

Rehabilitation of The Burn Patient

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Objectives

- Identify Indications for PT/OT intervention
- Define initial therapeutic interventions
 - Identify appropriate positioning, ROM, splinting needs.
 - Early mobilization.
 - Adaptations needed to improve functional independence.
- Define the focus of Acute Care versus Inpatient Rehab phase of therapy intervention
- Identify Follow-up/Outpatient services

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Role of PT/OT

- Early Mobilization
 - OOB within 24 hours of admission if possible
 - Push towards OOB/ambulation while on ventilator
- Prevention of Joint Contractures
 - ROM
 - Splinting/Positioning
 - Postural management
- Promote functional independence
 - Transfer/gait training
 - Activities of Daily Living / Adaptations
- Patient and Family Education
 - Importance of mobilization
 - Importance of Splinting/Positioning
 - HEP

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Activities of Daily Living

- ADLS are the foundation of every patients successful outcome in rehab.
- Ability to perform our own ADL's provides us with a sense of self-worth, increases our self-esteem, gives us hope, and a feeling of independence.
- Encourage patients to reach their highest level of independence in all aspects of their life: self-care, home management, work, leisure/play activities.

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Current Medical History

- Total Body Surface Area (TBSA)
- Location of the Burn
- Joints Crossed by injury
- Degree of the Burn
- Evidence of Inhalation Injury
- Types of Dressings
- Medications needed for pain, fluid resuscitation, pressors.

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Occupational Profile

- Obtain social and environmental information from patient, family, and medical chart. Patient may not always be able to provide.
- Home environment, environmental barriers, DME used prior to admission.
- Prior Level of Function in ADLS, IADLS, leisure, and vocational roles.
- Family/caregivers involved prior to admission and if they will be available upon discharge to assist.
- Patients daily routine and activity demands prior to admission and what is important to them when discharged home.

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Analysis of Occupational Performance

- Measurement of Active and Passive ROM
- Strength
- Sensation
- Coordination: manipulation of objects during functional activities.
- Vision
- Cognition/Communication
- Functional transfers/mobility
- Activity Tolerance

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Patient Factors

- Edema caused by initial injury and inflammatory process versus fluid resuscitation
- Pain and how it is affecting patient vitals and functional performance.
- Skin integrity: area of burn, size/depth, color and texture, exposed tendons, and status of graft.
- Psychological: fear , anxiety, appearance.

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Treatment of Burn Patients

- Prevent the loss of mobility with the use of proper splinting and positioning devices, assistive devices, orthotics, and ROM.
- Reduce edema with proper positioning, compression as appropriate, and ROM.
- ROM/Exercise program based upon each individual patient's needs to improve functional outcomes.
- Reduce pain through activity or motion.
- Involve the patient and family throughout the treatment process in order to decrease fear and anxiety.

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Achieving Patient Goals

- Encourage patients to work through the pain and frustration caused by the injury.
- May require modification of task in order to reach goal.
- Adaptive equipment or Adaptations to the environment .
- Change in routine.
- May require increased time/sessions.

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Early Mobilization

- Recent push for OOB/early mobilization across all critical care settings
- Benefits of early mobilization
 - Improvement of pulmonary status (inhalation injuries)
 - Aides in prevention of DVT/PE, PNA
 - Promotes functional independence
 - Promotes overall well-being for patients (psychological impact – ICU psychosis)
 - Decreases time in ICU setting
- Take a multidisciplinary approach
 - Include nursing staff - allows for OOB multiple times/day
 - Discussion with physicians/PAs barriers to mobilization (i.e. refusals, pain control, sedation)

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Early Mobilization Cont.

- Barriers to mobilization can include
 - PAIN
 - Good communication with nursing staff
 - Pre-medicate prior to therapy session!!!!
 - Increases patient tolerance
 - Achieve benefits of session
 - Patient/therapist rapport (children)
 - Medical complications
 - multiple trips to OR – RDM restrictions
 - Resp status – too tenuous for mobilization
 - Vitals
 - Cognitive impairments
 - Initial trauma related vs hospital acquired (psychosis, meds)
 - Patient and family cooperation
 - May circle back to pain
 - Loss of a loved one
 - Previous psychological involvement
 - Fear
 - Understanding of medical terms/diagnosis

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Proper Positioning

- Positioning
 - Begins upon therapy evaluation (if not sooner)
 - Burn wound healing begins as soon as injury occurs = need for early intervention
 - Patients will rest in a position that creates least amount of pain
 - "Position of comfort = Position of contracture"
 - Typically a flexed position
 - Importance of Patient and family education
 - Need to have continuity across all disciplines to ensure effectiveness of treatment
 - Importance of Communication
 - Daily rounds
 - Thorough documentation
 - Education

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Proper Positioning Cont.

