

M.P.'s First & Only HBOT Unit

Clinical Reference Guide For Physicians

US FDA APPROVED

14 Approved Indications

HYPERBARIC OXYGEN THERAPY



• **14** FDA-Approved Indications

• **60+** Years of Clinical Practice

• **10+** Medical Specialties



03 **Post-COVID Condition** : Fatigue, Brain Fog, Myalgia, Sleep Disorder, Memory Complaints



04 **Neurological Applications** : Brain Fog | Post-Stroke Rehab | Traumatic Brain Injury | POTS | Cognitive Decline



05 **Internal Medicine Applications** : Chronic Fatigue Syndrome | Post-Viral Fatigue | Long COVID | Systemic Inflammation | mitochondrial dysfunction, and endothelial microinjury



06 **Pulmonology & Respiratory Medicine** : Post-COVID Dyspnoea | Exercise Intolerance | Post-Exertional Malaise | CO Poisoning - URGENT



07 **Cardiology & Autonomic Medicine** : POTS | Post-COVID Palpitations | Autonomic Dysfunction | Post-MI Cardiac Rehab | Myocarditis



08 **Endocrinology & Diabetology** : Diabetic Foot Ulcers | Wound Healing | Limb Salvage | Osteomyelitis | Wagner Grade II-IV



09 **Psychiatry Applications** : Post-COVID Depression | Anxiety | Cognitive Impairment | Sleep Disorder | PTSD



10 **Oncology Applications** : Osteoradionecrosis | Radiation Cystitis | Radiation Proctitis | Soft Tissue Necrosis | Post-Cancer Fatigue



11 **Orthopaedics & Rehabilitation** : AVN - Refer Early | Fracture Non-Union | Crush Injury | Sports Medicine | Post-Surgical Wounds



12 **Dermatology & Wound Care** : Chronic Non-Healing Ulcers | Necrotising Fasciitis - Urgent | Pyoderma Gangrenosum | Pressure Ulcers | Skin Flaps & Grafts



13 **ENT & Ophthalmology** : SSNHL - Urgent | CRAO - Emergency | Post-COVID Anosmia | Tinnitus | Xerostomia Time-critical Urgent



14 **Safety Profile & Contraindications** : Evidence-Based Safety Data | Absolute Contraindication | Relative Contraindications | Drug Interactions



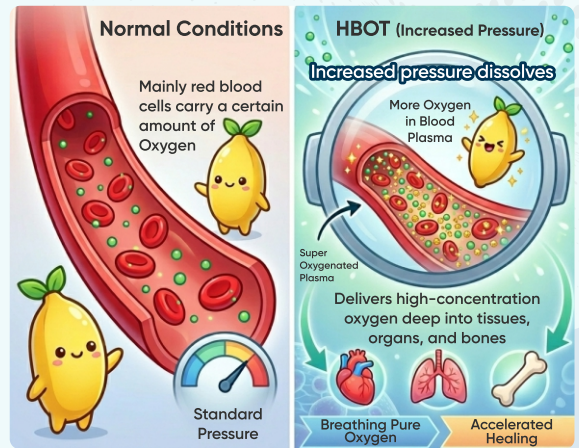
15 **Facility & Logistics Applications** : Facility Tour Chamber Technology | Patient Journey



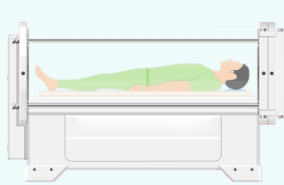
16 **Monoplace VS Multiplace** : Zyada Shudh Oxygen, Zyada Fayda, Zyada Safety

WHAT IS HBOT?

1. Non-invasive treatment involving breathing pure 100% Oxygen in a pressurized chamber.
2. Normally, oxygen is carried mainly by red blood cells.
3. In HBOT chamber increased pressure allows large amounts of oxygen to dissolve directly into blood plasma.
4. This super-oxygenated plasma delivers high-concentration oxygen deep into tissues, organs, & bones.
5. Result: accelerated healing and recovery.



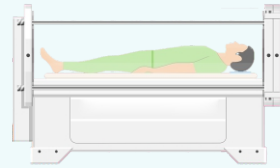
THE HBOT EXPERIENCE : PATIENT JOURNEY



Enter Chamber



100% Pure O₂
INHALED

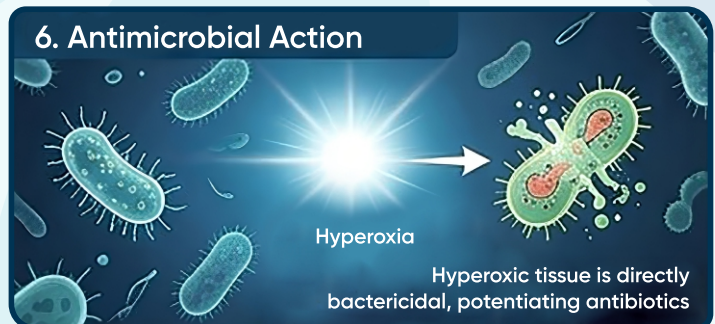
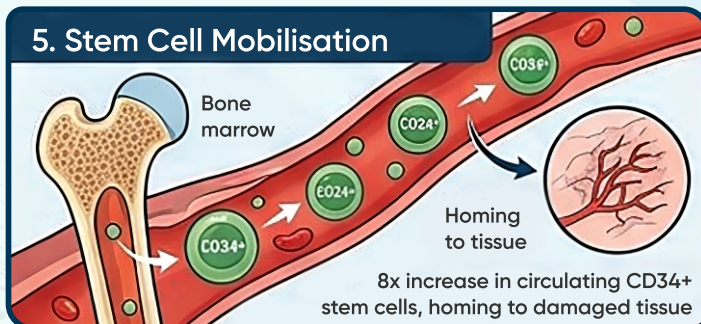
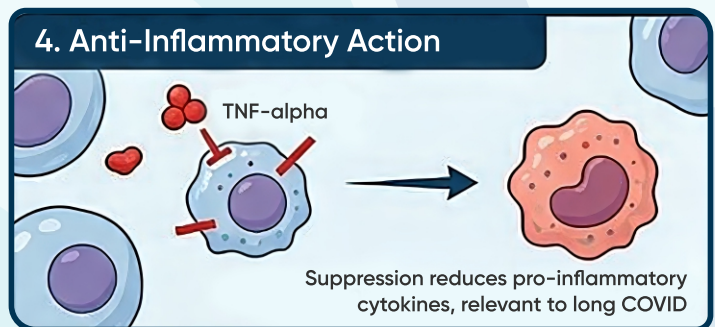
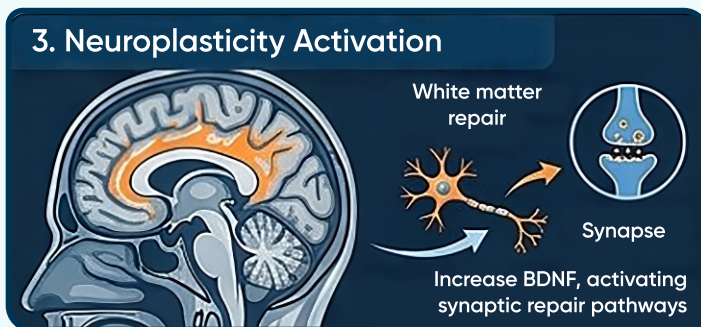
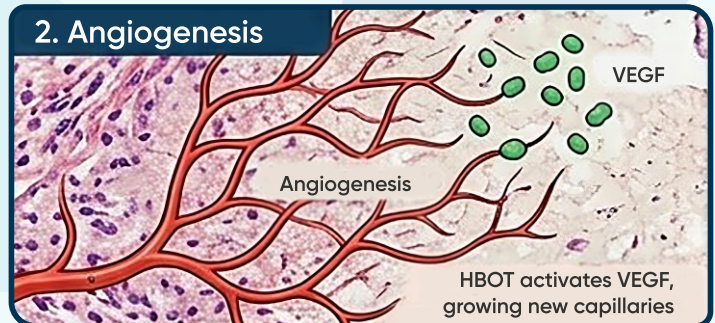
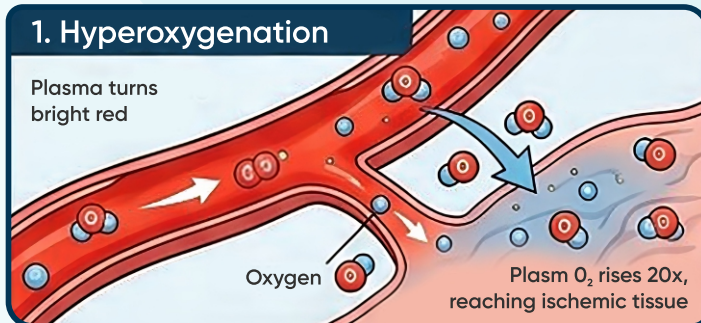


