VISION OF REHABILITATION

A multidisciplinary approach to optimize the quality of patient care is considered essential at the Arizona Burn Center, located at Maricopa Medical Center in Phoenix, Arizona. Occupational Therapy, Physical Therapy, Nursing, Respiratory Therapy, Psychology, Nutrition, Social Work, and the medical team all work together to contribute to the rehabilitation of patient's with burn injuries, with the goal of restoring functional independence and the patient's return to their previous level of mobility.

PHYSICAL THERAPY

The role of physical therapy is to prevent disability and restore function. At the Arizona Burn Center, physical therapy broadly fills this role by providing range-of-motion, positioning, strengthening, mobility and gait training to our burn patients. Emphasis is placed upon proper biomechanical function and restoration of the individual patient's pre-burn level of function.

OCCUPATIONAL THERAPY

The Occupational Therapist (OT) plays an important role on the burn center team through performing initial assessments, consulting with team members, and developing an individualized rehabilitation plan of care for the newly admitted patient.

Consulting with other team members and making recommendations for positioning is essential, especially for the intubated or unresponsive patient. Positioning is the first line of defense to preventing contractures. Fabricating splints, scar management, maintaining and improving ROM, strengthening, education, and improving the patient's ability to participate in activities of daily living are all OT responsibilities.

Activity of daily living skills for each patient may be adversely affected by a burn. Through training with an OT, the individualized plan of care will address ways in which the patient can return to independence.
As an integral part of this process, guidelines and protocols have been established on the areas of splinting and positioning. These guidelines are adapted to meet the individual needs of each patient.

Ideal Position of a Burn Patient

Note “Burn Position” similar to anatomic position, with the following important exceptions:

- shoulders abducted to 90 degrees, horizontally adducted 20 degrees
- arms in neutral rotation, forearms supinated
- wrist in slight extension, with MP flexion, IP extension, thumb abducted and opposed
- neck slightly extended and chin slightly protracted
- hips in slight abduction with full extension
- ankles in neutral plantar/dorsiflexion, with subtalar neutral

SPLINTS

Splints are used to maintain a functional resting position for joints that are directly or indirectly affected by burn injury. At the Arizona Burn Center, splinting is a multidisciplinary responsibility involving therapists, nurses, burn technicians, physician assistants, and physicians. Splint schedules are posted in the patient bedside chart by the rehabilitation team, and splint use is tracked on the multidisciplinary Skin/Wound Assessment form found in the same bedside chart. Any skin breakdown caused by a splint is reported to the rehabilitation department.

Following are a few of the typical splint wear schedules used at the Arizona Burn Center and some of their indications. This is a representative list only, and not intended to be an exhaustive inventory of all potential splint wear schedules as practiced at the Arizona Burn Center or elsewhere. Also note that despite posted wear schedule, rehabilitation recommends skin check intervals ranging from every hour to once per shift.

"On At All Times" - This schedule exempts splinting for therapies, dressing changes, and skin inspections only. Indications for splints to be worn at all

times include the following:

- Splints that reinforce dressings status post autograft, CEA, Integra application, or Aquacell prior to unocclusion. Note that these dressings may preclude skin inspections.
- Splints that support "burn position" positioning with deep circumferential or deep flexor surface burns across a joint.
- Splints that are used to support range of motion gains.
- For patients who are not capable or otherwise able to follow a positioning or exercise program where splinting 10 hours on, 2 hours off per shift would otherwise be adequate.

"10 hours on/2Hours off per shift

- Splints that support "burn position" positioning with more superficial circumferential and joint crossing burns.
- Splints that must be worn as often as possible but that would otherwise limit activity or movement in a self-mobilizing patient.
- Splints used to support allograft placement.

"At night or Rest Periods Only"

- Used for mobile patients who still require resting support to maintain the desired "burn position".
- Commonly used with foot drop splints or PRAFO's.

Specific Splints and Recommended Applications

Following are examples of some commonly used splints at the Arizona Burn Center, their indications, precautions, and abbreviated donning instructions.

Vertical Towel Roll

Indications/Use: To promote normal chest expansion and scapular retraction in patients with anterior chest and shoulder burns.

Donning:

1- Roll lengthwise 2 to 3 towels.
2- Place rolled towel underneath patient's spine, between shoulder blades. Ideally, towel roll should extend from cervicothoracic junction proximally to mid-lumbar region distally, and not to sacrum.
3- Patient must be supine for roll to be effective.