JOINT	POSITION OF COMFORT	THERAPEUTIC POSITION
Neck	Flexed	Extended: towel roll/NO PILLOWS/collar
Shoulder	Abducted/IR	Abduct 90deg; wedge/air plane splint
Elbow	Flexed	Extended (-5deg): pillow/splint
Wrist	Flexed	Extended 30-60 deg; towel; splint
Hand	Closed w/ MCP extension; PIP/DIP flexion; thumb adducted	MCP flex 70 deg/PIP&DIP ext/thumb abd : splint/washcloth
Hip	Flexed/IR	Extended/neutral rotation/abduction: Pillow/wedge/abd pillow - NO PILLOWS
Knee	Flexed	Full Extension: NO PILLOWS

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Positioning in Acute Care Setting



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Scar Formation

- Scar formation is an ongoing process for the burn patient.
- Scars are dynamic and will continue to grow and change throughout the maturation process for approximately eighteen months post injury.
- Scars develop due to excessive amounts of collagen production seen during the healing process.

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Types of Scars

There are five main types of Scars:

- Atrophic scars: are sunken in and often seen with acne or wounds where skin and muscle are removed in one specific area.
- Hypertrophic Scars: Red, Raised, and Rigid due to increased collagen production. Tend to fade and flatten over time.
- Contracture Scars: often happen with burns when increased collagen production causes disorganized fibers that attach to other structures limiting mobility.
- Keloid Scars: Very elevated, pink/red/dark, and often grow larger than the site of original injury.
- Stretch Marks: considered a unique type of scar since they occur as a response to the skin being stretched rapidly and not because of an injury.

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Types of Scars

Hypertrophic Scarring is the result of:

- Tissue tension
- Persistent inflammation/edema
- Response of fibroblasts during the healing process which deposit large amounts of non-elastic collagen that adheres to other structures but are not as severe as keloid scars.
- Stay within the boundaries of the original wound.

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Types of Scars

Hypertrophic Scarring is characterized by the three **R**'s:

- **Red:** due to hyper-vascularization
- **Raised:** due to the **large** amounts of collagen produced (almost 4x's in a burn wound than any other wound)
- **Rigid:** due to disorganized collagen which does not allow the skin to be pliable.

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Examples of Hypertrophic Scarring



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Types of Scars

Keloids are the result of:

- **Excessive** growth of granulation tissue or collagen.
- Keloids are usually firm, shiny, rubbery lesions which vary in color from flesh color - pink- red- brown. Can be itchy and painful.
- Keloids grow beyond the boundary of the original wound.
- Keloid scars are seen more frequently in highly pigmented ethnic groups.
- Prognosis for Keloid scars? not good due to high incidence of return when removed.

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Examples of Keloid Scarring



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Types of Scars

Contracture Scars:

- This type of scar most often happens with burn injuries.
- Contractures are the chronic loss of joint motion due to structural changes in non-bony tissue. These non-bony tissues include muscles, ligaments, and tendons.
- Prognosis of contractures depends upon the cause of the contracture.
- The earlier treatment for the contracture begins the better the prognosis.

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Prevention of Contractures

- What is a contracture?
Definition : Contractures are the chronic loss of joint motion due to structural changes in non-bony tissue. These non-bony tissues include muscles, ligaments, and tendons.
- Put patients at risk for complications
 Medically: affect skin grafts and healing
 Functional: limit mobility and ADLs
- Patient Education is important
 Understanding of why they have to go through painful treatment sessions
 Less anxiety if patient knows what to expect

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Prevention of Contractures Cont.

- Limiting Factors can include:
 - Pain
 - Essential during all phases of care
 - Leads to high anxiety
 - Loss of trust between patient and provider
 - Conscious sedation may be necessary
 - Pre medicate
 - Education
 - Immobility
 - Global – Nature of the critical illness (complex)
 - Focal – burn itself
 - Poor Positioning
 - Muscle, soft tissue and bone pathology as a result of burn injury

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Prevention of Contractures Cont.

- Early ROM intervention is key
 - PT/OT evaluation for at least ROM within 24hrs of admission
 - Patients seen in hydrotherapy while under conscious sedation
 - Nursing involvement while performing daily dressing changes
 - Patient and family education on importance of ROM
- Proper Splinting
- Positioning

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Example of Contractures



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Splinting Examples

Burn Hand Splint



Measurements

- Wrist 30 degrees extension
- MP's 70 degrees flexion
- IP's and DIP's full extension or (0) degrees.
- Distal to proximal using ace wrap or cling gauze wrap.

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Example of Contractures



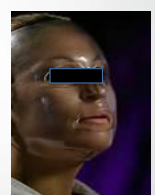
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Splinting Examples

Mold of Silicone Face Mask



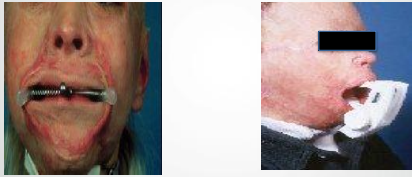
Patient Wearing Face Mask



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Splinting Examples

Mouth Pieces



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Splinting Examples

Anterior Neck



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Example of Contractures



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Splinting Examples

Axilla: Pre-fab Adjustable



Axilla: Fabricated Static



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Example of Contractures



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Splinting Examples

Dorsi-flexion Tension



Knee extension Adjustable



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Techniques for Scar Management

- Preserve ROM
- Splinting/Positioning
- Protect underlying vulnerable structures
- Increase ROM/Function
- Prolonged Stretch
- Apply pressure to scar area which promotes collagen remodeling

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Scar Massage

- Promotes collagen remodeling by applying pressure to scars.
- Provides moisture and increased pliability of skin (Burn area and Donor sites).
- Helps to decrease itching and discoloration.