0-1.2 ATA
TYPICAL PRESSURE



60 min
PER SESSION

HOW HBOT WORKS



Post-COVID Condition - Fatigue, Brain Fog, Myalgia, Sleep Disorder, Memory Complaints

30%

COVID SURVIVORS DEVELOP COVID SYNDROME

200+

LONG COVID SYMPTOMS DOCUMENTED BY WHO

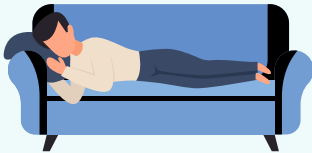
85%

PATIENTS IMPROVED WITH HBOT (EFRATI 2022)

CUSTOMISED SESSION PROTOCOL

REFER THIS PATIENT TODAY IF 2 OR MORE APPLY

- ✓ Fatigue persisting 3+ months post-COVID with no alternative explanation



- ✓ Brain fog, word-finding difficulty, or memory complaints post-COVID



- ✓ Post-COVID myalgia, joint pain, or exercise intolerance

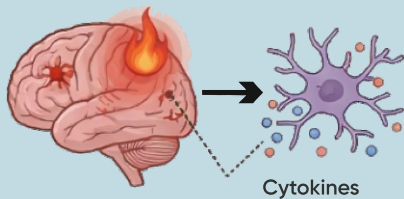


- ✓ Post-COVID sleep disorder not responding to standard management

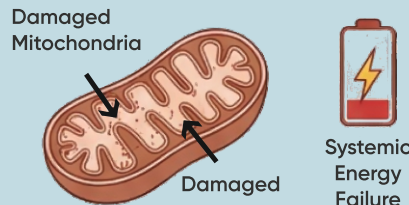


THE PATHOPHYSIOLOGY

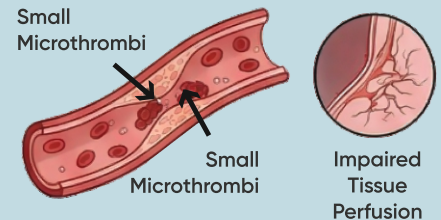
1. Neuroinflammation



2. Mitochondrial Dysfunction

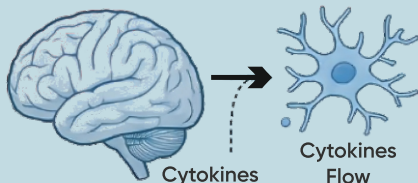


3. Microclotting / Endothelial Injury

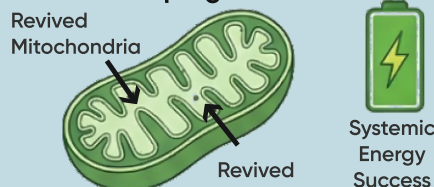


WHY HBOT WORKS FOR POST COVID

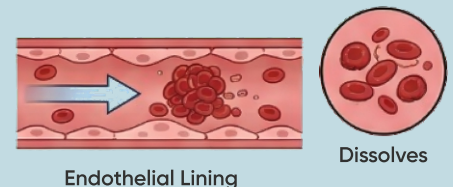
+HBOT: Suppresses NF-KB and restores neurological function



HBOT: Restores mitochondrial ATP production via hyperoxic upregulation



HBOT: Promotes fibrinolysis, reduces platelet aggregation, restores endothelial nitric oxide



👉 When to Refer for HBOT – Post COVID Condition

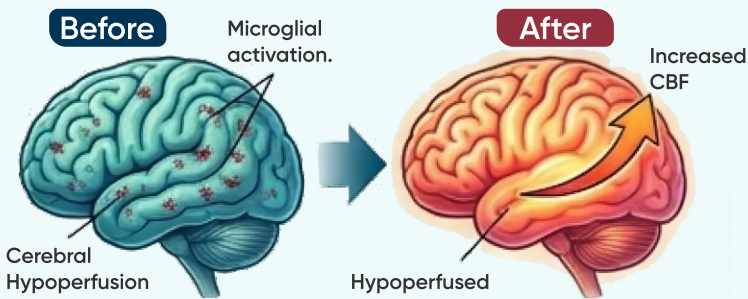
- ✓ Persistent fatigue, brain fog, or memory complaints lasting >12 weeks post-COVID with no alternative diagnosis
- ✓ Myalgia or musculoskeletal pain unresolved despite physiotherapy and standard pain management
- ✓ Sleep disturbances or cognitive dysfunction significantly impacting daily functioning or return to work
- ✓ Symptoms failing ≥2 conventional treatments with continued functional decline

NEUROLOGY -

Post-Stroke Rehab | Traumatic Brain Injury | POTS | Cognitive Decline

KEY NEUROLOGICAL INDICATIONS

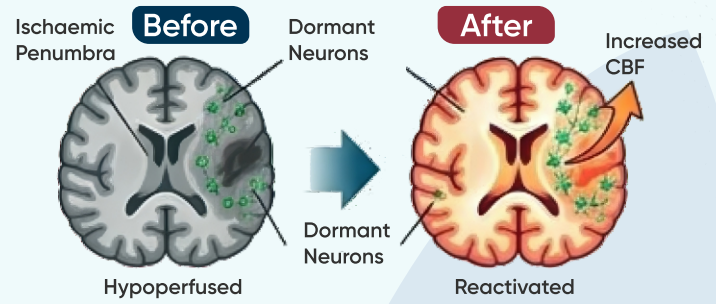
1. Post-COVID Cognitive Impairment.



