The Management of Burn Trauma in Children and Teens

A GUIDE FOR PARENTS AND FAMILIES

Hôpital de Montréal pour enfants
Centre universitaire de santé McGill

Montreal Children's Hospital
McGill University Health Centre

TRAUMATOLOGIE
TRAUMA

Every year, the Montreal Children's Hospital Emergency Department treats more than 17,000 children and teens for trauma-related injuries. Our patients come from all regions of Québec.

Over 400 of these children and teens sustain injuries that require hospitalization and the involvement of many specialists. Every year, the Trauma Centre receives more than 150 patient transfers in need of tertiary trauma expertise from regional centres. As well as thousands of outpatients referred by community physicians and regional centres for consultation and specialized trauma care.

ABOUT THE MONTREAL CHILDREN'S HOSPITAL TRAUMA CENTRE

- A provincially designated Pediatric and Adolescent Trauma Centre and Neurotrauma Centre of Expertise
- Rapid access to expert medical, surgical, nursing, rehabilitation and psychosocial trauma specialists
- Cutting-edge programs designed to meet the complex and multifaceted needs of all types and severity of trauma
- Specialized programs include: Trauma, Neurotrauma, Burn Trauma, Injury Prevention, Trauma Research, Mild Traumatic Brain Injury Program and Concussion Clinic
- Interprofessional patient and family centered approach to all types of trauma care, from urgent and critical care throughout the stages of recovery, early rehabilitation, discharge home and school reintegration
- State-of-the-art equipment
- Affiliated with Health Canada for CHIRPP - Canadian Hospitals Injury Reporting and Prevention Program

The Management of Burn Trauma in Children and Teens

A GUIDE FOR PARENTS AND FAMILIES

Having a child in the hospital with a burn injury can be a traumatic experience. This booklet has been designed to provide you with information on what to expect throughout the different phases of your child's hospitalization, treatment and recovery. We hope it answers many of your questions.

THE BURN TRAUMA TEAM: A FAMILY CENTERED APPROACH

"Family-centered care is based on the belief that the family is a child's primary source of strength and support. Healthcare professionals are the experts on health and disease. Parents are the experts on their child and they can offer essential information to enhance their child's health care. A successful partnership between healthcare providers and families is based on mutual trust, respect and responsibility."

—The Montreal Children's Hospital Patient and Family Centered Care Policy

We never expect that our life will change in an instant. We are in a state of panic, we are unsure of how to react and we do not know what to expect. When I was burned, I was immediately sent to the Montreal Children's Hospital Trauma Centre. Upon my arrival, there were many staff members waiting and ready to take care of me. Initially, I was afraid because I didn't know what was going to happen, however the care I received during my hospital stay was exceptional.

Without the support of the team of nurses, doctors, surgeons and my family, I would have never overcome this event. Thanks to them, I had a reason to smile everyday despite all the pain I was enduring.

Today, I am in a body that has undergone many plastic surgeries. The exceptional work of the entire team was so wonderful for which I have so many memories. The entire team made my hospital stay positive, moving and unforgettable.

Thank you to the Montreal Children's! *– Véronique*

"There is a story behind every scar."

WRITTEN BY

Diane Richard
BSc. RN

Trauma Coordinator
Burn Trauma Program

Montreal Children's Hospital, MUHC

EDITED BY

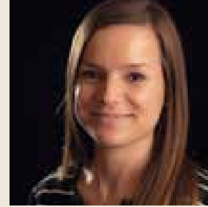
Debbie Friedman
BSc. pht. M. Mgmt.

Trauma Director

Director Canadian Hospitals Injury Reporting and Prevention Program

Montreal Children's Hospital, MUHC

Assistant Professor, Department of Pediatrics, Faculty of Medicine, McGill University



Amanda Fitzgerald

Trauma Administrative Procedures Specialist

Montreal Children's Hospital, MUHC

CONTENT REVIEW

Mirko S. Gilardino
M.D, MSc, FRCSC, FACS

Board-Certified Plastic Surgeon recognized by both the Canadian Society of Plastic Surgeons and the American Board of Plastic Surgery

Montreal Children's Hospital, MUHC

OTHER CONTRIBUTORS

Angeliki Souranis
Social Worker

Anne-Marie Hurteau
Audiologist

Caroline Richer
Speech and Language Pathologist

Doreen Shalla
Spiritual Care Professional

Helen Magdalinos
Child Life Specialist

Jessica Nolet
Physiotherapist

Justine Noiseux
Social Worker

Katrine Doucet
Speech and Language Pathologist

Line Parent
Occupational Therapist

Lise Gagnon
Child Life Specialist

Rachel Boisjoli
Psychologist

SPECIAL ACKNOWLEDGEMENTS

We wish to thank the Quebec Firefighters Foundation for Major Burn Victims for their financial support of this publication.

Our extreme gratitude is also extended to the families who so graciously allowed us to use their photographs in this publication: Émile, Cathy and Patrice Couillard, Ivy and Isabelle Maheu and Véronique Potvin.

A NOTE TO THE READER

The information you are about to read is intended for the family of a child or adolescent who has sustained a burn trauma. It is our objective to enhance your understanding of pediatric and adolescent burn care management. Information regarding the spectrum of burn trauma care and the role of the different specialists will be discussed.

Issues related to burn classification, recovery stages, rehabilitation, returning home, school re-integration and outcome are covered in the booklet you are about to read.

We hope that as burn trauma victims and families living through the experience you will find that the information will respond to your questions and assist you through the stages of recovery and facilitate your return home. Families play a key role in assisting the patient to achieve their maximum potential.