Precautions:

1- Monitor skin over spinous processes for any evidence of breakdown.
2- May be less effective when used in combination with air overlay mattress.

Towel Roll

Indications/Use: To support burn position for neck burns and status post neck contracture releases.

Donning:

1. Roll two to three towels.
2. Place rolled towels behind patient's upper shoulder blades (scapulae) and NOT UNDER PATIENT'S NECK.
3. Position patient's neck into neutral lateral flexion and neutral rotation.

Precautions:

1. Do not use in conjunction with a pillow.
2. Make sure patient's mouth doesn't remain open. It may be necessary to use a smaller towel roll or cervical collar as preventatives.

Soft Cervical Collar

Indications/Use: To support or replace towel roll for neck positioning, when towel roll alone is not sufficient.

Donning:

1- Position patient's neck in neutral lateral flexion and neutral rotation.
2- Apply collar with opening in the back.
3- Secure strap.

Precautions:

1- Do not use in conjunction with a pillow.
2- Do not allow collar to slide up over chin and cover patient's mouth or face.
3- It may be necessary to use a towel around the collar to remediate maceration.

Semi-Rigid Cervical Collar

Indications/Use: For neck burns, when more rigid support is needed than cannot be achieved with towel rolls or soft collar.

Donning:

1- Position patient's neck in neutral lateral flexion and rotation.
2- Fasten brace under patient's chin.
3- Secure straps.

Precautions:
1- Avoid use of a pillow in conjunction with semi-rigid cervical collar.
2- Do not allow brace to slide up and cover patient mouth or face.
3- More frequent skin checks - especially at chin and jawline, clavicular surfaces, and chest will be necessary with this rigid brace.

Foam Airplane Splint

Indications/Use: For axillary area burns, or burns that cross the chest or upper arms.

Donning:
1- Position patient's arm in 90 degrees abduction, 20 degrees horizontal adduction, and forearm supination (if possible). A pillow underneath the airplane splint will help achieve requisite horizontal adduction.
2- Place airplane splint underneath the axilla, snug against patient's lateral trunk and arm.
3- Secure straps around upper arm and wrist.

Precautions:
1- Discontinue use immediately if patient reports numbness or tingling in their arm, and contact rehabilitation.
2- Skin under straps is susceptible to breakdown and needs to be monitored frequently. Airplane splints are custom cut by the therapist to allow strap adjustment proximally or distally to prevent breakdown.
3- Use a towel along foam borders that contact body surface in the event of maceration.

Southern California Orthotic Instrument (SCOI)

Indications/Use: For prevention of contracture due to axillary, or shoulder. Allows more rigid support than airplane splint, and can be worn effectively during ambulation. Can be adjusted discreetly at multiple joints to allow more precise positioning than airplane splint.

Donning:

1- Abduct patient arm to desired position.
2- With SCOI shoulder joint locked in similar degree of abuction as patient arm, position SCOI at patient side, snug against patient arm and lateral trunk. Secure waistband.
3- Route color coded straps around patient neck and axilla as indicted on each strap, and secure through corresponding color-coded strap brackets. Make sure that ROM dial for patient shoulder joint lines up with patient's shoulder joint.
4- Place patient's palm on rounded hand grip, and position elbow joint in desired degree of flexion (0 degrees in most cases). If there is no burns to the elbow, allow free range of motion.

Precautions:

1- Monitor and reposition as necessary with mobile patients - brace may migrate if not secured adequately.
2- Discontinue use immediately if patient reports tingling or numbness in upper extremity. Report findings to rehabilitation.

Anterior/Posterior Elbow Splint

Indications/Use: For burns that cross elbow joint, to position elbow into full extension or partial flexion.

Donning:

1- Position patient's elbow into full extension.
2- Apply splint to appropriate surface of arm. Splints will be marked with permanent ink to indicate right/left and anterior/posterior, shoulder/wrist.
3- Secure with straps or ace wrap. (If using ace wrap - wrap distal to proximal.)

Precautions:

1- Check distal circulation as recommended by rehabilitation or every 2 hours.
2- If using ace wrap, check unwrapped distal upper extremity for signs of edema. Re-wrap limb from most distal point of edema, if edema noted. Notify rehabilitation.

Wedge/ Hip Abduction Pillow

Indications/Use: For burns that cross anterior hip joint, or affect adductor surface extensively.