COVID-19 causes cerebral hypoperfusion, neuroinflammation, and microclotting in peri-hippocampal regions. HBOT reverses hypoperfusion, reduces microglial activation, and upregulates BDNF – restoring measurable cognitive function on validated scales.

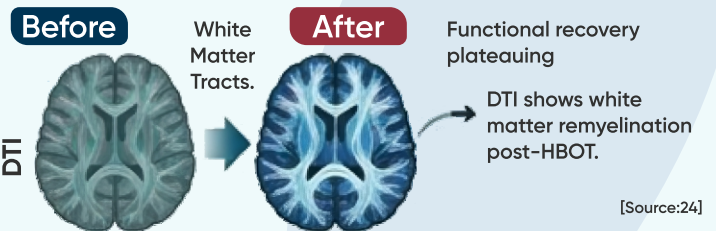
Brain perfusion increased measurably on MRI. BDNF increased post-HBOT. [Source:22]

2. Post-Stroke Rehabilitation (Plateau)



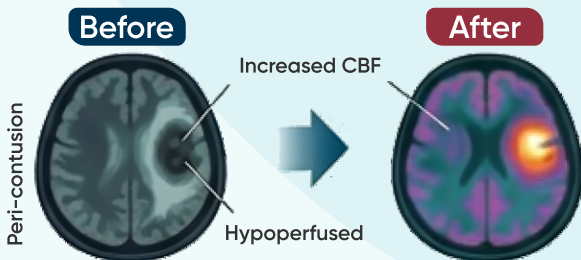
HBOT reactivates the ischaemic penumbra—dormant neurons that survived stroke but cannot function due to chronic hypoperfusion.

[Source:23]



[Source:24]

3. Chronic Traumatic Brain Injury (TBI)



Even years post-injury, HBOT improves cognitive outcomes. Dormant neurons in peri-contusion penumbra respond to hyperoxic stimulation. SPECT imaging confirms increased cerebral blood flow in previously hypoperfused regions.

Key cognitive metrics



Significant cognitive improvement even years post-injury (Boussi-Gross 2013)

KEY EVIDENCE

RCT	Boussi-Gross et al. 2013	PLOS ONE	Significant cognitive improvement. SPECT: increased cerebral blood flow in hypoperfused zones - even years post-injury.
RCT	Efrati et al. 2022	Nature Communications	BDNF increased
fMRI	Tal et al. 2017	Frontiers in Human Neuroscience	fMRI normalisation of pain processing centres. 70% VAS pain reduction documented.
Cohort	Aviv et al. 2020	Aging (Albany NY)	Cognitive improvement in healthy adults.

When to Refer for HBOT – Neurology

- ✓ POTS with dysautonomia and exercise intolerance
- ✓ Post-COVID cognitive impairment: brain fog, word-finding, memory deficits
- ✓ Post-stroke patient plateaued in rehabilitation (even 1-5 years post-event)
 - ✓ Chronic TBI sequelae: attention, executive function, mood
 - ✓ Cognitive decline in elderly with cerebrovascular risk factors
- ✓ Any neurological condition with confirmed hypoperfusion on SPECT/fMRI

INTERNAL MEDICINE – Chronic Fatigue Syndrome | Post-Viral Fatigue | Systemic Inflammation | Endothelial Microinjury

PRIMARY INDICATIONS PANEL



Post-COVID Syndrome / Long COVID

TYPICAL PATIENT PROFILE: Post-COVID fatigue, active, functional myalgia, dyspnoea, and mitochondrial dysfunction.



Chronic Fatigue Syndrome / ME-CFS

TYPICAL PATIENT PROFILE: Chronic fatigue syndrome/ chronic fatigue, or spectrum of mitochondrial dysfunction.



Post-Viral Fatigue (Any Aetiology)

TYPICAL PATIENT PROFILE: Post-COVID fatigue, brain fog, influenza, myalgia, dyspnoea, and mitochondrial dysfunction

80% Improvement after 25-30 HBOT Sessions*

100% Oxygen Under pressure dissolved in blood plasma in body fluid which is delivered to tissue to promote healing, anti-inflammatory, angiogenesis

73

Patients in Efrati 2022 RCT

85%

Global Improvement Rate

50+

Standard Sessions Per Protocol

3-24

Months post-Covid still respond well

WHO TO REFER

- ✓ Age: No Criteria
- ✓ Symptoms of Fatigue, Post Covid
- ✓ Patient Motivation is Low

IDEAL PATIENT PROFILE

- ✓ Age 25-60, previously active, now functionally impaired post-COVID
- ✓ CBC, LFT, RFT, TFT, CRP, Echo, CT all normal "everything normal" but patient is not
- ✓ Duration: 3 months to 2 years post-COVID (longer durations still respond, less rapidly)
- ✓ 2 or more of: fatigue, brain fog, sleep disturbance, myalgia, dyspnoea, mood change [Source: 37]
- ✓ Motivated; understands commitment of 10-40 sessions, 60 min each

👉 When to Refer for HBOT – Internal Medicine

- ✓ Post-COVID fatigue, brain fog, sleep disturbance persisting 3+ months [Source: 36]
- ✓ CFS/ME not responding to standard graded exercise or CBT management
 - ✓ CFS/ME not responding to standard management
- ✓ Post-viral fatigue after EBV, dengue, influenza, or any viral illness
- ✓ Normalised investigations with persistently symptomatic patient

RESPIRATORY MEDICINE – Post-COVID Dyspnoea | Exercise Intolerance | Post-Exertional Malaise | Acute CO Poisoning–Urgent

MECHANISMS & KEY INDICATIONS

1. Post-COVID Dyspnoea with Normal Investigations

Normal Spirometry Normal Echo



AUTONOMIC NERVE

POST VIRAL AUTONOMIC NERVE DYSFUNCTION

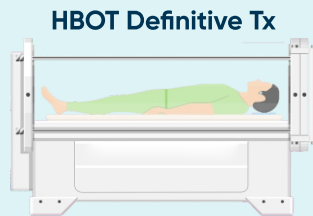
Autonomic dysfunction blunts ventilatory response. Mitochondrial muscle dysfunction. SpO₂ drops with exertion. [Source:41, 42]

HBOT: Restores autonomic regulation & mitochondrial function via hyperoxic stimulation. [Source:43]

