aci.health.nsw.gov.au

Multidisciplinary Burn Care & Rehabilitation

http://www.aci.health.nsw.gov.au/networks/burn-injury

ACI Statewide Burn Injury Service

NSW GOVERNMENT

AGENCY FOR CLINICAL INNOVATION

@nswaci

2022

Rehabilitation: A Team Effort

- Physical Abilities
- Functional Activities
- Psychosocial Issues
- Nutritional Needs
- Communication and Swallowing Problems

Physical and Functional

"The restoration of function and independence of burn survivors through early initiation of an intensive rehabilitation program is paramount"

Gomez et al 2017

-So much more than just the healed wound.

Which Burns Scar?

- Epidermal/Superficial dermal: Heal in < 14 days
- No scarring: Sun care and moisturise

Which Burns Scar?

- Mid dermal depth
- Healed 14-21 days = **may** scar/pigmentation changes
- > 21 days **will** scar in children and a flag for adults

Which Burns Scar?

- Full thickness
- usually grafted
- will scar

Scar Prediction: Who is at Higher Risk?

- **Age**: ↓ age = ↑ in scar activity
- **Skin type**: ↑ skin pigment = ↑ in scar activity (e.g. Mediterranean, Asian)
- **Genetic predisposition**
- **Length of time to heal**: the longer to heal the more active the scarring process

How do scars develop?

- Initially healed burn is **pink flat soft**
- Healed burn goes into state of “over drive”
- Period of increased vascularity
- New tissue develops in a distorted knotty fashion

  e.g. fibrocytes and collagen


Day of Injury
2 months post injury
3 months post injury
10 months post injury

A Hypertrophic Scar Is:

- Red or purple
- Raised above level of surrounding skin
- Hard (firm to touch) and dry
- Has strong contractile forces

Hypertrophic Scars

Red, Raised and Hard

Poor outcomes

Poor outcomes

Hypertrophic Scars

- Can impact on self image and appearance
- Restrict range of movement
- Limit functional independence
- Affect psychological health

Treatment Principles

Active Scar:	So We:
Raise	Compress
Thicken & Dry	Soften & Moisturise
Contract	Stretch

Treatment Principles

Active Scar:	So We:
Raise	Compress
Thicken & Dry	Soften & Moisturise
Contract	Stretch

Compression

- Reduces vascularity - limits deposition of scar tissue
- Controls oedema
- Used continuously
  - garments
  - bandages
  - tubular stretchy bandage

Compression

Compression Garments

Treatment Principles

Active Scar:	So We:
Raise	Compress
Thicken & Dry	Soften & Moisturise
Contract	Stretch

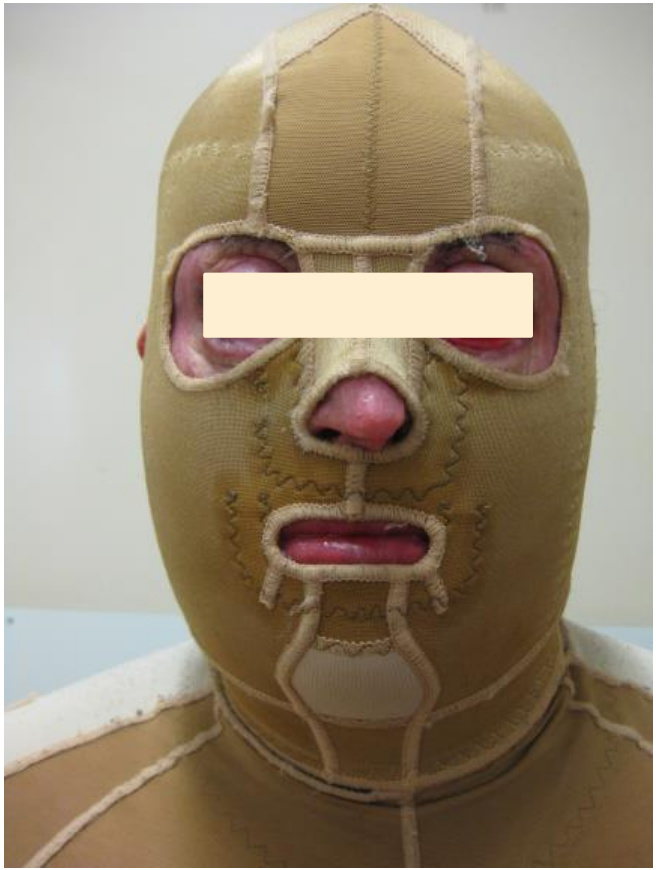
Softening

- Contact media e.g. silicone gel sheeting or hydrocolloid dressing

Hydrocolloid sheeting

Silicone gel sheeting


2008. 11. 27



Softening

Massage

- Break collagen bundles
- Massage with moisturiser
- Firm pressure
- Patient/carer participation