The content of this booklet is reflective of the experience and expertise of the Burn Trauma Program of the Montreal Children's Hospital Trauma Centre of the McGill University Health Centre.

The Management of Burn Trauma in Children and Teens

A GUIDE FOR PARENTS AND FAMILIES

CONTENTS

THE MONTREAL CHILDREN'S HOSPITAL BURN TRAUMA PROGRAM . 6
The MCH Trauma Burn Team 6

UNDERSTANDING THE BURN INJURY

THE SKIN 12

DETERMINING THE SEVERITY OF A BURN 12
Burn Location 14
Burn Size 14
Burn Depth 14

DURING YOUR HOSPITAL STAY

THE EMERGENT PHASE 16

THE ACUTE PHASE 17
Wound Care 19
Wound Healing 21
Scars 21
Positioning and Splinting 23
Pain Management 24
Nutrition 25
Psychological and Social Impact 25
Discharge Planning 26

THE REHABILITATION PHASE 28
Minimizing Scars after a Burn 28
Preventing Contractures Following a Burn 30

CARING FOR YOUR BURN AT HOME

IMPORTANT RECOMMENDATIONS . . 32
Dressing Change and/or Irrigation . . . 32
Compressive Garments and Splints. . . 33
Exercises 33
Skin Care 33
Scar Massage 33
Precautions 34
Itching 34
Blisters and Open Areas 34
Discoloration 34
Sun Sensitivity 35
Swimming 35
Diet 35
Medication 35
Returning to School 36

HOW TO CHANGE A DRESSING 38
Equipment 38
Instructions for Changing a Dressing . 38
Individualized Instructions 39

YOUR SPLINT: WEAR AND CARE 40
Splint Care 40
Precautions 40
When to Wear your Splint 40
Individualized Instructions 41

HOW TO USE A SILICONE GEL SHEET 42
Recommendations 42

REFERENCES 44

USEFUL LINKS 44

THE MONTREAL CHILDREN'S HOSPITAL BURN TRAUMA PROGRAM

The Montreal Children's Hospital Burn Trauma Program specializes in emergency care, critical care, early rehabilitation, and ambulatory management for all types and severities of burn trauma. Caring for a burn patient and supporting the family requires a team approach. Burn Trauma Specialists provide the patient with medical, surgical, nursing, rehabilitation and psychosocial care.

The patient- and family-centered team approach and involvement of Trauma Specialists begins in the Emergency Department and continues through the critical care phases to early rehabilitation, recovery phases and through transfer to a rehabilitation centre, community resource or discharge home.

THE MCH TRAUMA BURN TEAM

Acute Pain Service A team of anesthetists and nurses who specialize in pain management are consulted to work collaboratively with the Burn Trauma Team in order to effectively manage pain following a burn trauma.

Audiologist An Audiologist is consulted if the patient's burn has affected the ear, hearing or the ability to communicate. Audiologists evaluate hearing and provide treatment as needed at the bedside or in the Audiology Department.

Burn Trauma Coordinator A member of the interprofessional team who coordinates the care of the patient which includes ensuring communication and collaboration within the interprofessional team. The Burn Trauma Coordinator also helps to ensure a smooth transition from hospitalization to a rehabilitation centre or discharge home.

The Burn Trauma Coordinator ensures that family needs are met and will follow them regularly throughout the different stages of recovery.

Child Life Specialist A specialist who provides support to children, teens and their families during hospitalization. Through developmentally appropriate activities, the Child Life Specialist helps patients adjust to the hospital setting, reduce stress and promote positive coping mechanisms.

Children are frequently overwhelmed during an unplanned hospitalization. Following a burn trauma, children have particular emotional and psychological needs that differ from those of other patients. The goal of the Child Life Specialist is to help the patient regain a sense of control by expressing feelings, exploring body image and understanding treatments. Through play, the Child Life Specialist helps to restore functional skills.

The Child Life Specialist provides distraction and relaxation techniques during wound care and other medical procedures. Teaching dolls, medical play and expressive therapy all help make procedures less traumatic.

The Child Life Specialist offers support through the stages of recovery, the return home and during school reintegration as needed. Sibling support is also offered as appropriate.

Clinical Nutritionist A specialist who assesses and makes recommendations regarding the nutritional requirements needed to promote optimal wound healing. The Clinical Nutritionist works collaboratively with the patient and family in order to promote healthy eating habits during hospitalization that can be continued at home upon discharge post burn injury.

Critical Care Physician A physician who specializes in caring for critically ill patients in the Pediatric Intensive Care Unit.

Emergentologist A specialist who treats patients with acute illnesses or injuries requiring immediate medical attention in the Emergency Department.

General Surgeon A physician who specializes in the treatment of patients with acute injuries such as a burn trauma.

Nurse A member of the interprofessional team who assesses, plans, implements and evaluates the care of the patient.

Occupational Therapist A therapist who facilitates the patient in maintaining independence when performing daily activities. Interventions may include therapeutic activities to improve mobility and others to prevent contractures. Some interventions include: splinting, positioning, passive and active range of motion exercises.

Physiotherapist Evaluates the patient's ability to move his/her body and to perform daily activities. The Physiotherapist's goal is to prevent scar contracture, restore normal range of motion (ROM) of the involved joints and to assist the patient in achieving their highest level of function. The Physiotherapist concentrates on gross motor function which includes: gait training, stairs, balance, coordination, strengthening and improving cardiovascular endurance. Recommendations for equipment are made as needed.

Plastic Surgeon A surgical specialist whose expertise encompasses all areas of burn trauma care.

