

# THE EFFICACY OF CONTINUOUS TOPICAL OXYGEN THERAPY IN THE TREATMENT OF CHALLENGING DIABETIC FOOT ULCERS; A CASE SERIES

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## Introduction

Continuous Topical Oxygen Therapy (cTOT) is becoming increasingly recognized as an adjunct to good standard of care in non-healing chronic wounds.<sup>1</sup> Compelling evidence supporting the impact of cTOT on wound progression, healing and pain management is reported in primary research<sup>2,3</sup> and in various recent meta-analysis.<sup>4-6</sup> In practice, cTOT is advocated in wounds with less than 40-50% healing in 4 weeks,<sup>1</sup> helping patients and their carers heal wounds faster.

In this study the aim was to determine the efficacy of continuous oxygen therapy (cTOT) in the treatment of previously non-healing diabetic foot ulcers (DFU) where the majority of patients had a history of infections and prior amputations indicative of the severity and difficulty in healing.

## Methods

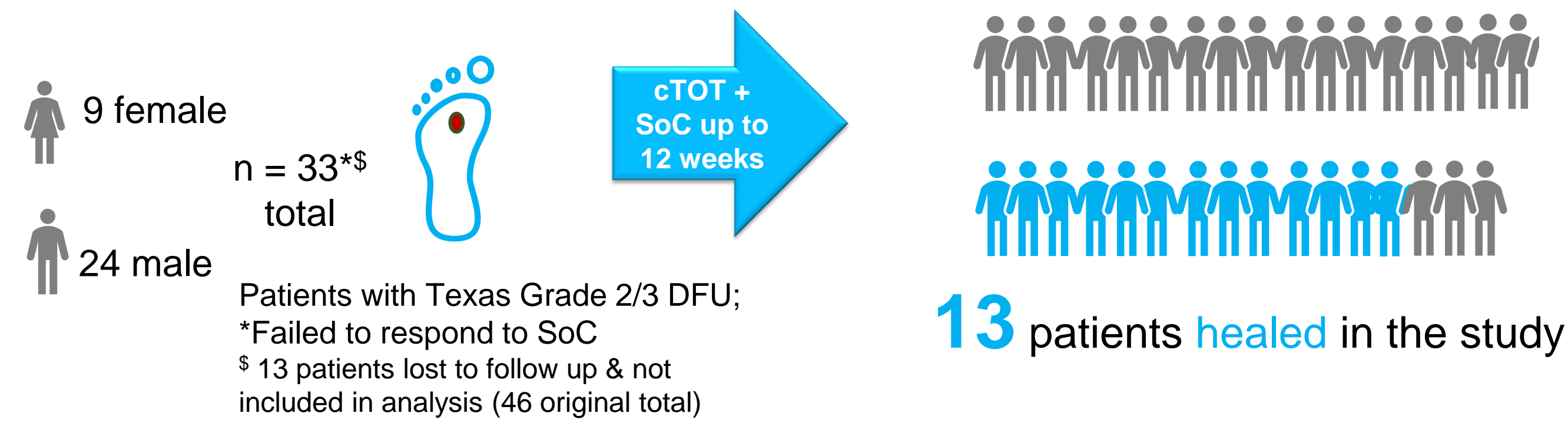
This observational study, examined the effect of a portable cTOT device\* as an adjunct to standard care (SoC) on the healing rates of patients presenting with a Texas grade 2/3 diabetic foot ulcer that had failed to respond to SoC<sup>5</sup>.

Treatment using cTOT with SoC was for up to 12 weeks or until healing. During this time, wound healing parameters which included percentage reduction in wound size, the incidence of infections and pain assessments, were measured weekly and recorded in an Advanced Digital Wound Care Platform (ADWCP) system.

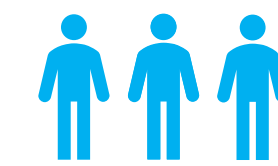
\*Continuous topical oxygen wound therapy device tested was NATROX® O2 Wound Therapy <sup>5</sup>SoC = absorbent foam dressing