Extra Pressure & Softening Options

Moisturising

- Deep burns can lose sebaceous and sweat glands
- Moisture replaced with water based moisturiser

Treatment Principles

Active Scar:	So We:
Raise	Compress
Thicken & Dry	Soften & Moisturise
Contract	Stretch

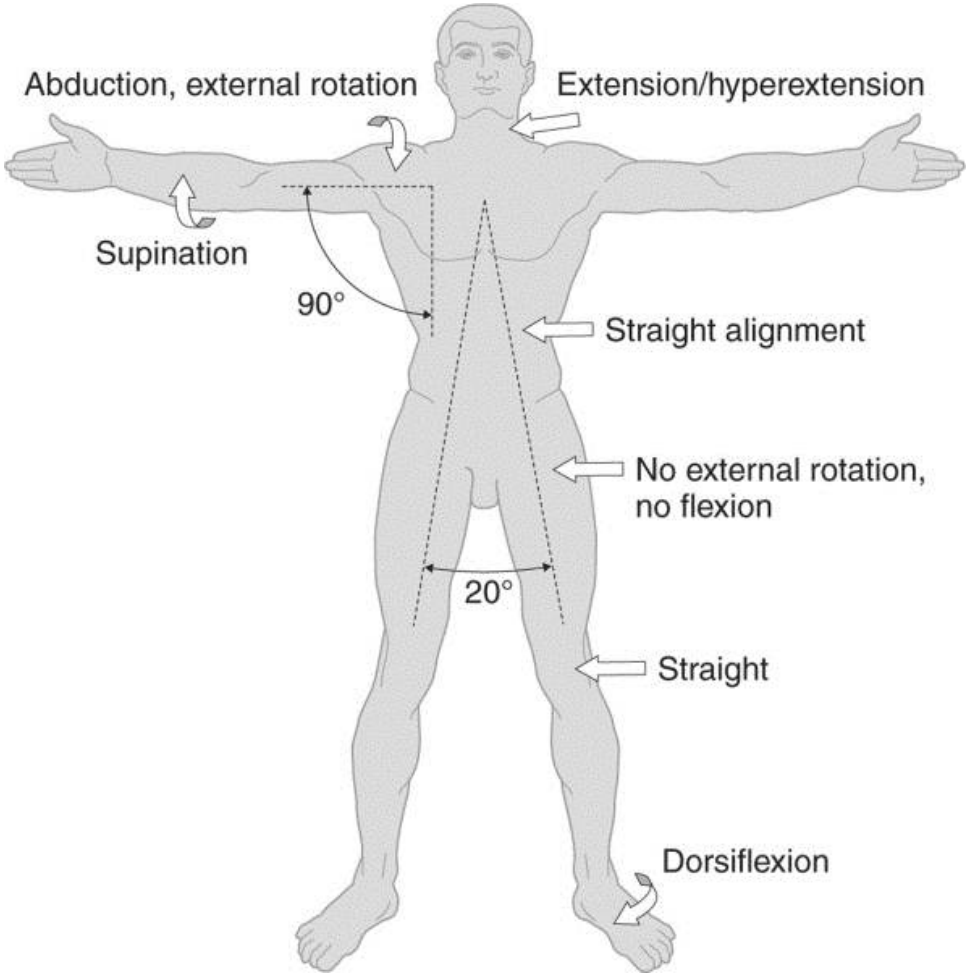
Stretching

- *Position of comfort is position of contracture*

- Need to counter the contractile forces of active scar tissue

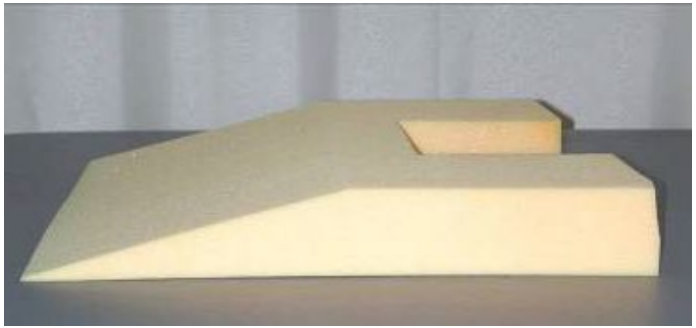
Stretching

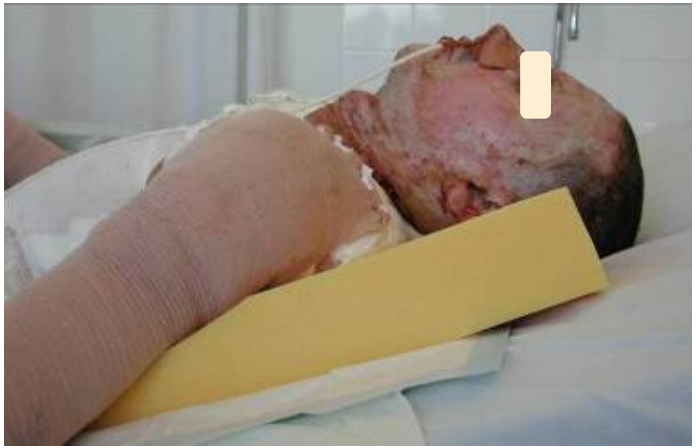
- Positioning
- Splints
- Exercises



Body Positioning

Stretching - Positioning



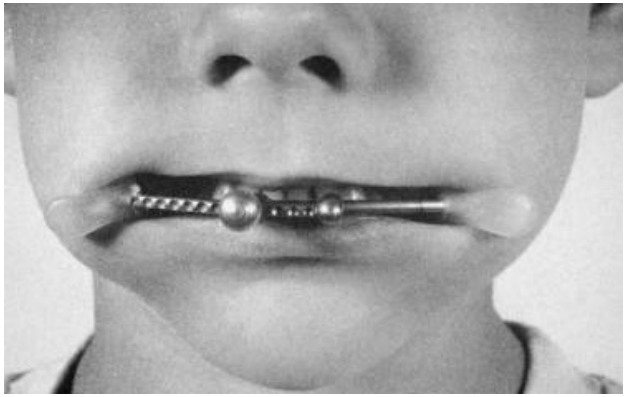


Splinting

- Immobilise (post grafting)
- Stretch
- Position
- Oedema management
- Prevent deformity
- Correct deformity (serial, dynamic)

Stretching with Splints

Stretching – Mouth Splints



Stretching – Passive Exercise

- Stretching during dressing changes

- Continue daily stretching months after burn has healed

