Delayed Radiation Injury — Osteoradionecrosis of the Jaw

ELECTIVE — prophylaxis is timed to the planned surgery

An adjunct — the 30/10 protocol for established disease and 20+10 for prophylaxis before surgical wounding of irradiated bone, on contested trial evidence.

TREATMENT PROTOCOL

Pressure	**2.4 ATA**
Duration	90 min
Frequency	Daily
Sessions	**Established disease: 30, then minor debridement; +10 if response adequate** (Marx 30/10). Stage II adds 10 after surgery; Stage III: 30 before segmental resection, 10 after; none for later reconstruction in Marx's current protocol. **Prophylaxis: 20 before surgery, 10 after**
Review	After 60 treatments

PATIENT SELECTION

Who to treat	Established osteoradionecrosis of the mandible, maxilla or skull after head-and-neck radiotherapy. Prophylaxis for planned surgical wounding of irradiated tissue — dental extraction or facial reconstruction.
Who not to treat, or when to stop	**Medication-related osteonecrosis is a different, drug-induced entity — do not import its trials.** ISOO-MASCC-ASCO 2024 confines hyperbaric oxygen with surgery to cancer-free patients.
Mechanism	Irradiated bone is hypovascular, hypocellular and hypoxic. Raising tissue oxygen tension supports osteoblast and fibroblast function and angiogenesis, confirmed in irradiated human tissue by a durable oximetry rise and increased microvessel density.
Outcome measure	Incidence of osteoradionecrosis for prophylaxis; 1-year recovery or healing for treatment; pain; wound dehiscence.

WHAT THE NUMBERS SHOW

- **Marx 1985 RCT** (prophylaxis): osteoradionecrosis **5.4% vs 29.9%, p=0.005**.
- **Shaw 2019 HOPON phase-3 RCT**: osteoradionecrosis at 6 months **6.4% vs 5.7%, OR 1.13 (95% CI 0.14–8.92)** — **null**.
- **Annane 2004 ORN96 RCT** (double-blind, sham-controlled, stopped early): 1-year recovery **19% (6/31) vs 32% (12/37), RR 0.60 (95% CI 0.25–1.41), P=0.23** — **negative, and stopped early for a possible harm signal**.
- **Forner 2022** (combined randomised data): healing at 1 year **70% vs 51%** — favourable but not significant, and underpowered.
- **Geçkil 2025** (13 studies; abstract only, AMSTAR-2 critically low): pooled single-arm success **69% with hyperbaric oxygen plus surgery, 38% hyperbaric alone, 36% surgery alone**. These are proportions from different studies, not a comparative effect; HBO alone was no better than surgery alone.
- **Quah 2024** (prevention at extraction, 29 studies): pooled single-arm ORN **3.4% with pentoxifylline–tocopherol (PENTO) vs 4.6% with HBO** — not a head-to-head test, but funders now raise PENTO/PENTOCLO as the oral alternative; no head-to-head trial has reported yet.

EVIDENCE BASE

Shape and certainty	Randomised trials exist for both prophylaxis (one positive, one null) and treatment (one negative, one favourable but underpowered). The 2024 ISOO-MASCC-ASCO guideline does **not** recommend routine prophylactic use before extraction (it may be offered where a substantial bone volume received more than 50 Gy), and says hyperbaric oxygen with surgery may be used in cancer-free patients with established disease. The wiki holds this page as **guarded**.

Study	Design	Result and risk of bias
Marx 1985 — PMID 3897335	Open-label RCT, prophylaxis	Positive; RoB 2 high
Shaw 2019 HOPON — PMID 30851351	Phase-3 RCT	**Null** primary; early secondaries favoured HBO
Annane 2004 ORN96 — PMID 15520052	Double-blind sham RCT, stopped early	**Negative**
Forner 2022 — PMID 34843843	Combined randomised data	Favourable, not significant
Geçkil 2025 — PMID 40097107	Meta-analysis, 13 studies	Mixed; pooled single-arm proportions; AMSTAR-2 critically low; abstract only

WHAT THE EVIDENCE DOES NOT SUPPORT

Cautions	HOPON found no prophylactic benefit against a low background rate, concluding routine prophylaxis is unnecessary. **Annane found no treatment benefit and was stopped early for potentially worse outcomes in the treated arm.** In skull-base disease, conservative management including hyperbaric oxygen resolved only 4.1% against 71.8% for surgery (non-randomised; HBO pooled with other conservative care). Dental implant survival in irradiated bone is unsettled: two small studies, one randomised, found no difference; a five-study retrospective subgroup (Liu 2026) favoured HBO.

STATUS AND SOCIETY POSITIONS

Status	Accepted indication in South Africa (SAUHMA Level B for both treatment and prophylaxis). **No clean PMB pair for the condition itself** — the funding pathway runs via the underlying malignancy.
ICD-10 (SA)	K10.8, K10.2, L59.8, M87.38, K02.8, K04.2, K13.5
ECHM 2017 (Type, Level)	Mandible and post-extraction prevention 1B; other bones 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.