## Results



Mean time to healing = **10.9 weeks**

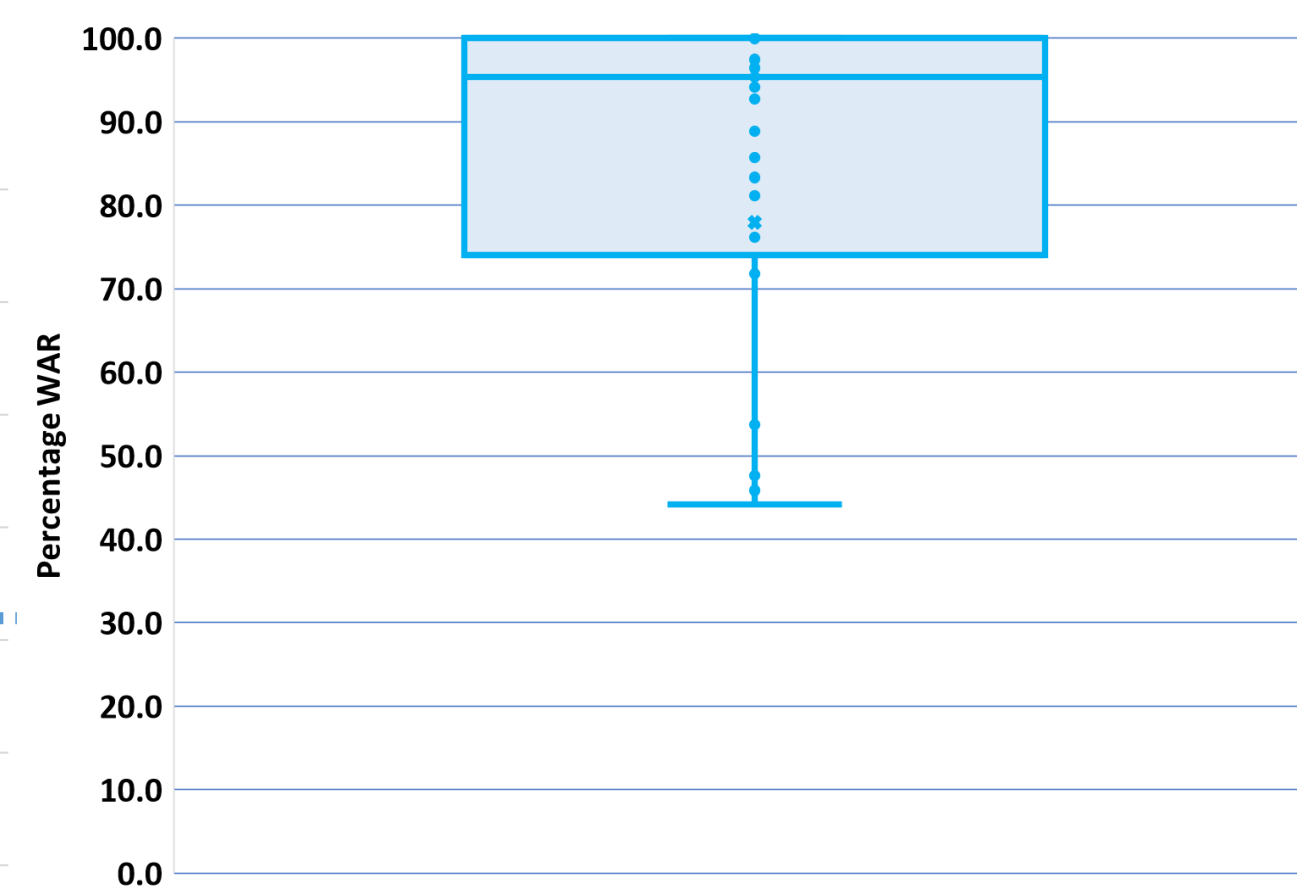
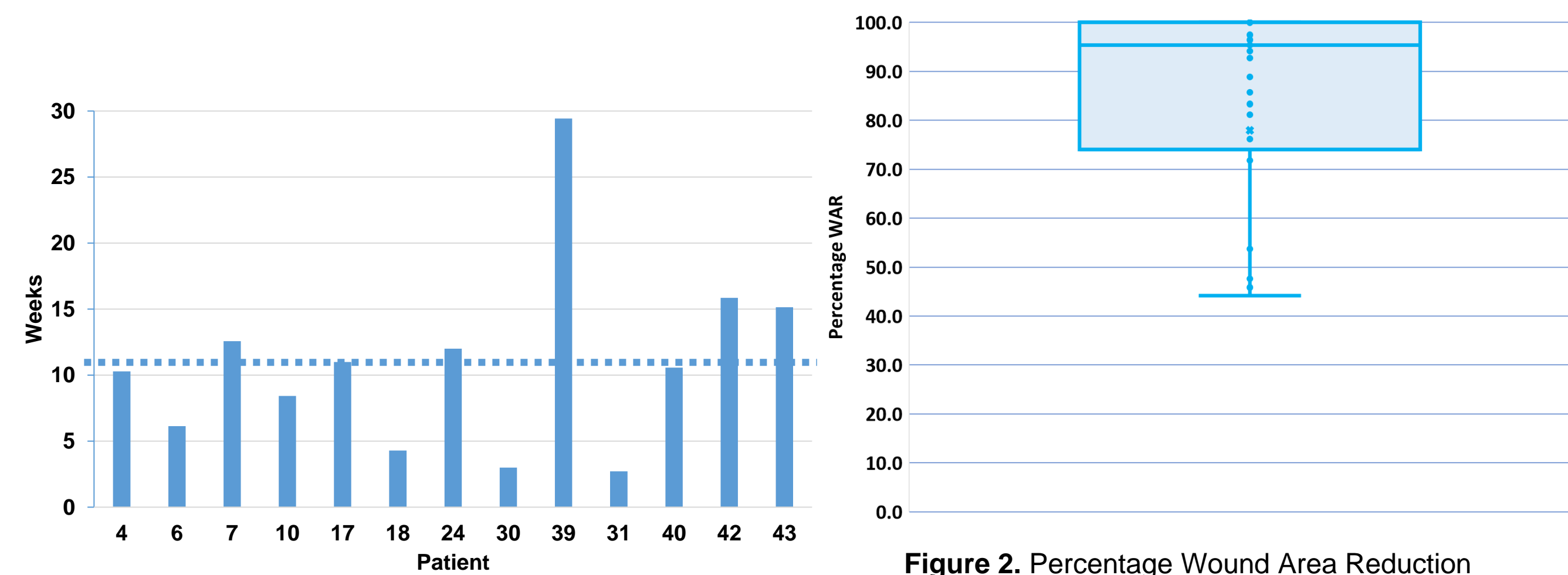


