

INTERNATIONAL CONSENSUS:
TOPICAL OXYGEN THERAPY

2023 ADA
EVIDENCE RATING A

Frykberg R, Andersen C, et al. Use of topical oxygen therapy in wound healing. Journal of Wound Care. 2023;32(S8B):S3–S30.

EXECUTIVE SUMMARY

This consensus document represents the collective expertise of a panel of 9 key opinion leaders from the US and Europe. It serves as a critical update to the 2017 EWMA document, synthesizing evidence from over 45 peer-reviewed articles to establish best practices for Topical Oxygen Therapy (TOT) in hard-to-heal wounds.

Purpose: To define mechanisms, review clinical evidence, and provide actionable recommendations for incorporating TOT into standard of care.

ADA Grade A
Evidence Rating (2023)

8.2M
Medicare Beneficiaries

\$96.8B
Projected Wound Costs

THE CRITICAL ROLE OF OXYGEN IN HEALING

Chronic wounds are inherently hypoxic. Oxygen is essential for cell metabolism, collagen synthesis, and antimicrobial defense. Without sufficient pO₂, the healing cascade stalls.

100 mmHg (Healthy) → ~10 mmHg (Wound)

IMPACT OF HYPOXIA ON ENZYMES

↓ Enzymatic activity falls to 10–30% of max efficiency at low oxygen tension.

↻ TOT reverses local hypoxia, restoring the microenvironment and upregulating angiogenic factors (VEGF, FGF-2).

SUMMARY OF TOT MODALITIES & EVIDENCE

Modality	Mechanism & Delivery	ADA Evidence Grade
Continuous Delivery of Oxygen (CDO)	Continuous low flow of pure oxygen (24/7). <i>Wearable, silent, ambulatory device.</i>	A
Higher Cyclical Pressure Oxygen (HCPO)	Humidified oxygen under cyclical pressure (10-50 mbar). <i>90 mins/day, 5 days/week (Extremity chamber).</i>	A
Hemoglobin Spray	Facilitates oxygen diffusion into wound bed. <i>Liquid spray applied at dressing changes.</i>	B
Other Modalities	Disposable CDO, Low Constant Pressure Oxygen (LCPO), Oxygen Dressings.	C

CLINICAL EVIDENCE HIGHLIGHTS

Key Findings from Randomized Controlled Trials & Systematic Reviews

CDO IN DIABETIC FOOT ULCERS

▶ **SIGNIFICANTLY HIGHER HEALING RATES**

46% vs 22% complete healing at 12 weeks compared to placebo (p=0.016).

▶ **ACCELERATED CLOSURE**

Time to 50% healing was nearly halved in the CDO group. Relative performance increased with larger, more chronic wounds.

HCPO IN DIABETIC FOOT ULCERS

▶ **REDUCED HOSPITALIZATIONS**

Real-world data showed an **82% reduction** in hospitalizations (p<0.0001) and 73% fewer amputations.

▶ **LONG-TERM DURABILITY**

12-month closure rate: **56% vs 27%** for standard of care (p=0.013).

COST-EFFECTIVENESS

▶ **ECONOMIC IMPACT**

CDO vs NPWT: Saves ~\$4,800 per patient.

CDO vs HBOT: Saves up to \$14,060 per patient.

▶ **SIMULATION RESULTS**

79% of economic simulations demonstrated that CDO was a cost-effective intervention for chronic wounds.

HCPO IN VENOUS LEG ULCERS (VLU)

▶ **SUPERIOR CLOSURE RATES**

76% vs 46% complete healing at 12 weeks (p<0.0001) in refractory non-healing VLUs.

▶ **FASTER HEALING TIME**

Median time to full closure: **57 days** (HCPO) vs 107 days (Conventional Compression).

CLINICAL RECOMMENDATIONS FOR IMPLEMENTATION

Primary Trigger: Consider TOT when wounds fail to reduce in size by ≥50% after 4 weeks of standard of care.

Broad Applicability: Appropriate for most non-neoplastic hard-to-heal wounds (DFU, VLU, Pressure Injuries).

Early Intervention: Earlier use is better; consider for early treatment of ischaemic DFUs.

Administration: Self-administration is possible after brief training; multidisciplinary approach recommended.

KEY TAKEAWAY & GUIDELINE UPDATES

TOT is safe, clinically effective, and cost-efficient. The substantial body of high-quality evidence has led to major guideline updates in 2023.

ADA Standards of Care (2023)

Gave TOT its highest-ever evidence rating (**Grade A**) for chronic diabetic foot ulcers.

IWGDF Recommendation (2023)

Made its first-ever recommendation to consider adjunctive TOT for hard-to-heal DFUs.



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