2. Carbon Monoxide Poisoning with Neurological Sequelae



CO Exposure
Mito Dysfunction

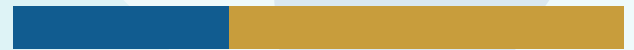


HBOT Restores Both

A FDA-APPROVED EMERGENCY Tx

Medical Emergency; Definitive Treatment [Source:44, 45]

CO half-life: 5hrs (room air) vs 60 min (with HBOT)



[Source:44, 45]

Refer same day

[Source:45]

EVIDENCE TABLE

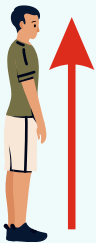
Gorenstein et al. 2021 Respiratory Research	60% improvement in 6-Minute Walk Test. SpO ₂ stability improved on exertion. Autonomic aetiology confirmed. Mitochondrial autonomic mechanism.
WHO Long COVID 2021	
Huang et al. 2021 The Lancet	26% of COVID survivors had persistent dyspnoea at 6 months with no structural lung disease identified, independent of cardiac function
Hadanny et al. 2020 Scientific Reports	

👉 When to Refer for HBOT – Respiratory Medicine

- ✓ Dyspnoea on exertion post-COVID with normal spirometry, CT & echocardiogram
- ✓ Post-COVID exercise intolerance with crash/post-exertional malaise (PEM)
 - ✓ **CO poisoning - URGENT:** any severity with neurological symptoms
 - ✓ SpO₂ drops to 92-95% on exertion without structural explanation

CARDIOLOGY – Myocarditis | POTS | Post-COVID Palpitations | Autonomic Dysfunction | Post-MI Cardiac Rehab |

1 Post-COVID Autonomic Dysfunction (POTS)

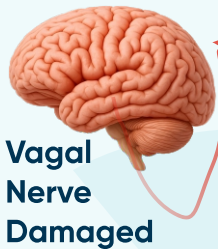


Orthostatic stand test: HR increment > 30 bpm, dizziness—Exercise intolerance.

✓ All cardiac investigations normal

HBOT restores vagal tone

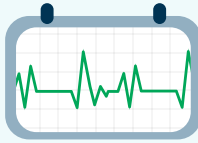
↓
Orthostatic tachycardia resolving.



Vagal Nerve Damaged

COVID-19 causes vagal nerve damage and brainstem neuroinflammation, affecting cardiac mechanisms.

2 Post-COVID Palpitations—Normal Investigations.



Normal 24hr Holter



Normal Echo

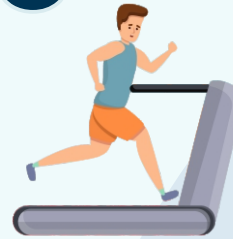
Persistent palpitations 3+ months post-COVID
Normal Holter.

Mechanism: NF-KB-driven cardiac inflammation [Source:54]



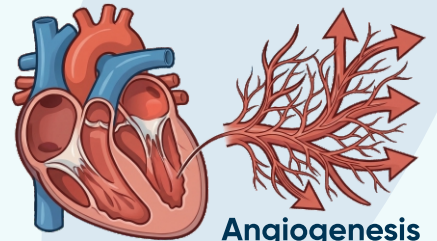
HBOT suppresses NF-KB inflammation cascade, restores cardiac autonomic balance.

3 Post-MI Cardiac Rehabilitation Adjunct.



Exercise Limitation

Adjunct to standard cardiac rehab protocol.
HBOT improves NYHA class.



Angiogenesis

enhances cardiac tissue oxygenation, stimulates VEGF-driven angiogenesis. [Source:55]

KEY EVIDENCE

RCT	Stavros et al. 2022 J Internal Medicine	60-70% symptom improvement in POTS. NASA lean test HR increment reduced significantly. Autonomic recovery confirmed.
Cohort	Slade et al, 2020 Heart Failure Reviews	No adverse cardiac events ✓
Trials	Jain et al. 2020 Frontiers CV Medicine	NF-KB suppression reduces post-COVID myocarditis inflammatory load.

👉 When to Refer for HBOT – Cardiology & Autonomic Medicine

- ✓ Persistent palpitations, tachycardia, or orthostatic intolerance despite ≥3 months of standard therapy
- ✓ Post-COVID cardiac symptoms (fatigue, chest discomfort, exertional intolerance) lasting >12 weeks
 - ✓ Autonomic dysfunction or recurrent syncope not responding to conventional management
 - ✓ Post-MI or myocarditis with persistent symptoms >4–6 weeks despite optimal care

ENDOCRINOLOGY & DIABETOLOGY

Diabetic Foot Ulcers | Wound Healing | Limb Salvage | Osteomyelitis | Wagner Grade II-IV



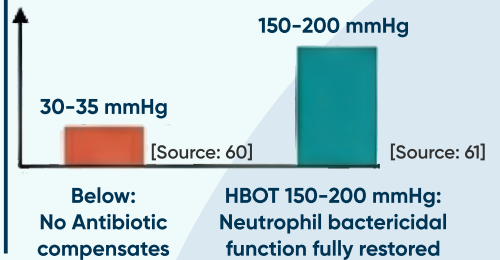
HOW HBOT HEALS DIABETIC WOUNDS

1. Core Problem: Wound Hypoxia

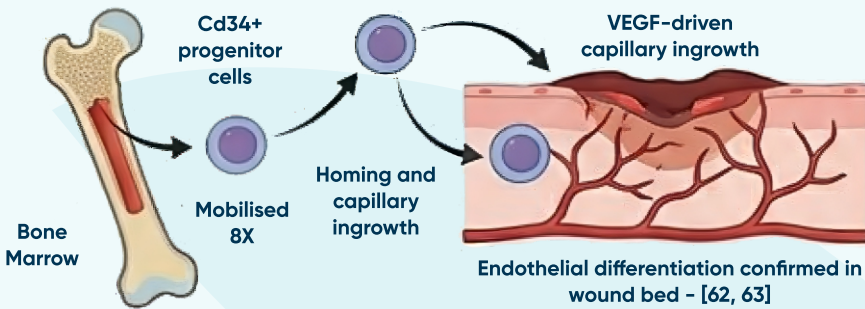


Neutrophil bactericidal activity requires a minimum tissue pO₂ of 30-35 mmHg. [59]

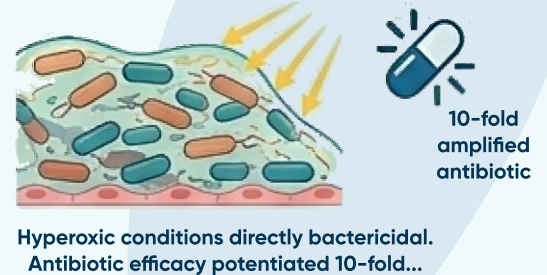
1. Hyperoxia



2. Angiogenesis



3. Biofilm Destruction



URGENT NOTE FOR DIABETOLOGISTS REFER BEFORE AMPUTATION IS SCHEDULED 50-60% - in Wagner III saved by HBOT

KEY EVIDENCE

Cochrane	Kranke et al. 2012 Cochrane Review	Major amputation: OR 0.30 (95% CI 0.10-0.89). Complete healing at 1 year significantly higher with HBOT.
CT	Londahl et al. 2010 Diabetes Care-Wagner III-IV	52% HBOT vs 29% placebo NNT
Review	Goldman 2009 Advances in Wound Care	Leukocyte killing enhanced 5-10x at hyperoxic pO ₂ . Wound pO ₂ threshold: 35 mmHg minimum confirmed.
Research	Fosen & Thom 2014 Advances in Wound Care	Endothelial differentiation