**Three** wounds healed within **4 weeks** of cTOT



**Reduction in wound area** demonstrated in **30** wounds

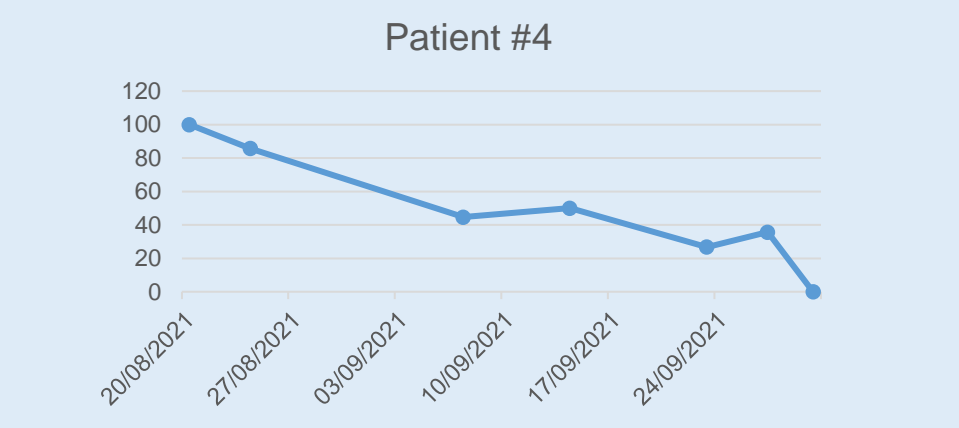
**78%** mean reduction over the study



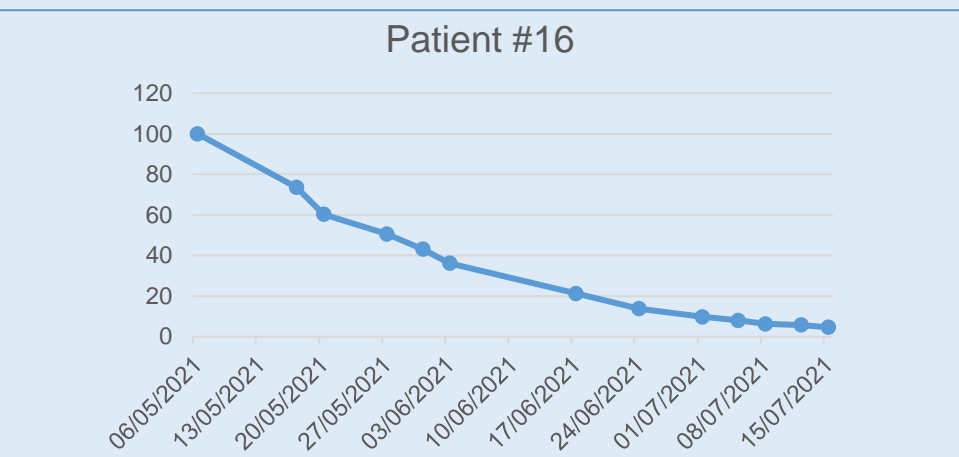
## Case examples

### CASE HISTORY

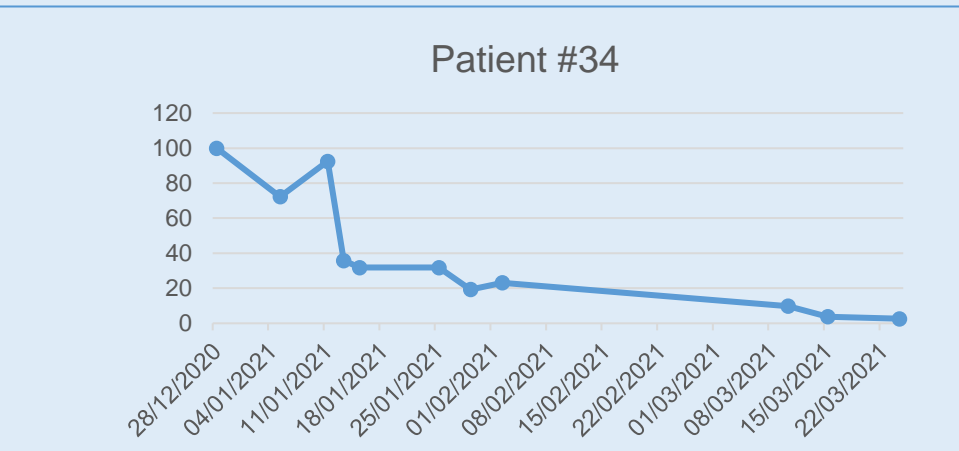
Male 68 years  
DFU Left foot, 1st digit



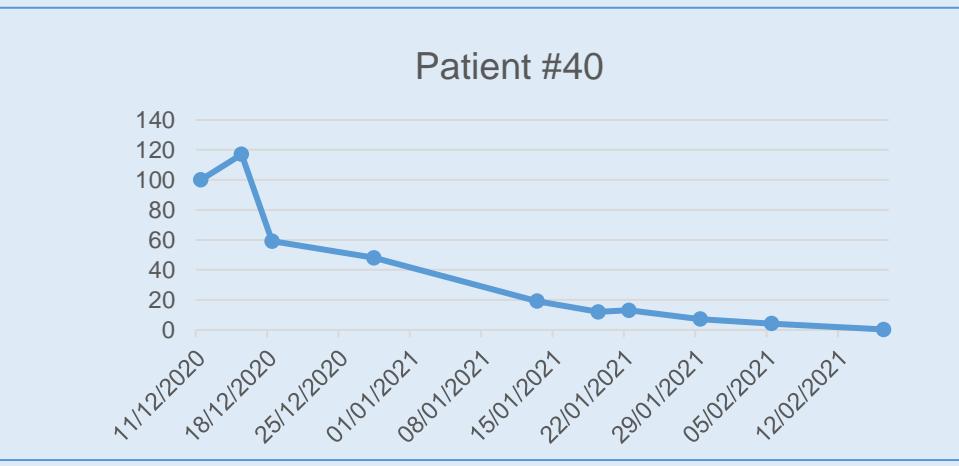
Male 61 years  
DFU, Left foot, 5th digit



Male 75 years  
DFU, Left Foot,  
Ankle Flexure



Male 54 years  
Diabetic with wound at  
toe amputation site  
Right foot, 1st digit



## Discussion

The benefits of cTOT in challenging DFU's has previously been demonstrated in a recent RCT with a 71% greater healing rate in challenging DFU compared to SoC alone.<sup>2</sup>

This study supports these findings with a mean wound area reduction of 78% and 13 patients healed, highlighting the benefits of cTOT as an adjunctive therapy to progress hard to heal wounds previously shown to be stagnating with SoC.

