent dressing, made from a rayon / cellulose centre covered with a layer of high density polythene	Change PRN depending on the volume and nature of exudate	<ul style="list-style-type: none"> Used to hold primary dressing in place. Used in patients with an allergy to other secondary dressings e.g. gauze. Non adherent Ideal for use in older children Do not use with petroleum based dressings as these may interfere with its absorbency

All-in-one dressings can be used on their own over a superficial / almost healed wound

Dressing	Description	Frequency of change	Comments
Mepilex®	3 layer foam dressing Outer film bonded to middle layer of foam. Wound contact layer of silicone	Change PRN depending on the volume and nature of exudate	<ul style="list-style-type: none"> Used on exuding wounds Low adherence, suitable for delicate skin
Mepilex Lite®	Thinner version of	Change PRN depending on	<ul style="list-style-type: none"> Used on very low wounds – suited to delicate wounds

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	Mepilex. 3 layer foam dressing. Wound contact layer made of silicone	the volume and nature of exudate	which require protection • Low adherence, suitable for delicate skin
Duoderm®	Hydrocolloid	Change once exudate is 2cm from edges of dressing	• Suitable for wounds with little exudate, or to protect areas of redness e.g. pressure areas • Avoid on heavily exuding wounds as can cause overgranulation
Allevyn gentle Border®	Gel Adhesive Hydrocellular Foam Dressing with Border	Change PRN depending on the volume and nature of exudate	• Used for exuding wounds. • Of limited value on dry wounds with no exudates, as will adhere to wound.
Negative Pressure Wound Therapy	Vacuum Assisted Closure	Dressing changed every 48-72 hours but can be left in situ for up to 1 week.	Refer to Section C5.8

C5.8 Negative Pressure Wound Therapy^{24,25,26,27}

Negative Pressure Wound Therapy (NPWT) is a vacuum assisted wound care treatment using a negative pressure of 60-125 mm Hg on the wound bed. This system consists of a sponge and suction tubing which is connected to a NPWT system. The sponge is secured in place using an occlusive dressing. This system works by creating a negative pressure environment in the wound (either continuous or intermittent) and has been shown to aid wound healing by:

- Removing excess fluid / infected material which may be present
- Promotes tissue granulation in wounds
- Helps promote perfusion in the wound
- Promotes a moist wound healing environment.
- Following SSG it acts by securing the graft to the wound bed – improving graft survival

This dressing will be left in place for 5-7 days, unless there is a clinical indication to change it sooner.

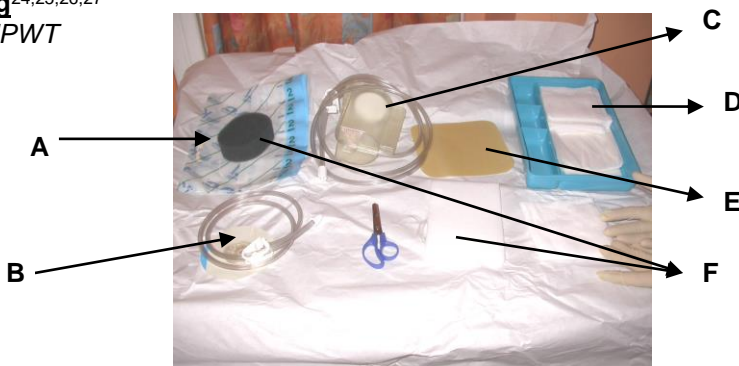
NOTE: To help reduce pain and bleeding when the sponge is being removed, a solution of 2mg / kg of 1% lidocaine and adrenaline solution may be prescribed and can be added to the sponge. (This can be diluted further if the volume is too small). It is added by clamping the system first. Then open the system via the connector on the tubing. Insert the syringe to the tubing connected to the sponge, open the clamp, push in the solution then re-clamp. The solution is left in place for approximately 20-30minutes prior to removing the dressing. Then proceed to remove the dressing. Once prescribed correctly the nurse can safely carry out this procedure. Discuss with the Plastics Team and the Acute Pain Service.


1. Guide for applying a N.P.W.T. dressing^{24,25,26,27}

Note: These guidelines relate to the use of NPWT in OLCHC.

Equipment:

- Occlusive dressing
- Tubing with suction pad
- Canister with tubing
- Large burns dressing pack
- Duoderm dressing
- White or black sponge (see guide)



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2. Protecting surrounding skin:

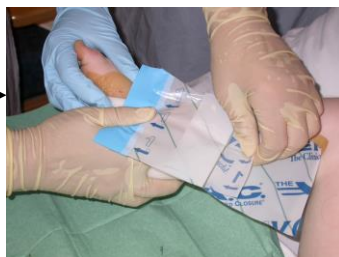
Protect surrounding skin by applying a layer of Duoderm® around the edges of the wound. This protects the skin from becoming macerated.



3. Applying the sponge:

Apply sponge (black or white as decided) slightly overlapping the wound edges. (See bridging below)

Cover well with an occlusive dressing trying to avoid the possibility of air leaks.



4. Bridging:

When joining 2 pieces of sponge together (black or white) a bridge must be made to ensure the N.P.W.T. system works properly. This is made using a piece of black sponge extending from one sponge to the other prior to applying the occlusive dressing.




5. Applying the suction pad

To apply the suction pad, once the occlusive dressing is fully sealed, cut out a small area out of the occlusive dressing preferably in the centre of the sponge. Peel off the backing from the suction pad and apply the centre of the sticky side directly over the cut-out area.

Finally, attach the suction pad tubing to the canister tubing via the connection port. Set N.P.W.T. pressure as indicated by the team.




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C6.0 Guidelines for Nursing Management


The role of the nurse is to provide safe, effective care for the child and family, adopting a family centred care approach and liaising with the relevant health care professionals within the multidisciplinary team in order to obtain the best outcome for the child with a burn injury. All nursing care is planned, implemented and evaluated following an individualised assessment of the child's needs.

	Action	Rationale & Reference
Maintaining a safe environment		
1.	Decontaminate hands before and after patient contact	To prevent cross infection ²⁸
2.	Wound swabs to be taken: <ul style="list-style-type: none"> ➢ on admission ➢ weekly thereafter ➢ 48 hours prior to skin grafting. ➢ If any signs of wound infection are present 	To detect any micro organisms promptly and determine the antibiotic sensitivity of those micro-organisms
3.	Monitor vital signs as clinically indicated & report any deviations from the normal.	To promptly detect any deterioration in the child's condition i.e. inhalation injury.
4.	Monitor closely for signs & symptoms of circulation compression related to oedema (Pallor, Pulseless, Paraesthesia, Pain & Paralysis)	To ensure adequate circulation and perfusion ²⁹
5.	If infection is detected or suspected, administer antibiotics as prescribed.	To treat infection.
6.	Anticipate the need for analgesia and administer before the pain becomes severe. Assess regularly.	To prevent recurrence of severe pain and distress ^{14,17} .
7.	Adopt non-pharmacological methods of pain management e.g. distraction, relaxation, guided imagery etc. Involve the play specialist.	This helps to make the pain more tolerable and help reduce distress ^{14,17} .
8.	Itch usually begins when the burn is almost healed and can be very distressing for the child. Administer antihistamines as prescribed for this.	This will help to reduce the itch for the child and also help to reduce the stress associated with it.
Breathing & Circulation		
9.	Assess respiratory status closely for signs of inhalation injury, looking for deterioration in colour and signs of increasing respiratory effort. <ul style="list-style-type: none"> ➢ Oxygen saturation monitoring ➢ Assist with bloods e.g. carboxyhaemoglobin levels and blood gases. 	Promptly detect deterioration of the child's condition as symptoms of an inhalation injury may present anytime up to 24 hours following the burn injury ³ .
10.	Administer oxygen as prescribed for the specified period or as necessary in a child with an inhalation injury.	100% oxygen helps to dissociate the carbon monoxide much quicker than if the child was breathing room air ³ .

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11.	<p>Monitor for signs of hypovolaemic shock in the child by monitoring the following:</p> <ul style="list-style-type: none"> ➤ General appearance of the child ➤ Skin colour and skin temperature ➤ Venous capillary refilling ➤ Urinary output (see also <i>Elimination</i> below) ➤ Assisting with the taking of blood for ABG's 	<p>To promptly monitor and detect the onset of shock.</p> <p>The classical signs of shock i.e. tachycardia & hypotension, may not be reliable indicators in a child following a burn Injury. Tachycardia in a child following a burn injury may be associated with pain and distress as well as hypovolaemic shock. Hypotension may be a late sign of shock³.</p> <p>However, always consider and assess for hypovolaemia in the child with tachycardia</p>
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Communication		
12.	The concept of family centred care should underpin all nursing care. Promote family centred care by discussing the child's care with the child and family and negotiating with the family the extent to which they wish to be involved in the child's care.	To encourage and promote the partnership with the child and family ³⁰ .
13.	Unless in an emergency situation, encourage parents to be present with the child as much as is possible	To help prevent the risk of separation anxiety ^{29,30} .
14.	Speak to the child in age appropriate language to explain all care and procedures necessary prior to them commencing. Also speak to the parents using non-medical terms.	
15.	Introduce the child and parents to staff and other children / parents on the ward.	To help alleviate anxiety by knowing there are other people going through a similar experience ²⁹ .
16.	Involve the play specialist	Helps relieve the child's anxiety and explains procedures through play.
17.	If a language barrier exists – arrange for an interpreter to speak with the child / parents so as they can give informed consent Aids to break down the communication barrier may be devised. e.g. bilingual word / phrase cards.	Helps relieve anxiety and improve communication between the child, family and staff.
18.	<p>Liaise with the social worker for</p> <ul style="list-style-type: none"> ➤ Any child with a burn, aged < 1 year. ➤ At the parents request ➤ If the nurse / doctor observe a need for social work involvement e.g.: concerns re family coping abilities, suspicion of NAI etc... 	<ul style="list-style-type: none"> ➤ To discuss issues regarding safety and burn prevention ➤ To alleviate any concerns / worries they may be experiencing. ➤ To be of support and assistance to the family and
19.	Liaise closely with all members of the multidisciplinary team.	

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Eating and Drinking		
20.	A nasogastric tube is to be passed on any child with >10% burns, on admission or any child with <10% burns who has a poor nutritional intake. Feeding to commence as early as possible, even if a dietician is not available (Refer to Section C10.0)	Early enteral feeding reduces the risk of paralytic ileus, maintains the integrity of the G.I. tract and aids wound healing ³ .
21.	Strict recording of intake is required.	<ul style="list-style-type: none"> ➤ To ensure adequate hydration ➤ To determine if the child meets their daily nutritional requirements.
22.	Liaise closely with the dietician	To monitor the nutritional needs of the child
23.	Administer H ₂ antagonists as prescribed.	Children with a burn <10% can be at risk of developing a curlings ulcer. Administering H ₂ antagonists along with early feeding helps reduce this risk ³ .


Elimination		
24.	Strict urinary output to be recorded in all children with burns and especially those with a burn >10%	To ensure that the child is well hydrated and to prevent the risk of renal failure due to hypovolaemic shock ³ .
25.	A urinary catheter is to be inserted in any child with: <ul style="list-style-type: none"> ➤ A burn > 10% ➤ Burns to the genital area or perineum. 	<ul style="list-style-type: none"> ➤ To enable strict urinary monitoring while on resuscitation fluids. ➤ Swelling to this area following a burn may impact on urinary output and cause urinary retention.
26.	Observe for constipation, record bowel motions and administer laxatives as prescribed when necessary	To maintain a healthy bowel pattern as most children with a burn injury receive opioids regularly for pain relief and this can cause the child to become constipated.

