The use of a pH-modulating ointment in the treatment of a metatarsal and a heel ulcer

Steven Long

Podiatric management of people with diabetes should include continuous assessment of their feet – this assessment should include the recognition of any problems followed by suitable care and education. During the management of an individual's diabetic foot problem, he or she should be involved in all stages of care and education, in order that they may learn to appreciate the problem and how to prevent similar ones in the future. In this case study, the author describes the use of a pH-modulating ointment to treat a 72-year-old male, Mr H, who had non-healing ulcers on his feet, is a non-smoker and has had type 2 diabetes for 14 years, which was often poorly controlled. He has significant retinopathy and nephropathy.

The author's local community podiatry service recognised, in 2002, that further management was required of Mr H's feet and referred him to the hospital podiatry service at Glasgow Royal Infirmary. He initially presented with a non-healing ulcer on the apex of his left first toe which became, over the years, one of several small ulcers appearing on his feet. The ulcers were managed as well as they could be, thus allowing him as normal a mobile day-to-day life as possible.

Podiatric assessment revealed peripheral neuropathy, poor peripheral pulses (indicating peripheral arterial disease), thin and dry skin, and a marked depletion of fatty, fibrous tissue over the metatarsals and heels.

Continuing management meant monitoring of the feet which also included prescription of stock footwear with shock absorbing insoles (both from Chris Hanley & Partners, Northampton).

During one of Mr H's visits to the author's podiatry department two small but significant ulcers were discovered (approximately 20mm x 7mm and 6mm x 6mm on the right first metatarsal head and the left heel, respectively).

The principles of TIME™ (Schultz et al, 2003) were used with an aim to promote rapid healing.

'T' is for Tissue non viable

Initially, slough was present in both ulcers, which was treated by sharp debridement plus the application of Iodosorb ointment (Smith & Nephew, Hull). Wound exudate was managed by a secondary foam dressing (Mepilex; Mölnlycke Health Care, Dunstable).

Pressure relief for Mr H's left heel was achieved with the DH off-loading shoes (Royce Medical, Camarillo, California) in which small hexagonal sections of the shock-absorbing insole are removed to off-load a specific area. His right first metatarsal head was off-loaded using the forefoot relieving boot (Bauerfeind, Birmingham).

Vascular assessment was also performed, which confirmed poor pedal pulses but viable femoral and popliteal pulses. Reconstruction surgery had been ruled out because Mr H's limbs were not considered, by the vascular department, to be threatened.

In order to manage the sloughy ulcers, treatment continued from January 2005 until spring of the same year. At this time Mr H decided to do a great deal of digging in his garden and his right first metatarsal head ulcer became infected.

'I' is for Inflammation or Infection

The infection was quickly dealt with by increasing the frequency of dressing (Iodosorb ointment with Mepilex dressing) changes to twice a week.

It was then decided to use a 7mm felt plantar metatarsal pad to relieve pressure from Mr H's right first metatarsal head. There was

Figure 1. Photographs A–C illustrate the timescale of healing (27 days) for Mr H's right first metatarsal ulcer from the introduction of a pH-modulating ointment.

Figure 2. The ulcer has healed by this stage, the photograph illustrates the thin shiny skin with reduced fatty, fibrous tissue on Mr H's feet.

an awareness, by the author, that the forefoot relief boot was being removed at times, thus reducing the effectiveness of pressure reduction. (Note: Due to the friable nature of the skin the vast majority of adhesive was removed from the felt by running cotton wool over its surface).

'M' is for Moisture imbalance

Moisture imbalance had not been too problematic as the exudate had been moderate and well-managed with an appropriate foam dressing.

Factors that affect healing were discussed with Mr H and insulin therapy was suggested (his HbA_{1c} was 8.3%), as poor glycaemic control is known to inhibit wound healing (Slater et al, 2001). However, he maintained that he always felt very well and he resisted the move until early summer 2005, when he was started on NovoMix 30 (Novo Nordisk, Crawley), 36 units twice a day.

'E' is for Edge of wound non-advancing or undermining

Despite using other advanced wound care products the now non-infected and non-healing metatarsal and heel ulcers showed no sign of granulation; the ulcers had shown no improvement in closure: neither reducing in diameter nor depth.

Figure 3. Neutral shell Aquaplast orthotic with a 6mm professional protective technology (PPT) plantar metatarsal pad to relieve the previous ulcer site. The orthosis also has a 3mm PPT heel cup.

The healing wound is considered acidic in nature, and the chronic, alkaline. It is an acidic environment that allows the wound to epithelialise (Greener et al, 2005). Cadesorb ointment (Smith & Nephew, Hull) lowers the pH of the wound, therefore making it more favourable to wound closure; it also minimises protease activity (Greener et al, 2005). The manufacturer recommends a change of dressing every 3 days in order to maintain the adjusted pH.

The introduction of this ointment to the treatment plan was looked upon by Mr H with little enthusiasm and seen as yet another product to try during his many clinic visits.

The three photographs in *Figure 1* illustrate the speed of healing using the pH-modulating ointment in conjunction with a secondary foam dressing (Mepilex). The dressings were changed twice a week. The felt pad relieving the right first metatarsal pad was replaced at each visit.

The total healing time of the metatarsal ulcer was 27 days and that of the small heel ulcer (not shown) was 10 days.

A review was carried out 22 days later – the ulcers had remained closed (*Figure 2* illustrates Mr H's closed right first metatarsal head ulcer, as well as the thin shiny skin with reduced fatty, fibrous tissue on his feet). A neutral shell aquaplast orthotic (*Figure 3*) was manufactured to incorporate a 6mm professional protective technology (PPT) plantar metatarsal pad to relieve the pressure at the site of the metatarsal ulcer site and a 3mm heel cup was added because Mr H had reduced fatty, fibrous tissue. This orthotic was worn directly after wound healing. Standard shock absorbing insoles in the patient's supplied shoes protected the site of the previous heel ulcer.

Conclusion

The time involved in the treatment of Mr H had been lengthy. Both he and his supportive wife had been fully involved in the care of the dressings between treatments. However, he had felt the pace of healing had been disappointingly slow and the round-trip of 36 miles had often been difficult. The treatment over the year had become expensive both in time and financially.

In the author's opinion, the introduction of a pH-modulating ointment to Mr H's treatment plan helped close the long-standing ulcers quickly; this will allow podiatry intervention time, for other people with diabetic foot ulcers, in the future to be reduced considerably. Prescribed footwear that had long been consigned to the cupboard was now worn and continuous monitoring of his feet by Mr H during his daily foot checks and by podiatry, now on a monthly basis, has given Mr H that very welcome improvement in his quality of life. ■

Steven Long is Chief Podiatrist at Glasgow Royal Infirmary.

Greener B, Hughes AA, Bannister NP Douglass J (2005) Proteases and pH in chronic wounds. *Journal of Wound Care* **14**(2): 59–61

Schultz GS, Sibbald RG, Falanga V et al (2003) Wound bed preparation: a systematic approach to wound management. *Wound Repair and Regeneration* **11**(Suppl 1): S1–28

Slater R, Ramot Y, Rapoport M (2001) Diabetic foot ulcers: principles of assessment and treatment. *The Israel Medical Association Journal* **3**(1): 59–62