

# Burn Care

*An introduction to burn management from  
a Physical Therapist's perspective  
-- Juli Olmsted PT*

WARNING: The following presentation contains images of patients that have suffered burn injuries. Some of these images may appear graphic in nature.

## Burn Management

Today's lecture will cover the following topics:

- **Introduction to PT's role in Burn Care**
  - Prevalence of burn injuries in the U.S.
  - Who comprises the "Burn Team"
- **Classifications and Types of Burns**
- **Role of PT**
- **Positioning & Activity**
- **Long Term Outlook**
- **Questions & Answers**

## Introduction to PT's role in Burn Care

- **Prevalence of burn injuries in the United States**
  - Approximately 1.2 million people suffer from burn injuries in the U.S. each year. This number is taken from the most recent American Burn Association Survey in 2000. Data prior to this survey showed an estimated 2 million burns/year.
  - Each year U.S. hospitals admit an average of 45,000 burn patients, and emergency rooms treat approx 700,000 burn patients each year. The remaining injuries are not documented through the burn registry.
  - There are 125 American Burn Association Certified facilities in the U.S.

## Who comprises the "Burn Team"

- Surgeon, nursing, PT, OT, Speech Therapy, dietician, social work, chaplain and the patient.
- Psychology.



## University Burn Team



From left to right: Paul Linneman, RN, MH Cho, Dietician, Boyd, Terry, MD, James Kraatz, MD, Cathy Barrow, OTR/L, Nicholas Meyer. MD.

Not pictured: Juli Olmsted, PT

## Classifications of Burns

- o Superficial
- o Partial Thickness
- o Deep Partial Thickness
- o Full Thickness

Occupational Therapy Class of 1985

### o Superficial

- pink or red in appearance
- sensation is intact but wound is painful
- Blanching, but may have delayed cap refill
- commonly referred to as 1<sup>st</sup> – 2<sup>nd</sup> Degree
- common causes: scalding or sunburn



### o Partial Thickness

- red or bright pink, blistered, wet & soft/pliable
- exposed nerve endings make wound painful
- increased sensitivity to: temperature changes, exposure to air and light touch
- commonly referred to as 2<sup>nd</sup> Degree
- common causes: gasoline flash, cooking scald



### o Deep Partial Thickness

- mottled red or waxy white, wet & soft/pliable
- sensation is variable
- commonly referred to as 2<sup>nd</sup> – 3<sup>rd</sup> Degree

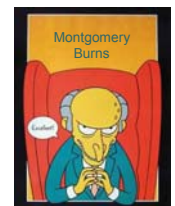
### o Full Thickness

- white or tan, waxy, dry & leathery texture, rigid and non-pliable
- does not blanch & insensate, due to destruction of nerve endings
- commonly referred to as 3<sup>rd</sup> Degree
- common causes: Clothing ignition, propane explosion, molten metal



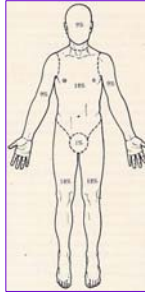
## Types of Burns

- Acid/Chemical
- Electrical
- Flash
- Radiation
- Thermal
- Inhalation

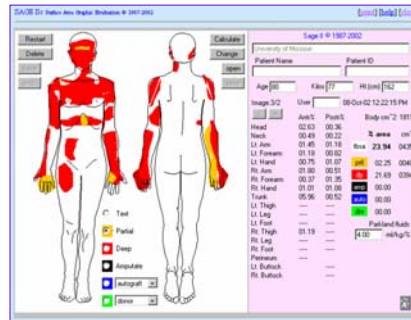


## Evaluate Burn Size Rule of Nines

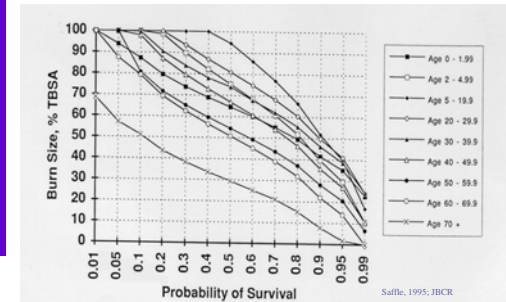
- ◆ Head- 9%
- ◆ Arms- 9% each
- ◆ Torso- 18% each surface
- ◆ Legs- 18% each
- ◆ Perineum- 1%



## Sage Diagram On-line burn calculation



## Prognosis, 1995



## Wound care: Biobrane

- Used on partial thickness burns
- Must have wound clean, shaved, debrided
- Applied with staples or strips
- Adheres to the wound over 24 hours
- Stays on until healed, 10-14 days

## Biobrane on PT burn



## Skin grafting

- Requires OR
- Thin layer of skin is harvested from the patient
- Burn is excised to living tissue
- Skin is applied to the excised burn wound
- Requires some immobility for 4-5 days

## Skin graft for full thickness burn



## Role of the PT

- Early & continued attention to positioning of burned areas.
- Management & prevention of joint & soft tissue contractures and deconditioning in acute setting.
- Improving independence with functional mobility for re-entry into society.
- Generally, PT is involved from the day of admission and as long as 1 -2 years post-injury, depending severity.

