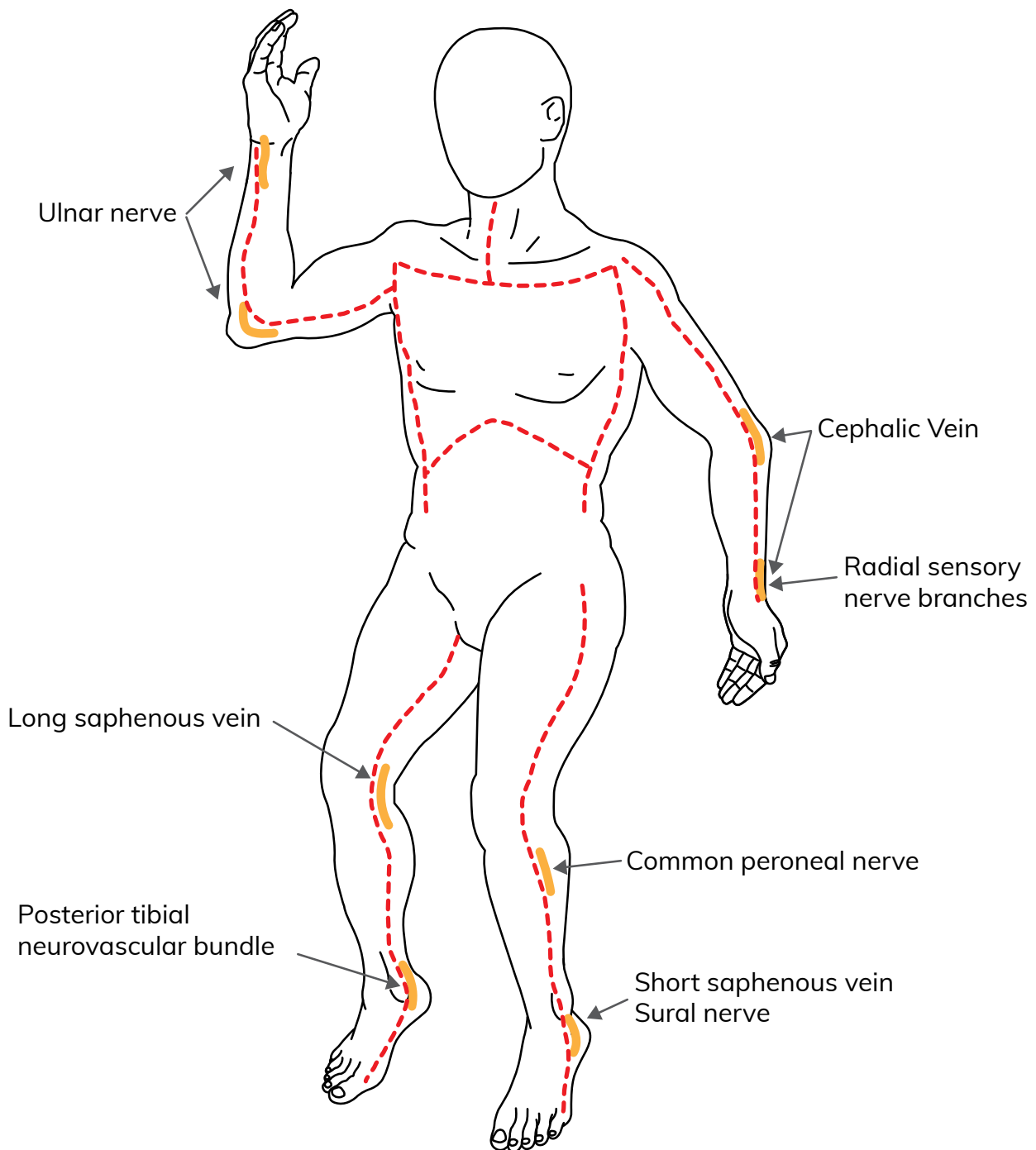


Escharotomy for Burn Patients

2nd Edition



The Agency for Clinical Innovation (ACI) works with clinicians, consumers and managers to design and promote better healthcare for NSW. It does this by:

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Introduction

Deep dermal and full thickness burns develop a rigid and inelastic tissue termed 'eschar'. In deep circumferential or near circumferential burns of limbs or chest, as oedema forms the inelastic eschar can cause a buildup of pressure and act like a tourniquet.¹ This pressure can lead to significant complications such as respiratory compromise and loss of tissue perfusion requiring a surgical procedure known as an 'escharotomy'.²⁻⁶ An escharotomy is performed by making an incision through the eschar to release the pressure.

