



The importance of physiotherapy in burn patients



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Burns are a global health problem and are the fourth leading cause of trauma worldwide according to the American Burn Association.

BURNS ARE PAINFUL and as such can be a challenge to treat from the critically ill patient through to the burn patient with a comparatively small total body surface area (TBSA) that can be managed at home.

The goal of burn rehabilitation is to assist the individual in their return to their pre-injury status or as close to their pre-morbid state as possible including physical, functional and psychological rehabilitation.

Even in the critically ill patient physiotherapy commences on day one with education and positioning for optimal results. It is vital that the best outcome is achieved for each patient, and therefore it's extremely important to involve family members to ensure that buy in, understanding and compliance is achieved. In the larger TBSA burn physiotherapy may span over many months and in the case of paediatric patients span years and even decades, especially if the child sustains severe burns at a young age necessitating ongoing reconstructive surgery as the child matures and grows.

Morbidity and mortality increases with age, TBSA and co morbidities. Depending where you are in the world also plays an important role. (Atiyah *et al*).

Small burns can be fatal especially in the elderly. Their immune systems are not as efficient as in a younger person; adults over 55 are more susceptible to deeper burns

due to the thinning of their skin and loss of subcutaneous fat.

Positioning

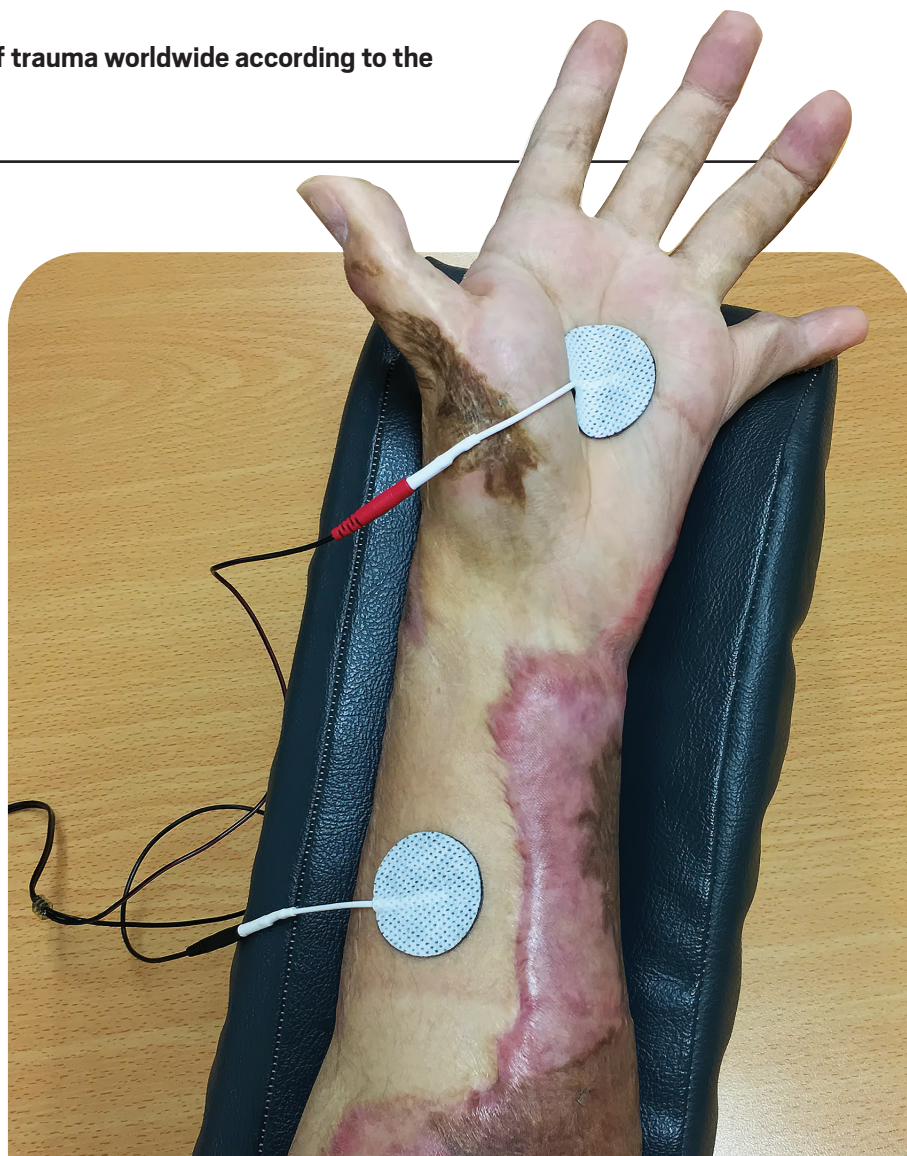
- Important from day one
- Flexed positions generally include elbows, hips, knees and the neck. These are positions of comfort
- Flexed positions: Cause shortening of tissues and contracture later
- Discipline is important daily in maintaining good positions
- Education: Explain the consequences of poor positioning long term. Use pictures to get point across if need be.

Correct positioning for a burn patient

- Neck in extension and midline
- Axilla abducted to 90°
- Elbow extension
- Forearm supinated
- Wrist extension of 20–30°
- Thumb in abduction and opposition, functional position metacarpophalangeal (MCP) joints at 70° flexion
- Interphalangeal (IP) joints extended
- Hips neutral and not in flexion
- Knees in extension
- Ankles in dorsiflexion.