Controlling Body Temperature		
27.	If pyrexial greater than 38.5 ^o centigrade twice within 24 hours to commence a septic workup: Contact the plastics team. <ol style="list-style-type: none"> a) Change dressing even if not due b) Repeat wound swabs c) Urine for culture and sensitivity. d) Assist with blood cultures e) Assist the doctor with an ear, nose and throat examination 	To determine if the pyrexia is as a result of the burn injury and skin loss or another treatable cause ³ . <ol style="list-style-type: none"> a) To check for cellulitis. b) To check for a wound infection. c) To out rule a urinary tract infection d) To out rule septicaemia e) To out rule an ear, nose or throat infection
28.	Administer antipyretics as prescribed	To reduce temperature and promote the child's comfort.
29.	Observe closely for a rash	May be caused by the temperature however may indicate a more serious side effect such as Toxic Shock Syndrome.
30.	Reassess the child's condition on a regular basis.	To promptly detect any deterioration of the child's condition and to evaluate the effectiveness of care.

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Mobilising		
31.	<p>Liaise with physiotherapist for any child with a burn over a joint, the neck or any area where mobility may be affected.</p> <p>Liaise with the Occupational Therapist for any burn to the face, neck, over a joint (i.e. shoulder / elbow / wrist / hand / knee / ankle)</p>	<p>To commence mobility exercises as soon as possible and help maintain flexibility of these areas³.</p> <p>To review the need for thermoplastic splinting to protect joint position and/or maintain range of motion and tissue length.</p>
32.	Assist the child with regular physiotherapy exercises, when physiotherapist not available.	To help maintain mobility.
33.	<p>Use a pressure relieving mattress if prolonged bed rest is required, mobility is restricted or if child is at risk of developing a pressure sore.</p> <p>If pressure relief is required as a component of a wheelchair issued by Occupational Therapy, please contact OT department.</p> <p>Pressure relief may also be required for standardised seating.</p>	<p>To reduce the risk of pressure sores developing³</p> <p>To reduce the risk of pressure ulcers developing and to maintain comfort levels.</p>
34.	Keep skin clean and dry and change position frequently as necessary.	To maintain skin integrity ³
35.	Apply aqueous cream to healed areas 3 times a day.	This helps to maintain supple skin which assists with mobility. ³¹


Personal Cleansing and Dressing		
36.	<p>Basic hygiene needs of a child are required on a daily basis.</p> <ul style="list-style-type: none"> ➤ Oral Care ➤ Daily bed-bath + shower / bath at dressing changes- to include hair care. ➤ Eye Care – to include administering drops / ointments as prescribed when necessary 	<p>To maintain dignity and comfort at all times and promote a positive self image.</p> <ul style="list-style-type: none"> ➤ To maintain the mouth in good condition – clean, comfortable & free from infection³² ➤ To maintain skin integrity³². ➤ To prevent infection / prevent further injury to the eye³³.
37.	<p>Catheter care:</p> <ul style="list-style-type: none"> ➤ Daily bath, bed bath or shower. <p>For a child on bed rest, clean urinary meatus with soap and water.</p>	To reduce the risk of catheter related infection ³⁴ .
38.	Frequency of dressing changes to be decided on an individual basis. (Refer to Section C5.0)	

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Working & Playing		
39.	Liaise closely with the play specialist & involve play in all aspects of care when possible.	To help relieve anxiety ²⁹ .
40.	School: <ul style="list-style-type: none"> ➤ Liaise closely with the teachers in the hospital school ➤ Schooling can take place at the bedside or when the child is well enough they can attend the hospital school ➤ The hospital school teacher can link closely with the child's own teacher who will provide homework etc so as the child will not fall too far behind in their work while in hospital. 	<ul style="list-style-type: none"> ➤ Children with burns may require lengthy stays in hospital and therefore could easily fall very behind with their school work. ➤ This may result in the child having to repeat a year. ➤ By school being available in the hospital and links made with the child's own school this will help to ensure the child keeps up to date with the progress of their own class which will make it easier for their return when they are well enough. ➤ It also helps to keep the child occupied and prevent boredom.
Expressing Sexuality		
41.	Maintain privacy and dignity at all times & nurse in a single room where possible	To maintain dignity at all times
42.	If a single room is not available, consider age and gender of the children with whom the child is sharing.	

Sleeping		
43.	Provide an environment conducive to the child sleeping	Adequate sleep helps the body to heal ²⁹ .
44.	Administer night time sedation as prescribed where a child has difficulty sleeping.	To ensure the child receive adequate sleep.
45.	Monitor for signs of sleep disturbance which may indicate psychological trauma following the burn e.g.: age-inappropriate bed wetting, nightmares, unwillingness to go to sleep	To detect and seek appropriate intervention promptly. Sleep may be affected as a result of trauma and/or hospitalisation ³⁵ .

Dying		
46.	If the child is dying, provide end of life care which respects the needs and the dignity of the child and his/her family.	To protect the dignity and the needs of the child ^{36, 37} .
47.	Use Careplan 5: End of Life Care to plan the care of this child and his/her family.	
48.	Refer to the End of Life Care Resource Folder for further information	
49.	Involve Social Worker / Chaplain / Religious Minister /Spiritual guide	To offer support and comfort to the child's family ^{36,37} .
50.	Maintain privacy and respect religious beliefs	To maintain dignity at all times

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C7.0 Surgery

C7.1 Skin Grafting³¹

Definition: Skin grafting is the method in which skin is transplanted by completely detaching a portion of skin from a donor site and transferring it to a new host bed where it will receive a new blood supply.

Criteria for Skin Grafting: Skin grafting is required in children with:

- deep partial thickness and full thickness burns
- areas of burn not healed within 2 weeks following the injury or
- areas which have broken down and are not healing

Types of Skin Graft

Split-thickness Graft: Involves excision of the epidermis and part of the dermis to a depth of 0.15-0.6mm.³⁸

Full-thickness Graft: Involves excision of the epidermis and entire dermis to a depth of greater than 0.6mm³⁸

Autograft: This is the most common type of grafting used in OLCHC. It is when skin is harvested from a donor site and placed on a host site of the same individual.

Allograft: This is when skin is harvested from non-identical member of the same species e.g. a mother donating skin to her child or cadaver skin. This sort of skin graft is very likely to reject. However using an allograft to cover a widely meshed autograft has proven to be more beneficial than using an autograft alone. (Mostly used in children with very large TBSA burns)

C7.2 Preparation for Surgery:

- **Fasting**³⁹

If the child has an extensive burn > 10% and requires nasogastric feeding, fast from solids and enteral feeds for 6 hours prior to surgery. Clear fluids (i.e. flat 7-up or water) are permitted up until 2 hours before surgery. Infants who are breastfed should be fasted for 4 hours prior to surgery.

Feeding overall is a vital part of the therapy required for a child following a burn injury. Therefore it is **not** acceptable for these children to be fasted and cancelled on a regular basis. Link closely with the theatre department re: fasting times.

- **Wound Swabs:**

All children going to theatre for grafting **MUST** have wound swabs performed **48-72 hours** prior to the planned surgery and the results must be available prior to the child going to theatre to exclude β -Haemolytic group A streptococcal infection or any other infections which may be present and need to be treated prior to surgery.

(See Section C8.1 - treatment of infected wounds)

- **Infected Cases:**

Children diagnosed with MRSA, β -Haemolytic group A streptococcal infection or any other organisms considered to be an infection risk should be discussed in advance with theatre staff to arrange an appropriate plan for taking this child to theatre.

- **Blood Requirements:**⁴⁰


Estimated blood loss during a skin graft procedure can be calculated as 4% of total blood volume per 1% burn excised where blood volume is estimated at 80ml/kg.

E.G. A 15kg child is going for excision of 10% surface area.

=> 15kg x 80mls = 1200ml of child's total blood volume.

Total estimated blood loss = 4(%) x 10 (% TBSA) = 40%

=> 40% of 1200mls = 480mls of blood required for transfusion.

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• **Anaesthetic Considerations**

Potential problems must be communicated to the anaesthetic team prior to the child leaving the ward to go to theatre. This will allow for planning to occur in the event of needing extra assistance, equipment or arranging a bed in ICU post operatively.

The following children **MUST** receive an anaesthetic review pre-operatively:

- Facial / neck burns & contractures of this area.
- Previous intubation problems.
- Inhalation injuries.
- Planned excisions of > 10% TBSA
- Associated medical conditions
- Associated injuries
- Septic, unwell & unstable patients

• **Photography**

Photographs should be taken at the last dressing change prior to going to surgery.

• **Splints**

A referral should be made to Occupational Therapy as soon as it is anticipated or clear that post-operative splinting will be necessary (either as an inpatient or an outpatient).

Should splinting be indicated while the patient is in the Operating Theatre, a referral should be made to Occupational Therapy once the patient is listed for theatre by the Burns & Plastics Team.

C7.3 Wound management of grafted area - Refer to Section C5.0:

C8.0 Complications of a burn injury⁴¹


C8.1 Burn wound infection:

A break in the continuity of the skin allows the entry of bacteria to the body. Microbiological examination of a burn wound will almost always show some bacterial presence. However, there may be no clinical signs or symptoms of the presence of bacteria due to:

- The type of bacteria
- The amount of bacteria present
- The immune response of the child

The following table differentiates between the varying levels of bacterial activity in a wound^{42,43}.

Contamination	Presence of micro-organisms but without multiplication
Inflammation	Initial response to tissue invasion or injury. Results in a defensive reaction to tissue injury with increased blood flow and capillary permeability and facilitates physiologic cleanup of the wound; accompanied by increased heat, redness, swelling and pain in the affected area.
Colonisation	Micro-organisms present in or on a host, without host interference or interaction and without eliciting symptoms in the host.
Critical colonisation	Delayed healing with malodour, raised levels of exudate and slough present in the wound but without clinical infection and surrounding cellulitis.
Wound Infection	Condition in which the person interacts physiologically and immunologically with a micro-organism. Occurs when host resistance fails to control the growth of microorganisms

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Local signs of burn wound infection:^{42,43}

- Delayed wound healing
- Deterioration in a previously healing wound
- Conversion of the burn wound from partial thickness to full thickness
- Spreading peri-burn erythema – a purplish discolouration of the burn wound or oedema.
- Rapid eschar separation
- Black or dark brown focal areas of discolouration in the burn wound
- Ecthyma gangrenosum – purple or black lesions in the surrounding skin.
- Haemorrhagic lesions in the subcutaneous tissue of the burn or the surrounding skin
- Sub-eschar pus or abscess formation

The presence of the above local signs of burn wound infection in association with general evidence of sepsis is an indication for immediate antibiotic therapy. The antibiotics to be used are guided by previous wound swab results. **(See Appendix 8 – Empiric Antibiotic Guidelines).**

A consult to the Infectious Diseases team requesting their intervention and advice may be necessary also. This consult is requested by the plastics team when advice is required re antibiotic therapy suitable for certain infections or if the child is clinically unwell.

