

## INTRODUCTION

The use of a continuous oxygen wound therapy system is primarily indicated for the treatment of wounds and ulcers that fail to heal with standard of care or where there are known underlying aetiology that impair wound healing.

The system utilised, provides a continuous flow of 98% pure humidified oxygen directly to the wound bed and peri wound skin at a rate of 13 mls / h, with oxygen delivery maintained 24 hours a day. When this system is used with an appropriate occlusive bandage or dressing, an atmosphere rich in oxygen is kept around the wound, promoting rapid healing.

Oxygen Wound Therapy Device



## METHOD

Patients with perviously non-healing wounds were selected for treatment. All wounds were regularly cleansed with Propilbetaine and Poliesanide (PHMB) solution.

The oxygen wound therapy system was applied directly to the wound bed and was covered with a semi-occlusive secondary dressing (absorbent or hydrophilic polyurethane foam depending on the amount of exudate produced).

The secondary dressing and oxygen delivery system were renewed every 4 days until complete resolution.

## CASE REPORT

### Case 1

#### Patient history

48 year old man with an infected phlebostatic ulcer on left lower leg. Job required standing for long periods of time thus not helping wound healing. Duration prior to oxygen therapy 2.5 years.



Day 0  
Wound bed clean, wound malodorous with high levels of exudate VAS 10



Day 0  
Device positioned under foam dressing and compression therapy



Day 20  
Reduction noted in wound depth exudate and pain levels



Day 65  
Complete wound closure. patient has now returned to full time work as a chef

Wound present for 910 days healed in 65 days

### Case 2

#### Patient history

82 year old man with cutaneous injury to his right achilles heal with exposed tendon. Duration of the wound prior to oxygen therapy 2 years. Initially treated with NPWT however due to severe pain unable to tolerate even with opioids.



Day 0  
Wound malodorous and necrosis evident at lower aspect of wound VAS 10



Day 8  
Commenced on oxygen therapy due to severe pain and failure to progress



Day 14  
Necrosis resolved and granulation tissue beginning to cover tendon



Day 35  
Tendon now completely covered with granulation tissue. Oxygen therapy discontinued

Wound present for 720 days tendon covered completed with granulation tissue in 27 days

### Case 3

#### Patient history

54 year old man with diabetes. Ulcer present for 2 years following a trauma. Treated daily with Merbromine aqueous solution. Initial plan – amputation of 1<sup>st</sup> digit, however active therapy started as an alterative strategy.



Day 0  
Commenced on NPWT VAS 8



Day 7  
NPWT stopped as purulent discharge noted and oxygen therapy initiated



Day 17  
Purulent discharge resolved, Wound reduction and active granulation evident



Day 30  
Complete wound healing achieved with minimal scarring evident

Wound present for 720 days completed healed in 23 days of oxygen therapy

## RESULTS

All patients showed significant improvement in wound healing with 2 of the 3 achieving complete wound closure which was unexpected due to the severe chronicity of the wounds.

The median VAS (visual analog score) was 10 on commencement of oxygen therapy. All patients reported a drastic reduction of their VAS during the course of therapy.

The hydrophobic outer layer of the oxygen delivery system allowed the even diffusion of oxygen over the entire wound surface, making it easy and painless to remove and no adherence to the wound bed was noted.

The type of dressing used in conjunction with the device depends on the type and quantity of the exudate with most wounds demonstrating increased levels of exudate initially.

## CONCLUSIONS

Persistence wound hypoxia can have deleterious effect which not only favour wound chronicity but can also encourage bacterial growth and biofilm formation. If hypoxia is untreated not only will angiogenesis be prevented wound healing will stall but there is also an increase in likely wound complications. Therefore it is imperative that corrective intervention is swift and effective.

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