

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	
<ul style="list-style-type: none">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 as printed; Fisher's exact P=0.088). 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.	
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.

STATUS AND SOCIETY POSITIONS	
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.
ICD-10 (SA)	T04.7, T04.8, T04.9, S47, S57.0, S57.8, S57.9, S67.0, S67.8, S77.0, S77.1, S77.2, S87.0, S87.8, S97.0, S97.1, S97.8, T79.6
ECHM 2017 (Type, Level)	Open fractures with crush 1B; crush without fracture 2C

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 28 October 2026. Not a SAUHMA publication and carries no society endorsement.