

**UR 81: Hyperbaric Oxygen Therapy
Medical Necessity Criteria**

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|---|-----------------|
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MEDICAL NECESSITY CRITERIA AND OTHER REQUIREMENTS FOR Hyperbaric Oxygenation

Medical necessity criteria are applied only after member eligibility and benefit coverage is determined. Questions concerning member eligibility and benefit coverage need to be directed to Membership Services.

BACKGROUND
DEFINITIONS

Table 1. Wagner’s classification of diabetic foot ulcers¹

| | |
|---------|---|
| Grade 0 | Skin intact but bony deformities lead to “foot at risk” |
| Grade 1 | Superficial ulcer |
| Grade 2 | Deeper, full thickness extension |
| Grade 3 | Deep abscess formation or osteomyelitis |
| Grade 4 | Partial Gangrene of forefoot |
| Grade 5 | Extensive Gangrene |

Refractory osteomyelitis: Osteomyelitis is an infection of bone or bone marrow, often caused by pyogenic bacteria or mycobacteria. Refractory osteomyelitis is chronic osteomyelitis that persists or recurs after appropriate interventions have been performed or where acute osteomyelitis has not responded to accepted management techniques.²

Sudden sensorineural hearing loss (SSNHL): A subset of sudden hearing loss that is a) sensorineural in nature, b) occurs within a 72-hour window, and c) meets certain audiometric criteria. The most frequently used audiometric criterion for SSNHL is a decrease in hearing of ≥ 30 decibels affecting at least 3 consecutive frequencies. Because premorbid audiometry is generally unavailable, hearing loss is often defined in relation to the opposite ear’s thresholds.³

Idiopathic sudden sensorineural hearing loss (ISSNHL): Sudden sensorineural hearing loss with no identifiable cause despite adequate investigation.³

POLICY AND CRITERIA

Coverage guidance: Hyperbaric oxygen therapy may be excluded from coverage. Check CM for exclusions or limitations.

| Source | Policy |
|---|---|
| For Medicare Members | |
| CMS Coverage Manuals | NA |
| National Coverage Determinations (NCD) | Hyperbaric Oxygen Therapy (20.29) |
| Local Coverage Determinations (LCD) | Oxygen and Oxygen Equipment (L33797) |
| Local Coverage Article | Oxygen and Oxygen Equipment (A52514) |
| Kaiser Permanente Medical Policy for Medicare Members | UR 81 does not apply. For Medicare lines of business, apply the criteria in the NCD and LCD. |
| For Medicaid Members | |
| OR Medicaid | UR 81 does not apply. Check linefinder |
| WA Medicaid | UR 81 does not apply. See Hyperbaric oxygen (HBO2) treatment for tissue damage Washington State Health Care Authority |
| Commercial and Self-Funded Members | |
| OR Commercial | UR 81 applies |
| WA Commercial | UR 81 applies |
| Self-funded plans | UR 81 applies |

CRITERIA

- A. Hyperbaric oxygen therapy may be indicated with **ONE or more of the following:**
 - 1. Diabetic wounds of the lower extremities and need for initial hyperbaric oxygen treatment in patients who meet the following criteria:
 - a. Patient has diabetes mellitus and has a lower extremity wound that is due to diabetes; AND
 - b. Patient has a wound classified as Wagner grade III or higher; AND
 - c. Patient has failed an adequate course of standard wound therapy for a minimum of 30 days, including ALL of the following:
 - i. Good control of diabetes as evidenced by recent HbA1C; AND
 - ii. Pressure reduction or offloading (Must have documentation of the use walker boot, knee scooter, walker, or wheelchair); AND
 - iii. Topical wound treatment with documentation of specific products used, duration of use, and effectiveness; AND
 - iv. Appropriate wound debridement; AND
 - v. Documented assessment of patient’s vascular status and correction of vascular problems in the affected limb.
 - 2. Diabetic wounds of the lower extremities and need for continued hyperbaric oxygen treatment in patients who meet the following criteria:
 - a. Documented evidence of improvement during the initial 20 hyperbaric oxygen dives.
 - 3. Decompression illness,
 - 4. Gas embolism,
 - 5. Acute carbon monoxide intoxication,