Indications

Circumferential deep dermal and full thickness burns of the chest or limbs with respiratory or circulatory compromise.⁷

Consultation with the relevant burn unit should always be made before embarking on escharotomy.⁸

Limb

Escharotomy is indicated when the circulation is compromised due to increased pressure in the burned limb and cannot be relieved by simple elevation.⁸ It is recommended that the procedure is performed before the pulses are absent.¹ The eschar is rigid and increasing oedema under this inflexible skin may interfere with circulation. Elevation of the burned limb should always be done first and then closely monitored.

Signs in a limb that may indicate the need for an escharotomy

- Loss of circulation
 - Pallor, cyanosed
 - Reduced or absent capillary return related to capillary return in non-burned areas
 - Coolness
 - Loss of palpable pulses (late sign)
 - Decrease pulse pressures as measured by doppler ultrasound.⁸
- Numbness
- Decreased oxygen saturation as detected by pulse oximetry.

Chest

Escharotomy should be considered when a circumferential burn of the chest wall results in respiratory compromise by restricting normal chest wall movement.^{1, 7, 8} Under some circumstances escharotomy may be necessary for near circumferential burns of the chest wall if chest wall movement is restricted.¹

Circumferential burns of the abdomen may also cause respiratory compromise by restricting diaphragmatic movement. Infants under 12 months are particularly vulnerable since respiration is predominately diaphragmatic.⁷ Under these circumstances a sub-diaphragmatic transverse escharotomy may be necessary.

Flame burns of the chest are often accompanied by burns to the face and neck and are commonly associated with an inhalation injury.

Consider the inhalation injury high priority.

- Secure the airway.
- Oxygen by rebreathing mask at 15 ltr/min.⁷
- Endotracheal intubation should be considered early if the airway is compromised.

Once the airway has been secured consider chest escharotomy if there is:

- circumferential full thickness burns of the thorax and abdomen
- restricted movement of the chest wall or abdomen
- high ventilator pressures
- reduced air entry bilaterally
- shallow respiratory effort
- tachypnoea
- hypoxaemia.

NB In paediatric patients burns to the abdomen may compromise respiratory function due to their abdominal breathing pattern.

Instruction on performing an escharotomy

If advised by the burn unit, escharotomies should be performed under the following guidelines.⁷

Before beginning

- Before starting, the upper limb should be in the supine position with arms out at 90 degrees and palms facing upwards; the lower limb in the neutral position.
- Limbs: incisions should be performed in the mid axial line bilaterally (see schemas below).
- For the chest, incisions along the mid axillary lines, continuing over the abdominal wall if the burn extends to this region. A transverse elliptical incision across the abdomen below the costal margin can be made joining the vertical incisions.
- Commonly no general anaesthetic is required in adults. The patient should be appropriately sedated and given adequate pain relief.⁹ **General anaesthetic should be used for children.**
- Always start and finish the incision one centimetre into unburned healthy tissue where possible.⁷ **Use local anaesthetic for the unburned skin.**

What to avoid

See schema for areas to avoid.⁸

Avoid incisions across the flexural creases of joints – incisions of the limbs are in the mid-axial lines between flexor and extensor surfaces.⁷ Mark anatomical at risk areas.

Lower limbs

- Medial
 - Avoid the posterior tibial arteries and nerve and long saphenous vein and saphenous nerve.
 - Incision should pass anterior to the medial malleolus.
- Lateral
 - Avoid the common peroneal nerve at the neck of the fibula.
 - Incisions are made anterior to the head of the fibula.

Upper limbs

- Medial
 - Avoid the ulnar nerve at the elbow.
 - Incision should pass anterior to the medial epicondyle.

Neck

- Avoid carotid arteries and jugular veins.

Procedure

Consultation with the relevant burn unit should always be made before performing an escharotomy.