When to Refer for HBOT – Endocrinology & Diabetology

- ✓ Diabetic foot ulcer not healing in 4 weeks despite standard wound care
 - ✓ Diabetic foot with osteomyelitis - adjunct to antibiotics
 - ✓ Wagner Grade II, III, or IV with any ischaemic component
- ✓ Refer BEFORE amputation is scheduled - HBOT avoids major amputation in 50-60%

NEUROINFLAMMATORY BASIS & HBOT MECHANISMS

1 Microglial Activation



Activated microglia

Post-HBOT Restored

Residual brain immune cells remain activated post-COVID... causing depression, anxiety, and cognitive blunting. [source: 68]
HBOT: Suppresses microglial overactivation in imaging

2 Cerebral Hypoperfusion



Reduced perfusion

Post-HBOT Restored

Reduced perfusion in prefrontal and limbic regions post-COVID in several imaging studies. [source: 69]
HBOT: Reverses cerebral perfusion deficits measurably on imaging

3 Mitochondrial Dysfunction



Activated microglia

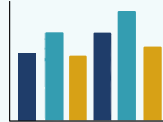
Post-HBOT Restored

Cellular energy failure in inflammation, it restore energy. [source: 70]
HBOT: Restores ATP + increases BDNF.. [source: 71]

EVIDENCE TABLE



RCT
 Efrati et al. 2022
 Nature Communications
 [source: 72]

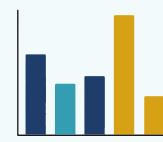


• **PHQ-9**
 (depression) improved 33%
 [source: 73]

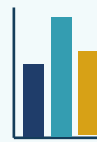
GAD-7
 (anxiety) 33%
 Sleep quality significantly improved .



fMRI
 Tal et al. 2017
 Frontiers Human Neuroscience
 [source: 74]



• **PHQ-9**
 70% pain reduction.
 Analgesic cessation in many patients.
 fMRI: pain centre normalisation confirmed



IMPORTANT NOTE FOR PSYCHIATRISTS

Continue existing medications to create a combination of neuroinflammation reduction (HBOT) and neurotransmitter support shown to produce synergistic benefit.

Do not discontinue psychiatric medications without clinical review. [source: 77]

👉 When to Refer for HBOT – Psychiatry & Mental Health

- ✓ Post-COVID depression not responding to first-line antidepressants (organic/inflammatory basis)
- ✓ Post-COVID anxiety with autonomic symptoms (POTS, palpitations, hyperventilation)
- ✓ Post-COVID sleep disorder not responding to standard management
- ✓ Post-COVID cognitive impairment affecting work or daily function
- ✓ Post-COVID fatigue with mood component – rule out neuroinflammatory substrate
- ✓ PTSD with documented cerebral hypoperfusion

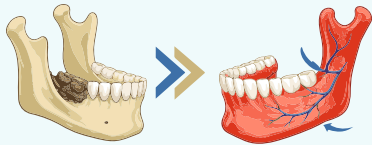
ONCOLOGY – Osteoradionecrosis | Radiation Cystitis | Radiation Proctitis | Soft Tissue Necrosis | Post-Cancer Fatigue

the only treatment with consistent evidence

PRIMARY ONCOLOGY & RADIATION INDICATIONS

1 Osteoradionecrosis (ORN) of the Jaw

[source: Marx Protocol]



Radiation destroys vascularity, ischemic necrosis

Resolution rate 95% (Marx Protocol) 30 15 yr follow-up data

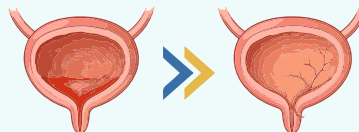
Marx Protocol: 20 HBOT sessions pre-operatively + 10 post-operatively → achieves 95% resolution at 15-year follow-up

... worldwide standard of care.

Refer BEFORE surgical debridement

2 Radiation Cystitis (Haemorrhagic)

Post-pelvic radiation



Reduced perfusion

Post-HBOT suppressed

HBOT restores mucosal vascularity, capacity, and urinary frequency.

Radiation destroys mucosal neovascularisation. [source: 81]

Durable haematuria cessation in 76% of patients. [source: 82]

3 Radiation Proctitis

Post-pelvic/rectal radiation



Bleeding, urgency, pain, fistula risk

HBOT

Cochrane review confirms significant reduction in proctitis symptoms [source: 70]

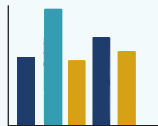
HBOT: restores tissue vascularity and supports wound closure...

Mucosal neovascularisation.

KEY EVIDENCE



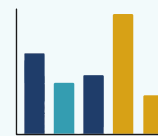
Cochrane Bennett et al. 2012 Cochrane Review – 11 RCTs [source: 72]



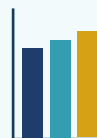
- **Cochrane Review - 11 RCTs |** ORN significantly reduced. Soft tissue healing improved RR 1.30 (95% CI 1.09–1.55) Radiation cystitis improved



n=150 Feldmeier et al. 2005 – Cancer Journal [source: 83]



- **Cystitis: complete haematuria cessation in 76%, significant bladder capacity improvement. Mean sessions: 30.**



4 Post-Cancer Fatigue (Post-Chemo / Radio)

Chemotherapy impairs mitochondrial function



ATP

HBOT

HBOT restores ATP production & healthy mitochondria [source: 70]

Reuter et al. 2020: significant improvement... mitochondrial restoration mechanism.