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Scar Massage Instructions

- Apply lotion to healed burns, grafted areas, and donor sites. Avoid perfumed lotions or lotions with additives.
- Massage while applying enough pressure to blanch the skin (white/yellow). Stop if skin begins to blister or tear.
- Massaging in a circular pattern will avoid shearing.

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Custom Pressure Garments

- Custom Garments provide pressure to a scar in order to decrease excessive collagen growth which leads to scarring.
- They are meant to conform to a patient's body contours to limit scar formation and deformity.
- Important that garments fit properly to assure maximal benefit.
- Assist with decreasing edema.
- Assist with discoloration of skin and smooth appearance.
- Patients report feeling better while wearing garments.

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Wear and Care of Custom Pressure Garments

Does not fit properly:

- Garment is too small if it binds or digs into the skin.
- Garment should not ride up or down on patient with motion.
- Garment should not cause the fingers or toes to become swollen or numb.
- Garment should not appear baggy or loose on patient.

Care of Garments:

- Patient should be given 2 sets of pressure garments so that one can be washed and the other worn.
- Garments should be washed daily by hand or washing machine with warm water or a mild soap. Do not put garments in the dryer.

When to Wear Garments:

- Patients should wear their garments 23 hours a day for over a year.

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Examples of Custom Pressure Garments

Chin/Neck/Chest/Upper
Extremities



Face Mask / Left Upper
Extremity



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Therapy Treatment Techniques

- Silicone for scar management.
- Inserts to apply pressure while wearing splints and pressure garments.
- Paraffin can be used on a case by case basis.
- Ultrasound

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Medical Treatment of Scar Formation

- Steroid injections can help with hypertrophic or keloid scars but is almost always temporary and needs to be repeated.
- Skin resurfacing using lasers/radiation.
- Surgical release of contractures, further grafting, possible flap, or need for tissue expanders.
- Z-plasty which is designed to relieve tension across the scar area.

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Acute Care PT/OT Burn Care

- Thorough PT/OT evaluation/initiation of tx within 24 hours of admission
 - If able – may be too critical for thorough assessment
 - Despite pt participate need to initiate ROM/stretching and Splinting/positioning
- Prioritize this patient population
 - Due to quick onset of impairments
 - Quarterly audits completed to ensure compliance
- Large focus on early ROM/Splinting and Functional Outcomes
 - May need to treat BID to ensure proper ROM as well as focus on function
- Early mobilization/ADLS
- Communication
 - Need to communicate with team regarding possible restrictions post-op
 - D/C recommendations as early as possible

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Communication

- Due to complex nature of burn injury care, a multidisciplinary approach is important
- Team includes: Burn Surgeons, PAs, Nurses, Anesthesiologists, Respiratory therapists, PTs, OTs, Dietitians, Psychosocial experts, Social work.
 - Patient and family also members of team – need to be included
- Clear and concise communication is key
 - With multiple disciplines miscommunication can easily happen
 - Also need good communication between covering therapists
- At UPMC Mercy the burn team meets for daily rounds
 - Discussion of barriers to care
 - d/c recs and patient progress

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Pediatric Patient in Acute Care

- See infants > adolescents
- Family dynamics
 - Can hurt or help
 - Lack of support vs too much involvement (i.e. refuse for patient)
- Need to take developmental milestones into consideration
 - May see a regression of skills s/p trauma
- ROM/stretching under conscious sedation
 - May require BID tx in order to include function as well – incorporate play
 - May take a few sessions to build trust – consistency is important
- Communication with CLS
 - May require a set schedule for therapy times, schooling, etc.
- Discharge planning/Recommendations
 - More complex due to family dynamic
 - Difficult due to MOI – large involvement of social work and case management

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Inpatient Rehab PT/OT

- Continue to focus on ROM/stretching
 - Responsibility starts to shift from therapist to patient and family
- Function becomes more of the therapists' focus
 - May need to adapt mobility due to contractures/limitations that may have occurred early on
 - Acute focus on prevention of contractures vs rehab focus on adaptation of contractures which may limit mobility/ADLs
- Family/support system more involved with patient care
 - Ther ex
 - Dressing changes
- May have some disconnect with burn team
 - Need clear communication between acute care rep and rehab members
 - Communicate barriers in rehab huddles

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Follow-up/Discharge Planning

- Outpatient Occupational and Physical Therapy
- Psychology
- Vocational/Work Hardening
- Community Re-entry

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Hip	Flexed/IR	Extended/neutral rotation/abduction: Pillow/wedge/abd pillow - NO PILLOWS
Knee	Flexed	Full Extension: NO PILLOWS
Ankle	PF/inversion	DF/neutral inv/ever: PRAFOs