Stretching – Active Exercise

Stretching alone is not enough…..

Cardiovascular fitness and strength

- Burn injuries are complex, resulting in a hypermetabolic response that continues for at least 3 years post injury (Flores et al 2020)
- This response leads to chronic sequelae - loss of lean body mass and bone density, muscle weakness and contractures (Flores et al 2020)
- Comparison studies of non burned adults with adult burn survivors:
  - aerobic capacity, ambulation speed, pulmonary function and strength are significantly reduced, and oxygen consumption elevated in adult burn survivors (Nedelec et al 2016, Won et al 2020)

Course of Treatment

- Continues until optimal functional ROM achieved
- Scar management continues until pale soft flat
- Continues with reconstructive surgery
- Children reviewed until fully grown

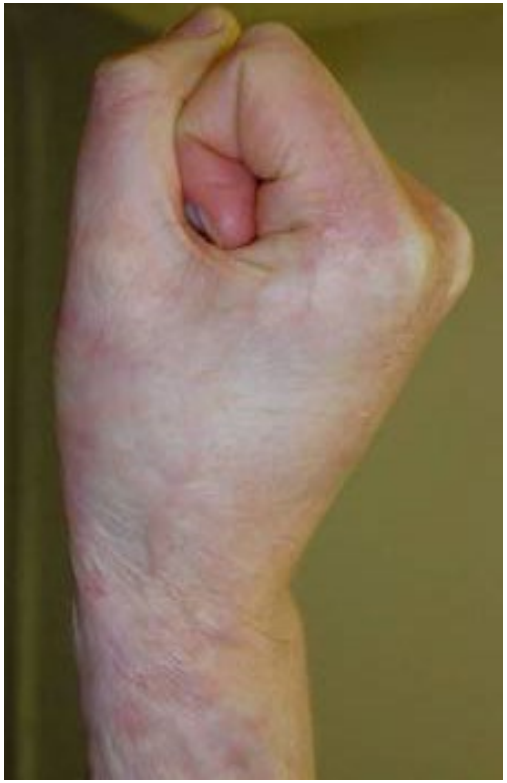
BURNED SKIN AND ACTIVE SCARS CONTRACT OVER HOURS RATHER THAN OVER DAYS OR WEEKS

Mature scars:

- Pale, Soft, Flat

Good Result: Mature Scars

- Full Range of Movement



Immature scar under good control

Instead of

Problem Areas

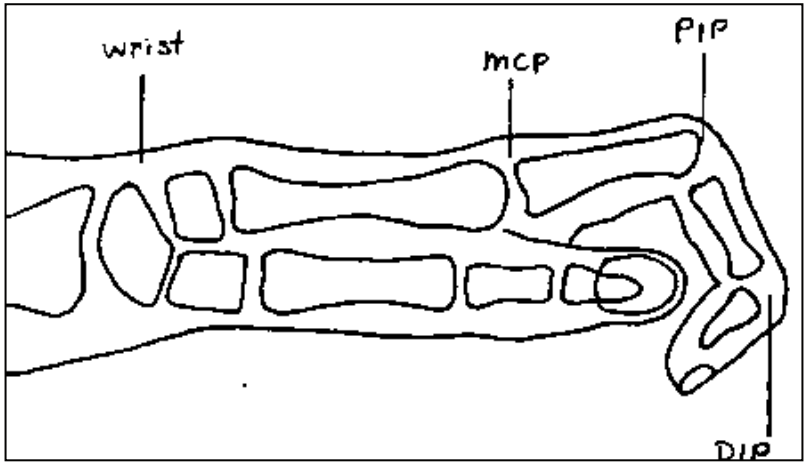
- Flexor surfaces of all joints
- Hands (many moving parts)
- Axillas
- Mouths/faces
- Necks
- Feet/toes
- Elbows and knees

Hands

- Most common body part to be burned
- Small area big impact – highly functional
- Can be isolated burn or part of a larger burn
- Most moving parts in smallest area

Hand Burns

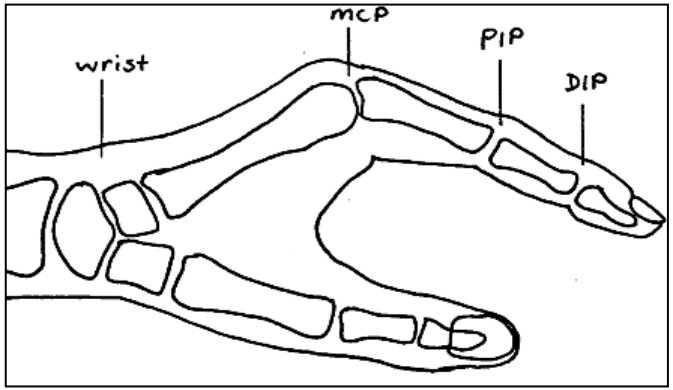
Position of comfort/deformity



Without therapy

Correct hand positioning

- For dorsal or circumferential burns



Treatment

Combination of Exercises and Splinting

Children:

- Splinting more intensive.
- Exercises only for the hours that the splint can be left off and range maintained.
- Joint stiffness not as much of a concern

Treatment

Adults:

- Splint overnight (functional position)
- Exercise++ by day
- Functional activity encouraged

Desired Outcome

Return to Usual Activities and Roles

- Common **functional issues** include:
- Self-care
- Home duties
- Community access
- Return to work/school
- Sexual needs
- Leisure activities

Early Intervention – Activities of Daily Living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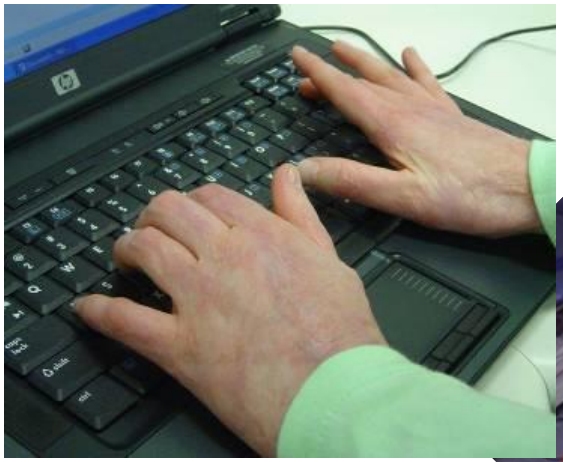
Early Intervention – Mobility