[source: 70] **Exclude recurrence first.**

👉 When to Refer for HBOT – Oncology

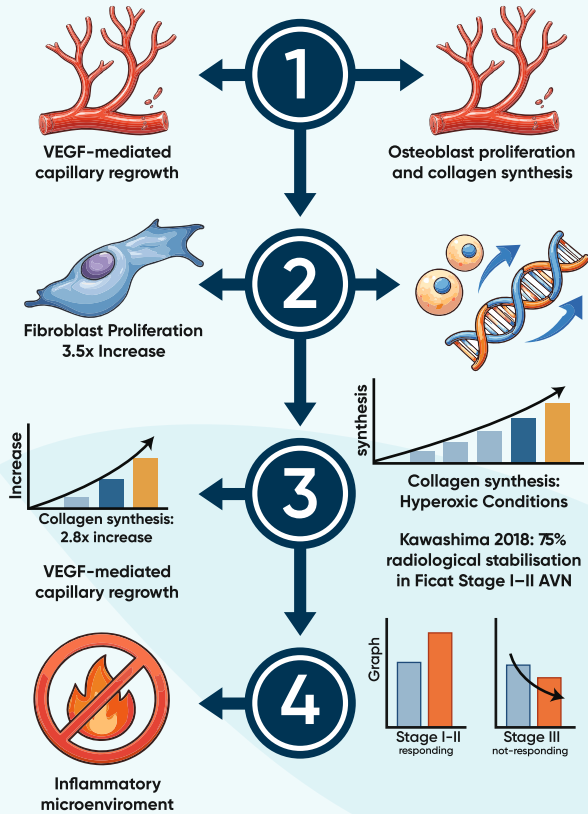
- ✓ Osteoradionecrosis of jaw → refer BEFORE scheduling surgical debridement (Marx Protocol)
- ✓ Haemorrhagic radiation cystitis not responding to conservative management
 - ✓ Radiation proctitis with persistent bleeding, urgency, or fistula risk
 - ✓ Soft tissue radiation necrosis: breast, chest wall, head-neck, pelvis
- ✓ Post-radiation head-neck complications: xerostomia, mucosal damage
- ✓ Cancer survivors with persistent fatigue → exclude recurrence first

ORTHOPAEDICS – AVN – Refer Early | Fracture Non-Union | Crush Injury | Sports Medicine | Post-Surgical Wounds

ADDITIONAL ORTHOPEDIC INDICATIONS

Avascular Necrosis (AVN) – The HBOT Mechanism

[source: 95] Ficat Stage I–II radiological stabilisation. Prevent or delay collapse. Stage III is too late.



Fracture Non-Union Compromised blood supply. (6+ months)

Drives angiogenesis,
Restores osteoblast function
Improves microenvironment
for bone healing.
Adjunct to surgery.



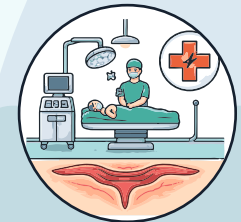
Crush Injury / Threatened Limb Limb viability is time-critical (within 24–48 hours)

Significantly reduces
oxidative stress and surgical
re-intervention
Restores tissue oxygenation
89% vs 54% limb salvage
(Bouchoure RCT)



Sports Medicine / Accelerated Recovery

Accelerated muscle, tendon,
ligament repair (MRI
confirmed). Used by elite
athletes.
Inflammatory resolution
phase accelerated.



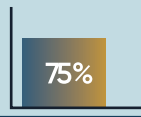
Complications: Post-Surgical Wound

Infection
Restores local tissue oxygen-
ation to >40 mmHg.
Hypoxic bed becomes
oxygenated, healing previously
non-healing wounds.

KEY EVIDENCE



Kawashima et al. 2018
J Bone & Mineral Research
[source: 106]



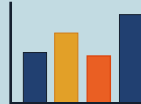
Cohort

Kawashima et al. 2018
J Bone & Mineral Research
[source: 106]

75% radiological stabilisation in Stage I–II AVN. HBOT may avoid or delay total hip replacement.



Camporesi et al. 2010
Undersea & Hyperbaric Med Soc
[source: 107]



Sports

Camporesi et al. 2010
Undersea & Hyperbaric Med Soc
[source: 107]

Sports injuries: 30–40% faster recovery time. Accelerated muscle repair confirmed on MRI.

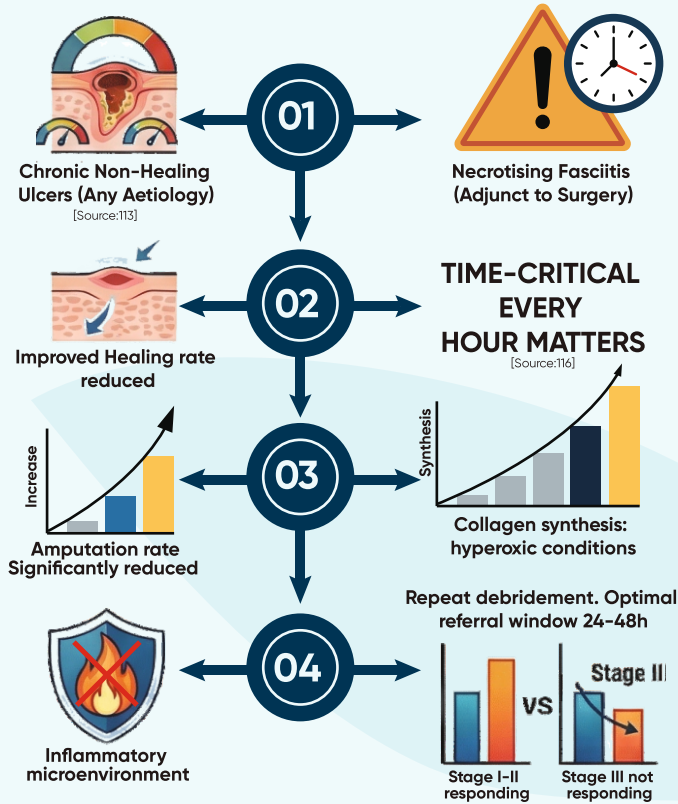
👉 When to Refer for HBOT – Orthopaedics & Rehabilitation

- ✓ AVN (Avascular Necrosis) confirmed on MRI at early stage (Ficat I–II) before structural collapse occurs
 - ✓ Fracture non-union with failed healing >3–6 months despite fixation or bone grafting
- ✓ Crush injuries with compromised tissue viability, compartment syndrome sequelae, or threatened limb
- ✓ Post-surgical wounds with poor healing, infection risk, or compromised vascularity after orthopaedic procedures
- ✓ Sports injuries with delayed recovery, tendon/ligament damage, or persistent inflammation unresponsive to standard rehab

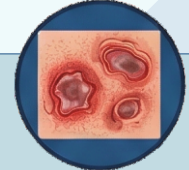
DERMATOLOGY & WOUND CARE Chronic Non-Healing Ulcers | Necrotising Fasciitis – Urgent | Pyoderma Gangrenosum | Pressure Ulcers | Skin Flaps & Grafts

Chronic wounds typically have tissue pO₂ of 5-20 mmHg

PRIMARY DERMATOLOGY INDICATIONS



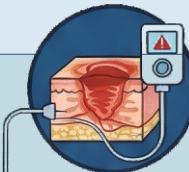
Pyoderma Gangrenosum refractory PG lesion.
reduces pathergic response ... does not replace it. complete healing... Anti-inflammatory bactericidal action... Every hour matters



Pyoderma Gangrenosum (Refractory)
reduces response ... does not replace it. complete healing. Anti-inflammatory pro-healing environment



Compromised Skin Flaps & Grafts
Flap viability improved 20-30% with pre-operative HBOT conditioning, pre-op conditioning and post-op support.