Plastic Surgery Resident A physician who is being trained in plastic surgery following completion of medical school.

Psychologist The Psychologist supports the patient by helping them regain an optimal level of functioning. Victims of burn trauma occasionally experience psychological symptoms that can impair social functioning in school or at home. Some may experience nightmares, flashbacks or avoidance, all of which may be difficult to manage. Treatment is recommended when symptoms affect the functioning of the child or influence behavior. Furthermore, emotional issues such as low self-esteem may require a more targeted treatment plan.

Social Worker The Social Worker provides emotional and practical support to the patient and family throughout hospitalization and following discharge by offering a variety of coping methods. The Social Worker will facilitate communication between the patient/family and the treating team. The Social Worker will also provide travel and accommodation needs assessment as well as facilitate arrangements for parents requiring time off work. They will continuously monitor the individual psychosocial needs of the patient and family throughout the hospital stay.

Speech and Language Pathologist A Speech and Language Pathologist is involved with patients who have sustained inhalation burn injuries. These patients often have difficulty communicating due to injury to the vocal tract and/or vocal folds. The Speech and Language Pathologist may be involved when a patient is intubated and alert. The Speech and Language Pathologist helps the patient establish a personalized method of non-verbal communication, for example, through the use of a communication book.

Once the patient is extubated, the Speech and Language Pathologist assesses speech and voice to avoid risk of further damage to the vocal folds. Healthy vocal hygiene habits are explained and reinforced.

Over time, the Speech and Language Pathologist's recommendations will evolve and may include:

- Avoid whispering
- Avoid forcing the voice
- Discourage staff and family members from asking the child to raise his/her voice
- Promote the use of alternative communication methods
- Encourage voice use only when vocal quality is deemed adequate
- Drink more water (if medically possible)

Spiritual Care Professional A professional who has received specialized training. They offer support and coping strategies to the patient and their family during a period of illness or hospitalization. Spiritual Care Services is available 24 hours a day, 7 days a week.

Other specialists may be consulted as indicated.

Understanding the Burn Injury

- THE SKIN
- DETERMINING THE SEVERITY OF A BURN

THE SKIN

Normal skin consists of two main layers: the epidermis and the dermis. The epidermis is the outer layer of the skin and acts as the first line of defence to the environment. The dermis contains glands, hair follicle roots and capillaries.

The skin serves as a physical barrier against the environment. Specific functions include:

- Protective agent against infection
- Protects against body fluid loss preventing dehydration
- Controls body temperature
- Excretes some waste products
- Receives sensory stimuli
- Produces vitamin D

These essential functions are reduced with a partial thickness burn, and eliminated with a full thickness burn.

DETERMINING THE SEVERITY OF A BURN

The overall severity of a burn is determined by a variety of factors. Depth, size and location are all considered when evaluating the severity of a burn. Knowing the severity will help determine and predict the healing process as well as the likehood of complications.

Hospitalization following a burn trauma is based on:

- Burn location
- Burn size
- Burn depth

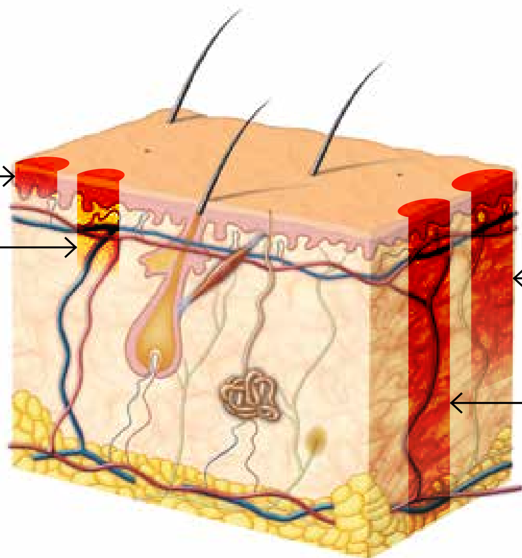
BURN DEPTH EXPLANATION

First-degree burn

- Dry, red and painful (sunburn)
- Limited to the outer layer (epidermis) of skin

Superficial second-degree burn

- Damage to the epidermis and part of the dermis
- Moist, red and blisters
- Usually very painful
- Heals independently and does not usually scar if healed within 2 weeks



Deep second-degree burn

- Deep partial thickness
- Damage to the epidermis and the deeper dermis
- Less moist, red to white, very painful
- May require surgery and grafting

Third-degree burn

- Full thickness
- Entire thickness of skin destroyed (into fat)
- Dry, varies in color (white, black, red or brown)
- Usually not painful
- Requires surgery and grafting

BURN LOCATION

Burns affecting the face, eyes, hands, genitals, feet, and those that encircle the limbs and/or torso, as well as burns over joint areas, require special attention.

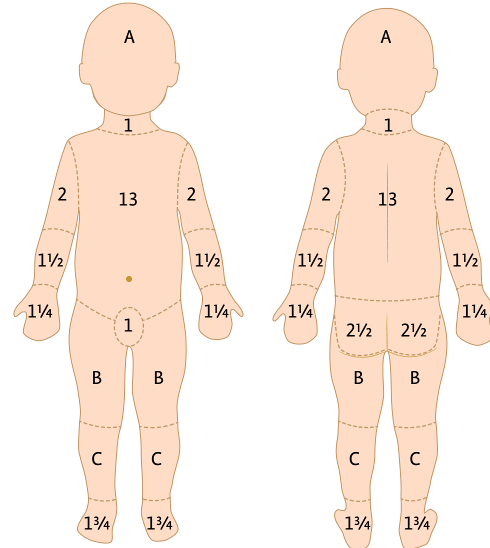
BURN SIZE

Burn size is expressed as a percentage of the total body area affected by the burn.

