

## Burns Assessment - GREENWOOD SCALE

The Authority recognises that the functional consequences of burns vary depending on the interaction of the extent of burns (% of body affected), depth of the burns (3<sup>rd</sup> degree or deeper), anatomical location of the burns and age of the person. Consistent with like Schemes, the Authority adopted full thickness burns to at least 50% of the body (or in the case of children aged 16 and under, 30% of the body) as the base criterion with equivalence, for the purpose of interim eligibility for lifetime support, applied as follows.

The model used was developed by Associate Professor John Greenwood<sup>4</sup> and proposes that:

- Interim eligibility will be established where the burn impact  $\geq 50$  points
- With the points calculated by reference to the total body surface area (TBSA), depth, age of the person, site, and respiratory impairment thus
- $\geq 50$  points = TBSA/Depth/Age score + Site score + RI score (refer to Figure 1 and related text)

### Guide to Abbreviations

TBSA	Total Body Surface Area Relates to the size of a burn injury or other skin loss pathology
RI	Respiratory Impairment
ROM	Range of Motion or Range of Movement Relates to the number of degrees that a joint can move through in a given direction and can be compared against normal controls
VAP	Ventilator-Acquired Pneumonia This can occur simply as a result of the requirement for endotracheal intubation. Pneumonia complicates lower airway inhalation injury in 27% of cases
ADLs	Activities of Daily Living <sup>11</sup>

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Is proportionate to

## Glossary of Terms

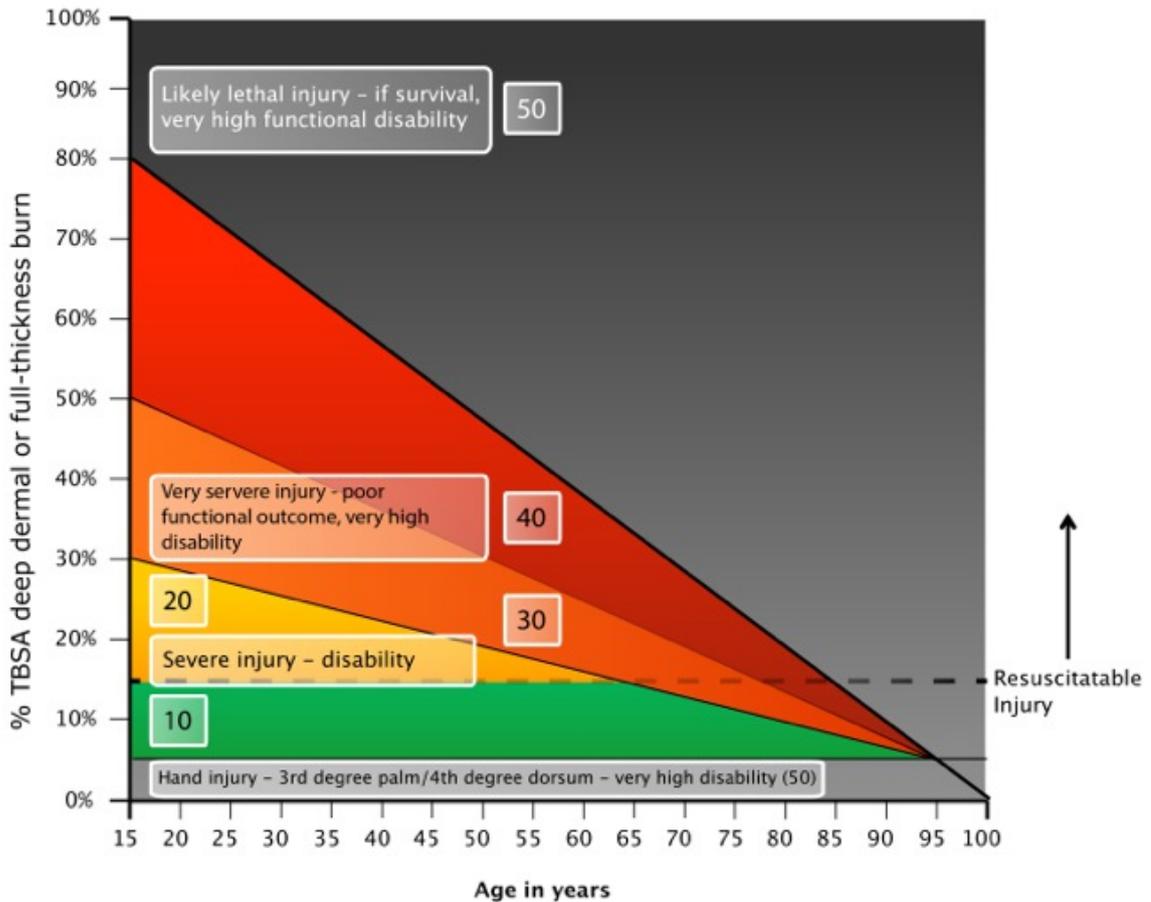
Tangential excision		<i>'Shave'</i> excision of burn, where (repeated) passage of the excising knife removes burn, without significant removal of healthy underlying tissue
Fascial excision		Immediately deep excision of burn ± healthy tissue down to the relatively bloodless muscular fascia
Autograft		Skin graft taken from a host and used to repair a defect on that same host
Dermal matrix		A biological or synthetic material applied to the wound after deep burn excision which allows tissue from the wound to grow into it so that it becomes part of the patient, in effect a new <i>'dermis'</i>
Autologous composite skin	cultured	A skin substitute grown in a biological or synthetic matrix and making use of the patient's own cells which are cultured into the matrix
3 <sup>rd</sup> degree burn		Involves the full thickness of the skin i.e. the epidermis and the full-thickness of the dermis
4 <sup>th</sup> degree burn		Involving deeper structures under the burned skin, such as muscle, paratendon, tendon, nerve, blood vessels, cartilage, joint capsule, bone. These burns are particularly disabling when they affect the hand
Heterotopic calcification/ossification		A pathological deposition of calcium salts into the soft tissues (frequently around joints such as the elbow in burn injury), which impair joint movement. Sometimes considered to be bone formation outside the skeleton

