PHYSICIAN REFERRAL GUIDE

CANADA HYPERBARICS

Hyperbaric Oxygen for Thermal Burns

A referral guide for emergency and referring physicians in Canada.

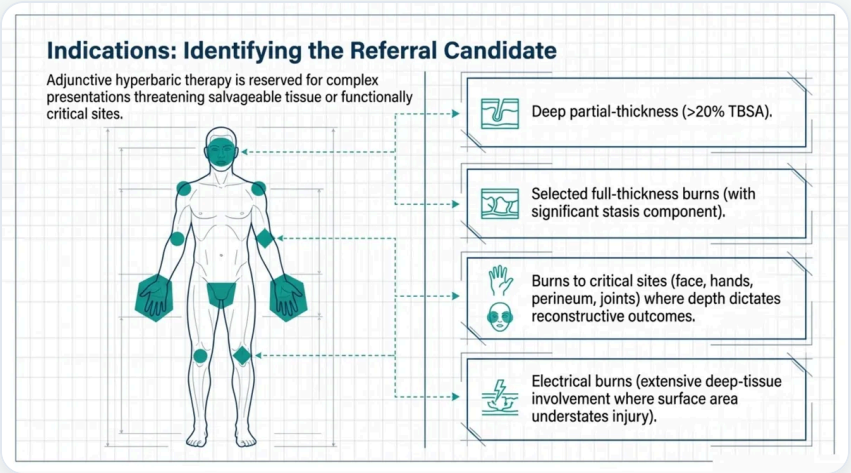
Condition: Thermal Burns Open-access studies: 3 Updated June 2026 Reviewed quarterly

For referring and emergency physicians in Canada. Severe thermal burn injury is one of the 14 conditions Health Canada recognises for hyperbaric oxygen therapy (HBOT), and where it is used it is an adjunct to specialised burn-centre care, not a substitute for resuscitation, surgery, or wound management. Because the burn evidence base is limited and largely observational, this guide is deliberately conservative. It summarises when to consider referral, how to assess and stabilise the patient first, what the evidence does and does not support, the Canadian referral pathway, and contraindications. It closes with the complete list of open-access research published since 2020, each linked to its free full text.

IN THIS GUIDE

When to refer

HBOT for burns is time-sensitive, so any consideration of adjunctive hyperbaric treatment should happen in parallel with definitive burn-centre referral, not after it. The first priority is always transfer to a burn centre for resuscitation and surgical assessment. Where a hospital-based hyperbaric programme is co-located with or accessible to that burn centre, consider raising HBOT for a patient with:



FIGURE

When to refer: adjunctive hyperbaric oxygen is reserved for complex burns that threaten salvageable tissue or a functionally critical site, not routine burns. The presentations to consider are deep partial-thickness burns over roughly 20 percent of total body surface area, selected full-thickness burns with a significant zone-of-stasis component, burns to critical sites such as the face, hands, perineum, or joints where depth drives the reconstructive outcome, and electrical burns whose deep-tissue damage is understated by the surface area. In every case the referral conversation runs in parallel with burn-centre transfer and resuscitation, which always take priority.

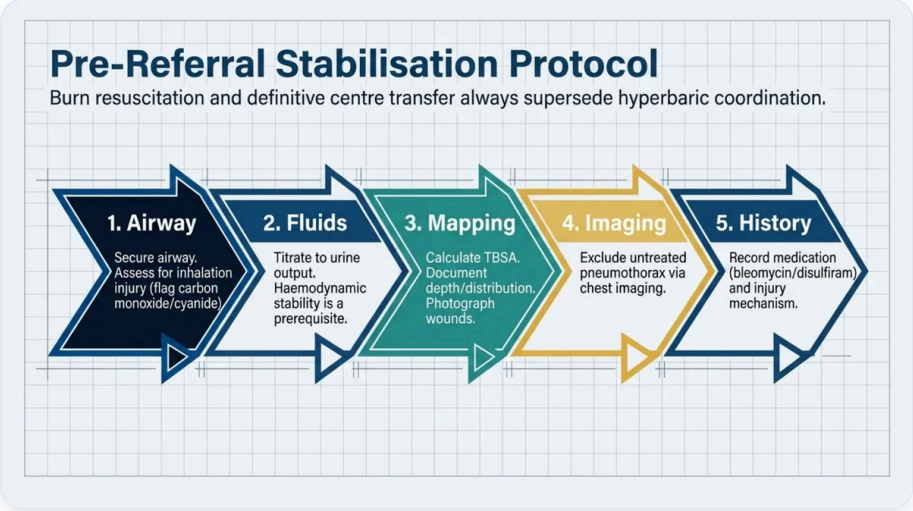
- **Deep partial-thickness (deep second-degree) burns exceeding roughly 20 percent total body surface area (TBSA)**, where progression of the zone of stasis threatens otherwise salvageable tissue.

