The Therapist’s Role in The Burned Hand

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Objectives:
- Importance of Palmar creases with palmar contact burns
- Splinting … how, when, and what position
- ROM with circumferential hand burns….sometimes ..Less is more
- Function, ROM, scar management post wound healing
- Treatment of treadmill injuries

Etiology
- Contact
- Scald
- Electrical
- Chemical
- Friction

Burn location
- Palm
- Dorsum
- Side of digits
- tips
- Crossing joint

Acute Phase
Still possibility of infection, patient to get very sick
Surgery or post surgical
Need to know healing time

Palmar Hand Burns
Palmar Creases

Considerations with ROM

- Edema
- Blisters
- Tendon Exposure

Splinting Considerations

- Edema
- Possible tendon involvement
- Blisters
- May need to re-form splint several times secondary to dressings

Splinting position

- Palmar extension with digits in slight hyperextension and wrist in extension
- Wrapping with bandage NOT strapping
- Keeping hand extended and wrist extended during dressing change and splint application

Splint Time

- AT ALL TIMES
- Teach parents/patients proper don/ doff
- Review type of supplies, non stretch

ROM while healing

- Patient may bleed at creases
Patient/Parental Education
- Plays a large role in recovery
- Repetition is the key to learning with parents
- Stressful for parents with child crying
- Education to patient if adult and possibly caregiver if assistance needed
- Written information and demonstration

ROM exercises
- Complete Good palmar extension 1x day during healing process
- Creases open, digits slight hyperextension, thumb abducted and extended
- Child's ROM > adult ROM

Palmar burn is healed
- Splint at night if > 3 weeks to heal x 1 month
- Follow up visits for one year
- Cream, massage and stretching 3x day

Scarring
- Self adhesive wrap as soon as possible
- Frequent follow up visits
- Contractures and loss of ROM quicker than you think

About 30% of palmar burns require grafting
- Higher grafting ratio with dorsal contact burns

Circumferential or Dorsal Hand Burns
Etiology
- Flame burns
- Scald, immersion
- Often children under 5 declare themselves with amputations of distal digits after a few weeks

Considerations
- Suspicion of tendon damage, exposed tendon
- Joint stiffness, tightness vs. edema
- open joint
- Unstable joint, ligament loss/damage

Tendons
- Be careful with any tendon involvement
- Can see tendon, white shiny vs dull white and with gentle ROM can see gliding
- Tendon needs to be protected and to stay moist AAT
- Limit PROM and encourage AROM for tendon gliding
- Check for tendon intact with AROM blocking

Deep Hand Burns
**Less is more**
- After review of bad wounds, possible tendon exposures, structures exposed…
- Be careful not to do more damage.
- Splint first, range later.

**ROM**
- Gentle PROM to each joint separately
- DIP = 30
- PIP = 90
- MCP = 90

**Options for positioning:**
**Early K-wire for 4-6 weeks**

**After k-wires removed**
- SPLINT, SPLINT, and SPLINT !!
- ½ time MCP = 90, PIP and DIP = 0, and wrist in 20 extension
- ½ time palmar extension due to palmar contractures
- Wean off during the day as patient uses hand functionally
**Treadmill Injuries**

![Image of treadmill injury]

**Etiology**
- Mean age 3.5yrs (most under 6yrs)
- Male > Female
- 45% of all treadmill injuries involve the volar surface of the hand
- All are friction burns due to hand getting caught under conveyor belt

**Initial Concerns**
Possible structural involvement
1. tendon exposure
2. fractures

Depth of burn:
- 3rd degree with eschar
- Often severity is missed by untrained professionals

**Range of Motion**
- Very limited ROM
- If MD would like ROM encourage AROM
  -- will help to ensure tendons are intact

**Splinting**
If NO tendon involvement or fractures noted:
- Palmar burns = splinting in palmar extension, digits in slight hyperextension, wrist extended
- Dorsal/circumferential burns = intrinsic plus position/ resting hand

**Splinting**
Before R/O of fractures or tendon involvement
- Make a PROTECTIVE splint
  1. palmar surface = digits extended, wrist neutral
  2. dorsal hand/circumferential = resting hand
Complications
- Often misinterpreted by parents and non-specialized health care professionals due to:
  1. NO bleeding and NO pain
     Child not in distress = parent less concerned
- Increased Incidence of late medical attention

Patient/Caregiver Education
As treadmill injuries are often a full thickness burn:
1. May take over 3 weeks to heal
2. Will most likely scar
3. Increased risk for infection
4. Important for this to heal in correct position so contraction does not occur
5. Follow-up consistently with a Healthcare provider is CRUCIAL.

Healing Stage
- 1/3 require grafting
- A few require tendon repair
- Splinting is Crucial

Burn is Healed
- ALL treadmill injuries reported in studies resulted in Some scarring
- Scar massage, skin care, splinting (at night) pressure garments, and home exercise program

Rehabilitation Phase
Scar management
outpatient therapy
Return to function

RISK FACTORS
- Healing Time > 14 Days
- Grafted Regions
- Very Young Children
- Skin Tone and Pigment
- Area of high tension
Scar Formation

- May occur when the dermis is involved in an injury
- Increased vascularity in new connective tissue
- Increased collagen formation
- Decreased organization of collagen

Immature Vs. Mature Scars

- Immature/Active Scars - the 3 R's
  - Red
  - Raised
  - Rridged
- Mature Scars - the 3 P's
  - Pale
  - Planar
  - Pliable

Scar Massage

- Requires deep pressure to decrease local blood supply
- Normalizes sensation
- Promotes soft and supple scar formation

Guidelines for Compression Therapy

- early application is best
- should be worn 22-23 hrs/day
- garments are applied or wrapped distal to proximal
- wrap in spiral or figure 8 pattern
- progression of pressure garments from non-shearing wraps to custom-made garments
Types of Compression Garments

- Elasticized dressing
- Self adhesive bandage
- Elastic tubular stocking
- Interim Garments
- Custom-Fitted Garments

Pressure

- As soon as healed begin self adhesive wrap
- Soft material stretch glove
- Get measured for Custom glove
- Wear time as tolerated up to 23hr/day

PROM/outpatient therapy

- 3x week therapy for PROM, AAROM, AROM
- Scar management
- Functional activities
- HEP to increase use of hands at home
- So important to stay on top of problems
- If skin is limiting, encourage Return to MD

ROM

- Once the patient is healed, this is when the real therapy begins…
- Very aggressive with PROM, splinting, scar management.
- PROM as pt tolerates..bring them to their end range
- Use place and hold for strengthening
- AROM and strengthening

Function

- Self feeding, self care
- Nintendo
- Games or crafts involving fine motor skills
**ADL’s for adults**

- Start early
- Working against idea of dysfunction/still sick/incapable of doing for self.

**Limiting factors in function**

- Amputations
- No nails
- Changes in sensation
- Contractures of the palm
- Structural damage

**Cosmetics**

- Very visible scars
- Often there is higher rate of depression involved with hand and facial burns
- Be sensitive to patients needs, function vs overcoming look of scars
- Get help for patient and be supportive

**Any Questions?**

- Thank you!

**References**