

Crush Injury and Acute Traumatic Ischaemia

START AS CLOSE TO INJURY AS POSSIBLE — the 4–6 h window comes from a canine model

An adjunct to surgical management that raises oxygen tension in marginally perfused tissue and attenuates ischaemia-reperfusion injury, to improve limb and tissue salvage.

TREATMENT PROTOCOL

Pressure	2.5 ATA (the trial dose). The UHMS chapter states no pressure at all
Duration	90 min
Frequency	3 or more treatments in the first 24–72 h. The trial gave twice daily for 6 days. If treatment is delayed into the repair phase, daily or preferably twice daily for 14 days
Sessions	About 12 on the trial schedule
Review	By healing stage: 2–3 days usually suffice for the acute inflammatory stage; about 14 days for repair

PATIENT SELECTION

Who to treat	Acute traumatic peripheral ischaemia — crush injury, compartment syndrome, threatened limbs or digits with marginal perfusion, and reperfusion injury. Adjunctive to surgery.
Who not to treat, or when to stop	Surgery is primary — this does not replace fasciotomy or revascularisation, and must never be used to justify withholding either. One earthquake cohort found fasciotomy within 24 h essential, with no full recovery after 48 h.
Mechanism	Raises oxygen tension in marginally perfused tissue; reduces oedema by vasoconstriction while maintaining oxygen delivery; attenuates reperfusion injury by suppressing CD18 neutrophil-endothelial adhesion.
Outcome measure	Complete healing; repeat surgery and amputation rate; tissue necrosis and infection; functional outcome at 1–2 years.

WHAT THE NUMBERS SHOW

- Bouachour 1996 RCT (n=36, double-blind, placebo-controlled): complete healing 17/18 vs 10/18, P<0.01; repeat surgery 1 vs 6, P<0.05. In the over-40 grade III subgroup, 87.5% vs 30%.
- Millar 2022 HOLLT RCT (n=120, multicentre): the primary composite endpoint was not significant (43% vs 58%, OR 0.55, P=0.12); tissue necrosis OR 0.35, P=0.01; late complications OR 0.22, P=0.007.
- Choi 2026 (meta-analysis, 7 studies, 3 RCTs): wound infection OR 0.31 (95% CI 0.22–0.45); time to healing and length of stay were null.
- Açiksari 2019 (rat mesenteric model, 8 per group; the only direct test of timing): histology at 6 h was only marginally worse than sham; at 12 h it was significantly worse than both.

EVIDENCE BASE

Shape and certainty	About 19 records, including two randomised trials — the strongest tier among the surgical indications.
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Study	Design	Result and risk of bias
Bouachour 1996, J Trauma — PMID 8760546	Double-blind RCT, n=36	Positive; RoB 2 some concerns
Millar 2022 HOLLT — PMID 36100927	Multicentre RCT, n=120	Primary endpoint null; secondaries positive
Choi 2026, Medicina — PMID 42654485	SR / meta, 7 studies	Mixed — infection positive, healing null
Garcia-Covarrubias 2005 — PMID 16022014	EAST systematic review, 9 studies	8 of 9 favourable; dated to 2003

WHAT THE EVIDENCE DOES NOT SUPPORT

Cautions	HOLLT's primary composite endpoint was not significant, and its positive findings are secondary outcomes. A CrossFit compartment-syndrome case report used hyperbaric oxygen as principal therapy with no fasciotomy and pressures never measured — it must not be cited in support of withholding fasciotomy. Improved perfusion on imaging has still ended in partial amputation: perfusion is not preserved tissue.
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STATUS IN SOUTH AFRICA

Status	Accepted indication in South Africa (SAUHMA Level B). Maps to the crush-injury diagnosis-treatment pair, whose statutory treatment column names surgery, ventilation and dialysis rather than hyperbaric oxygen.
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Compiled from the UHMS Hyperbaric Oxygen Therapy Indications Manual, 15th edition (2023) and the appraised trial evidence held in an HBOT evidence library. All treatments are 100% oxygen. US Navy Treatment Table profiles are named, not reproduced — the US Navy Diving Manual is the operative document at the chamber. Session counts are largely guideline convention rather than dose-finding evidence. This card summarises published parameters and does not replace those source documents or clinical judgement for the individual patient. Generated 03 October 2026. Not a SAUHMA publication and carries no society endorsement.