Maximum Function



Complications

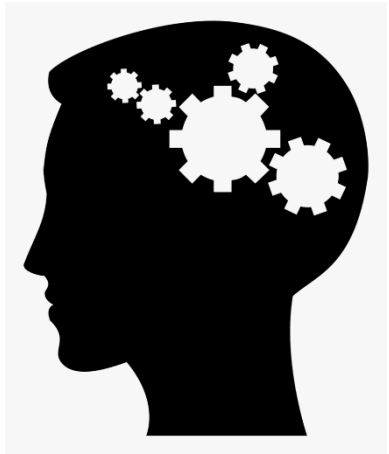
Common problems:

- Deconditioning
- Loss of hand function
- Loss of AROM
- Altered sensation
- Hypersensitivity to sun
- Folliculitis

Severe burn injuries can result in:

- Impaired thermoregulation
- Loss of digits/limbs
- Heterotrophic ossification
- Intensive care neuropathy
- Decreased function
- Chronic skin breakdown

Psychosocial



Psycho-Social Adjustment

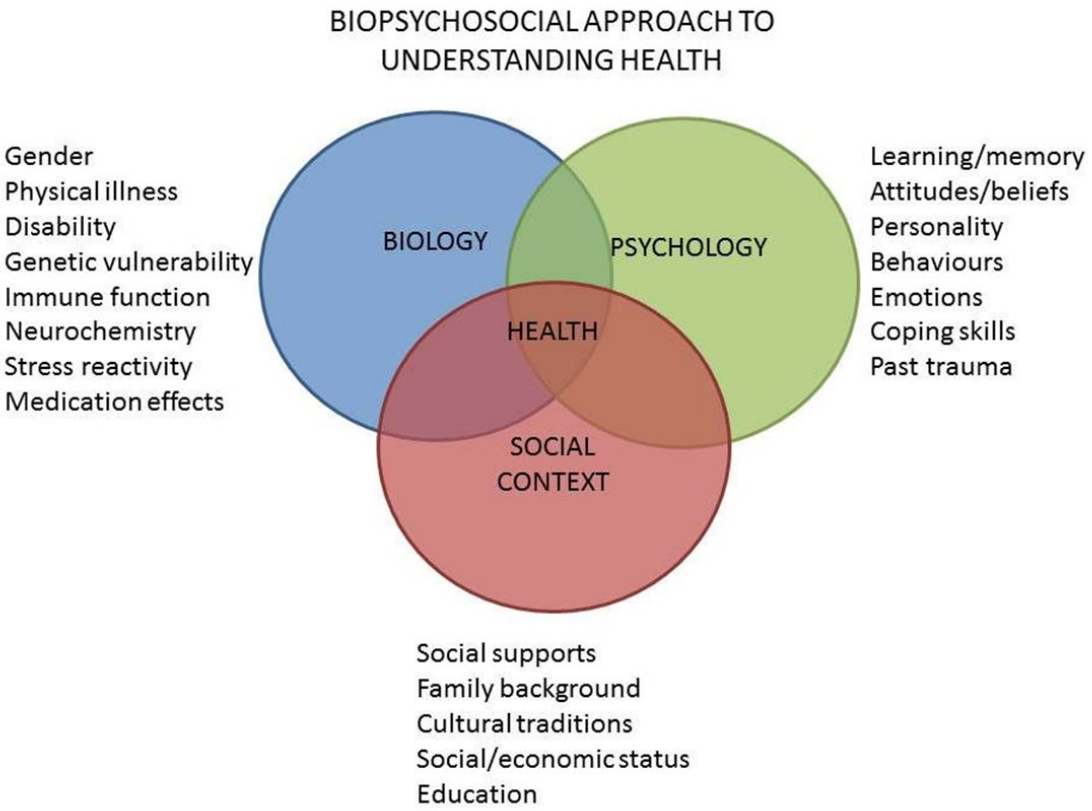
The impact of a severe burn can affect the patient and family's ability to reintegrate back into their pre burn life

Psycho-Social Adjustment

- Adjustment to a severe burn injury can be a challenging and demanding journey for **patients, families and staff**. The impact can be enormous.

- As well as recovering physically, patients must work towards a psychosocial recovery by confronting a complex range of emotional responses to their injury.