Punch biopsy or surgical excision of suspected infected areas of a burn are useful in determining bacterial presence but it is usually not possible to do this prior to commencing antibiotic therapy, nor is it routinely performed in paediatrics.

C8.2 Sepsis

Typical clinical picture of Gram positive sepsis:

(e.g. *Staphylococcus Aureus*, *Streptococcus Pneumonia*; *Streptococcus Pyogenes*; *Clostridium Tetanii*)


- Symptoms develop gradually
- Temperature 40°C or higher
- White Blood Cell count → 20,000-50,000
- Decreased haemoglobin and haematocrit levels.
- Wounds macerated in appearance
- Exudate is 'ropey' and tenacious
- Child is anorexic and irritable
- Decreased bowel sounds or ileus
- Decreased urine output
- Hypotension
- Burn wound biopsy shows >10⁵ organisms per gram of tissue and / or histological evidence of invasion of viable tissue. (This procedure is very seldom performed with paediatric burns)

Typical clinical picture of Gram negative sepsis:

(e.g. *Escherichia Coli*, *Pseudomonas*, *Haemophilus Influenza*, *Klebsiella Pneumoniae*)

- Rapid onset, becoming very ill within 12 hours
- Temperature 38°C – 39°C initially, however may become hypothermic later.
- White Blood Cell count will rise initially then return to normal
- Wounds develop focal gangrene
- May develop satellite lesions away from the wounds
- The child may be drowsy and / or confused
- Decreased bowel sounds or ileus may be present
- Decreased urinary output
- Hypotension
- Burn wound biopsy shows >10⁵ organisms per gram of tissue and / or histological evidence of invasion of viable tissue. (This procedure is very seldom performed with paediatric burns)

Treatment: definitive management of burn wound sepsis is surgical debridement with antibiotic therapy.

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C8.3 Toxic Shock Syndrome⁴⁴

Definition: Toxic shock syndrome (TSS) is an acute onset illness characterized by fever, rash formation, and hypotension that can lead to multiple organ failure and lethal shock, as well as desquamation in patients that recover. The disease is caused by bacterial superantigens (SAGs) secreted from *Staphylococcus aureus* and group A streptococci.

Clinical Manifestations:

- Sudden onset of high fever – 38.9°C or higher
- Vomiting and diarrhoea
- Profound hypotension
- Shock
- Oliguria
- Erythematous macular rash
- Subsequent desquamation (1-2 weeks following onset – usually palms of hands and soles of feet.)
- Headache
- Blurred Vision
- Purulent Conjunctivitis

Treatment: Anti-staphylococcal antibiotics

C8.4 Pneumonia

Definition: Inflammation of the lungs with consolidation - classified according to location or causative organism.

Bacterial Pneumonia (Common in children with burns)

Causative organisms – Staphylococcus Aureus; Streptococcus Pneumonia; Klebsiella Pneumonia.


Risk Factors

- Large TBSA burn;
- Endotracheal intubation
- Tracheostomy
- Paralytic Ileus;
- Aspiration;
- Septicaemia

Clinical Manifestations:


- Febrile - >38.5°C
- Unproductive to productive cough with whitish sputum
- Tachypnoea
- Chest Pain
- Retractions
- Nasal Flaring
- Pallor
- Decreased Oxygenation
- CXR – Diffuse or patchy infiltration
- Vomiting
- Irritable / Restless

Treatment: Antimicrobial therapy, depending on the sensitivities of the causative organism.
Physiotherapy

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C8.5 Other complications

Complication	Possible Causes	Suggested prevention / treatment
Curling's Ulcer:	<ul style="list-style-type: none"> • shock and paralytic ileus 	<ul style="list-style-type: none"> • Early feeding po /ng prevents shock • Commence on an H₂ agonist or a Protein Pump Inhibitor on admission
Urinary Tract Infection:	<ul style="list-style-type: none"> • Indwelling urinary catheter • Reduced mobility • Soiled wound dressings in close proximity to genital area 	<ul style="list-style-type: none"> • Daily catheter care or as necessary. • Remove the catheter as soon as it is no longer necessary. • Send a C.S.U. if an infection is suspected and if unable to remove the catheter change same.
Deep Venous Thrombosis (DVT):	<ul style="list-style-type: none"> • Prolonged bed rest • Post surgery • Burns to the lower legs 	<ul style="list-style-type: none"> • Mobilize as soon as possible • If the child is at an increased of developing a DVT, commence them on an anti-coagulant i.e. Tinzaparin
Sinusitis	<ul style="list-style-type: none"> • Presence of a wide bore nasogastric tube 	<ul style="list-style-type: none"> • Insert a nasogastric tube of the correct size • Remove as soon as the tube is no longer required.
Infective Endocarditis	<ul style="list-style-type: none"> • Bacteria entering the blood stream due to the damage to the skin 	<ul style="list-style-type: none"> • Prophylactic antibiotics in children with predisposing risk factors such as cardiac abnormalities. • Early recognition of the signs & symptoms of infective endocarditis. i.e. high fever (38.9° to 40°C), tachycardia, fatigue, and rapid and extensive heart valve damage
Suppurative Ear Chondritis	<ul style="list-style-type: none"> • Burns to the ear – causative organisms include: Pseudomonas aeruginosa Staphylococcus aureus Streptococcus Pyogenes 	<ul style="list-style-type: none"> • Early surgical debridement of burns to the ear • Antibiotic treatment

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C9.0 Social work involvement

C9.1 Plastics team social work referral system

The medical Social Worker is a part of the multi-disciplinary team (MDT) on the unit offering services to the child and their family. The medical social worker can provide emotional, social and practical support to children and their families around the impact of illness or accident. The medical Social Worker's role also includes undertaking child protection assessments regarding mode of injury, suspected non accidental injury to children (N.A.I) or neglect in relation to children. The Social Worker can if required refer the case to the statutory HSE child protection teams in the community. This role is outlined in the Children First Guideline⁴⁵. The medical Social Worker can also undertake assessments and counselling, advocate for families, provide information and liaise and refer families to other appropriate agencies/services.

Referrals to the medical Social Worker can be made by consultants, Doctors, Nurses, hospital staff, families, and outside agencies including the HSE. The medical Social Worker may share information with the HSE in the community if the case is known to them prior to admission. Referrals coming from staff should be written on blue consult cards and include the reason for referral and other useful information regarding the child or family.

When the Social Worker allocated to the Burns and Plastics service is absent, referrals from the plastics team will be taken by the duty social worker in OLCHC.

C9.2 Cases automatically referred to the medical Social Worker on admission:


- Electrical burns
- Chemical burns
- Inhalation burns
- All burns patients in ICU
- Burns with co-morbidity
- Any burns covering more than 10% TBSA
- Any burns to a child under 1 year
- Child protection concerns including possible NAI and/or neglect
- Delay in presentation
- Suggested mode (story) of injury does not match clinical presentation
- Suspected non accidental injury (N.A.I)
- Child unaccompanied by a parent or guardian

C9.3 Other referrals:

- Circumstances where parents or child needs support
- Social circumstances that affect discharge and aftercare
- Where there has been a trauma or impact on the family and/or child
- Other circumstances in order to ensure the welfare of the child

Contact details for the Burns Social Worker:

The Burns Social Worker can be contacted on Bleep 8153 or Ext 6356, between the hours of 09.30 – 16.30, Monday to Friday.

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C10.0 Nutritional management of paediatric burns

Failure to recognize and effectively provide nutritional therapy for children with burns will result in rapid depletion of fuels and nutrients essential for their recovery^{46,47}

C10.1 Aims of nutritional support

1. To promote optimal wound healing.
2. To maintain normal growth.
3. Promote resistance to infection.

C10.2 Who requires dietetic assessment?

Please refer the following children for dietetic assessment. A written blue referral card should be sent to the Dietetic Department.

1. All children with > 10% burns.
2. All infants with >5% burns.
3. Patients with burns to the face or hands, impacting on oral intake.
4. Patients that have demonstrated a poor dietary intake for a period of 48hrs.
5. Patients with poor appetite, poor diet or history of weight loss on admission.
6. Patients that are on a specialized (therapeutic) diets
Eg: Patients with dietary allergies on exclusion diets, patients with diabetes or renal disease.

Note: If a patient's admission is anticipated to be < 48 hours, dietary referrals are not warranted. Ensuring that these patients receive regular high energy meals and snacks can be done at ward level.

C10.3 Admission

Weight and Height: It is important that both these measurements are taken for all patients on admission.


Child's weight	Ensure child is in light clothing with no shoes
Child's height	Use stadiometer Shoes should not be worn
Infant's weight	weigh without clothing or nappy Use baby scales for infants under 10kgs
Infant's length	Use the rollometer

Minor Burns

- All parents of children with burns should be given High Energy High Protein leaflet for Burns on admission. This gives advice on achieving adequate protein and calorie intakes upon admission.
- Encourage these patients to start eating and drinking as early as possible.
- Nutritious fluids such as milk, milkshakes, hot chocolate, Yops®, etc should be offered in preference to water or fizzy drinks.
- Daily food and fluid record should be kept.
- Aim for frequent meals and snacks.
- Dinners from hospital trolley should be served as soon as trolley arrives on ward to ensure meals are still at an appropriate temperature.
- High Protein Snacks - yoghurts, Yops®, custard, rice pudding, cheese and crackers, beans and toast. These can all be arranged at ward level.

Note: Snacks are sent down to St. Anne's ward on a daily basis from the diet kitchen.

Halal meals and requests for children who may be "fussy" eaters should be sent to main kitchen. If difficulties are experienced in ensuring an adequate nutritional intake, refer to the Dietician.

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It is important to remember that some patients with <10% burns may still require nasogastric feeding. The dietician may consider tube feeding in the following cases.

- In the case of facial burns, NGT should be inserted prior to facial swelling.
- Demonstrated poor dietary intake (as assessed by Dietician) combined with poor wound healing.
- In some cases of full thickness burns.

Major Burns > 10%TBSA^{48,49}

- In major burns, a nasogastric tube should be passed within the first few hours of treatment when other invasive procedures are taking place. Early enteral feeding reduces paralytic ileus incidents, maintains integrity of gastrointestinal tract, improves immune status and wound healing.
- It also may moderate the hypermetabolic response.
If nasogastric feeding is expected to be long term i.e. >1 week, the corflo long term polyurethane tubes should be passed. These are available on the ward.
- Type of feed and regimen will be recommended by the Dietitian.
Feeding regimen needs to be tailored to the individual, to take into account fasting periods for theatre, dressing changes, medications, time for play and physiotherapy.
- Diet should be encouraged in adjunct to supplementary nasogastric feeding.
- Nasojejunal feeding may occasionally need to be considered in cases where there is persistent vomiting, high risk of aspiration and reflux. These feeds should always be infused continuously.
- Parenteral nutrition should only be considered when there is prolonged paralytic ileus or where poor tolerance of feeds prevents reaching nutritional requirements. However, where possible, minimal enteral feeds (as little as 2ml/hr) should be maintained to maintain gut integrity⁴⁹.
- If patient is admitted at weekend and Dietitian is not available (**See Appendix 9**).

C10.4 Monitoring nutritional status

Weight Checks: The table below outlines the minimum frequency of weights for children with burns
Weigh children without dressings or with dry dressings


Toddlers and older children	Weigh 1/week
Infants	Weigh every 3 rd day

It is important to remember that oedema may mask true weight early in the clinical course.