6. Cyanide poisoning,
 7. Gas gangrene,
 8. Idiopathic sudden sensorineural hearing loss with referral issued or approved by Head and Neck Surgery and treatment starting within 30 days of condition onset. Idiopathic sudden sensorineural hearing loss as indicated by **one or more of the following**:
 - a. Patient is presenting with sudden mild to moderate hearing loss (hearing loss range 26 – 55 dB HL)⁴ and has medical contraindications to oral or intratympanic (IT) steroid therapy or hearing loss persists after steroid therapy; OR
 - b. Patient has sudden mild to moderate hearing loss (hearing loss range 26 – 55 dB HL)⁴ in only hearing ear; OR
 - c. Patient is presenting with sudden severe to profound hearing loss (hearing loss range 71 or greater dB HL)⁴
 9. Progressive necrotizing infections (necrotizing fasciitis)
 10. Osteoradionecrosis as an adjunct to conventional treatment,*
 - *Conventional treatment for osteoradionecrosis: debridement of devitalized tissue and wound care.
 11. Acute traumatic peripheral ischemia when loss of function, limb, or life is threatened as an adjunct to standard therapeutic measures (i.e., revascularization with or without fasciotomy).
 12. Crush injuries and suturing of severed limbs when loss of function, limb, or life is threatened, as an adjunct to conventional treatment (i.e., debridement and revascularization when possible).
 13. Acute (i.e., onset within past 48 hours) peripheral arterial insufficiency
 14. Soft tissue radionecrosis as an adjunct to conventional treatment,*
 - *Conventional treatment for soft tissue radionecrosis: debridement of devitalized tissue and wound care.
 15. Chronic refractory osteomyelitis, unresponsive to conventional medical and surgical management,*
 - *Conventional treatment for chronic refractory osteomyelitis: Debridement and antibiotics
 16. Actinomycosis, only as an adjunct to conventional therapy when the disease process is refractory to antibiotics or surgical treatment.
 17. Chronic peripheral vascular insufficiency with the presence of a non-healing wound in a patient who is not a candidate for revascularization
 18. Skin grafts and flaps (compromised)
 19. Central retinal artery occlusion (approval for 5 treatments/dives initially with extension as indicated per clinician assessment)
 20. Thermal burns (2nd or 3rd degree), must be referred by Plastic Surgery
- B. Unless otherwise indicated above, an **initial** course of hyperbaric oxygen therapy for any indication should not exceed 20 treatments/dives.
- C. Continuation of course of hyperbaric oxygen therapy can be approved only after reevaluation by the referring/treating provider with documentation that treated condition improved but has not resolved during the initial 20 hyperbaric oxygen dives. Unless otherwise indicated above, **continuation** of course of hyperbaric oxygen therapy for any indication should not exceed 20 treatments/dives (for a total course of 40 treatments/dives).

Hyperbaric oxygen therapy is not medically necessary for any condition other than those listed above.

CONTRAINDICATIONS TO BE DETERMINED PRIOR TO HYPERBARIC OXYGEN THERAPY BY THE TREATING PHYSICIAN

1. Untreated pneumothorax. Patients with pneumothorax should be treated (likely with some form of thoracostomy tube) before hyperbaric oxygen therapy.

RATIONALE

Indications

MCG reviewed the evidence on hyperbaric oxygen therapy (HBOT) in 2025.⁵ Their findings relevant to the following indications are provided below:

Diabetic wounds of the lower extremities

For chronic severe diabetic ulcers, evidence demonstrates at least moderate certainty of at least moderate net benefit. A systematic review and meta-analysis of 11 randomized trials (668 patients) comparing hyperbaric oxygen therapy with usual care for the treatment of diabetic foot ulcers found that patients treated with hyperbaric oxygen therapy had lower rates of major amputations (defined as amputation above the ankle) and higher rates of complete ulcer healing compared with patients treated with usual care, with no difference in minor amputations (below the ankle) or total amputations seen between groups. The authors noted that heterogeneity among the included studies limited the results, and further studies were recommended.⁶ A systematic review and meta-analysis of adjunctive therapies for diabetic foot ulcers found that treatment with hyperbaric oxygen therapy plus comprehensive wound care was associated with a lower major amputation rate and an improved healing rate as compared with comprehensive wound care alone.⁷ A retrospective study of 1006 diabetic patients selected for hyperbaric oxygen therapy based on transcutaneous oxygen levels demonstrated that 73.8% of wounds granulated or healed after a mean of 34 treatments, and hyperbaric oxygen therapy was discontinued after a mean of 24 treatments in patients who failed to show any improvement. The authors acknowledged that there is diminished benefit after a total of 35 to 40 treatments.⁸ Hyperbaric oxygen therapy has been demonstrated to improve quality of life in such patients.^{9,10} An evidence-based specialty society guideline states that, based on very low-quality to moderate-quality evidence, hyperbaric oxygen is recommended for Wagner grade 3 or higher diabetic foot ulcers following surgical debridement or when ulcers fail to heal after 30 days of conventional therapy due to its impact on major amputations and healing.¹¹