Biopsychosocial Understanding Can Help



Biopsychosocial Understanding

BIO

- Wound closure
- Scar management
- Pain
- Itch
- Mobility
- Range
- Muscle/body mass
- Infection control
- Comorbidities

PSYCH

- Trauma responses
- Mood
- Pain
- Itch
- Sleep
- Coping
- Behaviour
- Body image
- MH vulnerability

SOCIAL

- Supports
- Connections
- Background
- Resources
- Housing
- Education
- Health Literacy
- Integration
- Other stressors

Psycho-Social Challenges

Acute:

- Surviving the initial injury
- Recovering from trauma
- Repairing self as well as the body

Rehabilitation:

- A new life, body & sometimes new self
- Adjusting and new coping
- Changed body image
- Reintegration and impact on relationships

Psycho-Social Recovery

Psycho-Social Adjustment

Risk factors resulting in loss of independence after burn injury:

- Elderly
- Pre-existing mental health problems
- other co-morbidities e.g. DM, IHD, DD, D&A

Protective factors resulting in better outcomes:

- Social and family support,
- coping,
- post traumatic growth and resilience,
- meaning making,
- community belonging

Psycho-Social Considerations

- May need supported care to return home / work / school
- May need increased care or services
- May need longer term therapeutic interventions to facilitate reintegrate into life after burn

Psycho-Social Adjustment

- Changed body image
- Developmental issues
- Relationship issues
- Reintegration

Psycho-Social Adjustment

- Psychological trauma associated with the burn and acute treatment e.g. post traumatic stress disorder (**PTSD)**

- **Compliance** with physical treatment requirements

Nutrition

Nutrition

A major burn leads to a **hypermetabolic** state

- Lasts 6 - 12 months following wound healing
- Major burn up to double normal requirements
- Use muscle mass NOT fat stores for energy

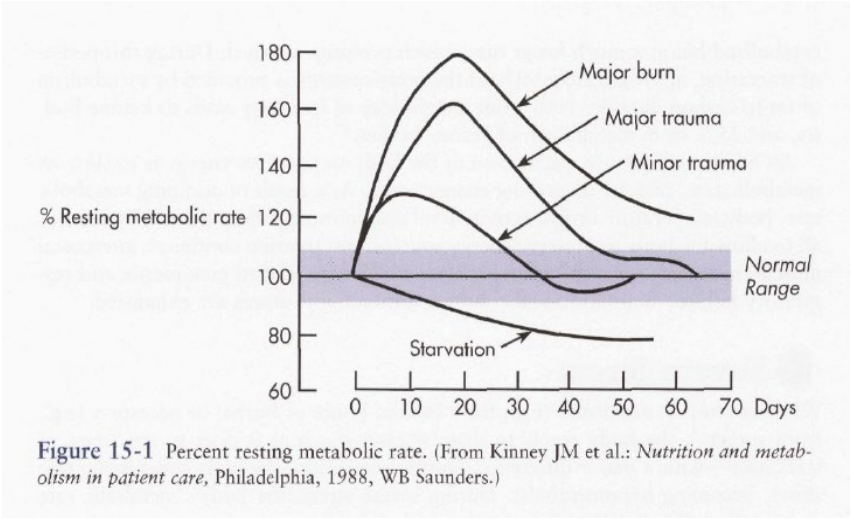


Figure 15-1 Percent resting metabolic rate. (From Kinney JM et al.: *Nutrition and metabolism in patient care*, Philadelphia, 1988, WB Saunders.)

Nutrition

- Burns >10% TBSA & smaller burns to face, hands, or inhalation injury:
  - High energy, high protein diet
  - Oral nutrition supplements

- Consider **enteral** feeds
  - Adults >20% TBSA
  - Children >15% TBSA

Nutrition

- Inadequate nutrition can lead to:
  - Muscle wasting
  - Delayed wound healing
  - Immune compromise
  - Increased LOS