Biochemistry and Haematology. Routine biochemistry should be monitored. Frequency will vary depending on the child's clinical course. Vitamin, mineral and trace element status should be monitored in extensive burns injuries. Children receiving nasogastric feeds should have their biochemistry checked at least once weekly. Patients with suspected iron deficiency anaemia should have their FBC and serum ferritin checked.

Nutritional Intake. Accurate intake (enteral, oral intake – food and fluid) charts should be kept. The Dietitian will be able to calculate a child's energy and protein intake from these charts. These charts are particularly important when deciding whether to wean or increase tube feeds. The Dietitian will endeavor on each review to total the previous day's calorie and protein intake (from information recorded on food record charts).

- | |
|--|
| <p>Intake Charts. To ensure accuracy please record the following details.</p> <ul style="list-style-type: none"> • Type of food and name of product (whether low fat or full fat, diet varieties). • Volume of fluids taken and type of fluids taken, e.g. 100mls of low fat milk • Portion size consumed i.e. 1 scoop of creamed potatoes, half slice of toast with butter. |
|--|

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Nutritional Requirements. These will be calculated on patient's admission by the Dietitian. Nutritional requirements will change relating to the rate of wound healing. As % BSA changes, so will a child's requirements change. They will need to be reassessed regularly.

GI symptoms. The number and consistency of bowel motions should be recorded accurately. The number of vomiting episodes and volume should also be recorded accurately.

C10.5 Enteral feeding (refer to OLCCH Guidelines on Enteral Feeding)

Common problems encountered on ward and potential solutions


Feeding Problem	Potential Causes	Action /Prevention
Nausea and Vomiting	Feeding position of patient Medications –Antibiotics Constipation Delayed gastric Emptying Medical cause. Infective cause Excessive feed volume or rate	<ul style="list-style-type: none"> Discuss with Dietitian. Check patient is in correct feeding position. Hold feeds for 30minutes if patient is vomiting. Restart feeds at decreased rate (50% of target) and build back up to target rate within 4hrs. If vomiting still does not resolve- trial antiemetic or prokinetic. If vomiting still does not resolve- trial post pyloric feeding
Diarrhoea	Medications –Antibiotics Infective – Cdiff/ Rotavirus Contamination of feed or plastics used. Overflow diarrhoea due to faecal impaction.	<ul style="list-style-type: none"> Discuss with Dietitian. Obtain a stool sample and send for culture to check for infective causes of diarrhoea. Dietitian may modify feed and feeding regimen. Assess for signs of constipation and treat accordingly Review medication regime with medical team
Constipation	Predisposing medical condition. Medications – Analgesics. Immobility.	<ul style="list-style-type: none"> Discuss with Dietitian. The Dietitian will aim to use fibre enriched feeds for all patients if nil contra indications. Ensure patient is receiving 100% of fluid requirements May need to add prune juice or laxative if constipation remains unresolved
Tube blockage	Lack of flushing Build up of feed/ medications	<ul style="list-style-type: none"> Flush tube after all feeds / medications Try to unblock tube with lukewarm sterile water. Consider replacing tube

C10.6 Nutritional considerations

Nutritional requirements are dependent on the child's: age, sex, weight, height/length, % burns surface area, thickness of burn, general nutritional status. The above variables should be documented upon admission.

Energy: Calculated by the Dietitian using a combination of the Hildreth formula^{50,51}, Davies and Liljedahl Formula and the Curreri-Junior Formula⁵². Calorie (energy) requirements need frequent reassessment and adjustment for a successful outcome. There is an increased energy requirement for children with burns above 10%.

Protein: Children with a burn have an increased protein requirement. Protein requirements will be higher if the burn is partial or full thickness. All parents of children with burns should be given High Energy High Protein leaflet for Burns on admission. This will give parents advice on achieving adequate protein and calorie intakes upon admission.

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Fluid requirements: Hydration of the skin is essential in promoting wound healing. Often NGT or I.V. fluids are necessary (**Please refer to Section C3.0 – fluid resuscitation**). Aim to meet 100% of fluid requirements.

Vitamin and Mineral requirements: It is important that requirements are achieved for certain vitamins and minerals, especially Vitamin A, B Vitamins, Vitamin C, Iron, Zinc, Copper and Selenium. These micronutrients have an important role in wound healing. Micronutrient deficiencies are frequent after major burns.

Children with minor burns (< 10%): who are not taking oral nutritional supplements (ONS) or receiving NG feeding would likely benefit from a multivitamin and mineral supplement.

Children with major burns (> 10%): would likely benefit from a multivitamin and mineral supplement even if taking ONS +/- NG feeding⁵³.

Children with larger burns (> 20%): additional supplementation with Vitamin A, Ascorbic Acid and Zinc may be indicated⁵⁴. This will be assessed on a case by case basis by the Dietitian.

Vitamin and Mineral Supplementation

1. If dietary intake is poor, biochemical parameters suggest deficiency and requirements are high, multivitamin preparations can be prescribed to supplement a child's intake. (**See Appendix 10** for vitamins and minerals that aid wound healing)
2. Treatment of Iron deficiency anaemia: The IMB and British National Formulary for Children (2013-14) recommend 3-6mg/kg/day in 1-3 divided doses for treatment of Iron Deficiency Anaemia

This equates to the following


Weight of infant	Dosage of Galfer per day (9mg Fe per ml)	Level of elemental iron provided per day
3-4kg	2 x 1ml	18mg Fe
5-6kg	2 x 1.5ml	27mg Fe
7-9kg	2 x 2 ml	36mg Fe
9-15kg	3 x 2ml	54mg Fe
>15kg	3 x 3 ml	81mg Fe

Other iron supplements:

Supplement	Recommended doses
Ferrum syrup® (10mg Fe per ml)	1-12 yrs 5-10mls/day (50-100mg Fe) > 12yrs, same as adult dose 10-20mls /day (100-200mg Fe)
Ferrum Tablets® 100mg (chewable chocolate flavoured – can be halved)	1-12 yrs : half – one tablet /day (50-100mg Fe) > 12yrs, adult dose: 1-2 tablets/day (100-200mg Fe)
Galfer® syrup (9mg Fe per ml)	Infants and Young Children: 2.5-5ml once or twice daily
Galfer® Capsules (100mg Fe per capsule)	>12yrs: 1-2 capsules /day (100-200mg Fe)

NB: It is important that supplementation of any nutrient should be reviewed when used in conjunction with enteral and/or parenteral nutrition. Ideally, this should include appropriate biochemical parameters monitoring. Galfer is the only iron preparation available on medical card scheme.

Contact details for the Dietician: Bleep 8134 or Ext 6809

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C11.0 Physiotherapy management of paediatric burns³¹

“The greatest commitment in rehabilitation after a serious burn trauma is the achievement by the patient of maximum autonomy and functionality in order to guarantee the best possible quality of life”⁵⁵

Physiotherapy is essential in the treatment of burns to improve an individual's total quality of life by physical means.

C11.1 Aim of physiotherapy intervention

The goals of burn rehabilitation are to:

- Reduce the effects of oedema and immobilization
- Maintain functional joint motion and muscle strength
- Stretch scar tissue
- Return the patient to the optimal level of function

The physiotherapist will aim to maintain, improve or restore physical functioning, alleviate pain and prevent physical dysfunction in patients.

In conservative treatment of burns a vigorous physiotherapy programme is instituted immediately. Post grafting, exercises to the grafted areas are discontinued for 5-7 days, or as per consultant instructions. Escharotomies, fasciotomies and synthetic dressings are not contraindications to exercise.

C11.2 Indications for physiotherapy

When requesting a physiotherapy review a written blue card referral should be sent to the physiotherapy department.

The following details should be included;

- 1) Name, address, DOB & chart number of patient.
- 2) Details of injury:
 - a) Type of injury.
 - b) Date of injury.

St Anne's ward and dressing clinic blue card referrals signed by staff nurses will be accepted. Referrals made from any other department / ward must be signed by a member of the plastics team.


Physiotherapy is indicated for:

- Superficial burns involving a joint where Range of Movement (ROM) is affected
- Superficial burns to a foot where the patient is not mobilizing
- Partial/ full thickness burns to the hands, feet, face or neck
- All partial/ full thickness burns involving a joint

Physiotherapy is not indicated for:

- Superficial burns where ROM is not affected
- Burns to the trunk that do not involve the neck or axilla
- Fingertip injuries / amputations unless there is a marked loss of ROM

Treatment will commence appropriate to referral request and physiotherapy assessment. Treatment plans will be discussed with the MDT, parents and patient and may be ongoing for several months depending on individual patient needs.

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Location of Physiotherapy Treatment

Inpatients: seen on St. Anne's Ward or in the Physiotherapy gym if permitted to leave the ward.

Outpatients: seen in the Physiotherapy gym or in the Dressing clinic.

Patients are seen for follow up treatment as out-patients in the Dressing Clinic or in the Physiotherapy department.

Patients outside of the OLCHC care area can be followed up for further treatment by the appropriate local service. This will be organised by the physiotherapist if required.

Contact details for the Physiotherapist


As there is currently no dedicated burns physiotherapist in position the details for the physiotherapist caring for each individual child can be found on the notice board in St Anne's ward.

They will be contactable:

Monday to Friday between the hours of 9.00 – 16.30 on the bleep number provided.

For other enquiries please contact the physiotherapy department on Ext 6551 / 6780

Out of hours service will follow the Physiotherapy Emergency on-call policy.

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C12.0 Occupational therapy management of paediatric burns

The ultimate goal of burn rehabilitation always has been to return patients to as near as or to their normal premorbid functional capacity⁵⁶.

Occupational Therapy is essential in the treatment of burns to ensure the best possible outcome both functionally and cosmetically for the patient⁴¹. The occupational therapist is responsible for a vast array of treatments and interventions including: the provision of splinting, positioning and scar management programmes to maximise the child's potential post burn injury.

C12.1 Aim of Occupational Therapy Intervention

Promote functional independence and return the patient to optimal function via acute and long-term management with the eventual goal of returning the patient to their home as functionally independent as possible.

C12.1.1 Acute Management

- Splinting to stretch scar tissue and prevent contractures/deformities
- Splinting and range of motion programme to maintain tissue length and alleviate/reduce oedema
- Positioning and postural management; the OT may provide equipment (if indicated) to promote comfort and normal anatomical alignment
- Assessment of functional ADLs
- Initiate functional rehabilitation
- Discharge facilitation

21.1.2 Long-Term Management

- Functional rehabilitation programme
- Provision of a comprehensive scar management programme until scar maturation (18 months – 2+ years post-date of injury) including:
 1. Advice and prescription regarding pressure therapy
 2. Custom-made pressure therapy garments if warranted
 3. Scar massage techniques i.e. scar mobilisations and stretching
 4. Use of contact media i.e. silicone gels, silicone sheets, elastomer moulds
- Assessment of sensation
- Desensitisation programme
- Facilitation of age-appropriate activities of daily living
- Liaison with community occupational therapists to facilitate home and school visits as necessary

C12.2 Indications for Referral to Occupational Therapy


- Burn to primary area (facial burns/ hands/feet) (Partial thickness and Full-thickness)
- All burns involving joints (neck/ shoulder/ wrist/ hand/ elbow/ knee/ ankle)
- All patients post skin grafting
- Any patient who has taken longer than 14 days to heal

Making a referral:

Referrals are to be made on a blue card with all relevant information completed and signed.

