

**Purpose**

This case series demonstrates that cyclical pressure topical wound oxygen therapy and umbilical cord allograft is an effective concurrent treatment for a chronic diabetic ulceration with an exposed Achilles tendon.

**Background**

**An Exposed Achilles Tendon**

- Achilles tendon repairs are common.<sup>1</sup> However, an exposed Achilles tendon can be quite difficult to treat.
- The small number of blood vessels per cross sectional area poses a potential problem when the Achilles tendon is exposed in a chronic ulceration.<sup>2</sup>

**Cyclical Pressure Topical Wound Oxygen Therapy (TWO2)**

- The approach of topically oxygenating the wound is different from hyperbaric oxygen therapy (HBO) as it does not involve pressures as high as in HBO and has none of the contraindications or risks associated with systemic delivery of oxygen. Additionally, it can be easily administered by the patient at home, thereby reducing cost and compliance.

- Oxygen is essential to wound healing but is lacking in chronic wounds due to local tissue hypoxia, caused by compromised vasculature and edema.<sup>3</sup>

- Oxygen plays a vital role in the synthesis of collagen, enhancement of fibroblasts, angiogenesis, and leukocyte function.<sup>4</sup>

**Umbilical Cord Allograft**

- Umbilical Cord Allograft is a minimally manipulated, dehydrated, non-viable cellular allograft derived from the structure that protects the blood vessels that carry essential nourishment and oxygenated blood to and from mother and fetus.<sup>5</sup>

- This allograft is designed to provide a protective environment for the healing process.<sup>5</sup>

**References**

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**Case History**

- A 74 year old Type 2 diabetic (HbA1c 9.4%) White male, with a history of non-compliance, was seen as an inpatient at bedside for an unusual pressure ulceration of the right posterior leg.
- The patient complained of 10/10 aching pain on his initial presentation.
- WBC, CRP, and ESR were elevated.
- All pedal pulses were palpable. His initial wound measured 12.0cm x 3.5cm x 0.4cm with tracking along the Achilles tendon. Erythema, increased warmth, edema, and purulence were noted. He was being treated with IV vancomycin/zosyn.
- The patient's ulceration began (Figure 1) after he spent several weeks in a sub-acute rehabilitation facility s/p bilateral common femoral artery and superficial femoral artery endarterectomies with Vascutek patch angioplasty.
- While in the sub-acute rehabilitation facility, the patient admitted to hanging his feet off the end of his bed (in a dependent position) for pain relief.
- Wound and Achilles tendon debridement were performed. A 3.0cm x 5.0cm umbilical cord allograft was directly applied to the Achilles tendon for augmentation. The patient was seen at 1 week post-op (Figure 2).
- At 2 weeks post-op the patient reported 0/10 pain in the area.
- At 2 weeks post-op, the ulceration was debrided (Figure 3). TWO2 therapy and dressing changes were discussed. The patient refused to perform his own dressing changes. He felt "very uncomfortable" with anyone but his doctors changing his dressing. Home Health was offered, but he refused the service.
- Patient elected to proceed with TWO2 therapy, which he would perform, and he agreed to return to the VA every other week for dressing changes. Umbilical cord allograft, Mepitel, Steri-Strips, Sorbact, and DSD were applied to the ulceration every other week.
- From week 2 onward, the patient administered TWO2 therapy twice daily for sixty minute sessions.
- Photographs were obtained every other week: 4 weeks post-op (Figure 4), at 6 weeks post-op (Figure 5), at 8 weeks post-op, and at 10 weeks post-op (Figure 6).

**Case Photos**



Figure 1: Wound at the Sub-Acute Rehabilitation Facility

Figure 2: 1 Week Post-op

Figure 3: 2 Weeks post-op; Ulceration at start of Topical Wound Oxygen Therapy

Figure 4: 4 Weeks Post-op

Figure 5: 6 Weeks Post-op

Figure 6: 10 Weeks Post-op

**Results**

- The patient reported that he was comfortable with use of the TWO2 therapy and could easily apply it over his dressing.
- The wound resolved at 10 weeks post-op.

**Conclusions**

- The favorable outcome of this case study suggests that concurrent use of cyclical pressure topical wound oxygen therapy and umbilical cord allograft can be effective at treating an ulceration with an exposed Achilles tendon. Further studies are warranted.

**Affiliations**

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