Donning:
1- Abduct patient’s legs.
2- Place abduction pillow between legs as proximally as able.
3- Secure straps proximal and distal to patient’s knees. Patient’s legs must be snugly against contoured cut-out of brace for this splint to be effective.
4- Keep lower portion of bed flat, and hips extended as far as possible.
5- Consider using reverse-trendelenburg bed position if patient must have head elevated.

Precautions:
1- Cover the foam splint with towels or a blanket if maceration occurs.
2- Splint is ineffective for maintaining hip extension if bed is the head of the patient bed is raised while leg portion is flat, or if lower portion of bed is elevated.

Hip Spica Splint

Indications/Use: To preserve neutral hip extension when abduction pillow insufficient. Particularly useful after hip or groin contracture release.

Donning:
1- Roll patient to sidelying.
2- Position soft strap behind patient. Hard plastic proximal portion of splint should be anterior.
3- Slip thigh cuff around patient’s distal thigh and secure with straps.

Precautions:
1- Be sure that this custom fabricated splint is made with neutral hip extension, not 20 degrees of hip flexion.
2- Never turn patient beyond 1/4 sidelying on same side as brace.
3- If patient must have the head of their bed elevated, use reverse trendelenburg position if possible.

Locking Knee Brace

Indications/Use: For popliteal or posterior leg burns that cross knee joint.

Donning:

1- Place brace posterior to patient limb so that round, locking dials align with knee joint.
2- Dials will be set to predetermined position be rehabilitation team.
3- Secure straps using two finger rule.

Precautions:

1- Distal neurovascular integrity should be checked every 2 hours or with patient complaint of numbness/tingling.
2- Skin breakdown rarely a problem due to sufficient padding at all skin contact surfaces.
3- Consider this splint instead of knee immobilizer secondary to immobilizer's tendency to position patient in very slight knee flexion.

Pressure Relief Ankle Foot Orthosis (PRAFO)

Indications: For specific positioning control of ankle with posterior lower leg and ankle burns.

Donning:

1- Place patient's foot in PRAFO boot, with bottom of heel (heel pad) firmly against bottom of PRAFO.
2- Secure 3 dorsal foot and leg straps using two finger rule.
3- Rotate kickstand to maintain patient's leg in neutral rotation.

Precautions:

1- PRAFO's should be checked whenever patient has changed position to ensure that patient's heel does not migrate to rest against metal frame posterior to patient's leg.
2- Do not overtighten distal foot strap, as improper fit can cause pressure to medial and lateral metatarsal heads, leading to skin breakdown.
3- Consider PRAFO primarily a foot drop splint with malleable yet rigid support - it may be necessary to float heel of PRAFO over pillow to adequately protect heel.

Burn Hand Splint
Clamdigger(Intrinsic Plus)Splint
Functional Hand Splint
Pan Splint
C-Bar splint

Microstomia Prevention Appliance (MPA)

Indications: Facial burns where ROM of mouth may be affected. Helps to stretch mouth, aiding in oral-motor function.

Donning:
1- Start with lowest tension setting.
2- Place one side of MPA in corner of mouth.
3- Stretch opposite side of lip around opposite side of MPA.
4- Widen MPA to desired width.

Precautions:
1- Moisten lips with lubricant prior to application of MPA
2- Increase wear time and tension very gradually. Even small amounts of pressure can damage orbicularis oris muscle.

MARICOPA INTEGRATED HEALTH SYSTEM
POLICY & PROCEDURE

Effective Date: 02/03

Reviewed Dates: 2/92, 6/95, 6/98, 8/99, 3/03

Revision Dates: 02/03

Policy Title: PT/OT Exercise Protocol **Policy #:** 018

Scope: [ ] **System-Wide**
[X] **Department:** Arizona Burn Center

Signature: ______________________
Medical Director / Administrative Director

Purpose:
To define the standard of care a burn patient will receive in occupational and physical therapy.

Policy:
Physical and Occupational therapists will follow established written guidelines in

the treatment of burn patients.

Procedure:

A. Unexcised burn

1. Patients will ambulate (with or without assistance) as tolerated.
2. Active, active assist and passive range of motion (ROM) to all major body joints burned and unburned.
3. The patient's level of comfort and intervening therapist determine the intensity of the therapeutic regime.
4. Patient will be up in a chair with assist of nursing during the day.
5. Edema management via elevation and compression wrap will be incorporated by all members of the burn team.