## References

1. Frykberg, R. *et al.* Use of Topical Oxygen Therapy in Wound Healing. *J Wound Care* 32, S1-S32 (2023).
2. Serena, T. E. *et al.* Topical oxygen therapy in the treatment of diabetic foot ulcers: a multicentre, open, randomised controlled clinical trial. *J Wound Care* 30, S7-S14 (2021).
3. Jebiril, W. *et al.* Topical oxygen treatment relieves pain from hard-to-heal leg ulcers and improves healing: a case series. *J Wound Care* 31, 4-11 (2022).
4. Sun, X. K., Li, R., Yang, X. L. & Yuan, L. Efficacy and safety of topical oxygen therapy for diabetic foot ulcers: An updated systematic review and meta-analysis. *Int Wound J* 19, 2200-2209 (2022).
5. Sethi, A., Khambhayta, Y. & Vas, P. Topical oxygen therapy for healing diabetic foot ulcers: A systematic review and meta-analysis of randomised control trials. *Health Sciences Review* 3, 100028 (2022).
6. Carter, M. J. *et al.* Efficacy of Topical Wound Oxygen Therapy in Healing Chronic Diabetic Foot Ulcers: Systematic Review and Meta-Analysis. *Adv Wound Care (New Rochelle)* 12, 177-186 (2023).

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