Please ensure the blue referral card includes:

- Name, Address, HCRN, Consultant
- Date of Injury
- Mechanism of Injury
- Depth of Burn
- Healing timeframe (if applicable)

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Location of Occupational Therapy Treatment and Intervention

Patients are seen in three areas: In-patients, Out-patients and St. Anne's Dressings Clinic.


In-patients are treated on St. Anne's ward and if possible can be seen in the Occupational Therapy treatment rooms.

Out-Patients are seen in the St. Anne's Dressings Clinic or the Occupational Therapy treatment rooms.

Contact details for the Occupational Therapists

The Burns Occupational Therapists are contactable on:

Bleep 8460 / 8459 or Ext 6072 / 6184 - Monday to Friday between the hours of 8.30 – 16.30

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C13.0 Psychological Intervention in the Management of Paediatric Burns

C13.1 Psychological and Psychosocial Issues in Paediatric Burns

Children with burns are exposed to considerable challenges during treatment and rehabilitation^{25,57}. Recovery from burn injury typically requires extensive and painful physical rehabilitation i.e. pain during acute treatment, and itching and scar management during wound healing⁵⁸. Following a burn, children can suffer with long term physical, psychological and social difficulties⁵⁹. Common psychological symptoms after burns are sleep disturbance, anxiety, depression and post-traumatic stress⁶⁰. Also, issues with body image and self esteem are frequently observed (noted) in burn injury survivors⁶¹. Common psychosocial issues in children following a burn injury are peer relationship difficulties, problems settling back to school⁶² and behavioural problems.

C13.2 The Role of Psychology

The Psychologist, as part of the Multidisciplinary Team, provides emotional support and psychological intervention to children and their families who are experiencing distress. Part of psychologist's role is to liaise with nursing and medical staff as well as external agencies to ensure the child's needs are met. The psychologist typically works with the child, their family and staff in order to increase the child's coping ability and help them deal with distressing procedures in the short term and the impact of trauma and adjustment in the long term.

C13.3 Indication for Referral to Psychology

When requesting a psychological assessment a written blue card referral signed by the doctor should be sent to the Psychology Department and include reason for referral. Burns patients are referred to the psychologist when medical and nursing staff are reporting the following issues:

- The child's emotional distress is interfering with medical treatment
- Pain and scar management
- General anxiety and procedural anxiety (acute stress during dressing changes, needle phobia etc.)
- Sleep disturbance (nightmares, flashbacks etc.)
- Challenging and oppositional behaviour towards staff on the ward
- Body image and self esteem problems
- Depression
- Post-Traumatic Stress Disorder (**see appendix 11**)

C13.4 Psychological Intervention

The goal of psychological intervention is to reduce and contain emotional distress in burn survivors and together with the Multidisciplinary Team promote patient's coping and compliance. Patients are seen for individual and family sessions on St. Anne's Ward during the acute rehabilitation process and in the psychologist's office when the child becomes more mobile. Psychological intervention approaches include:


- | | |
|-------------------------|---|
| ▪ Play Therapy | ▪ Reward and Star Chart system |
| ▪ Desensitization | ▪ Developing Coping Skills |
| ▪ Individual Counseling | ▪ Relaxation and Distraction techniques |
| ▪ Pain Management | ▪ Liaising with staff at the Multidisciplinary Team Meeting |

Most children and parents are able to cope well, with some extra support and with time. Some will have persistent traumatic stress reactions. When they persist, traumatic stress reactions can:

- Impair day to day functioning
- Affect adherence to medical treatment
- Impede optimal recovery

By incorporating an awareness of traumatic stress in their encounters with children and families, we can:

- Minimize potentially traumatic aspects of medical care
- Help identify children and families with (or at higher risk for) persistent distress
- Provide anticipatory guidance to help prevent long-lasting traumatic stress

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C14.0 Future management

Once a burn is healed the management of the burned area continues for a lifetime. Scar management by the occupational therapist can last for up to 2 years following the initial burn injury. Release of contractures and further surgery to improve the cosmetic appearance of the burn scar can take place years after the initial burn injury as the child grows and develops into adulthood.

The most common surgeries for release of contractures scar management are as follows:^{31,63}

Z-Plasty: a plastic surgery technique that is used to improve the functional and cosmetic appearance of scars. It can elongate a contracted scar or rotate the scar tension line.

Flaps: An area of tissue used to correct a defect.

Rotation flap: an area of tissue lifted and rotated to cover a defect, maintaining its own blood supply

Free flap: a removal of tissue from one area of the body to another area which involves reconnecting the blood and nerve supply to the damaged area.

Tissue expansion: Developing new skin by the process of inserting a silicone envelope with an injection port attached, under normal skin.

C15.0 Companion Documents

See appendices

C16.0 Implementation Plan

Communication and Dissemination

- Guidelines will be posted on hospital Intranet
- Hard copies of the guidelines will be circulated to the following areas:

St. Anne's Ward
Emergency Dept

Physiotherapy Dept.
Occupational Therapy Dept.

Theatre Dept
PICU

Dietetics Dept.
Social Work Dept.

Nursing Site Management

Psychology Dept

- Email will be circulated to all staff informing them of issue of guideline
- Information will be circulated in NPDU Newsletter


Training

- Education and training will be delivered at departmental level using existing educational resources, e.g. Clinical Nurse Facilitators
- Education is included in induction packages for relevant clinical areas / staff

C17.0 Evaluation and Audit

Evaluation and Audit includes:

- Feedback and evaluation from clinical staff on the guidelines to contribute to ongoing guideline development

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Appendices

Appendix 1: Tetanus Prophylaxis

(Adapted from Royal College of Physicians of Ireland National Immunisation Advisory Committee. Immunisation Guidelines for Ireland (2008). Available from:

<http://www.immunisation.ie/en/HealthcareProfessionals/ImmunisationGuidelines2008/>)

http://www.hpsc.ie/hpsc/A-Z/EMIToolkit/sections/the_guidelines.pdf

Prophylaxis for tetanus-prone wounds

The following wounds are considered tetanus-prone:

- Wounds contaminated with soil, faeces, saliva or foreign bodies
- Puncture wounds*, avulsions, burns or crush injuries
- Wounds or burns requiring surgical treatment which is delayed for more than 6 hours
- Compound fractures

Note: Occasionally, apparently trivial injuries can result in tetanus.

*Needlestick injuries in healthcare settings are unlikely to pose a risk of tetanus.

Risk assessment of wounds for use of tetanus immunoglobulin (TIG) ^(a)

(a) Consider TIG if wound contaminated with stable manure or if extensive devitalised tissue. Give TIG if HIV positive, irrespective of vaccine status.

(b) If last tetanus containing vaccine <1 month previously, defer for 1 month

(c) If child is >1 year, the follow-up vaccine(s) will be DTaP/IPV or DTaP/IPV/Hib (only one dose of Hib is required >1 year).

<u>Age</u>	<u>Immunisation Status</u>	<u>Clean Wound</u>	<u>Tetanus Prone Wound</u>
<4 years	< 3 doses or unknown	DTaP/IPV+/- Hib ^(b)	TIG, DTaP/IPV +/- Hib ^(c)
	3 or more doses	Nil	Nil Consider TIG ^(a)
>4 – 9 years	< 3 doses or unknown	DTaP/IPV	TIG plus DTaP/IPV
	3 doses only, > 5years since last dose	DTaP/IPV	DTaP/IPV Consider TIG ^(a)
	3 doses only, < 5years since last tetanus toxoid	Nil	Nil Consider TIG ^(a)
	4 or more doses, > 5years since last dose	Nil	DTaP/IPV, consider TIG ^(a)
10 years & over	<3 doses or unknown	Td	TIG plus Td/IPV
	3 or more doses, >10 years since last dose	Td	Td, consider TIG ^(a)
	3 or more doses, <10 years since last dose	Nil	Consider TIG ^(a)


TIG Tetanus immunoglobulin

DTaP/IPV/Hib Diphtheria, tetanus and acellular pertussis vaccine/inactivated polio virus vaccine/*Haemophilus influenzae b* vaccine

DTaP/IPV Diphtheria, tetanus and acellular pertussis vaccine/inactivated polio virus vaccine

Td/IPV Tetanus, low-dose diphtheria/inactivated polio virus vaccine

Tdap Tetanus, low-dose diphtheria and low-dose acellular pertussis vaccine

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Important:

If both TIG plus a vaccine are to be given, administer at separate sites.
Refer to GP for follow-up vaccines.
Batch numbers and expiry dates must be recorded for all vaccines given.

This information MUST be communicated to the patient's GP so that:

- Duplication of vaccination does not occur
- Full records may be passed onto the relevant agencies in order that a full nationwide database is kept of batch numbers and expiry dates of vaccines given to children.

Specific tetanus immunoglobulin Indications

- (1) Those with tetanus-prone wounds who have not received at least 3 doses of tetanus toxoid and their last dose within 10 years (see table above)
- (2) Patients with impaired immunity who suffer a tetanus-prone wound – may in addition require anti-tetanus immunoglobulin
- (3) Patients who have suffered a high-risk wound, regardless of vaccine history.

Dose and route of administration of tetanus immunoglobulin

Prevention

250 units intramuscularly into the anterolateral thigh.

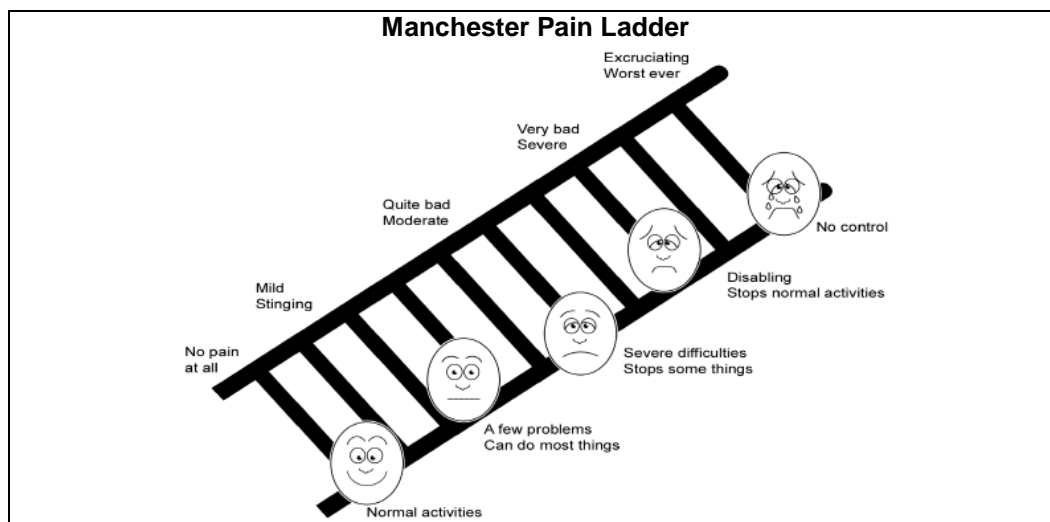
The single dose of TIG is doubled to 500 units (2ml) when any of the following situations exist:

- The injury occurred more than 24 hours previously
- The patient weighs more than 90kg
- The wound is heavily contaminated
- The wound is infected or involves a fracture

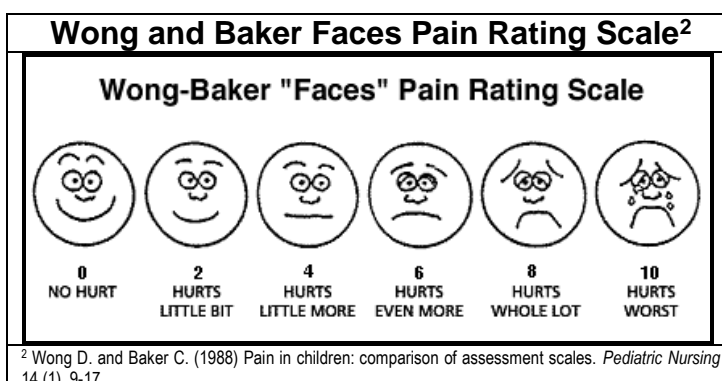
Treatment


150 units/kg given in multiple sites. Specific anti-tetanus immunoglobulin is available in 1ml ampoules containing 250 units.