- **Selected full-thickness (third-degree) burns** with a significant viable zone-of-stasis component that may benefit from improved tissue oxygenation.
- **Burns to functionally critical sites** such as the hands, face, perineum, or major joints, where preserving depth-dependent function changes the reconstructive outcome.
- **Electrical burns with extensive deep-tissue involvement**, where surface area understates the true tissue injury.

The biological window matters. Where benefit has been reported, HBOT was generally started within the first 24 hours of injury, and the rationale for benefit is concentrated in the first 24 to 48 hours, when the zone of stasis is most vulnerable to progression. Refer early and let the burn centre and hyperbaric team decide together, rather than waiting to see whether the wound declares itself.

Assessing the patient before referral

Burn resuscitation and stabilisation come first. While arranging burn-centre transfer and any hyperbaric discussion, the receiving department should:



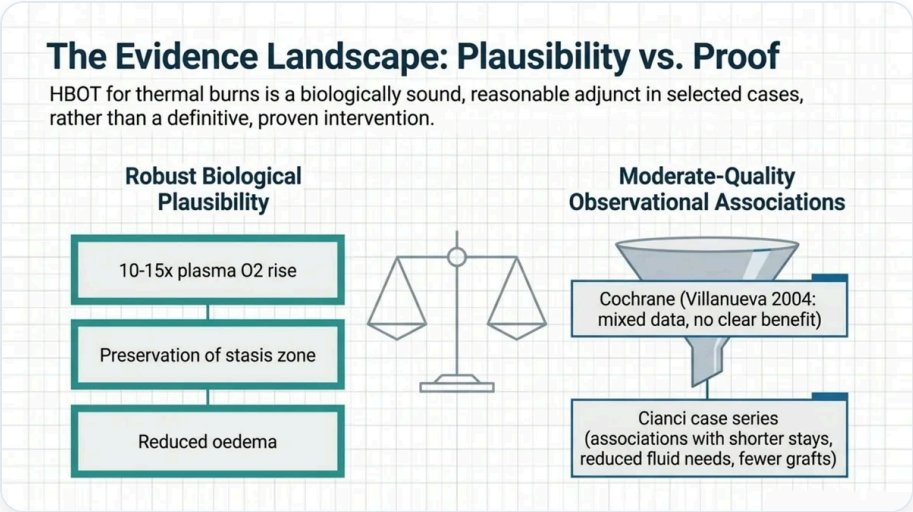
FIGURE

Before referral, stabilise first; burn resuscitation and definitive-centre transfer always supersede hyperbaric coordination. Secure the airway and assess for inhalation injury, flagging carbon monoxide and cyanide exposure. Titrate fluids to urine output, since haemodynamic stability is a prerequisite for chamber entry. Map the burn by calculating total body surface area and documenting depth and distribution, and photograph the wounds. Exclude an untreated pneumothorax on chest imaging, and record the medication history, in particular any bleomycin or disulfiram, together with the injury mechanism. These details let the receiving team decide whether and when hyperbaric oxygen can be added safely.

- **Secure the airway and assess for inhalation injury.** Facial burns, singed nasal hair, carbonaceous sputum, or stridor warrant early airway evaluation. Suspected concurrent carbon monoxide or cyanide exposure changes the urgency and the oxygen strategy and should be flagged explicitly to the hyperbaric team.
- **Begin fluid resuscitation** using a recognised formula and titrate to urine output. Haemodynamic stability is a prerequisite for safe chamber entry.
- **Calculate TBSA and document burn depth and distribution** with a standard chart, and photograph the wounds where possible.
- **Exclude an untreated pneumothorax** on examination and chest imaging, particularly after blast, electrical, or high-energy mechanisms, because it is an absolute contraindication to chamber entry until drained.
- **Record the medication and exposure history**, specifically any concurrent bleomycin or disulfiram, and the mechanism, timing, and any associated trauma.