BURN DEPTH

Burn depth is classified as either first, second or third degree.

BURN SIZE PERCENTAGE DIAGRAM



	YEARS				
SURFACE	0	1	5	10	15
A = ½ of head	9 ½	8 ½	6 ½	5 ½	4 ½
B = ½ of thigh	2 ¾	3 ¼	4	4 ¼	4 ½
C = ½ of leg	2 ½	2 ½	2 ¾	3	3 ¼

During Your Hospital Stay

- THE EMERGENT PHASE
- THE ACUTE PHASE
- THE REHABILITATION PHASE

There are different phases involved in burn care. Burn severity will determine the length of each recovery stage. Trauma care is unique to each patient's specific condition and individualized needs.

THE EMERGENT PHASE

The emergent phase refers to the first few days post-burn. The severity of the injury sustained is determined. Urgent care is provided; **intravenous therapy** and wound care are started. During this phase, vital signs are monitored and all fluids taken in and eliminated are recorded. Observation is ongoing for signs of potential complications.

Stabilization occurs during the emergent period and includes the following:

- **Airway/Breathing** Smoke inhalation can cause swelling of the airway. The patient may need a tube inserted to help with breathing and to give the lungs an opportunity to heal. The tube is connected to a ventilator that pushes air in and out of the lungs. The patient is given medication to keep them sedated and more comfortable.
- **Hydration** Burns cause body fluid loss. Intravenous lines are inserted to ensure that the patient remains hydrated. A **Foley catheter** is inserted into the bladder to monitor fluid levels (output) and is also used to keep peri-anal burns clean.

- **Intravenous therapy** Infusion of specialized fluids and medication directly into a vein.
- **Foley catheter** Flexible tube inserted into the bladder used to drain urine.

- **Feeding tube (NG or NJ)** A small tube inserted through the nose or mouth that extends into the stomach. A feeding tube is inserted when the patient is intubated or has insufficient caloric intake. Burn patients require additional calories and protein in order to heal.
- **Initial debridement and dressing** Once stabilized, wounds are cleaned and a burn dressing is applied. The patient is then either transferred to the Pediatric Intensive Care Unit (PICU) or to the Surgical/Trauma Unit. The location is based on specific care requirements.

Many other tubes, lines and equipment may be used throughout your child's treatment, each of which has an important function in the care process. Do not hesitate to ask questions about equipment and its purpose.

THE ACUTE PHASE

The acute phase begins and remains until all full-thickness wounds are covered by skin grafts. The objectives during this period include:

- Removal of dead tissue (eschar) and covering the wounds with skin grafts (if required)
- Providing adequate nutrition
- Preventing complications
- Preventing **contractures**
- Meeting the individualized and evolving emotional needs of the patient and family

For a burn wound to heal, the wound(s) need to be cleaned regularly, which may involve daily, bi-weekly or weekly cleansing. Wound care can be done in the Operating Room, Treatment Room or at the bedside depending on specific needs. The size of the burn, the treatment required and the patient's condition will determine where the

Contractures Tightening of the skin following a second or third degree burn.

dressing change will be done. When medically permitted, some patients choose to remain in their hospital room for treatment while others prefer to have their treatments done in the unit's Treatment Room. Having treatments done in the Treatment Room may help preserve the safe feeling of the hospital room.

WOUND CARE

Wound care may include wound cleaning, debridement, grafting, escharotomies and dressing changes:

- **Wound cleaning** The first step involved in wound care is to clean the burned skin. Warm water and gauze is used to remove dead tissue. This step is essential to wound healing and for preventing infection.
- **Debridement** Occasionally surgical equipment is needed to remove dead skin. If wounds are deep, debridement is performed by a Plastic Surgeon in the operating room. Otherwise, this aspect of care can be performed by a Nurse, Physiotherapist or Occupational Therapist on the unit during a dressing change.
- **Escharotomies** The dead skin and tissue on a burn is called eschar. A burn that surrounds a body part may cause the area to swell and tighten, subsequently impairing blood flow to the area. When this occurs, Plastic Surgeons make an incision in the burned area in order to relieve the pressure.
- **Grafting** Deeper burns rarely heal on their own therefore requiring a skin graft. A skin graft is a very thin piece of skin that is taken from an area of the body unaffected by the burn and then used to cover the burn. The site from which the graft is removed will heal on its own in approximately 10-14 days and can be used again for future grafting. The most common areas used as a donor site include the legs, back and buttocks; less frequently used are the chest and arms.

A variety of dressing types are used to cover the **donor site**. Skin grafting is performed by Plastic Surgeons in the Operating Room. There are two types of skin grafts: **sheet** and **mesh**.

- **Dressing changes** This procedure may cause pain. Prior to the dressing change, a nurse or doctor will give the patient medication to help control pain and diminish anxiety. A variety of Trauma Specialists will be present during the procedure and may include: Plastic Surgeon, Plastic Surgery Resident, Trauma Coordinator, Nurses, Physiotherapist, Occupational Therapist, Child Life Specialist and a Patient Care Attendant.

The Burn Trauma Team works efficiently so that wounds are not exposed for extended periods of time. The team will wear gowns, masks and gloves as necessary to diminish the risk of infection. You too may be required to wear these items. The Child Life Specialist will provide distraction and coping techniques throughout the procedure.