Appendix 2: Pain Assessment Tools




FLACC Behavioural Scale ¹			
Categories	Scoring	Scoring	Scoring
	0	1	2
Face	No particular expression or smile	Occasional grimace or frown, withdrawn, disinterested	Frequent to constant frown, clenched jaw, quivering chin
Legs	Normal position or relaxed	Uneasy, restless	Kicking or legs drawn up
Activity	Lying quietly, normal position	Squirming, rocking back and forth	Arched, rigid or jerking
Cry	No cry, asleep	Moans or whimpers, occasional complaint	Crying steadily, screams or sobs
Consolability	Content, relaxed	Reassured by occasional touching, hugging or being talked to. Distractible	Difficult to console or comfort
Each of the 5 categories is scored 0-2, giving a total score 0-10.			
¹ Merkel S., Voepel-Lewis T. and Malviya S. (1997) The FLACC: a behavioral scale for scoring postoperative pain in young children. <i>Pediatric Nursing</i> 23(3), 293-7.			



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Appendix 3: Pre sedation checklist (for inpatient use only)

Name:		HCR Number:	
Date:			
Pre Procedure			
Risk assessment Checked (see below)			
Sedation drug(s) given:			
• Midazolam			
• Chloral Hydrate			
• Morphine			
• Actiq Lozenge (fentanyl)			
• Entanox (record minutes used)			
• Oxycodone			
• Other:			
Fasting Time: (Solids)			
Safety Equipment Checked as per policy			
Adequate Staff Available			
Baseline vital signs including pain score recorded on observation chart PRIOR to commencing procedure			
Sedation Score (See below)			
During Procedure			
Sedation effective (Y/N)			
Pain effective during procedure			
Comments:			
Additional medication required (Y/N)			
Comments			
Post Procedure			
Sedation Score at end of procedure			
Pain at end of procedure (Good=G ;Average =A; Poor=P)			
Vital Signs recorded at end of procedure			
Result of sedation (Good=G ;Average =A; Poor=P)			
Side effects or adverse event of sedation (Y/N)			
Comments:			
Sign:			
Risk Assessment: Prior adverse reaction Snoring, stridor, sleep apnoea Craniofacial abnormalities, history of airway difficulty Vomiting, bowel obstruction Asthma exacerbation, pneumonia/URTI Cardiac disease, hypovolaemia, sepsis Altered mental status, head injury, neurological/neuromuscular disorder History of sedation failure / adverse reaction Moderate or severe systemic disease Chest Injury; pneumothorax; Middle ear disease Any positive findings on risk assessment need to be discussed with the Consultant. Sedation on the burns unit might be contraindicated.		Sedation Score: 0= Awake/alert 1= Minimally sedated: Tired/sleepy/responds appropriately to verbal conversation and /or sounds 2= Moderately sedated: Somnolent/sleeping, easily aroused with light tactile stimulation. 3= Deeply sedated: Deep sleep/arousable only with significant physical stimulation. 4= Unrousable to stimuli S: Very Anxious, agitated, distressed.	

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Appendix 4: Quick Guide to Weaning Short-Medium Term Analgesia and Sedation (<21 days)

Quick Guide to Weaning Short-Medium Term Analgesia and Sedation (<21 days)	
<p>GENERAL CONCEPTS</p> <ul style="list-style-type: none"> Consider patient's medication history before commencing weaning Convert from IV to Oral equivalent sedative/opioid medication as soon as possible – NOTE: All IV/PO conversions are approximate – monitor patient closely during this period Wean one agent at a time (usually) Reduce dose not interval (except at end of long wean) Dose reduction based on initial dose and NOT current dose <p>N.B. Any child on opioid /sedative analgesia > 5 days or if withdrawal suspected should have withdrawal scores done 12 hourly (See Appendix 4)</p>	
<p>WEANING MORPHINE INFUSION – N.B: quick guide only</p> <ol style="list-style-type: none"> If on <5 days: Wean infusion rate every few hours until off If on ≥5 but <10 days and <10 microgram/kg/hour : Stop as per < 5 days If on ≥5 but <10 days and ≥10 microgram/kg/hour : Reduce dose by 50% of original dose for 24 hours, then by a further 25% of original dose for 24 hours, then stop infusion If on ≥10 days: < 10 microgram/kg/hour: Reduce dose by 2 micrograms/kg/hour every 24 hours If on ≥10 days: > 10 microgram/kg/hour: Reduce dose by 10% of the highest original dose every 12 hours until rate reaches 10micrograms/kg/hour, then reduce dose by 2 micrograms/kg/hour every 24 hours 	
<p>TO CONVERT IV MORPHINE TO ORAL MORPHINE</p> <ol style="list-style-type: none"> Calculate total amount the pt has received in the last hour/few hours (last 24 hours if on > 2 weeks) Multiply by 24 to convert to equivalent total daily dose Multiply by 2 to convert to oral morphine equivalent Age < 6 months of age divide this by 4 to calculate the 6 hourly dose Age > 6 months of age divide this by 6 to calculate the 4 hourly dose Round dose to nearest 100 micrograms (pts >10kg), 50 micrograms (pts <10kg) <p>NOTE: Once the first dose of Oramorph™ has been given, wait 1 hour and then turn off the infusion.</p>	
<p>CLONIDINE WEANING GUIDE: NB: : If patient on clonidine and opioids/benzodiazepines for > 2 weeks wean opioids/benzodiazepines first then wean clonidine.</p> <ul style="list-style-type: none"> Clonidine < 1 week: Stop, no need to wean. Clonidine >1 and < 2 weeks: Wean by 50% of dose for 24 hours and then stop. Clonidine > 2 weeks and < 1 month: Wean by 20% of original dose over 5 days. Clonidine > one month: Wean by 20% of original dose every 48 hours when off opioids. Monitor for rebound hypertension and withdrawal and adjust weaning plan if necessary. 	<p>Wean dose not frequency. Monitor for rebound hypertension</p>

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Opioids > 2 weeks and < One Month:

1. Wean by 20% of the **original dose** each day. Round dose to nearest 100microgram
2. Once dose is weaned to 100 microgram 4 hourly, extend dosing interval rather than reducing dose.
3. Stop after 48 hours at 100microgram 8 hourly or 100microgram 12 hourly in neonates

Opioids >than one month


1. Reduce dose by 10% of the **original dose** every 24 to 48 hours. Round dose to nearest 100microgram
2. Once dose is weaned to 100 microgram 4 hourly, extend dosing interval rather than reducing dose.
3. **Stop after 48 hours at 100microgram 8 hourly or 100microgram 12 hourly in neonates**

Weaning Example: child on opioids for 4 weeks

Child receiving Oromorph® 5mgs 4 hourly =30mgs x 3weeks. Weaning dose is **10% = 3 mgs**

1. Wean by 3 mgs. =27mgs ÷ 6 = 4.5mgs 4 hourly
2. Wean by 3mgs = 24mgs =4mg 4 hourly

Weaning can be carried out every 24 to 48 hours. Monitor for withdrawal. If there are symptoms of withdrawal, do not wean. Return to previous dose and wean again after 24hours.

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Appendix 5: Morphine Conversion Charts

1. Converting from IV morphine to oral morphine/oxycodone

TO CONVERT IV MORPHINE/OXYCODONE TO ORAL MORPHINE/OXYCODONE

1. Calculate total amount the pt has received in the last hour (last 24 hours if on > 2 weeks)
2. Multiply by 24 to convert to equivalent total daily dose
3. Multiply by 2 to convert to oral equivalent
4. Age < 6 months of age divide this by 4 to calculate the 6 hourly dose
5. Age > 6 months of age divide this by 6 to calculate the 4 hourly dose
6. Round dose to nearest 100 micrograms (pts >10kg), 50 micrograms (pts <10kg)

NOTE: Once the first dose of oral opioid has been given, wait 1 hour and then turn off the infusion.

Example:

Patient on morphine infusion 15microgram/kg/hour and weighs 25kg.
 In one hour, the patient is receiving $15 \times 25 = 375$ microgram (0.375mg)
 In 24 hours, the patient is receiving $24 \times 375 = 9000$ microgram (9mgs)
 Convert to equivalent oral dose, multiply by 2: $2 \times 9\text{mgs} = 18\text{mgs}$
 Divide into 6 hourly doses: $18\text{mgs} \div 6 = 3\text{mgs}$.

Oral Morphine 3mg PO every 4 hours

REMEMBER 5MG ORAL OXYCODONE IS EQUIVALENT TO 10MGS OF ORAL MORPHINE

2. Converting form immediate release opioid (Oramorph™ or Sevradol®) to sustained release morphine (MST)

TO CONVERT FROM IMMEDIATE RELEASE MORPHINE INFUSION TO MST® (SUSTAINED RELEASE MORPHINE):

1. Calculate how much the patient has receiving in the last 24 hours including any breakthrough morphine given for pain (excluding dressing changes).
2. Divide this dose by 2 to get the BD dose
3. The breakthrough dose for pain (not dressing changes) is 1/6th of total daily dose

Example:

Patient on Oramorph® 5mgs 4 hourly = 30mgs
 Breakthrough dose of 5mgs
 Child received 4 breakthrough doses in past 24hours = 20mgs
 In 24 hours, the patient received 50mgs
 Convert to equivalent MST dose divide x 2: $50\text{mgs} \div 2 = 25$ mgs BD
“MST® 25mgs PO BD”

Breakthrough dose is 1/6th of 50mgs=8mgs
 Breakthrough dose is 8mgs 2-4 hourly prn (for breakthrough pain)

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Appendix 6: Opioid & Benzodiazepine Withdrawal Observation Chart

Opioid & Benzodiazepine Withdrawal Observation Chart

Addressograph Label

Opioid & Benzodiazepine Withdrawal - Non-ITU Observation Chart

Date weaning commenced _____


NB: For further details see overleaf and patients weaning chart

SCORE 1 POINT FOR EACH SYMPTOM

Comments

Write letter corresponding to symptom (s) present e.g. S.D.T

Date	Time	Tremors	Movemen disorder	Hallucinations "bad dreams"	Crying / agitation more than 1 out of 4 hrs	Pupils >4 mm	Sweating not related to environment or pyrexia	Vomiting Diarrhoea unexplained by feeding	SCORE Max=7	Clinical judgement In withdrawal? Yes/No	Comments			
											S sleeplessness	P poor social interaction	G tongue thrusting –give details	