Autografts

1. Occluded, and immobilized with a splint if necessary for five days
    2. Post operative day (POD) five: begin gentle active and passive range of motion to burned joint after dressing has been taken down and observed by medical team.
    3. If autograft does not cross a joint, then passive and active range of motion (ROM) is begun on postoperative day one, at the discretion of the treating therapist.
    4. Mobility training and gait training can begin as early as POD one where grafts will not be stressed
    5. Splint wearing schedule should continue as predetermined by treating therapist.

A. Allografts, Homografts, and Xenografts

1. Occluded and splinted for five days.
2. Begin active/passive range of motion (ROM) on postoperative day (POD) 1.

A. Integra

1. Occluded and splinted for 5 to 7 days, per physician.
2. ROM of uninvolved extremities may begin POD one.
3. ROM to extremities with integra grafts may begin on POD 5 to 7, provided ROM is avoided over grafted joints.
4. ROM across joints where integra is applied will begin as determined by the surgeon and intervening therapist, usually between POD seven and POD twelve.

A. Cultured Epithelial Autografts

1. Splinted, if applicable, for 7 to 10 days until dressing removed.
2. Gentle ROM to affected area when dressings removed, avoid shearing to CEA area.
3. Strengthening and conditioning can resume POD 7, with physician approval.
4. Gait training generally will begin 3 days after dressing takedown (POD 10 - 13). Ace/coban wraps may be used for venous support on both upper and lower extremities with upright tasks.
5. Stretching and aggressive ROM is generally initiated 4 to 6 weeks post operatively.

A. Sheet Grafts

1. Grafted extremities will be immobilized with splint or cast.
2. ROM to affected area may begin POD 5 at discretion of physician, based upon integrity of graft.
3. ROM gradually progresses, as patient is able to tolerate treatment session.

A. Therapy in the Operating Room

1. Therapy services for ROM or splinting will be provided in the OR at the discretion of the involved therapists and physicians.
2. Therapy services may also be provided in the OR to diagnose joint ROM.

A. Conscious Sedation

1. Conscious sedation may be used to provide ROM and positioning for patients who are unable to tolerate these same therapy services with the aid of pain medications or other pain control techniques.
2. Conscious sedation will be used from two to five days a week, at the discretion of the treating therapist and physician.

A. Donor sites

1. Occluded for 24 hours postoperatively; then dressing changed.
2. After dressing change, begin passive and active range of motion as tolerated.
3. Patient will be up in chair and ambulatory as tolerated with nursing, even with lower extremity donor sites.
4. Gait and mobility training can be resumed POD one as indicated.

A. Hydrotherapy

1. Hydrotherapy will be used to address burn wounds that cannot effectively be submerged by tubbing in the tub room:
    a. Patients who are too large to handle in the tub room.
    b. Patients with burned areas that cannot be submerged fully in the tub.
    c. Patients who are too immobile to safely enter and exit the tub.
1. A registered nurse must accompany all telemetry status patients or continuously monitored patients to hydrotherapy and be present throughout the course of the hydrotherapy treatment.
2. Hydrotherapy is contraindicated for patients on ICU status.
3. Refer to the Whirlpool Policy for whirlpool treatment specifics.

A. Splints

1. Splints may be fabricated by the treating therapist, or referred to an outside orthotist for fabrication, at the discretion of the treating therapist and physician.
1. The treating therapist will determine the type of splint and wearing schedule.
2. Splint wearing schedules shall be posted in the front of the bedside chart.
3. All limb restraints should be applied directly to limb prior to donning splints.

K. Cadillac Chairs

1. It is the responsibility of nursing to handle all custodial care issues, including cadillac chair transfers.

2. Patients immobilized for extended periods of time may need to initiate out of bed mobility via cadillac chair prior to mobilization with physical therapy.

L. General

1. Patient will participate in wound care based on comfort level.
2. Patient will be out of bed during the day as tolerated.
3. Ambulation (with or without assistance) will occur unless injuries preclude it.
   4. Assistive devices for ambulation and mobility to be determined by rehabilitation team.
4. Pain control must be optimized to allow maximal participation in therapy.
   5. Burn patients will be out of bed with assist of nursing for their meals unless contraindicated.
   6. Patients will participate in basic ADL's if applicable.
   7. Family /caregiver education will be incorporated into treatment sessions when possible.