

Stimulating granulation tissue in chronic non-healing wounds: the use of Kerraboot®

Barker SGE, Soliman AR, Leigh R
Academic Department of Vascular Surgery,
The Middlesex Hospital, Mortimer St, London, W1T 3AA

Foot and leg ulcers often show poor healing rates, with many patients having their ulcers for longer than a year (Cornwall et al, 1986). Recrudescence is a major problem (Callam et al, 1985). They represent a huge burden on the NHS and cause considerable distress to the patient. Kerraboot® is a new type of device for leg and foot ulcers which provides a completely different approach to existing dressing options. It is a non-contact, non-pressurised, boot-shaped dressing that completely surrounds the ulcer(s) on the leg or foot, creating an optimum wound healing environment (Ashton, 2004), that also allows free drainage of wound exudate away from the surface of the wound.

Case one

A 74-year-old female presented with chronic, painful, bilateral leg ulcers, most extensive on the right leg (Figure 1). She had a 25-year history of venous disease and multiple chronic ulcers affecting her lower limbs. The patient was well systemically, a non-smoker and had no history of diabetes, hypertension, or pertinent cardiac or family history. Her ulcers were managed by standard four-layer compression bandaging, but after four months, the ulcers affecting the right leg had increased in size, with no signs of healing. However, the ulcers affecting her left leg had demonstrated slow, but promising signs of healing using the same regime.

There were three coalescing ulcers persisting around the right ankle of different sizes: approximately 4x2cm, 3x3cm and 4x3cm. The ulcer bases contained a small amount of poor quality granulation tissue. The skin and soft tissues of the right leg were severely oedematous. Sensation in both legs was intact, as were peripheral pulses. A venous duplex scan on the right leg revealed extensive deep venous incompetence and accompanying superficial (varicose) venous disease. On the left, a similar picture was evident. An arterial duplex scan confirmed normal vessels with ABPI's of greater than one, excluding mixed arteriovenous disease.

The four-layer compression bandaging was stopped and the ulcers were surgically debrided and became one wound. The Kerraboot® was then used for two weeks around the right lower limb, and changed daily to promote the growth of granulation tissue, in preparation for skin grafting (Figure 2). Split-thickness skin grafting was placed, with 100% 'take', to complete healing of her ulcers.

Case two

A 78-year-old Asian male presented with a chronic and painful ulcer on the sole of the right foot. The patient was in good health, had no history of diabetes or hypertension, was a former smoker and was without an identified history of peripheral vascular disease.

The patient had an approximate 3x2cm deep, fungating ulcer with raised edges, extending between the plantar surface of the fourth and fifth right metatarsal heads. The floor of the ulcer was heavily infected. The adjacent skin and soft tissues appeared normal. Draining lymph nodes were not noticeably enlarged.

Vascular assessment revealed palpable, but weakened peripheral pulses. Neurological assessment of the right leg was normal apart from some diminished sensation in the forefoot. Routine blood tests were normal, while microbiological culture confirmed the presence of anaerobic bacteria. Intravenous antibiotics (cefuroxime 1.5 grams tds; flucloxacillin 0.5 grams qds, and metronidazole 500 mg tds) were given for one week. Regardless of this, and debridement of the ulcer, it did not show ready signs of healing. Osteomyelitis was considered, which was confirmed by plain X-ray of the (right) foot.

A ray amputation of the third, fourth and fifth toes was performed. Histological assessment of the amputated tissue confirmed a well-differentiated squamous cell carcinoma, with clear margins. Post-operatively, the right foot was positioned in Kerraboot® for two weeks, to promote rapid growth of granulation tissue at the open amputation site, preparing the wound for skin grafting. Subsequent split-thickness skin grafting was completely successful at the first attempt.



Figure 1. A chronic, non-healing ulcer on the right ankle following standard treatment, in a patient with a long history of venous disease.



Figure 2. Ulcer at day 14 following daily change of the Kerraboot: healthy granulation tissue is seen covering the ulcer, before skin grafting.

Conclusion

Previously, the Kerraboot® has been demonstrated to improve healing rates in lower limb ulcers (Barker et al, 2001; Leigh et al, 2004). In this report it has been shown to promote the rapid development of healthy vascular granulation tissue in preparation for skin grafting in two very different patients. Stimulating healing in this way requires not just a warm moist environment but also that chronic wound exudate is allowed to drain away from the surface of the wound. This has hastened 'time to healing' and has resulted in the more rapid discharge of the patient from the hospital to home. **WUK**

Ashton J. Managing leg and foot ulcers: the role of Kerraboot®. *Br J Comm Nurs* 2004; **9(9)**: 26-30

Barker SGE, Cooper DG, Ahmed A, Agu O, Challoner EJ, Hollingsworth SJ. The 'Wound Boot': A preliminary assessment of a novel device for the management of leg ulcers. *Phlebology* 2001; **16**: 73-5

Callam MJ, Ruckley CV, Harper DR, Dale JJ. Chronic ulceration of the leg: extent of the problem and provision of care. *Br Med J (Clin Res Ed)* 1985; **290**(6485): 1855-6

Cornwall JV, Dore CJ, Lewis JD. Leg ulcers: epidemiology and aetiology. *Br J Surg* 1986; **73(9)**: 693-6

Leigh R, Barker SGE, Murray N, Hurel SJ. The Kerraboot: A novel wound dressing device for the management of leg and foot ulcers. *Practical Diabetes International* 2004; **21(1)**: 27-30