What the evidence supports

The evidence for HBOT in thermal burns is limited and should be presented to patients and colleagues as such. The condition is graded as moderate-quality evidence drawn predominantly from controlled and observational studies rather than from large, definitive randomised trials.



FIGURE

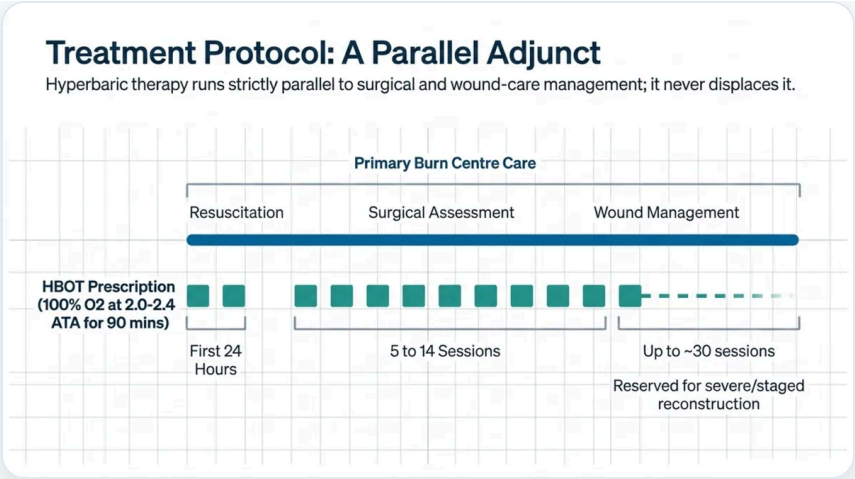
What the evidence supports, framed honestly. The mechanistic rationale is strong: 100 percent oxygen at pressure raises plasma oxygen roughly 10 to 15 fold, which can help preserve the vulnerable zone of stasis and reduce oedema. The clinical evidence is weaker and largely observational. A Cochrane review (Villanueva et al. 2004) found mixed data and no clear benefit, and case series such as those of Cianci report associations with shorter hospital stays, reduced fluid requirements, and fewer grafting procedures rather than proof of cause and effect. Hyperbaric oxygen for thermal burns is therefore best understood as a biologically sound, reasonable adjunct in selected cases, not a definitive or proven treatment.

The most cited synthesis is the **Cochrane review (Villanueva et al. 2004)**, which found the evidence mixed and predominantly observational and did not establish a clear benefit. Observational work, most notably the **Cianci case series**, has reported associations with reduced fluid-resuscitation requirements, shorter hospital length of stay, fewer skin-grafting procedures, and improved survival in patients with moderate-to-severe burns. These are associations from non-randomised data, not proof of benefit, and they should not be framed as established outcomes.

The mechanistic rationale is more secure than the clinical outcome data. At treatment pressure, plasma oxygen content rises roughly 10- to 15-fold and tissue oxygen tension in the peri-burn zone can reach several hundred mmHg, which supports the threatened zone of stasis. Hyperoxic vasoconstriction reduces oedema without compromising oxygen delivery, neutrophil bactericidal activity and antibiotic efficacy are enhanced, and angiogenesis and fibroblast function are supported for wound healing and graft take. Taken together, the biological plausibility is reasonable while the outcome evidence remains modest, so HBOT in burns is best understood as a reasonable adjunct in selected cases rather than a proven intervention.

◈ Clinical translation

Consider it early, position it correctly, and do not oversell it. The rationale for benefit is concentrated in the first 24 to 48 hours, so any decision to involve the hyperbaric team should be made alongside the burn-centre referral, not days later. Where it is offered, a typical course is 100 percent oxygen at 2.0 to 2.4 ATA for 90-minute sessions, often two sessions in the first 24 hours and then once daily for roughly 5 to 14 sessions, with extended courses of up to about 30 sessions reserved for severe burns or staged reconstruction. Throughout, HBOT runs in parallel with surgical and wound-care management and never displaces it. You can read the full clinical background on the acute thermal burns condition page.