Pressure Ulcers Stage III-IV
Transcutaneous oxygen measurement (TcPO) below 40 mmHg, poor peripheral perfusion below 40 mmHg

KEY EVIDENCE

Cochrane | Villanueva et al. 2004
Cochrane Review-Chronic Wounds [Source:123] 75%

Camporesi et al. 2010
Undersea & Hyperbaric Med Soc [Source:124]

Cohort Kawashima et al. 2014 J Bone & Mineral Research | Improved healing rate RR 1.70 (95% CI 1.12-2.60). Amputation rate significantly reduced [Source:120,123]

RCT Undersea & Hyperbaric Med | mortality reduction [Source:124]

When to Refer for HBOT – Dermatology & Wound Care

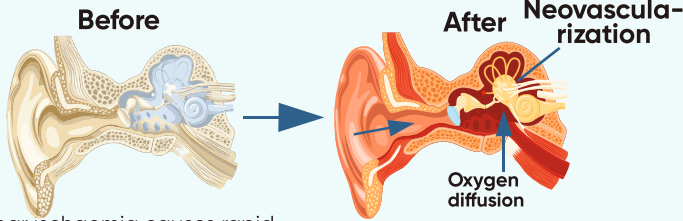
- ✓ Chronic non-healing ulcers (diabetic, venous, or arterial) with no improvement despite ≥ 4 weeks of optimal wound care
- ✓ Necrotising fasciitis – refer urgently post-surgical debridement to limit tissue loss and aid recovery
- ✓ Pyoderma Gangrenosum with progressive ulceration not responding to immunosuppressive therapy
 - ✓ Pressure ulcers (Grade III-IV) with poor granulation or compromised tissue perfusion
- ✓ Compromised skin flaps or grafts showing signs of ischaemia, necrosis, or failed take post-surgery

ENT & OPHTHALMOLOGY | SSNHL – Urgent | CRAO – Emergency | Post-COVID Anosmia | Tinnitus | Xerostomia TIME-CRITICAL URGENT REFERRALS IMMEDIATELY

⚠️ URGENT & EMERGENCY REFERRALS ⚠️

Sudden Sensorineural Hearing Loss (SSNHL)

[Source: 126]



Inner ear ischaemia causes rapid cochlear damage. Cochlea extremely high metabolic demand and irreplaceable hair cell death within hours

HBOT delivers oxygen via plasma diffusion and oxygen diffusion.

best outcomes within 2 weeks of onset
benefit after 3 months



clinically significant hearing recovery

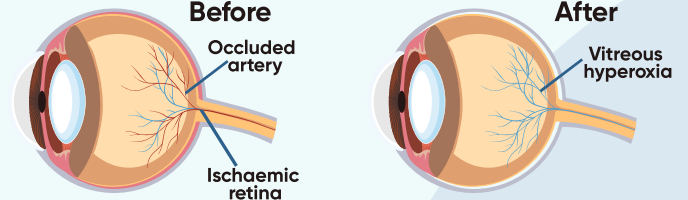
Simultaneously with steroids

[Source: 129]

[Source: 130]

Central Retinal Artery Occlusion (CRAO)

[Source: 131]



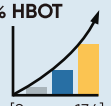
Inner retinal layers tolerate ischaemia for only 90-100 minutes. irreversible damage

HBOT maintains inner retinal oxygenation and normoxia... vitreous hyperoxia

refer within 24 hours – ideally within 6 hours



Visual recovery in 40% HBOT vs 8% standard care, vitreous hyperoxia



[Source: Murphy-Lavole 2012]

[Source: 134]

ACTION: Refer to HBOT and Treat simultaneously with steroids. Call helpline directly : 8223082555

ACTION: EMERGENCY: Initiate HBOT simultaneously

OTHER ENT OPHTHALMIC INDICATIONS



Post-COVID Anosmia (Persistent)

COVID-19 causes anosmia persisting 3+ months...

BDNF mediated



olfactory stem cell regeneration. BDNF upregulation...

2022: improved olfactory scores vs training alone

best outcomes within 6 months of onset



Post-COVID Tinnitus & Hearing Loss

[Source: 138]



vasculitis ... new or worsening tinnitus or sensorineural hearing loss post-COVID...

HBOT: Reduces inner ear neuroinflammation

best outcomes within 6 weeks of onset
60% improved by 10+ dB within 6 weeks

[Source: 139]

[Bassetti et al 2021]



Radiation-Induced Xerostomia

[Source: 140]

salivary gland vascularity destroyed ... severe dry mouth... permanently impairs quality of life



HBOT: Restores salivary output. VEGF-mediated angiogenesis

Significant improvement in 40-60% of patients salivary output

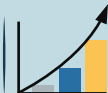
[Source: 141]

KEY EVIDENCE



Cochrane | Conlin & Nicholas 2006

Cochrane Review – SSNHL



HBOT + steroids vs steroids alone: NNT=5 for significant hearing recovery. Time-sensitive–best within 2 weeks.



Cohort | Seiden et al. 2022

Annals of Otolaryngology – COVID Anosmia

[Source: 142]



HBOT improved olfactory scores vs olfactory training alone.



When to Refer for HBOT – ENT & Ophthalmology

- ✓ SSNHL (Sudden Sensorineural Hearing Loss) – refer urgently within 72 hours for best outcomes
- ✓ CRAO (Central Retinal Artery Occlusion) – emergency within 6–24 hours to prevent permanent loss
- ✓ Tinnitus unresponsive to standard medical management for >3 months
- ✓ Xerostomia post-radiotherapy with significant impact on speech & swallowing

SAFETY PROFILE & CONTRAINDICATIONS - Evidence-Based Safety Data | Absolute Contraindications | Relative Contraindications | Drug Interactions

COMMON SIDE EFFECTS

[Source: 491]

Middle Ear Barotrauma




Most Common - 1-3% of

Ear pressure or fullness
[Source: 491]

Management

- Teach Valsalva
- Decelerate pressurisation rate
- Myringotomy (rare persistent cases)

Temporary Myopia



Rare - 1% of patients


Reversible lens refractive change... Resolves completely... [Source: 493]

Management

- Counsel patients requiring precision vision
- Does not require treatment

[Source: 494]

Confinement Anxiety




Rare - manageable

Mild claustrophobia in monoplace chambers [Source: 495]

Management

- Anxiolytic medication, relaxation, or transfer to multiplace chamber 496
- Most patients adapt by session 3

Oxygen Toxicity Seizure



Very Rare - 1 in 10,000

Grand mal seizure

- Self-limiting
- No sequela [Source: 497]

Management

- Risk minimised by standard ATA protocols (max 2.4 ATA, air breaks)
- No lasting harm [Source: 498]

ABSOLUTE CONTRAINDICATIONS

[Source: 499]

**⚠ Untreated tension pneumothorax .
Treat first, then refer**

**⚠ Concurrent bleomycin or cisplatin therapy...
Pulmonary/renal oxygen toxicity**

[Source: 500]

RELATIVE CONTRAINDICATIONS

[Source: 501]

- ✓ **Active URTI or otitis media... defer session** [Source: 502]
- ✓ **Uncontrolled seizure disorder... stabilise** [Source: 503]
- ✓ **Untreated middle ear pathology... resolve ENT** [Source: 504]
- ✓ **Severe claustrophobia... anxiolytic** [Source: 504]
- ✓ **Pregnancy - Category C... benefit vs risk** [Source: 505]
- ✓ **Implantable devices (pacemakers, cochlear implants)... modern compatible** [Source: 505]
- ✓ **Active high fever... defer** [Source: 506]

Assess at consultation - most manageable [Source: 507]

DRUG INTERACTIONS TO NOTE

Bleomycin - ABSOLUTE CI

Pulmonary O₂ toxicity-do not use concurrently under any circumstances.