Equipment required	
Sterile drapes	Local anaesthetic (with syringe and needle)
Skin prep	Diathermy or scalpel
Personal protective equipment (PPE)	Dressing pack
Surgery marker	Dressing e.g. alginate (e.g. Kaltostat®) or impregnated gauze (e.g. Bactigras®)
Ligature	Outer non-stick dressing (i.e. Melolin® and crepe bandage)

Procedure			
1	Sterile procedure with adequate drapes. Don PPE.	6	Ensure incision is on both sides of limb or chest to restore circulation.
2	Draw a line where you will make the incision.	7	Ensure the adequacy of the incisions by reassessing the circulation or respiration. There should be a noticeable separation and relief of pressure from tight 'tourniquet' effect of burn.
3	Insert local anaesthetic into normal skin where incision will continue 1cm past the edge of the burn.	8	Have diathermy or ligatures available for haemorrhage control.
4	Perform full thickness incision, using diathermy or scalpel, into subcutaneous fat sufficiently to see obvious separation of the wound edges. ⁹	9	Dress wounds with alginate dressing e.g. Kaltostat® or impregnated gauze e.g. Bactigras®.
5	Run a finger along the incision to detect residual restrictive areas.	10	Continue to assess limb circulation/chest expansion to ensure the procedure is effective. ⁹



Plan where incision to be made – draw line

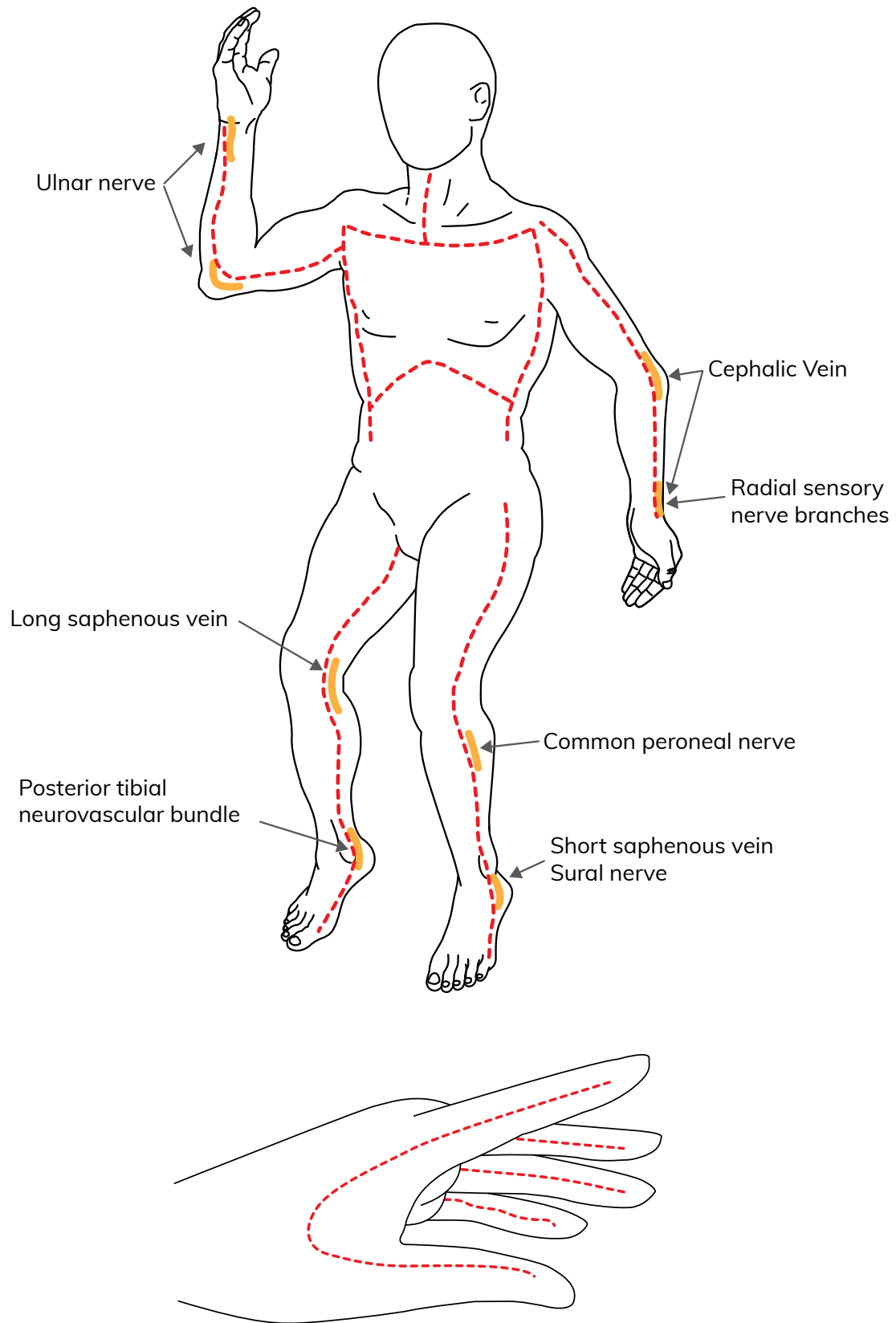


Incision



Dressing of incision

Escharotomy schema



Diagrams reproduced with permission from the Australian and New Zealand Burn Association, 2019.⁷