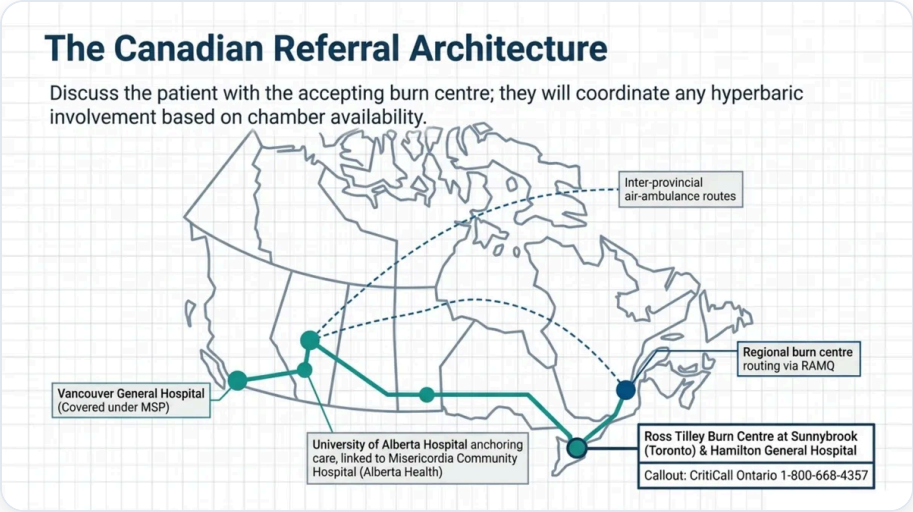


FIGURE

Clinical translation: hyperbaric therapy runs strictly parallel to surgical and wound care and never displaces it. A typical prescription is 100 percent oxygen at 2.0 to 2.4 ATA for about 90 minutes, often given twice in the first 24 hours and then once daily for a usual course of roughly 5 to 14 sessions. Up to about 30 sessions may be used for severe burns or staged reconstruction, with the exact course set by the hyperbaric physician alongside the burn team. Throughout, resuscitation, surgical assessment, and wound management remain the primary treatment, and hyperbaric oxygen is added around them.

The Canadian referral pathway

Severe thermal burn injury is recognised by Health Canada as one of the 14 conditions for which provincial health insurance covers HBOT at hospital-based programmes. In practice, adjunctive HBOT for burns is only available where a hyperbaric programme is co-located with or accessible to a burn centre, so the referral pathway runs through burn-centre transfer first.



FIGURE

The Canadian referral pathway. For thermal burns, discuss the patient with the accepting burn centre first; that centre coordinates any hyperbaric involvement based on chamber availability. Centres with burn and hyperbaric capability include Vancouver General Hospital in British Columbia (covered under MSP), the University of Alberta Hospital in Edmonton with its linked Misericordia hyperbaric programme, the Ross Tilley Burn Centre at Sunnybrook in Toronto and Hamilton General Hospital in Ontario, and regional burn-centre routing through RAMQ in Quebec. Patients in provinces without combined burn and hyperbaric capability are moved by inter-provincial or air ambulance to the nearest centre. For urgent inter-hospital transfer in Ontario, CritiCall Ontario (1-800-668-4357) connects emergency departments to these centres.