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Interim Eligibility = TBSA/depth/age score + site score + RI score

**A. Eligibility  $\propto$  TBSA**

If depth of burn  $\geq$  deep dermal (i.e. deep dermal or full thickness and therefore requiring tangential (or equivalent) or fascial excision and repair by split-skin autograft  $\pm$  dermal matrix, autologous cultured composite skin replacement, full thickness graft or flap repair).



**Figure 1: Burns Severity Graph**

From Figure 1, it can be seen very large, deep burn injury results in functional impairment for a number of reasons:

1. Grafting to bilateral hands (hands are almost invariably involved in major burn injuries) and across multiple major joints
2. Inhalation injury (see below)
3. Facial injury leading to psychosocial withdrawal

For these reasons, burns falling into the large *'grey block'* inevitably result in significant disability. Additionally, isolated burns to both hands which are 4<sup>th</sup> degree on the dorsum, or 3<sup>rd</sup> degree on the palms, inevitably result in significant disability. Burns within these *'grey blocks'* are given 50 points automatically. The addition of points for other sequelae (as listed below) may be used to provide an accurate appraisal of the need for additional, or exceptional, support.

People with burns in the *'red block'* should survive with modern burn care but suffer many of the issues above. A value of 40pts has been automatically allocated to these individuals, however, it is likely that additional points, added for hand injury or respiratory impairment, will take them over the 50pt threshold.

People with burns in the *'orange block'*, whilst still suffering a life-threatening injury, would be expected to have a good functional outcome. Obviously scar management, compression garment wearing, regular medical review and therapy sessions will be needed in the intermediate term (up to 2 years post-injury) and graft/scar care by massage and moisturisation must continue for life, but most of these patients return to their pre-injury employment in some capacity, or are suitable for retaining and re-employment in some other field. Again, the addition of points from other post-burn injury sequelae may lift their disability into red, or even grey categories.