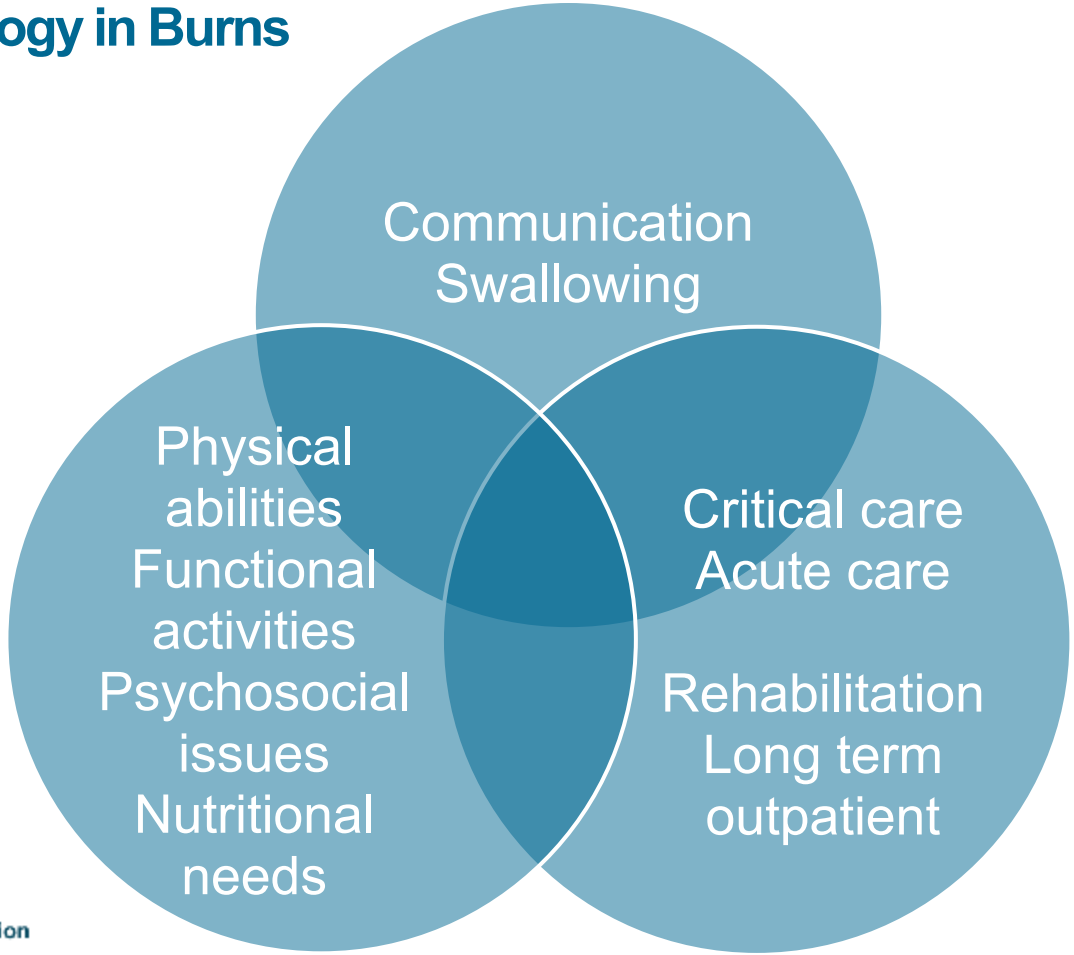
- Requirements reduce over time
  - Aim to avoid inappropriate weight gain in recovery

Summary

- A large burn injury results in an increased metabolic rate which is part of the stress response to burns.
- Adequate nutrition is essential to optimise wound healing.
- Nutrition support should be individualised, monitored and adjusted, as needed, during recovery from a burns injury.

Communication & Swallowing

Speech Pathology in Burns



Dysphagia & Dysphonia

- **Dysphagia** = disorder of swallowing (affect oral/pharyngeal/oesophageal phase swallowing)
- **Dysphonia** = disorder of voice (may affect person's ability to communicate effectively)

Incidence:

Dysphagia

- post **thermal burn injury** in adults – **11.18%** (Rumbach et al 2011)
- post burn injury age **>75 years** = **46.97%** (Clayton et al 2018)
- in **inhalation burn injury** = **89.47%** (Clayton et al 2019)

Dysphonia post burn injury – UNKNOWN

Dysphagia & Dysphonia

Causes:

- Often multifactorial with sensory and motor components:
  - Direct impact of burn of oropharyngeal and laryngeal tissue
  - Acute de-conditioning and muscle atrophy from critical care
- Risk factors for dysphagia & dysphonia:
  - Head & neck burn injury
  - Inhalation injury
  - Intubation & mechanical ventilation
  - Tracheostomy
  - >18% TBSA burn
  - Concomitant neurological injury
  - Advanced age (>75 years)
  - Significant comorbidities

