



ARC SAC ADVISORY

Burn Cooling

Overall Recommendation:

Studies support the immediate cooling of thermal burns for first aid as a way to decrease the depth and size of burns, decrease pain, length of hospital stays, and other outcomes. This can be accomplished by use of cool or cold running (potable) water applied for a minimum of 10 – 20 minutes. Because clothing and jewelry overlying a burn can continue to burn, overlying clothing and jewelry should be removed immediately. Cooling of a burn should continue for a minimum of 10 -20 minutes. If cool or cold water is not available, a clean cool or cold, but not freezing compress can be used as a substitute for cooling thermal burns. There may be benefit in applying cool water up to 3 hours after the injury. Care should be taken to monitor for hypothermia, especially when cooling large burns or burns in small children. There is evidence of potential harm due to risk of hypothermia from cooling beyond 40 minutes.

Recommendations:

Standard:

- Monitor for hypothermia when cooling large burns or burns in small children. (Level 5)
- Avoid cooling beyond 40 minutes due to risk of hypothermia. (Level 2b)
- Do not use ice to cool a burn, including an ice pack or bag, due to a risk of worsening the injury. (Level 4)

Guideline:

- Patients who sustain thermal burns should have overlying clothing and jewelry removed (Level 2a, 2b)
- Begin immediate cooling of thermal burns, preferably with cool running water applied to the burn for a minimum of 10 minutes, ideally 20 minutes. (Level 2a, 2b)

Option:

- There may be benefit in cooling a burn up to 3 hours after the injury. (Level 5)
- If cool or cold water is not available, a clean cool or cold compress or cold pack can be used as a substitute to cool thermal burns. (Level 5)

Questions to be addressed:

Among adults and children with acute thermal burns, does the use of one cooling modality and duration, compared with another, cause a change in clinical outcomes including pain, depth or size of burn, need for hospitalization, duration of hospital stay, or other?

Introduction/Overview:

The Red Cross has not previously reviewed the literature regarding appropriate treatment and active cooling for thermal burns. However, in 2015, ILCOR reviewed the literature regarding this topic and found limited evidence to support cooling of thermal injuries¹. This review concluded that a minimum of 10 minutes of active cooling should be performed but there was insufficient evidence to suggest a particular method of cooling or appropriate temperature of cooling substrate. The ILCOR review and treatment recommendations were the basis for the 2015 AHA/Red Cross First Aid Guidelines update, which recommended a minimum of 10 minutes cooling for thermal burns. Some burn specialists have been critical of this recommendation, saying that 20 minutes is the minimum amount of time that a thermal burn should be cooled. The June 2019 SAC Scientific Review on this topic aimed to review the literature since the 2015 ILCOR review to see if there are any new scientific evidence to support or refute the recommended minimum of 10 minutes for cooling. The review also aimed to identify any other first aid interventions for thermal burns that might be of benefit.

Summary of Scientific Foundation:

In the 2019 SAC review of cooling of thermal burns, 2 randomized control trials (RCT), 4 observational cohort (2 prospective, 2 retrospective), and 2 statistical modeling studies were identified that were published in the last 5 years to provide updated information to literature from a 2015 International Liaison Committee on Resuscitation (ILCOR) review. These studies support the use of cool water for the first aid treatment of burns. In these studies, cool water was able to improve pain scores, a reduction in skin grafting, decrease ICU admission rate and length of hospital stay. One observational cohort study demonstrated a dose-response relationship with length of cooling, with benefit anywhere from 10 minutes to 40 minutes.

In addition, one statistical model highlighted the importance of clothing removal as fast as possible, the thickness of the clothing, skin thickness, and temperature of the water correlated with time to more severe injuries.⁵

Overall these studies support the benefit from cooling and support the 2015 ILCOR recommendation regarding the minimum time for cooling that may show benefit is 10 minutes. As most of the studies still use 20 minutes of cooling as the standard, there is more data available to support this 20-minute time period, although much of the data is from older studies and studies performed in animals.

There is some evidence of harm with cooling times over 40 minutes. Thus, it is not recommended to cool a burn for longer than 40 minutes. In addition, children and those with large body surface area burns may lose heat more rapidly and have the potential to become hypothermic, so care should be taken to avoid hypothermia when treating these populations.

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