Decompression illness and gas embolism

For decompression illness or suspected intravascular gas embolism, evidence demonstrates at least moderate certainty of at least moderate net benefit. Early hyperbaric treatment is considered a standard of care, and it results in complete resolution of decompression illness as well as gas embolism from other causes, such as manipulation of central venous catheters or cardiac surgery with cardiopulmonary bypass.¹²⁻¹⁵ Because clinical presentations vary, and the window of opportunity for a successful outcome is unknown, treatment should be initiated once the diagnosis is suspected to reduce the risk of residual symptoms.¹³ An observational study of 5269 cases of decompression illness found that a longer delay in treatment was associated with a lower rate of complete recovery (94% complete recovery at 1 to 6-hour delay vs 76% complete recovery at greater than 36-hour delay).¹⁶ A review article noted that most patients with decompression illness resolve their symptoms with one hyperbaric oxygen treatment; however, if residual symptoms are present at the end of the hyperbaric

oxygen treatment, additional hyperbaric oxygen sessions are recommended as long as improvement occurs.¹⁷

Acute carbon monoxide intoxication and cyanide poisoning

For carbon monoxide poisoning, evidence demonstrates a net benefit, but of less than moderate certainty, and may consist of a consensus opinion of experts, case studies, and common standard care. A specialty society guideline supports the use of hyperbaric oxygen for treatment of carbon monoxide poisoning.¹⁸ A systematic review identified 6 randomized controlled trials involving 1361 participants and concluded that the evidence does not yet clearly establish whether the administration of hyperbaric oxygen therapy to patients with carbon monoxide poisoning reduces the incidence of adverse neurologic outcomes. Published trials have conflicting outcomes regarding benefit, are generally supported by weak evidence, and have design or analytical flaws. The authors noted that although a pooled meta-analysis did not suggest a benefit from hyperbaric oxygen therapy, those results should be interpreted with caution. A multicenter randomized controlled trial was recommended to better define the role of hyperbaric oxygen therapy for the prevention of neurologic injury in patients with carbon monoxide poisoning.¹⁹ Review articles on hyperbaric oxygen therapy for carbon monoxide poisoning noted that further study is needed regarding the optimal pressure, number of treatments, and timing of treatments after poisoning; the authors identified one trial that reported improved cognitive outcomes when 3 hyperbaric oxygen treatments were given in a 24-hour period.^{20,21} A specialty society policy supports the use of hyperbaric or high-flow normobaric oxygen for the treatment of acute carbon monoxide poisoning but notes that large high-quality multicenter trials are necessary to definitively compare the efficacy of the 2 therapies.²²

Idiopathic sudden sensorineural hearing loss

For idiopathic sensorineural hearing loss, evidence demonstrates a net benefit, but of less than moderate certainty, and may consist of a consensus opinion of experts, case studies, and common standard care. A systematic review of 7 studies (392 patients) found that although hyperbaric oxygen therapy significantly improved hearing for patients with acute (generally 2 weeks or less) idiopathic sensorineural hearing loss, no evidence was identified that addressed hyperbaric oxygen therapy in chronic idiopathic sensorineural hearing loss (ie, 6 months or more).²³ Uncontrolled case series have demonstrated conflicting results after the use of adjuvant hyperbaric oxygen therapy. Improvement in hearing was associated with the presence of profound hearing loss (greater than 91 dB) and initiation of treatment within 10 days of symptom onset.²⁴⁻²⁶ A specialty society guideline supports the use of hyperbaric oxygen for the treatment of idiopathic sudden sensorineural hearing loss.²⁷ An evidence-based practice guideline concludes that hyperbaric oxygen is an option when combined with steroid therapy for either initial treatment (within 2 weeks) or salvage therapy (within 1 month) for sudden sensorineural hearing loss.³