- **Donor site** Area of the body from which skin is taken and used to cover areas affected by the burn.
- **Sheet skin graft** Thin layer of skin used in its entirety to cover a burn.
- **Mesh skin graft** Thin layer of skin modified by medical equipment permitting it to stretch and cover a large area affected by the burn.

Parents are an integral part of the team and are therefore encouraged to accompany their child during procedures. Your presence will reassure and comfort your child. At this time, you will also have the opportunity to see the evolution of the healing burn.

The bandages/dressings are removed and all wounds are cleaned to remove dead tissue and **exudates**. The wounds are then assessed by the Plastic Surgeon who will determine when the next dressing change will take place or if surgery is required.

The Physiotherapist and Occupational Therapist will assess **range of motion** and function, perform exercises and determine if **splints** are required. The wounds are then covered with a silver dressing or ointment depending on the size and area of the body affected by the burn. The frequency of dressing changes varies and can range from daily to weekly.

- **Exudates** Refers to the fluid that leaks from an open wound.
- **Range of motion** Full movement of a joint, range of flexion and extension.
- **Splint** A rigid material made of either plaster or plastic used to support and/or immobilize a limb.

All grafts are immobilized to prevent movement and promote healing.

The first dressing change is done at approximately five days post surgery. Dressings are worn until all wounds have healed.

WOUND HEALING

Varies depending on the size and depth of the burn, individual healing ability, nutrition and infection. This stage can often be a challenging time for the patient and family. An update of the treatment plan will be discussed regularly with you.

SCARS

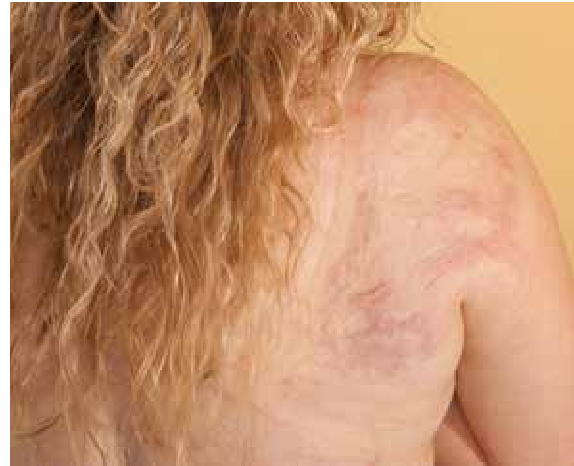
Depth of the wound, healing time, complications and treatment will affect scarring. Some patients scar more profoundly than others therefore making it more difficult to predict how much scarring a patient will have. Once the wound heals, the scar will typically be red in appearance and is referred to as an “immature” scar.

From about three months to two years post burn the scar will likely become paler, flatter and softer and is referred to as a "mature scar."

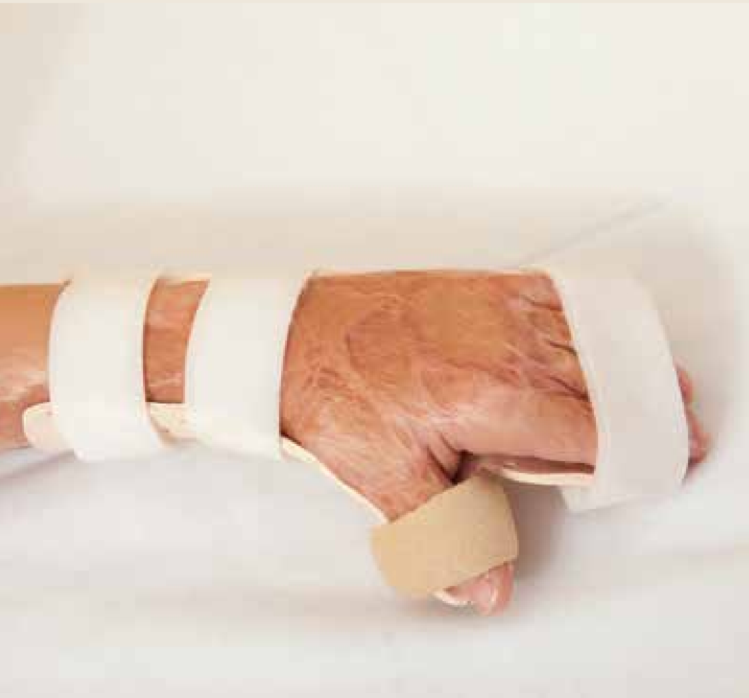
Deep second-degree and third-degree burns can continue to produce scar tissue up to two years following the injury. At this point in time, some scars will gradually improve while others may become permanent. The Plastic Surgeon will provide you with information concerning scarring. Surgical procedures that can be done at a later time to improve the appearance of permanent scars may also be discussed.

Scar massage Scar tissue may stick to the underlying muscles, tendons, blood vessels, nerves and bones. Massage can prevent this from occurring and helps to maintain the flexibility of the scar tissue. Scar massage involves rubbing and moving the skin and underlying tissue in a firm manner.

Scars may feel sensitive or hurt when touched; regular massage can help control this and eventually the area will become less sensitive. It is recommended to use an unscented moisturizing cream during scar massage. Once the burn wounds are healed the Occupational Therapist will teach you the proper techniques used in scar massage.



Mature scar



Positioning and splinting is essential to the rehabilitation process.

POSITIONING AND SPLINTING

It is essential for the rehabilitation process to begin immediately following hospitalization and continue through discharge. Both the Physiotherapist and Occupational Therapist closely monitor and oversee this aspect of burn care. They will assess the patient's need for splinting and positioning. An individualized program will be developed which will include range of motion exercises and stretching to ensure all joints are loose and functional. Proper positioning is essential for optimal healing and to prevent contractures. If the joints are not stretched regularly and positioned properly they eventually become tight and difficult to straighten. This will have a direct impact on function, rehabilitation potential and the patient's ability to perform daily activities.