Dysphagia & Dysphonia

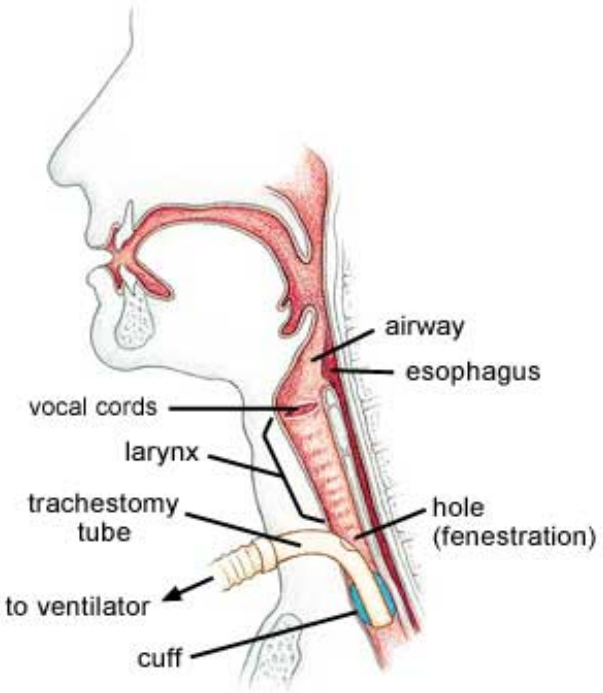
Prognosis for recovery:

- Very good for swallowing
- Long term disorders not uncommon in voice

Scar tissue anywhere over the face ➡ reduced facial mobility resulting in poor facial expression (important for communicating the suprasegmental aspects of conversation i.e. emotions etc.)

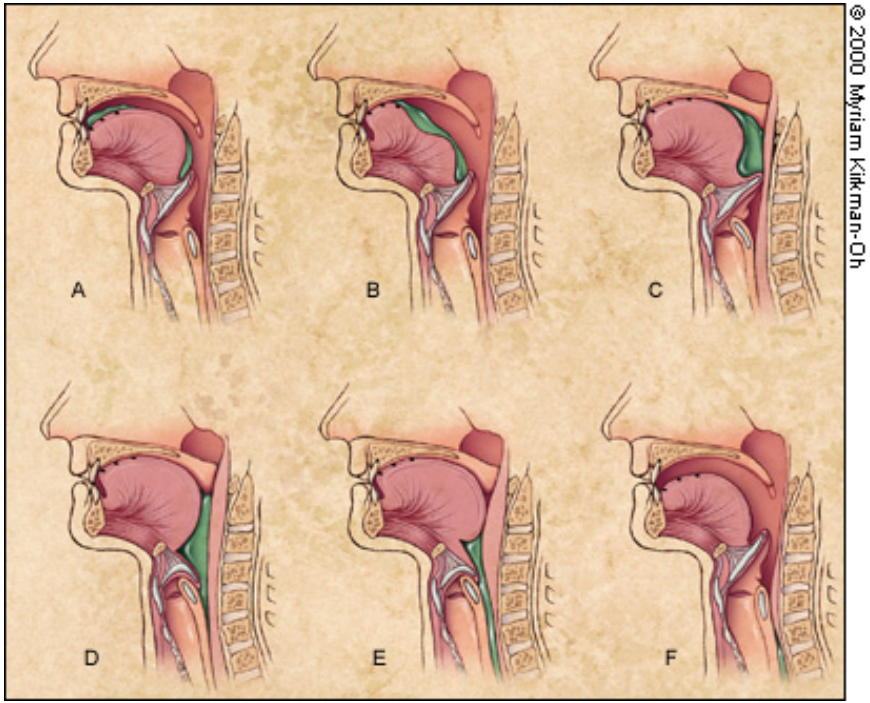
Communication Disorders

- Contractures - facial & inhalation burns
- Intubation / tracheostomy - voice, loss of verbal communication
- Loss of anatomical structure/ function - reconstructive
- Psychological stress - exacerbated, interferes with speech/language development
- Distress associated with augmentative & alternative communication (AAC)



Swallowing

- Airway protection compromised
  - Medical equipment
  - Sedation / narcotics
  - Oral secretions
- Altered physiology
- Deconditioning / sepsis
- Increased nutrition need



Please Keep Communication Open

Contact the Burn Unit

- The Children's Hospital at Westmead
  9845 1114
- Concord Repatriation General Hospital
  9767 7776
- Royal North Shore Hospital
  9463 2112

- ACI Statewide Burn Injury Service
  9463 2105

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NSW GOVERNMENT

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