Escharotomy factsheet

Aim

To release rigid and inelastic burnt skin (eschar) to allow circulation (in a limb) or breathing (when chest involved) **BEFORE** problems arise **OR** to treat an existing problem.

Indications

Circumferential deep dermal or full thickness burns of chest or limbs with respiratory or circulatory compromise (chest may not be circumferential particularly in paediatric patients).

Environment

May be performed in theatre under general anaesthetic but commonly done in emergency department or intensive care unit with local anaesthetic for adults as long as the patient is appropriately sedated and given adequate pain relief. General anaesthetic should be used for children.

Equipment

- Sterile drapes
- Skin prep
- Personal protective equipment (PPE)
- Surgery marker
- Ligature
- Local anaesthetic (with syringe and needle)
- Diathermy / Scalpel
- Dressing pack
- Dressing e.g. alginate (e.g. Kaltostat®) or impregnated gauze (e.g. Bactigras®)
- Outer non-stick dressing (i.e. Melonin® and crepe bandage)

Procedure

- **ENSURE** limb is in anatomical position (forearm supinated **NOT** pronated).
- Draw a line where the incision will be made.
- Prep wound with chlorhexidine or non-alcoholic povidone-iodine skin prep.
- Cut with either diathermy or scalpel along lines (see schema).
 - Limbs – release both medial and lateral sides.
 - Chest – release bilateral mid axillary lines and inferior transverse elliptical below costal margin joining vertical incisions.

CAUTION

Identify and avoid important structures (see schema)

- Ensure incision is **SKIN DEPTH ONLY** (see fat not muscle at base of wound).
- Ensure adequacy of release.
 - Run finger along wound to ensure no remaining tight bands.
 - Escharotomy extends above and below burn into unburnt skin (where possible).
Use local anaesthetic for the unburned skin.
 - Monitor for return or preservation of circulation (limb) or breathing (chest).
- Dress with:
 - alginate e.g. Kaltostat® or Algisite®; or impregnated gauze, (in escharotomy wound)
 - silver dressing e.g. Acticoat® (for rest of burn wound – **NOT** circumferentially)
 - loose non-stick dressing e.g. Melonin® and crepe as outer dressing.

Post escharotomy care

- Continue **MONITORING**
 - circulation (in limb)
 - breathing and ventilatory pressure (when chest involved).
- Elevate limbs.
- Continue burn care.

References

1. International Society for Burn Injury Practice Guidelines Committee. *ISBI Practice Guidelines for Burn Care*. *Burns*. 2016;42(5):953-1021.
2. de Barros M, Coltro P, Hetem C, et al. *Revisiting Escharotomy in Patients with Burns in Extremities*. *Journal of Burn Care & Research*. 2017;38(4):e691-e698.
3. Ur R, Holmes JH 4th, Johnson JE, et al. *Development of a Burn Escharotomy Assessment Tool: A Pilot Study*. *Journal of Burn Care & Research*. 2016;37(2):e140-4.
4. Hall K, Burns B. *A review of the burns caseload of a physician-based helicopter emergency medical service*. *Emergency Medicine Australasia*. 2017;29(4):438-443.
5. Mlcak RP, Buffalo MC, Jimenez CJ. *Pre-hospital management, transportation and emergency care, in Total Burn Care (4th ed)*. Herndon D, Editor. London: Saunders; 2012. p.93-102.e1.
6. Herndon DN, ed. *Total Burn Care (4th edition)*. 4th ed. 2012, London: Saunders; 2012.
7. Australian & New Zealand Burn Association. *Emergency Management of Severe Burns (EMSB), Course Manual (18th Ed)*. ANZBA; 2016.
8. Orgill DP, Piccolo N. *Escharotomy and decompressive therapies in burns*. *J Burn Care Res*. 2009;30(5):759-68.9.
9. Feldmann ME, Evans J, O SJ. *Early management of the burned pediatric hand*. *J Craniofac Surg*. 2008;19(4);942-50.