It is anticipated that patients with burn injuries falling into the *'yellow'* and *'green'* blocks will, although having lifetime scars and needing lifelong scar care, function quite well.

**A major caveat to this scale is that it represents disability due to thermal injury and CANNOT be transposed to electrical conduction injury where limb loss is common and devastating neurological/optical sequelae can present many months or even years post-injury.**

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## B. Eligibility $\propto$ AGE

Age is factored into the equation on the graph.

## C. Eligibility $\propto$ SITE OF BURN

Where the site involves one or both hands, one or both feet, or major joints where release fails to produce  $\geq 50\%$  ROM (or where heterotopic calcification/ossification limits ROM by  $\geq 50\%$ ).

### Site Scores

#### *Hands*

- Bilateral, 4<sup>th</sup> degree dorsal burns = 50pts
- Bilateral, 3<sup>rd</sup> degree palm burns = 50pts
- Bilateral hand burns, 4<sup>th</sup> degree palm on one side, 3<sup>rd</sup> degree dorsum and digits on other = 45pts
- Bilateral, 3<sup>rd</sup> degree dorsal burns involving digits on both sides = 40pts
- Bilateral hand burns, 4<sup>th</sup> degree palm on one side, 3<sup>rd</sup> degree dorsum without digits on the other side = 40pts
- Unilateral, 4<sup>th</sup> degree dorsal burns = 40pts
- Unilateral, 3<sup>rd</sup> degree palm burns = 40pts
- Bilateral, 3<sup>rd</sup> degree dorsum burns with digits involved on one side and without digit involvement on the other side = 35pts
- Bilateral, 3<sup>rd</sup> degree dorsal burns not involving digits = 30pts
- Unilateral, 3<sup>rd</sup> degree dorsal burns involving digits = 20pts

#### *Feet*

- Bilateral, 4<sup>th</sup> degree dorsal burns = 50pts
  - Bilateral, 3<sup>rd</sup> degree plantar burns = 50pts
  - Bilateral foot burns, 4<sup>th</sup> degree plantar on one side, 3<sup>rd</sup> degree dorsum and digits on other = 45pts
  - Bilateral, 3<sup>rd</sup> degree dorsal burns involving digits = 40pts
  - Bilateral foot burns, 4<sup>th</sup> degree plantar on one side, 3<sup>rd</sup> degree dorsum without digits on the other side = 40pts
  - Unilateral, 4<sup>th</sup> degree dorsal burns = 40pts
  - Unilateral, 3<sup>rd</sup> degree plantar burns = 40pts
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- Bilateral, 3<sup>rd</sup> degree dorsum burns with digits involved on one side and without digit involvement on the other side = 35pts
- Bilateral, 3<sup>rd</sup> degree dorsal burns not involving digits = 30pts
- Unilateral, 3<sup>rd</sup> degree dorsal burns not involving digits = 20pts

*Major joints* (shoulders, elbows, hips, knees, neck  $\leq$  50% ROM)

- > 2 joints in 2 limbs = 50pts
- 2 joints in 1 limb = 30pts
- Neck limited in flexion/extension or lateral rotation = 30pts
- 1 joint in 1 limb = 10pts

#### **D. Eligibility $\propto$ RESPIRATORY IMPAIRMENT (RI)**

Respiratory impairment secondary to lower airway inhalation injury (true smoke inhalation), where prolonged ventilation necessitates tracheostomy, is complicated by VAP or results in ongoing respiratory impairment.

#### **RI Scores**

- Permanent tracheostomy = 50pts
- Needs supplemental oxygen at rest = 50pts
- Breathlessness on ADLs = 30pts
- Post-ventilation respiratory impairment/breathlessness on spirometry/light exercise = 20pts

Breathlessness on heavy exertion (above and beyond ADLs) = 10pts