PAIN MANAGEMENT

Children with burn injuries experience pain. The intensity will vary according to the degree of burn and individual tolerance levels. Pain medication is given orally or through an IV before procedures and therapy sessions as well as on a regular basis. The objective is to maintain optimal levels of comfort.

Some parents express concern regarding the regular use of pain medication and addiction. It is rare for children to develop an addiction to pain medication because they are given small quantities for only a short period of time.

A PAIN SCALE

Trauma Specialists will ask your child (age permitting) to rate their pain using a pain scale. This tool helps the nurses determine when and how much pain medication to give your child in order to ensure comfort.

The Child Life Specialist will also help your child control pain using various coping techniques. Education and preparation helps manage anxiety surrounding procedures and treatments. The Child Life Specialist will teach your child to identify comforting ways to reduce anxiety. If you have questions about pain medication, you are encouraged to speak with your child's Trauma Coordinator, Nurse, Doctor or the Pain Management Team.

NUTRITION

The nutritional needs of burn injury patients differ from those of healthy individuals. The body requires a lot of energy to heal therefore it needs more calories, protein and vitamins. The nutritional support required will depend on:

- The patient's pre-burn nutritional status
- The total body surface area (TBSA) affected by the burn and the degree of burn
- The patient's nutritional intake during hospitalization

The well-nourished patient with a minor burn injury will not require additional nutritional support beyond that of a regular diet. This of course relies on the patient maintaining their usual nutritional intake. Given the amount of energy required throughout the healing process, a moderate burn injury patient with good pre-burn nutrition, as well as a major burn will require a high caloric and protein diet.

Burn injury patients often lack an appetite. Family members and nursing staff should be patient, supportive and encourage the patient to eat. Nourishing snacks or supplements are often provided between regular meals.

Vitamin supplements can also be given as needed. The Clinical Nutritionist will develop an optimal diet based on your child's individual needs.

PSYCHOLOGICAL AND SOCIAL IMPACT

We are committed to meeting the individual psychological needs of the patient and family throughout burn treatment and recovery. To facilitate this process we encourage parents and caregivers to collaborate with the team when developing individualized care plans. These plans are designed to meet the child's medical, rehabilitation and psychological needs as well as the family's needs throughout the different phases of recovery.

Children will often experience a variety of emotions following a burn trauma as well as during an unplanned hospital stay. Children with burn injuries may also experience changes in behavior and emotion. It is common for children to feel pain, stress, anxiety, anger, guilt, isolation, and to report low self-esteem and loneliness. Common reactions to these emotions are aggression, nightmares and even developmental regression in younger children (i.e. bed wetting or thumb sucking).

Your child's sense of body image may also be affected depending on their age. The way in which a child perceives themselves following a burn injury is an important concern. The MCH Psychosocial Team, consisting of a Social Worker, Child Life Specialist, Psychologist and Spiritual Care, will address these and other concerns that you may have about your child. Professional counseling is available if there are other aspects of your child's behavior which concern you. It is important to maintain a structured and consistent approach similar to the one at home regarding your child's discipline during the hospital stay. This is a difficult time for your child; love, support and providing clear expectations are beneficial.

DISCHARGE PLANNING

Upon admission to the hospital, the Burn Trauma Coordinator and other team members will begin discussing and planning your child's discharge with you. Some burn patients will be discharged home, while others may require a stay in a rehabilitation centre before returning home. The team will also determine when your child is ready to be discharged from the hospital from a medical, nursing and rehabilitation perspective. The severity of the burn injury and rehabilitation needs will be the determining factors as to whether or not your child will be transferred to a rehabilitation centre for a period of in-patient or out-patient care. Alternatively, your child may go home with out-patient follow-up care at the Montreal Children's Hospital Trauma Centre. Services may also be organized through your community CLSC.

We are committed to meeting the individual psychological needs of the patient and family throughout the different phases of burn treatment and recovery.

THE REHABILITATION PHASE

The rehabilitation phase involves resuming daily activities and helping your child to reach their functional potential. Patients and families often report that the period following discharge is challenging. In fact, many patients and families have expressed that the first 18 months following discharge from hospital are often more difficult for the patient than the hospital stay itself.

The rehabilitation goals at this time include: maintaining and increasing range of motion of joints, muscle strengthening, increasing functional activities, scar management, reconstructive surgery (if needed) and emotional and psychological support.

MINIMIZING SCARS AFTER A BURN

Compressive garments are used to reduce scarring. Children with deep burns are required to wear compressive garments. For optimal results, the garments must be worn 23 hours per day for up to two years following the burn injury and can only be removed while bathing. You will need to have at least two sets of compressive garments so that one can be worn at all times even during laundering.

Hypertrophic scars Hypertrophic scars are a challenging complication of burn injuries. Tissue formation is often excessive and can result in thick and swollen scars. Typically, hypertrophic scars develop once deep burns have healed. It is important to note that the burn healing process continues within the deeper layers of the skin even though the surface has healed.

- **Compressive garment** Form-fitting clothes worn over burned areas to help minimize scarring.

There are different methods used to help prevent and reduce hypertrophic scarring which include:

- Compressive garments
- **Gel sheet**
- Scar massage
- Injections
- Surgical incision

The Plastic Surgeon, Occupational Therapist and Trauma Coordinator will discuss available options.

Gel sheet Specialized sheet made of silicone used under the compressive garments to help reduce scarring.