Necrotizing fasciitis and gas gangrene

For necrotizing soft tissue infections, evidence demonstrates a net benefit, but of less than moderate certainty, and may consist of a consensus opinion of experts, case studies, and common standard care. A systematic review and meta-analysis evaluating hyperbaric oxygen therapy in adults with necrotizing soft tissue infection (21 studies, 48,744 patients) found decreased in-hospital mortality in patients receiving hyperbaric oxygen compared with patients not receiving hyperbaric oxygen therapy. The authors note that some studies suffered from incomplete population and outcomes reporting, that the optimal dose of hyperbaric oxygen therapy needs to be determined, and that randomized controlled trials are warranted.²⁸ A national database analysis of patients with necrotizing soft tissue infections compared 405 patients who underwent hyperbaric oxygen therapy with 45,500 patients who

did not and found, after multivariate adjustment, that patients who received hyperbaric oxygen therapy had significantly reduced rates of in-hospital mortality and other complications. The authors recommended multicenter randomized controlled trials to confirm the findings.²⁹ A retrospective cohort study of 80 patients with necrotizing soft tissue infections in various anatomic locations treated with or without adjunctive hyperbaric oxygen therapy found that there was no significant difference between groups with regard to in-hospital mortality; for those patients who had extremity involvement, there was no significant difference in amputation rates. The authors concluded that additional evidence of efficacy was required before hyperbaric oxygen therapy could be considered a standard of care for necrotizing soft tissue infections.³⁰ Review articles found that although there are no randomized controlled trials, some studies suggest that hyperbaric oxygen therapy may reduce morbidity and mortality from necrotizing fasciitis and clostridial myonecrosis (gas gangrene) when used as an adjunctive treatment to surgical debridement.^{31,32} Other review articles noted that the use of hyperbaric oxygen in the treatment of necrotizing fasciitis is controversial and that the evidence consists of retrospective uncontrolled studies in small populations with outcomes that are conflicting; definitive treatment with surgical debridement should be the priority.^{33,34} For soft tissue complications of venomous snake bites, studies are limited to case reports and series of patients also receiving antivenin and surgical therapy, making it difficult to isolate and confirm the effectiveness or incremental benefit of hyperbaric oxygen alone.³⁵

Crush injuries and acute traumatic ischemias

For crush injury, compartment syndrome, or acute traumatic ischemias, evidence demonstrates a net benefit, but of less than moderate certainty, and may consist of a consensus opinion of experts, case studies, and common standard care. A specialty society guideline supports the use of hyperbaric oxygen for crush injury, compartment syndrome, or acute traumatic ischemias.³⁶ A systematic review identified a trial of 36 patients with crush injuries that showed significantly improved healing and reduced tissue necrosis with hyperbaric oxygen as compared with sham treatment. However, this trial suffered from an unclear or high risk of bias, and additional high-quality randomized controlled trials were recommended.³⁷

Soft tissue radionecrosis and osteoradionecrosis

For radiation injury (delayed), evidence demonstrates a net benefit, but of less than moderate certainty, and may consist of a consensus opinion of experts, case studies, and common standard care. A systematic review found low-certainty evidence that hyperbaric oxygen therapy may improve or completely resolve late radiation therapy injury, may reduce wound dehiscence after head and neck surgery, and may improve pain scores associated with osteoradionecrosis at 12 months. Small sample sizes, study heterogeneity, and limited numbers of studies impacted the authors' certainty regarding the conclusions.³⁸ A systematic review found insufficient evidence to support the use of hyperbaric oxygen to prevent postextraction osteoradionecrosis.³⁹ A scoping review that included 16 studies (one randomized controlled trial) evaluating the efficacy of hyperbaric oxygen in 602 patients for the treatment of radiation-induced hemorrhagic cystitis found that 84% of patients had partial or complete resolution.⁴⁰ A pooled analysis of 2 randomized controlled trials of 65 patients with mandibular osteoradionecrosis compared mandibular surgery with or without hyperbaric oxygen therapy (30 sessions preoperative followed by 10 sessions postoperative) and found, at 12-month follow-up, no significant difference in healing outcomes between groups. The authors noted that the studies were underpowered and experienced high attrition rates in both treatment groups; further studies were recommended.⁴¹ A multicenter randomized controlled trial evaluated standard postoperative care with or without 30 sessions of perioperative hyperbaric oxygen (20 preoperative and 10 postoperative sessions) in 100 evaluable patients with prior mandibular radiation therapy and reported no difference

in the incidence of osteoradionecrosis by blinded central assessor at 6 months in the hyperbaric oxygen arm compared with the control arm.⁴² A randomized, controlled, double-blind, crossover study of 120 patients with refractory radiation proctitis comparing hyperbaric oxygen therapy with sham treatment found, at 1-year follow-up, that hyperbaric oxygen therapy was associated with decreased LENT-SOMA scores (an anatomic-specific morbidity scoring system), generating an absolute risk reduction of 32%.⁴³ However, a double-blind randomized controlled trial of hyperbaric oxygen vs sham pressurized air in 84 adults with chronic gastrointestinal symptoms after pelvic radiation therapy reported similar rectal and intestine functional outcomes on the Inflammatory Bowel Disease Questionnaire and similar nonsignificant decreases in subjective symptoms by LENT-SOMA score at 12-month follow-up.⁴⁴ A specialty society guideline supports the use of hyperbaric oxygen for the treatment of delayed radiation injury to soft tissue and bone.⁴⁵ Other specialty society guidelines support the use of hyperbaric oxygen to reduce bleeding in patients with chronic radiation proctitis.^{46,47}