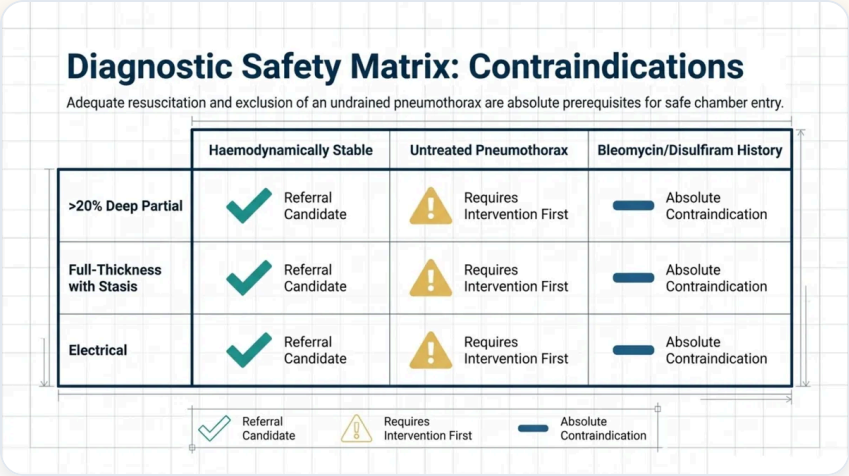
- **Ontario:** burn referrals route to the Ross Tilley Burn Centre at Sunnybrook (Toronto); Hamilton General Hospital also operates a hospital-based hyperbaric programme. **CritiCall Ontario at 1-800-668-4357** coordinates emergency inter-hospital transfer and can arrange Ornge transport when needed.
- **British Columbia:** route to Vancouver General Hospital, which has a hospital-based hyperbaric chamber; covered under MSP.
- **Alberta:** burn care is anchored by the University of Alberta Hospital in Edmonton, with hospital-based hyperbaric treatment available at the Misericordia Community Hospital hyperbaric programme; covered by Alberta Health.
- **Quebec:** RAMQ covers hospital-based hyperbaric programmes for recognised indications; coordinate burn transfer through the regional burn centre.

- **Provinces and territories without combined burn-and-HBOT capability:** inter-provincial referral routes exist, with air-ambulance transfer to the nearest centre that can provide both burn care and hyperbaric treatment.

Because eligibility for adjunctive HBOT depends on the burn centre's assessment and on chamber availability, the practical step for a referring physician is to discuss the patient with the accepting burn centre and let that team coordinate any hyperbaric involvement.

Contraindications and cautions

The absolute contraindications relevant to the acute setting are an **untreated pneumothorax**, which must be drained before chamber entry, and **concurrent bleomycin** or **concurrent disulfiram** therapy. Relative cautions include severe haemodynamic instability requiring continuous high-dose vasopressor titration, an uncontrolled seizure disorder, and severe chronic obstructive pulmonary disease with bullous lung disease. In the burn patient specifically, adequate resuscitation, a secured airway, and exclusion of an undrained pneumothorax are practical prerequisites for safe treatment, and the burn centre and hyperbaric team should weigh these together before any session.



FIGURE

Contraindications and cautions, screened before chamber entry. Adequate resuscitation and exclusion of an undrained pneumothorax are absolute prerequisites for safe treatment: a haemodynamically stable patient with a qualifying burn is a referral candidate, an untreated pneumothorax must be drained before any session, and concurrent bleomycin or disulfiram is an absolute contraindication. These rules apply equally across deep partial-thickness, full-thickness with stasis, and electrical burns. Relative cautions, including severe haemodynamic instability requiring high-dose vasopressors, uncontrolled seizures, and severe COPD with bullae, are weighed with the hyperbaric team but should not delay the initial referral conversation.

How to use the research list below

The list contains every thermal burn study in the Canada Hyperbarics database that was published in 2020 or later **and** has a freely available full-text version, each linked directly to that full text. Paywalled and abstract-only studies are excluded, and retracted studies are removed. This is a reference list, not a set of summaries. Because the open-access burn literature since 2020 is small, the list is short by design. Counts and the open-access set refresh each quarter.

Open-access research, 2020 to present

3 studies with a free full-text version, grouped by year, newest first. Each title links to the full text. Retracted and paywalled studies are excluded; the set refreshes quarterly.

2026

1. Sah R et al.. Role of hyperbaric oxygen therapy in oral submucous fibrosis: a randomized comparative study from India. *Arch Craniofac Surg.*

2025

1. Chu XL et al.. Research progress in different physical therapies for treating peripheral nerve injuries. *Frontiers in neurology*.

2021

1. Alyafi T et al.. Therapeutic Outcome of Burn Patients Treated With Hyperbaric Oxygen. *Cureus*.

Canada Hyperbarics, canadahyperbarics.ca. Reviewed each quarter. For clinicians; does not replace individual clinical judgement.