PREVENTING CONTRACTURES

- Wear a splint
- Perform range of motion exercises
- Promote independence in function

Compressive garments

Rehabilitation following a burn trauma

PREVENTING CONTRACTURES FOLLOWING A BURN

A contracture is a serious complication of a burn injury. Contractures develop when a burn scar matures, thickens and tightens preventing or limiting movement. If your child develops a contracture, they will not be able to mobilize the scarred area normally.

Have your child perform normal daily activities as much as possible. Movement that occurs during these daily activities such as eating, brushing teeth and hair as well as getting dressed will help keep the scar area stretched. It is important to encourage your child to continue doing these activities despite the fact that they may find them challenging.

Caring for Your Burn at Home

- IMPORTANT RECOMMENDATIONS TO FOLLOW

Once your child is ready to return home, you will receive instructions that will help you care for them. An individualized plan will be discussed and written instructions will be provided.

Your individualized discharge plan will include medication requirements, dietary needs, suggested daily activities, return to school integration plan, home care supplies and equipment, wound care instructions as well as information on potential complications. Follow-up appointments will be arranged and given to you at the time of discharge.

Returning home after a burn injury involves an adjustment period for both the child and family. You will likely experience a variety of feelings and emotions which are normal and to be expected following a burn injury. You may feel afraid, anxious, or uneasy about leaving the hospital and about your child's appearance and how others will react. The Trauma Specialists who were involved in your child's care will remain available as a resource upon discharge home.

IMPORTANT RECOMMENDATIONS

DRESSING CHANGE AND/OR IRRIGATION

Your child may have healing burned areas still requiring dressing changes and/or irrigation after discharge. The dressing change will either be done at the hospital, local CLSC or at home. You will be given specific instructions on how to change and/or irrigate the dressing if needed following discharge. Refer to the guidelines at the end of the booklet for additional details. The frequency of dressing changes may vary and you will therefore be provided with a schedule. It is best to give your child the prescribed pain medication 30 minutes before the dressing change begins.

COMPRESSIVE GARMENTS AND SPLINTS

Your child may be required to wear compressive garments and splints in order to:

- Manage scars
- Prevent contractures
- Decrease itchiness

Compressive garments should be hand washed using a mild soap, rinsed well, patted gently on a towel, and finally hung out to dry. Do not use bleach products or put the compressive garment in the dryer as this will damage the garment. Garments should be changed approximately every three months. Make sure to contact the Occupational Therapist if the garment becomes too loose or if other changes to the garment concern you.

EXERCISES

It is essential to ensure that your child performs the daily recommended exercises provided by the Burn Team. The Physiotherapist and Occupational Therapist will provide you with a written sheet of exercises prior to your discharge home.

SKIN CARE

Healed wounds, skin grafts, donor sites and scars all need regular moisturizing to prevent dryness, cracking and discomfort. Newly healed skin is unable to lubricate itself in the same way undamaged skin can.

- Unscented lotions/creams should be applied gently to the area then gradually progress to a massage
- Moisturizing should be done two to three times per day or more if the skin is very dry
- It is extremely important that the skin is cleaned each day as the build-up of cream can cause skin irritation

SCAR MASSAGE

Once the wound is fully healed begin scar massage.

- Massage the scar two to three times a day for five to 10 minutes at a time

- Continue scar massage until the scar has matured. A mature scar appears pale, flat and/or soft
- Moisturize the mature scar regularly

PRECAUTIONS

- Do not massage open wounds
- If the scar becomes sore, blisters, reopens or a rash develops, stop massaging and contact the Occupational Therapist or the Trauma Coordinator

ITCHING

Burn injured areas and donor sites may be very itchy for a prolonged period of time. This can be very uncomfortable especially at night. The following are some tips that may help ease the discomfort:

- Dress your child in loose, light-weight clothing
- Compressive garments should be worn all day
- Use an unscented body lotion or cream to moisturize healed wounds
- If itching is intolerable and prevents your child from sleeping, contact the Plastic Surgeon who may then prescribe medication to reduce itching

BLISTERS AND OPEN AREAS

May develop in newly healed skin and may form after minor hits, scrapes or scratches. Can also be caused by friction from tight clothing, as well as from not wearing compressive garments or not wearing them properly. With time, the skin toughens and blistering is less frequent. It may be necessary to apply a small dressing until the wound heals.

DISCOLORATION

Once burn healing has begun you may notice that your child's skin is a different color in comparison to the skin on the rest of their body. This is expected and is part of the normal healing process. It may appear light, deep pink or brownish in color. The extent of discoloration varies with each individual depending on their natural skin tone.

In superficial and/or some second-degree burns, the skin's natural color may return within several months. Other areas may take much longer and some discoloration can be permanent in burns of greater depth.

SUN SENSITIVITY

Newly healed skin and donor sites are extremely sensitive to sun exposure. The area tends to sunburn quickly especially within the first year following a burn injury.

- Limit sun exposure as much as possible
- Protect the skin by wearing light clothing to cover the areas affected by the burn
- Wear a large hat if the face and neck were burned
- Apply a high factor sun screen with both UVA and UVB protection

It is important to remember that pressure garments do not protect the skin from sunburn.

SWIMMING

If burn injury wounds are fully closed and healed your child is permitted to swim in a pool, lake or ocean. However, it is important to note that chlorine tends to dry out burn scars. Make sure to rinse the body well after swimming and remember to apply extra moisturizing cream on the scar.

DIET

It is important that your child maintain a well-balanced and nutritious diet at home as the healing process continues. The Clinical Nutritionist will provide you with information regarding your child's caloric needs at home and make suggestions on how you can fulfill them.