## Positioning

- Positioning is initiated on the day of admission to prevent functional limitations.
- Goal is to minimize contracture formation and edema.
- Will require frequent monitoring

*"Position of comfort is position of contracture."*

### Anterior neck:

- Avoid use of pillows.
- May initially require neck roll to support head/chin.

Incorrect



Incorrect



Correct



Correct



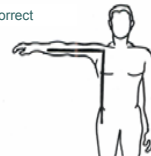
### Shoulder: axilla involvement.

- Position in shoulder abduction with slight horizontal adduction to avoid brachial plexus injury.
- May use Airplane splint, pillows, troughs.

Incorrect



Correct



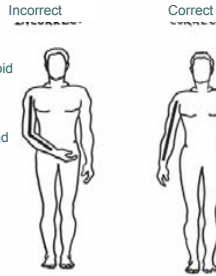


**Elbow:**

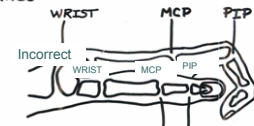
- Position in elbow extension.
- Encourage active flexion when appropriate post-operatively to avoid extension contracture.

**Forearm and wrist:**

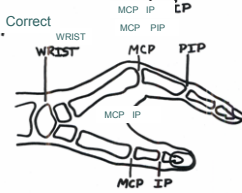
- Position in forearm supination and wrist extension.



**INCORRECT**



**CORRECT**



**Incorrect**



**Correct**



**Incorrect**

**Knee:**

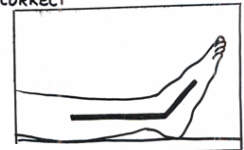
- Position in knee extension



**Correct**



**INCORRECT**



**Ankle:**

- Position in dorsiflexion.
- Will likely need splinting or use of wedge at end of bed
- Take care to avoid prolonged pressures on heels.

**Correct**





## Exercise

- Fibroblasts, which are responsible for wound contractures, enter a burn wound within 24 hrs and can remain active up to 2 yrs after injury.
  - In burn patient care frequent daily exercise/activity helps to offset effects of scar contractures by increasing joint range of motion and muscle strength.
- Timelines of exercise: new burn may immediately participate in passive and active range of motion/activity.
  - Generally must wait 4-5 days after skin grafting to resume passive and active exercise. Any post-graft activity must be cleared by the physician.

## Exercise Contraindications & Precautions

- exposed tendons or joints
- post-grafting
- infection

## Exercise Considerations

- Metabolic rate elevated up to 1 yr post burn, at highest 10 days post burn.
- Normal temperature of a burn patient is 101.84°F, thus you should consider room temperature. Generally most comfortable in 85-88° F.
- Pain control – pt may need adequate pain meds prior to activity.
- Give pt time to be successful in activity.
- Emphasize normal movement patterns with activity at first contact to minimize joint contracture, weakness and scar contractures.

## Heterotrophic Ossification

- Defined as "formation of new bone in tissue that normally does not ossify."
- Can occur in soft tissue around a joint or form a bony bridge across a joint.
- In some cases resolves spontaneously, others it limits functional mobility.
- Most common area is posterior medial elbow, then shoulder, then hip.
- Found most commonly in patients with < 20% full thickness burn and in those whose wounds were ungrafted for prolonged period of time.
- Most effective treatment is active exercise within pain-free range of motion. In some cases it may spontaneously resolve with this treatment.

## Scar Management

- Scar formation generally occurs for 12 – 18 months.
- The most active period of scarring is 2 – 7 months post-injury.
- Clinical scar maturation is characterized by:
  - progressive remodeling of the scar (i.e. softening, flattening and decreased wound tension)
  - progressive devascularization, scar tissue fades from red to match adjacent non-injured skin tone.
- Scar management techniques include: gradient compression garments, silicone sheeting and rigid compression devices.

## Facial Burns

- Differ from other burns because they are often the most traumatic for a patient.
- Difficult to treat due to the physical nature of both the face and the neck.
- Scar management of facial burns is addressed through the use of compression.
- Compression Options
  - elastic face masks
  - rigid plastic face masks

## Other consequences of burns

- Loss of endurance
- Body image, self esteem
- Compliance with long term rehab needs
- Itching, skin dryness
- Sun sensitivity
- Loss of sweat glands
- Alterations in sensation
- Weight loss (or gain!)
- Developmental stagnation, if pediatric

## Long term effects of burns from clinical perspective

- Burn patients tend to have pain up to 13 months:
  - may require prescription meds (Neurontin frequently prescribed)
  - may try TENS

## General Long term follow up major burns

- Education
- Marriage or relationship
- Employment
  - may be out of work < 30 weeks post burn
  - < 50 % return to work at initial job
  - Consider temperature fluctuations in work environment
- Self esteem
- Depression

## Sources

- *Burn Care & Rehabilitation Principles & Practice*, Reginald L. Richard & Marlys J. Staley ©
- "Burn Care: OT Role", Catherine L. Barrow, OTR/L ©
- "Child Life Therapy for Burn Patients", Paul Linneman, RN ©