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Guidelines

Addressograph Label

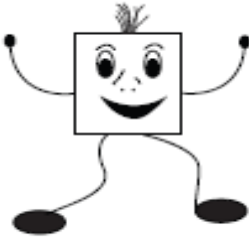
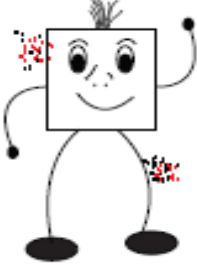
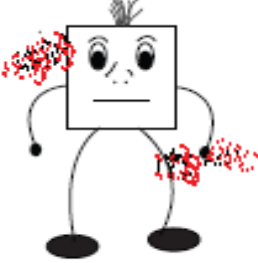
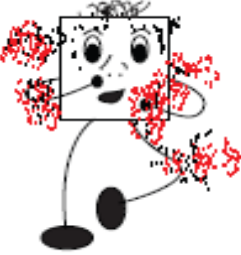

Use of Form	To assess signs and symptoms of opioid and benzodiazepine withdrawal
Eligibility	Any extubated patient who exhibits signs of withdrawal Potentially any neonate, infant or child who has received opioids and/or benzodiazepines for more than 5 days
Scoring interval	Every 6 hrs Score any signs observed within the period <input type="checkbox"/> Write the score in the box for each scoring interval
SYMPTOMS	
◆ Tremors	Score 1 if patient has tremors when disturbed
◆ Movement disorder	Score 1 if muscle twitches or choreoathetosis observed (i.e. involuntary, irregular, dance-like, movements of arms, legs and face, or slow, twisting movements of hands, fingers, toes or feet)
◆ Hallucinations	Score 1 if hallucinations are reported by the older verbal child <input type="checkbox"/> disoriented behaviour observed in non-verbal child
◆ Crying or agitation	Score 1 if continuous unexplained crying or agitated behaviour for 1 hr or more intermittent episodes that total 1 hour, despite efforts to console
◆ Eyes (pupils > 4 mm)	Score 1 if average pupil size > 4 mm
◆ Sweating (unexplained)	Score 1 if sweating is not related to environment or pyrexia (i.e. room temperature, lights, clothing, etc.)
◆ Diarrhoea	Score 1 if patient has unexplained diarrhoea loose stools that appears unrelated to changes in feeding regimen (i.e. do not score for 'breast milk stools') or infection
TOTAL SCORES	Add the points for the scoring period. Write in the 'Total Score' box. Maximum total points = 7
Clinical judgement (Withdrawal Yes/No)	Mark 'Y' if overall clinical judgement is that the child is experiencing withdrawal Mark 'N' if overall clinical judgement is that the child is not experiencing withdrawal This independent judgement may or may not match the 'Total Score'. If it does not, please add comments.
Comments (please specify)	Comment on other symptoms such as Sleeplessness, hypertension, tachycardia, facial grimacing, poor social interaction poor visual tracking, dystonic postures, tongue thrusting, any others you observe anxiety as communicated by the older child Parents' perceptions may be included. Also note signs of withdrawal related to clinical treatment (e.g. drugs that affect CNS / GI function).
TREATMENT	Provide environmental and psychological support for all patients: Rocking/ rhythmic movement quiet, darkened room, reassurance, swaddling and sucking for babies
If score ≥ 3 consider	slowing down rate of reduction of opioid or benzodiazepine recommencing patient on an opioid or benzodiazepine (whichever was stopped most recently) increasing the dose of opioid or benzodiazepine
If score ≤ 2 consider	Continuing to reduce opioid or benzodiazepine as per regime If score < 2 for more than 48 hours, consider increasing speed of withdrawal

Appendix 7: Itch Assessment Chart

Please assess Itch Score **at least BD**, i.e. **once per shift**, or more frequently if clinically indicated.

Use the Itch Man Scale below to assess the child's level of itch.


If child is unable to rate his/her level of level, nurse may assess itch using 0-4 scale.

0	1	2	3	4
				
Comfortable No itch	Itches a little Does not interfere with activity	Itches more Sometimes interferes with activity	Itches a lot Difficult to be still or to concentrate	Itches most terribly Impossible to sit still or to concentrate

© Blakeney & Marvin 2000


Date							
Time							
Score (0-4)							
Comment							
Signature							

Date							
Time							
Score (0-4)							
Comment							
Signature							

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Appendix 8: OLCCH Skin, Soft Tissue and Surgical Wound Empiric Antibiotic Guidelines
Extract from OLCCH Clinical Microbiology and Infectious Diseases Guidelines 2013

Condition	Likely Causative Organism	Empiric Treatment	Comments
<p>Burns</p> <p>If infected Early (< 5 days post hospitalisation)</p> <p>Late(>5 days post hospitalisation)</p>	<p>Group A Strep <i>S. aureus</i></p> <p><i>Above plus Aerobic Gram negative organisms (pseudomonas)</i></p>	<p>Should not initially be treated with antibiotics</p> <p>Flucloxacillin IV (plus Clindamycin PO/IV in severe infection)</p> <p>Above plus gentamicin</p>	<p>Treat only if infected and on the advice of the Consultant</p> <p><i>Duration: 10 days</i> Change to oral therapy when the child is afebrile</p> <p>Be aware of potential for toxic shock syndrome in children who often have only relatively small burns (fever, rash, diarrhoea, and ultimately shock)</p>


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Appendix 9: Enteral feeding starter regimen (i.e. if no Dietitian available)

- Request feed from formula room (ext 6388) or diet kitchen (ext 6403) using blue request (Referral) form.

If < 1 year: Wt <8kgs	Use the formula that the infant usually takes E.g. SMA Gold, Cow & Gate Plus, etc. Cow's milk is not a suitable substitute. Bolus feeds may be tolerated in lieu of continuous feed in this age group.
If > 1 year and <6yrs, Wt is 8-20kgs	Use Standard paediatric formula, e.g. Nutrini Standard. (1kcal per ml feed)
If > 6years Wt is > 20kgs	Use standard adult formula, e.g. Nutrison Standard (1kcal per ml feed)


- Request feed from formula room (ext 6388) or diet kitchen (ext 6403).
- After fluid resuscitation, aim to meet full fluid requirement via infant formula or enteral feed.
 - Start with 5- 10mls per hour and increase as tolerated i.e. every 4 hrs to a maximum rate of 50mls per hour.
 - Keeping to fluid requirement will usually ensure that an excessive amount of calories is not being given.
- Flush feeding tube with sterile water pre + post feeds plus pre + post medications
- Send written Referral with relevant patient details to Dietitian.
 - The Dietitian will review oral intake on next working day, and adjust feed accordingly.
- Feeding pumps are stored on the ward.
 - If no feeding pump is available, then please borrow one from another ward or request one from clinical engineering

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Appendix 10: Signs of Post -Traumatic Stress Disorder

Re-experiencing	<ul style="list-style-type: none"> ○ thinking a lot (unwanted, intrusive thoughts) about the illness, injury or procedure ○ feeling distressed at thoughts or reminders of it ○ having nightmares and “flashbacks”
Avoidance	<ul style="list-style-type: none"> ○ avoiding thinking or talking about the illness, injury, hospital or things associated with it ○ displaying less interest in usual activities ○ feeling emotionally numb or detached from others
Hyper-arousal	<ul style="list-style-type: none"> ○ increased irritability ○ trouble concentrating or sleeping ○ exaggerated startle response ○ “hyper-vigilance” – always expecting danger
Other Reactions	<ul style="list-style-type: none"> ○ new fears related to the medical event ○ new somatic complaints (bellyaches, headaches) not explained by the medical condition ○ feeling in a daze or “spacey”

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Appendix 11: Fluid Resuscitation

To replace B3:Fluid Resuscitation in ED (page 16) and C3:Fluid Resuscitation for Inpatients (page 20)

Fluid resuscitation: Fluid resuscitation is required for any child with a burn over 10% TBSA. Calculate the TBSA using the Lund & Browder Chart ([refer to page 14](#)).

Note: use caution when determining the need for additional fluid boluses and consider whether fluid boluses need to be included within the overall fluid resuscitation.

Bloods: Check FBC and U&E on admission and repeat thereafter depending upon child's condition.

Fluids: Two fluid calculations are required, the burn ration and the maintenance fluids

Burn ration (Hartman's solution):

The amount of resuscitation fluid (the burn ration) required is calculated using the following formula:

$$\text{Modified Parkland Formula: } 3\text{mls} \times \text{weight (kg)} \times \% \text{ burn}$$

Half of the burn ration should be given in the first 8 hours and half in the following 16 hours. The time of fluid administration is calculated from the time of the burn (not the start of resuscitation).

NB: The first 8 hours starts from the time the injury occurs.

Maintenance fluids (0.9% saline in 5% dextrose): 100% maintenance fluids are also required and are calculated using the following formula:

$$\begin{aligned} &100 \text{ ml / kg} \times \text{First 10kg} \\ &50 \text{ ml / kg} \times \text{Second 10kg} \\ &20 \text{ ml / kg for each kg in excess of 20kg.} \end{aligned}$$

The maintenance fluids are given at a constant rate and ideally through a separate cannula.

Example

A 2year old child is admitted with 12% scalds. The burn occurred at 14.00 hrs. The child weighs 15kgs. The time is now 15.00 hrs

■ **Burn ration =**

$3 \times 15 \text{ (weight)} \times 12\% \text{ (burn)} = 540 \text{ ml}$ of Hartman's solution, of which 270 ml should be given in the first 8 hours (from time of injury) and 270 ml in the following 16 hours

■ **Maintenance fluids =**

$$100 \text{ ml} \times 10 \text{ (kg)} = 1000\text{mls}$$

$$50 \text{ ml} \times 5 \text{ (kg)} = 250\text{mls}$$

Total Maintenance Fluids: 1,250mls or 52 ml per hour of 0.9% saline in 5% dextrose through a separate cannula

Note: The fluids should be adjusted accordingly to ensure a urinary output of

1-2mls/kg/hr in children < 8years of age &


0.5-1.5 mls/kg/hr in children > 8 years of age

Amendment approved by: Mr David Orr

Signature:




Date: 12th February 2018

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References:


- ¹ Anderson DM (2012) *Dorland's Illustrated Medical Dictionary*, 32nd edn. Elsevier Saunders, Philadelphia.
- ² Alsbjoern BF (2003) *European Practice Guidelines for Burn Care*, European Burns Association, Netherlands.
- ³ British Association (2006) *Emergency Management of Severe Burns, UK Version for the British Burns Association*, British Burns Association, England.
- ⁴ Lund C and Browder N (1944), The estimation of areas of burns. *Surgical Gynecology and Obstetrics* **79** 352-358
- ⁵ Josier MJ, Cancio LC, Amani H, Blayney C, Cullinane J, Haith L, Jeng JC, Kardos P, Kramer G, Lawless MB, Serio-Melvin ML, Miller S, Moran K, Novakovic R, Potenza B, Rinewalt A, Schultz J and Smith H (2013) American Burn Association Consensus Statements: Burn Resuscitation. *Journal of Burn Care & Research* **34**(4), 368-371.
- ⁶ Pham TN, Cancio LC and Gibran NS (2008) American Burn Association Practice Guidelines: Burn Shock Resuscitation. *Journal of Burn Care & Research* **29**(1), 257-266.
- ⁷ European Burns Association (2013) *European Practice Guidelines for Burn Care: Minimum level of Burn Care Provision in Europe*, 2nd edn. EBA, Vienna.
- ⁸ Jeschke MG and Herndon DN (2014) Burns in children: standard and new treatments. *The Lancet* **383**, 1168-1178.
- ⁹ Stoddard FJ, Sheridan RL, Saxe GN, King BS, King BH, Chedekel DS, Schnitzer JJ and Martyn JAJ (2002) Treatment of pain in acutely burned children. *Journal of Burn care and Rehabilitation* **23**(2)135-156
- ¹⁰ Macintyre PE, Schug SA, Scott DA, Visser EJ, Walker SM (Eds) (2010) *Australian and New Zealand College of Anaesthetists and Faculty of Pain Medicine: Acute Pain Management: Scientific Evidence* (3rd edition), ANZCA & FPM, Melbourne.
- ¹¹ Henry DB & Foster RL (2000) Burn pain management in children. *Pediatric Clinics of North America* **47**(3) 681-698
- ¹² Ratcliffe SL, Brown A, Rosenberg L, Rosenberg M, Robert RS, Cuervo LJ, Villarreal C, Thomas CR and Meyer WJ 3rd (2006). The effectiveness of a pain and anxiety protocol to treat the acute pediatric burn patient. *Burns* **32**, 554-562
- ¹³ Bonham A (2000) Managing Procedural Pain in Children with Burns. Part 1: Assessment of pain in children. *International Journal of Trauma Nursing* **2**(3), 68-77.
- ¹⁴ Kahana MD (2003) Burn Pain Management. In *Pain in Infants, Children and Adolescents*, 2nd edn (Schechter N, Berde C and Yaster M Eds.) Lippincott Williams and Wilkins, Philadelphia.
- ¹⁵ Wong D. and Baker C. (1988) Pain in children: comparison of assessment scales. *Pediatric Nursing* **14** (1), 9-17.

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- ¹⁶ Merkel S, Voepel-Lewis T, Shayevitz JR & Malviya S (1997) The FLACC: a behavioural scale for scoring post-operative pain in young children. *Pediatric Nursing* **23**(3):293-7
- ¹⁷ WHO (2012) Persisting pain in children package: WHO guidelines on the pharmacological treatment of persisting pain in children with medical illnesses. WHO, Geneva.
- ¹⁸ Willebrand M, Low A, Dyster-Aas J, Kildal M, Andersson G, Ekselius L and Gerdin B (2004) Pruritus, personality traits and coping in long-term follow-up of burn-injured patients, *Acta Dermato-Venereologica*, **84**(5), 375-380.
- ¹⁹ Matheson JD, Clayton J and Muller MJ (2001) The reduction of itch during burn wound healing, *Journal of Burn Care & Rehabilitation*, **22**(1), 76-81.
- ²⁰ Collier M (1996). The principles of optimum wound management. *Nursing Standard* **10**(43), 47-54.
- ²¹ Karlsson M, Lindgren M, Jarnhed-Andersson I & Tarpila E (2014) Dressing the split-thickness skin graft donor site: a randomized clinical trial. *Advances in Skin & Wound Care* **27**(1), 20-25.
- ²² Hilliard C., Brenner M., Peel G. (2014) Management of Paediatric Skin-Graft Donor Sites: A Randomised Controlled Study of Three Wound Care Products. *Conference Proceedings: American Burns Association 46th Annual Meeting*. Boston, USA. March 2014.
- ²³ Higgins L, Wasiak J, Spinks A and Cleland H (2012) Split-thickness skin graft donor site management: a randomized controlled trial comparing polyurethane with calcium alginate dressings. *International Wound Journal*, **9**(2), 126-31.
- ²⁴ Birmingham Children's Hospital NHS Foundation Trust (2009) *Principles of best practice: Vacuum Assisted Closure in paediatrics and young people: a consensus document*. MEP Ltd, London.
- ²⁵ European Wound Management Association (EWMA) (2007) Position Document: *Topical negative pressure in wound management*. MEP Ltd, London
- ²⁶ Willy C (Ed) (2006) *The Theory and Practice of Vacuum Therapy: Scientific Basis, Indications for Use, Case Reports, Practical Advice*. Lindqvist, Germany
- ²⁷ Banwell P (Ed) (2005) *V.A.C.® Therapy™ Clinical Guidelines: A reference Source for Clinicians*. KCI Ltd, London.
- ²⁸ Our Lady's Children's Hospital Crumlin (2010) *Guidelines on Hand Hygiene*. Our Lady's Children's Hospital Crumlin, Dublin
- ²⁹ Hockenberry MJ (2006) *Wong's Nursing Care of Infants and Children*. 8th edn. Mosby, St Louis
- ³⁰ Smith L and Coleman V (Eds) (2010) *Child and family centred healthcare*. Palgrave Macmillan, Basingstoke, Hampshire.
- ³¹ Herndon DN (2012) *Total Burn Care*, 4th edn. Saunders, Philadelphia
- ³² Dougherty L. & Lister S (Eds) (2011) *The Royal Marsden Manual of Clinical Nursing Procedures*, 8th edn. Blackwell Publishing, Oxford.
- ³³ Our Lady's Children's Hospital Crumlin (OLCHC) (2012) *Guidelines on Performing Eye Care*, OLCHC, Dublin
- ³⁴ Our Lady's Children's Hospital Crumlin (OLCHC) (2013) *Guidelines on the Care of Urinary Catheters: Urethral and Supra-pubic*. OLCHC, Dublin
- ³⁵ Trigg E & Mohammad T (2010) *Practices in Children's Nursing: Guidelines for Community and Hospital*. 3rd edn. Churchill Livingstone, Edinburgh
- ³⁶ Our Lady's Children's Hospital Crumlin (OLCHC) (2014) *End of Life Care Resource Folder*. OLCHC, Dublin

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- ³⁷ Irish Hospitals Friendly Hospitals (2010) *Quality Standards for Babies and Children at End of Life*. The Irish Hospice Foundation and The Health Service Executive, Dublin.
- ³⁸ Andreassi A, Bilenchi R, Biagoli M and D'Anniello C (2005) Classification and pathophysiology of skin grafts. *Clinics in Dermatology* 23(4), 332-37
- ³⁹ OLCHC Department of Anaesthesia (2013) Preoperative fasting guidelines. OLCHC, Dublin.
- ⁴⁰ Brown RA, Grobbellar AO, Barker S and Rode H (1995) A formula to calculate blood cross-match requirements for early burn surgery in children. *Burns*, 21(5), 371-3.
- ⁴¹ European Burns Association (2013) *European Practice Guidelines for Burn Care: Minimum level of Burn Care Provision in Europe*, 2nd edn. EBA, Vienna.
- ⁴² European Wound Management Association (EWMA) (2005) *Position Document: Identifying criteria for wound infection*. MEP Ltd, London.
- ⁴³ Health Service Executive (2009) *National best practice and evidence based guidelines for wound management*. Health Service Executive, Dublin.
- ⁴⁴ Young AE & Thornton KL (2007) Toxic shock syndrome in burns: diagnosis and management. *Archives of Disease in Childhood: Education & Practice Edition*, 92(4), 97-100.
- ⁴⁵ Department of Children and Youth Affairs (2011) *Children First: National Guidance for the Protection and Welfare of Children*. The Stationary Office, Dublin.
- ⁴⁶ Chan MM & Chan GM (2009) Nutritional therapy for burns in children and adults. *Nutrition* 25, 261–269
- ⁴⁷ Dylewski ML, Prelack K, Weber JM, Keaney T, Ryan CM, Sheridan RL & Fagan SP (2010) Malnutrition among pediatric burn patients: A consequence of delayed admissions. *Burns* 38(8), 1185-1189
- ⁴⁸ Venter M, Rode H, Sive A & Visser M (2007) Enteral resuscitation and early enteral feeding in children with major burns- Effect on McFarlane response to stress. *Burns*. 33, 464-471
- ⁴⁹ Mc Carthy H and Gurry C (2007) Burns. In *Clinical Paediatric Dietetics*, 3rd edn. (Shaw V and Lawson M, Eds), Wiley-Blackwell, Oxford, 497-503
- ⁵⁰ Hildreth MA, Herndon DN, Desai MH and Broemeling LD (1990) Current treatments reduces calories required to maintain weight in pediatric burns patients with burns. *Journal of Burn Care & Rehabilitation*, 11, 405-409
- ⁵¹ Hildreth MA, Herndon DN, Desai MH and Broemeling LD (1993) Caloric requirements of patients with burns under one year of age. *Journal of Burn Care & Rehabilitation*, 14, 108-112
- ⁵² Mayes T, Gottschlich MM, Khoury J, & Warden G (1996) Evaluation of Predicted and Measured Energy Requirements in Burned Children. *Journal of the American Dietetic Association*, 96(1), 24-29
- ⁵³ Prelack K, Dylewski M & Sheridan RL (2007) Practical Guidelines for Nutritional Management of Burn Injury and Recovery. *Journal of the International Society for Burn Injuries*, 33, 14-24.
- ⁵⁴ Rousseau AF, Losser MR, Ichai C, Berger MM (2013) ESPEN Endorsed Recommendations: Nutritional Therapy in Major Burns. *Clinical Nutrition*, 32, 497-502
- ⁵⁵ Civaia A, Fedele C, Gallino A and Oliva R (2003) The rehabilitative management of burn patients in the post-acute phase. *Annals of Burns and Fire Disasters*, XVI, (n. 1)
- ⁵⁶ Richard RL & Staley MJ (Eds) (1994) *Burn Care & Rehabilitation: principles and practice*. FA Davis, Philadelphia
- ⁵⁷ Willebrand M., Sveen J., Ramklint M., Bergquist M., Huss F., Sjöberg F. (2011) Psychological problems in children with burns – parents' reports on the Strengths and Difficulties Questionnaire. *Burns*, 1309-1316

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-
- ⁵⁸ Van Baar ME, Polinder S, Essink-Bot ML, van Loey NEE, Oen IM, Dokter J, Boxma H, van Beeck EF. (2011) Quality of life after burns in childhood (5-15 years): Children experience substantial problems. *Burns*, 930-938
- ⁵⁹ Spies M, Herndon DN, Rosenblatt JI, Sanford AP, Wolf SE. (2003) Prediction of mortality from catastrophic burns in children. *Lancet*, **361**(9362):989-94
- ⁶⁰ Esselman PC. (2007) Burn rehabilitation: an overview. *Arch Phys Med Rehabil*, **88** (12 Suppl. 2):S3-6
- ⁶¹ Pope SJ, Solomons WR, Done DJ, Cohn N, Possamai AM. (2007) Body image, mood and quality of life in young burn survivors. *Burns*, **33** (September (6)):747-55
- ⁶² Van Baar ME, Essink-Bot ML, Oen IM, Dokter J, Boxma H, van Beek EF. (2006) Functional outcome after burns: a review. *Burns*, **32**(1):1-9
- ⁶³ Chapman TT (2007) Burn scar and contracture management. *Journal of Trauma*, **62**(6 Suppl) S8.