MEDICATION

Your child may be discharged home with several different medications. A nurse will review how and when to take these medications, what they are used for and discuss any possible side effects.

RETURNING TO SCHOOL

Returning to school can be a challenging time for children and teens who have sustained a burn injury. Nonetheless, it is beneficial for them to return to their academic and social activities as soon as they can. To help with this transition, a member of the Psychosocial Team can go to your child's school ahead of time to help prepare classmates and teachers for your child's return.

This often helps students understand burn trauma and to recognize what their classmate has experienced. It also provides an excellent opportunity to discuss burn trauma prevention. If you feel that any of the above would facilitate your child's school reintegration, contact the Burn Trauma Coordinator.

THE TRAUMA PROGRAM IS HERE FOR YOU

Contact the MCH Burn Trauma Program if your child experiences any of the following:

- Fever
- Increase in wound pain
- Wound odor
- Bleeding from the wound between dressing changes
- Increased swelling to the burn injured part of the body

The Trauma Specialists remain available to you and your child upon discharge.

ALTERNATIVE CARE MODULE NURSE

Monday to Friday 8a.m. to 6p.m.
514-412-4400, extension 23535

BURN TRAUMA PROGRAM

Monday to Friday 8a.m. to 4p.m.
514-412-4400, extension 23310

SURGICAL/TRAUMA UNIT 7C1

AVAILABLE AT ALL TIMES
514-412-4400, extension 22433

PLASTIC SURGERY CLINIC

Monday to Friday 8a.m. to 4p.m.
514-412-4400, extension 23206

HOW TO CHANGE A DRESSING

Ensure that you have all the supplies you need set up neatly and that the area is clean.

EQUIPMENT

- Sterile water
- Sterile gauze
- Gauze bandage (e.g. Kerlix)
- Tape
- Cream, ointment or prescribed dressing

INSTRUCTIONS FOR CHANGING A DRESSING

1. Wash your hands with warm water and soap
2. Remove the old dressing (s)
3. Discard the old dressing (s) in a small plastic bag
4. Wash your hands again
5. Gently clean the wound. Always remove cream/ointment residue before applying a new dressing
6. Gently pat the area dry with a gauze
7. Apply the cream, ointment or dressing to the wound
8. Wrap the dressing with the gauze bandage. Begin wrapping at the point furthest away from the heart. For example, if the leg is burned, wrap from the ankle up to the knee
9. Tape the wrap in place
10. Clean equipment
11. Wash your hands

INDIVIDUALIZED INSTRUCTIONS

YOUR SPLINT: WEAR AND CARE

SPLINT CARE

- Clean the splint using lukewarm water and mild soap. Do not use hot water because it may alter the shape of the splint
- A brush may be used to clean your splint
- Thoroughly dry your skin and splint carefully after cleaning
- Do not leave your splint near a heat source (heater, oven, window) as it can alter the shape
- If your splint breaks or its shape is altered, contact the Occupational Therapy Department. Do not try to modify or repair the splint. It might change the fit, affect the skin or damage the splint
- After swimming, ensure the splint is dry on the inside and reapply it to dry, clean skin

PRECAUTIONS

- Observe for signs of redness, rash or blisters. A pressure point may be causing skin damage or an allergic rash may have developed to the material
- Note any signs of discomfort and/or numbness to the affected limb

If either of the above develops contact the Occupational Therapy Department and stop wearing the splint

WHEN TO WEAR YOUR SPLINT

- ☐ During the day
- ☐ At night and during rest periods
- ☐ Remove splint every .... hours
- ☐ Splint can be removed for exercises
- ☐ Splint can be removed for skin care

The splint prescribed by your doctor was custom designed and is an important part of treatment. If you have questions or concerns regarding its fit, application and/or schedule, please contact the Occupational Therapy Department at 514-412-4407.

INDIVIDUALIZED INSTRUCTIONS

HOW TO USE A SILICONE GEL SHEET

RECOMMENDATIONS

- Apply the adhesive side to clean, dry skin
- Wash the sheet twice daily with mild, non-oily soap and reapply to clean, dry skin. If there is a substantial heat exposure or physical activity it should be cleaned more frequently
- Do not use paper towels to dry the silicone sheet as it may adhere to the surface
- The silicone sheet should be applied for a minimum period of 12 hours (preferably 24 hours) per day
- The silicone sheet should be used for a maximum of:
  - 4 hours for the first application
  - 8 hours the following day

  Increase wearing time to 24 hours a day
- Once the silicone sheet begins to deteriorate, it should be changed. Sheets typically last three 3-4 weeks

If skin irritation, softening, skin breakdown or rash develops, call the Occupational Therapy Department and stop wearing the silicone sheet

You will meet with the MCH Trauma Burn Program members on a regular basis. Your questions and concerns are important to us. We encourage you to write down questions, concerns and/or suggestions that you wish to discuss with the team at a later time.

REFERENCES

The American Burn Association
Burnsurgery.org

The Montreal Children's Hospital
Burn Trauma Protocol

USEFUL LINKS

About face

aboutface.ca

Association des grands brûlés F.L.A.M.

www.assdesgrandsbrulesflam.ca

Canadian Burn Survivors Community

www.canadianburnsurvivors.ca

Entraide grands brûlés

www.entraidegb.org/home_en.htm

Fondation des pompiers du Québec
pour les grands brûlés

fondationdespompiers.ca

The Montreal Children's Hospital
Trauma Centre

thechildren.com/trauma/en/

Phoenix Society for Burn Survivors

www.phoenix-society.org