Increasing Health Care Equity for Patients in Rural California: How Topical Oxygen Therapy Improves Access and Saves Limbs

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Introduction: Chronic wounds, including diabetic foot ulcers (DFUs), venous leg ulcers (VLUs), and arterial wounds, pose significant challenges to healing, particularly for patients in remote or rural areas.[1] Inadequate tissue perfusion is a key factor in most chronic wounds, due to disruption of the microvasculature, inflammation, edema, increased metabolic demand, and underlying chronic conditions.[2] While traditional hyperbaric oxygen (HBO) is an established modality for improving wound healing, it is not covered by insurance for most wounds, and its accessibility remains a barrier for patients in remote settings.

A unique, portable, multi-modality topical oxygen therapy (TOT) device*, which concurrently delivers both intermittent compression and pressurized topical oxygen therapy, presents a home-based alternative that may address these challenges.

Methods: This case series examines six patients with chronic wounds, who were treated with TOT in rural California. Patients received multi-modality TOT in their homes, and outcomes such as wound healing progression, treatment compliance, and overall limb salvage were assessed.

Results: Patient demographics are shown in Table 1. Six multi-morbid patients with 7 wounds (3 DFU, 1 mixed arterial/venous/neuropathic s/p amputation, and 2 DFU s/p amputation) were treated with multi-modality TOT. Three wounds required minor amputation or revision early in treatment but continued therapy. Currently 5 wounds have healed completely, and the remaining 2 wounds have achieved 90% and 96% closure, respectively. Mean time on therapy was 76 days (post surgical wounds were treated as new wounds).

References

1. Olsson M, et. al., The humanistic and economic burden of chronic wounds: A systematic review. Wound Repair Regen. 2019 Jan;27(1):114-125. doi: 10.1111/wrr.12683.
2. Sen, C.K. (2009) 'Wound healing essentials: Let there be oxygen', Wound Repair and Regeneration, 17(1), pp. 1–18. https://doi.org/10.1111/j.1524-475X.2008.00436.x.

Patient 1: 1a. Initial presentation, 1b. Post 2nd ray resection, 1c. TOT initiated, 1d. 1 Week of therapy . The patient was admitted to the hospital with recurrence of osteomyelitis and underwent TMA. Therapy was restarted after discharge.
2a. TOT initiated, 2b. 1 week of therapy, 2c. 3 weeks, 2d. Healed at 5 weeks.

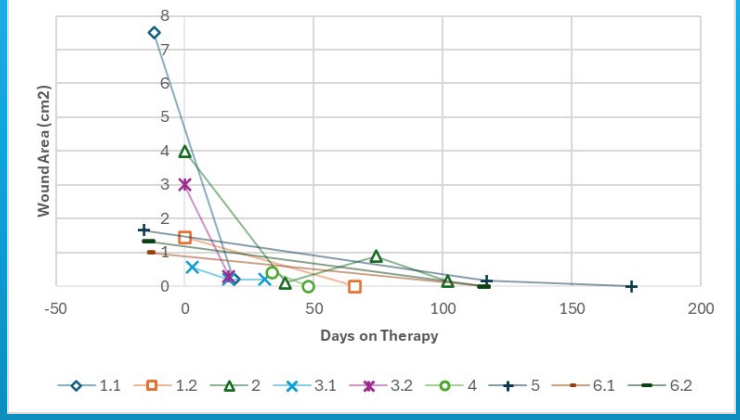
Patient 2: 3a. Pre-TOT, 3b. TOT initiated, 3c. 1 week of therapy, 3d. 7 weeks

Patient 5: 4a. TOT initiated, 4b. 7 weeks of therapy, 4c. 16 weeks, 4d. 17 weeks (closed at 18 weeks)

Table 1: Patient Demographics

Age	Sex	Comorbidities
34	F	DM1, obesity, right 2nd ray resection
68	M	DM2, HTN, HLD, suprapubic catheter, obesity, DVT, PE
72	M	PAD, CAD, A-fib, HTN, ESRD, obesity, neuropathy
73	M	DM2, PAD, HTN, HLD, prostate cancer, left gr toe amp.
59	M	DM2, Obesity, CAD, PAD, right BKA, venous insufficiency
53	F	DM2, neuropathy, HLD, HTN, obesity

Figure 5: Wound Size by Time on Therapy



Conclusion: Multi-modality TOT enabled improved access to oxygen therapy for patients in remote areas. All patients experienced accelerated wound healing, with reduced time to closure and improved quality of healed scars. Multi-modality TOT demonstrated effectiveness in managing difficult chronic wounds and provided additional benefits such as mitigating chronic lymphedema and resolving postoperative surgical site dehiscence. The portability and home-based application of multi-modality TOT enhanced patient compliance, contributing to positive outcomes.

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