[Source: 508]

Disulfiram - DISCUSS

Theoretical interaction-discuss with prescribing physician before commencing.

[Source: 509]

Anticoagulants - SAFE

No contraindication - may require platelet monitoring in extended protocols.

[Source: 510]

If uncertain about any patient medication or contraindication call our Doctor Helpline...

PATIENT JOURNEY - FACILITY TOUR | CHAMBER TECHNOLOGY | PATIENT JOURNEY

60-min duration | 6 sessions/week | Target 2.0 ATA. Relax in a comfortable supine position.

ADDITIONAL FACILITY APPLICATIONS WHAT YOUR PATIENT EXPERIENCES: PATIENT JOURNEY

[Source: 521]

Enter Chamber



Comfortable supine...
No complex procedures...
relax or read...

>> 60 min

>> 60 min

[Source: 521]

Management: Valsalva maneuver or decelerate rate. A small number of patients may require an ENT resolution.

10-min gradual

pressurization phase to allow ears to adjust

[Source: 522]



Total

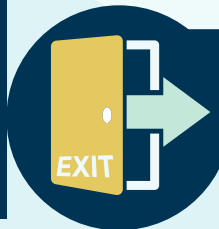
[Source: 524]

Treatment Phase



at 0 to 1.2 ATA... total ~60 min
Rest, music, or watch
entertainment... constant monitoring

Total Session ~60 min. [Source: 523]
6 sessions/week

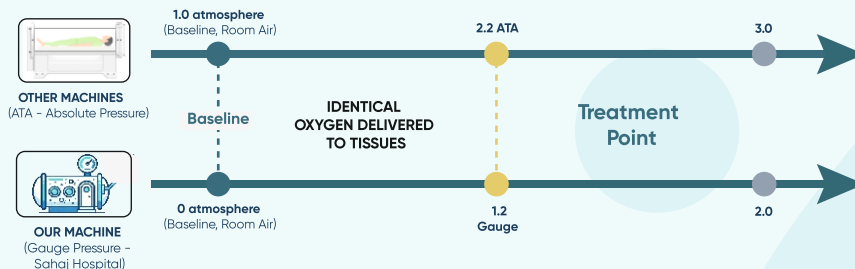


Depressurise

Gradual ~10 min...
Gentle release...
total treatment cycle finished

UNDERSTANDING HBOT PRESSURE READINGS: SAME THERAPY, DIFFERENT SCALES

Comparing our Gauge-based machine to standard ATA-based machines. Both readings describe identical treatment just measured from different starting points.



HBOT TREATMENT PRESSURE REFERENCE GUIDE		
INDICATION	OTHER MACHINES (ATA)	OUR MACHINE (GAUGE)
Long COVID / Neurology	2.0	1.0
AVN / Diabetic Foot (Most Common)	2.2	1.2
Wound Healing / Radiation Injury	2.2	1.2
CO Poisoning (Emergency Protocol)	2-2.5	1-1.5

SIMPLE FORMULA TO REMEMBER:

OUR MACHINE (Gauge) + 1.0 = ATA READING ON OTHER MACHINES

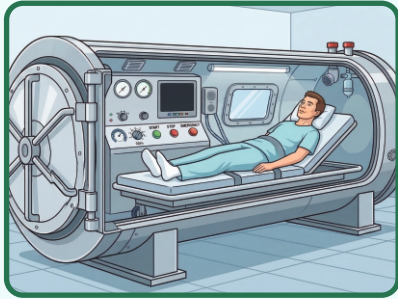
• **Example** : A requested 2.2 ATA setting is equivalent to **1.2 GAUGE** on our machine.

- **ATA (Absolute Pressure)**: Measures total pressure including atmosphere. Baseline is 1.0 ATA (normal room air).
- **Gauge Pressure**: Measures pressure above atmospheric baseline. Baseline is 0.0 Gauge (normal room air). The difference between the two scales is ALWAYS exactly 1.0.

MONOPLACE vs MULTIPLACE

Monoplace HBOT: The Preferred Choice for Therapy

MONOPLACE CHAMBER (RECOMMENDED PREMIUM)

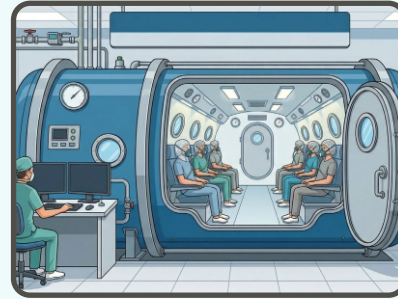


Private , 100% Pure O₂
Comfortable



OXYGEN DELIVERED:
100% directly into chamber

MULTIPLACE CHAMBER (LIMITED SHARED)



Crowded , No Privacy ,
Shared Air



OXYGEN DELIVERED:
60-90% via mask in
air-filled chamber

PARAMETER	MONOPLACE CHAMBER	MULTIPLACE CHAMBER
O ₂ Concentration	✓ 100% pure medical-grade oxygen	✗ 60-90% via mask or head in air-filled chamber
Patients per Session	✓ 1 patient - fully private	✗ Up to 12 patients + staff simultaneously
Infection Risk	✓ Zero cross-contamination	✗ Shared environment - cross-infection possible
Best For	✓ AVN, Wounds, Post-SVF, Long COVID, all OPD therapies	✗ Mass decompression sickness treatment only
Privacy	✓ Complete privacy - personal therapy suite	✗ No privacy - open shared space
Comfort	✓ Watch TV, Music, Quiet, Relaxed	✗ Crowded, Noisy, Mask discomfort
Protocol Compliance	✓ Higher - patients complete full protocols	✗ Lower - discomfort leads to dropouts

Referring a Patient is Simple 3 Step



STEP : 1

Share a Brief History

or us at **62625 06050**
with a short patient history.



STEP : 2

Send Your Patient

Direct your patient to us
at your convenience.



STEP : 3

We Handle the Rest

We'll coordinate care
and keep you updated
every step of the way.

6262 506050
0731-2510200, 8223082555

www.sahajhospital.com | info@sahajhospitals.com



13/2, South Tukoganj, behind Surya Hotel, Indore



Scan for more
information