Typical early deficits to watch out for in burn patients:

- Deficits are area, depth and severity dependent



Burn physiotherapy may span over many months and in the case of paediatric patients span years and even decades



General stretching and exercises are important for all burnt and healed areas

- Anterior neck burns are extremely challenging to treat and need to be monitored carefully due to the propensity of the front of the neck to contract in flexion. Sleep without a pillow is generally advised
- Attention to restriction of mouth opening and eye closure. Facial exercises and stretches are important, encourage chewy sweets or chewing gum to improve oral mobility
- Watch and ensure full supination of the forearm. This is one of the first movements a burns patient loses if there are arm burns and it is important for full supination to be able to toilet yourself successfully
- It is important to maintain MCP flexion for a functional hand and web spaces need to be kept stretched. Good thumb abduction are all vital for a functional hand and complete independence
- Combination movements are important, for example elbow extension, wrist extension with extended fingers like a wall push up
- It is important to stretch muscles that traverse two joints particularly as they are particularly prone to shortening.

MOBILITY:

- Progressive early mobilisation reduces complications (Phys Ther, 2013 Feb)
- Specific targeted exercises are important depending on the burnt areas and the patient needs to be instructed to carry these out at least twice daily for optimum results with special attention being paid if there are burns to the hands. (Cardiopulmonary Physiotherapy in Trauma).
- It is recommended that these exercises and stretches are written down to ensure they are being carried out correctly
- Exercises should include mobility and strengthening exercises, include balance / gait training and activities of daily living. Cardiorespiratory endurance needs to be worked on with walking, inclined walking and stairs for maximum recovery
- Optimise dressings for the best outcome

even in the early stages as this improves mobility, its not ideal to have 'boxing glove' dressings as these impede mobility. Finger joints can lose range very quickly so this needs to be avoided at all costs so that mobility can be facilitated by the patient

- Fingers need to be bandaged individually to maintain web space integrity and allow use of the hand (albeit somewhat limited) but joints are meant to move
- Glove like dressings are also not ideal because psychologically the patients need to know they can move their hands as there can be a certain hesitancy if global bandaging is used and the patient becomes scared to move thereby causing potential problems later.

PAIN CONTROL AND PSYCHOLOGICAL EFFECTS

This is very important for optimal benefits as ineffective pain management has a detrimental effect on rehabilitation and ultimately on the result. There is background pain and procedural pain which needs to be managed judiciously.

Of note is that neuropathic pain develops in over half of patients with a severe burn injury, and in fact ongoing pain can result in psychiatric disorders such as depression and Post-traumatic Stress Disorder (PTSD). (De Castro *et al*).

Poorly controlled pain can affect patient compliance and cooperation making rehabilitation challenging and compromise the outcome in this cohort of patients.

SPLINTING

Early splinting is crucial for optimal results especially if hands are involved. It's important to consider function of the burned hand, which if not taken care of adequately may result in poor functional outcome and may increase the disability of the hand. Initially, resting splints are generally used but may progress to dynamic splints later.

Splint the hand in a functional position with MCP flexion. Without the ability to flex MCP joints and oppose the thumb, the hand will not be very functional long term, and may result in lifetime impairment and

permanent disability. Hands are the most affected area and need special care and attention from day one.

FACTORS AFFECTING SUCCESSFUL BURN REHABILITATION

Hyper catabolism and muscular atrophy is common in the burn patient, hyper catabolism can continue for 18 months post burn injury. Large surface area burns, and deep burns are more difficult to rehabilitate. Ongoing pain from wounds, procedures and dressings are challenging.

Inhalation injury may result in a certain degree of lung damage requiring a carefully graded exercise programme. Pulsed oximeter may be beneficial in this type of patient. Poor endurance due to burns, general muscle weakness and debilitation requiring slower rehabilitation than for example a trauma patient.

Home programme

- Increase cardiorespiratory endurance. Stair climbing is useful and so is increasing walking distance and speed
- General stretching and exercises are important for all burnt and healed areas, this needs to continue for 12 to 18 months post burn as hypertrophic scarring can be a late complication of a burn injury
- Daily bathing and moisturising is important to keep skin pliant, gentle massage can be used
- Specific exercises if there is hand or finger involvement, its extremely important to achieve 90° MCP flexion and to maintain web space integrity especially first web space integrity
- Facial exercises are vital if there have been facial burns. Mouth opening and lip closure needs to be monitored carefully. Eye closure is important and should be closely monitored as restrictions can be devastating for the patient. Apart from being disfiguring this can cause corneal damage. Combination exercises are often

used by the physiotherapists such as neck extension ensuring the mouth is kept closed to get maximum stretch of anterior neck tissues

- Dietetic advice is important as catabolism can persist for 18 months post burn; anaemia and malnutrition impede wound healing. There are high-energy requirements due to catabolism, heat loss and tissue regeneration. Encourage good quality protein foods. Amount of protein should be kept to 1.5g-3g/kg. Trace elements may have a role to play These include zinc, copper selenium and thiamine use 1.5 -2x RDA (clinical nutrition). Inadequate nutrition can result in increased infections and complications such as poor wound healing
- Splint prescription and care of splints is important
- Sun exposure: Use factor 50 sun block for two years post burn
- Pruritus may be problematic and may require medication if local creams are not effective. Anecdotally coconut oil appears to reduce pruritus
- Pressure garment care: Washing and drying must be done out of the sun as it reduces the life span of the garments. Frequency of application of pressure garments (usually 23 hours out of 24 if tolerable), may have a role to play in the prevention of hypertrophic scarring developing
- Observe the healing burn and the healed burn for any signs of hypertrophic scarring which occurs due to an imbalance of collagen at the burn site. This phenomenon can occur as late as 18 months post burn after wound closure has taken place. **MC**

REFERENCES

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