Chronic refractory osteomyelitis

For osteomyelitis, evidence demonstrates a net benefit, but of less than moderate certainty, and may consist of a consensus opinion of experts, case studies, and common standard care. A specialty society guideline supports the use of hyperbaric oxygen for osteomyelitis that is refractory to antibiotics and surgery.⁴⁸ A systematic review found no randomized controlled trials, and it also found that existing studies comparing hyperbaric oxygen therapy with surgical debridement demonstrate conflicting results. The authors concluded that hyperbaric oxygen therapy may help promote remission of refractory osteomyelitis when used in conjunction with surgery and antibiotics, but more research is needed.⁴⁹ A review article reported that 15 observational studies suggested that hyperbaric oxygen may be useful as an adjunct for chronic refractory osteomyelitis; the authors noted that randomized controlled trials would help to confirm efficacy.⁵⁰

Compromised skin grafts and flaps

For skin grafts and flaps (compromised), evidence demonstrates a net benefit, but of less than moderate certainty, and may consist of a consensus opinion of experts, case studies, and common standard care. A specialty society guideline supports the use of hyperbaric oxygen for compromised skin grafts and flaps.⁵¹ A systematic review found a lack of high-quality evidence to support the use of hyperbaric oxygen for this indication. Two small trials reported improved survival of split skin grafts in burn wounds; however, two other studies reported that hyperbaric oxygen therapy was of no benefit for either skin grafting or free flap surgery. Additional high-quality randomized controlled trials were recommended.³⁷

Central retinal artery occlusion

For central retinal artery occlusion, evidence demonstrates a net benefit, but of less than moderate certainty, and may consist of a consensus opinion of experts, case studies, and common standard care. A specialty society guideline supports the use of hyperbaric oxygen for central retinal artery occlusion for patients presenting within 24 hours of onset.⁵² Another specialty society guideline states that hyperbaric oxygen may be used as an interim measure to facilitate passive diffusion of oxygen from the choroidal circulation to the retina while awaiting definitive reperfusion therapy.⁵³ An evidence-based literature review found that although hyperbaric oxygen therapy may prevent permanent visual loss if administered within 24 hours of the onset of acute visual loss, the evidence supporting its efficacy is only fair to good and is based upon retrospective case studies, not randomized controlled trials.⁵⁴ Another literature review and meta-analysis of 3 retrospective studies (296 total patients) evaluating the role of hyperbaric oxygen therapy for central retinal artery occlusion found no difference in visual outcomes in patients receiving hyperbaric oxygen therapy compared with those

who did not receive it. The authors noted significant heterogeneity across studies that may have impacted the results and called for large randomized trials into the role of this therapy in patients with central retinal artery occlusion.⁵⁵ A single-center retrospective review of 128 patients with central retinal artery occlusion who presented with a symptom duration of less than 20 hours found significant improvement in mean best-corrected visual acuity after hyperbaric oxygen therapy. The finding of a cherry red spot on funduscopy at presentation was associated with less visual acuity improvement after hyperbaric oxygen therapy.⁵⁶

Thermal burns

For thermal burns, evidence demonstrates a net benefit, but of less than moderate certainty, and may consist of a consensus opinion of experts, case studies, and common standard care. A specialty society guideline supports the use of hyperbaric oxygen for thermal burns that encompass at least 20% of total body surface area or involve hands, face, feet, or perineum.⁵⁷ Studies suggest that the use of hyperbaric oxygen therapy can result in improved healing, decreased infection, decreased length of stay, and reduced mortality.⁵⁸ A systematic review found insufficient evidence to support or refute the value of hyperbaric oxygen therapy for thermal burns; further research is needed.⁵⁹

Contraindications

Untreated pneumothorax is an absolute contraindication to HBOT as placing a patient in a chamber and altering ambient pressure can precipitate a life-threatening tension pneumothorax during ascent.⁶⁰

CODES

| CPT Code | Description |
|------------|--|
| 99183 | Physician or other qualified health care professional attendance and supervision of hyperbaric oxygen therapy, per session |
| HCPCS Code | Description |
| G0277 | Full-body hyperbaric chamber, per 30-minute interval |

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