

# Venous and lymphovenous lower limb wound outcomes in specialist UK wound and lymphoedema clinics

## ABSTRACT

This article explores the impact of combining tissue viability and lymphoedema techniques on optimising time to healing. Aim: To investigate the healing rates observed in patients who presented to wound and lymphoedema specialist clinics, located in the south eastern region of England, with venous/lymphovenous ulceration of the lower limb during the COVID-19 pandemic in 2020–2022 (30 months in all). Methodology: A retrospective analysis of patient outcomes. Results: 1041 patients were referred to the service, with a healing rate of 88.5% over 78 days. Discussion: When comparing 2013–2019 healing rates/time to healing vs 2020–2022 there was a decrease of 1.5% in the rate of healing and a mean reduction in time to healing of 40 days. Conclusion: Despite the pandemic the service was able to maintain previous levels of outcomes and observed a decrease in the mean time to healing.

**Key words:** Healing outcomes ■ Healing rates ■ Venous leg ulcers ■ Debridement ■ Lymphoedema ■ Specialist clinics

**V**enous leg ulcers (VLUs) are the most common type of leg ulcer, with a lifetime prevalence of 0.1–0.3% in the UK (Lim et al, 2018; Sarkar and Ballantyne, 2000). There is an increasing prevalence of VLUs in the ageing population (Margolis et al, 2002; Wounds UK, 2022). VLUs cost the NHS over £3 billion each year and this figure is expected to increase (Guest et al, 2015; Franks et al, 2016; Guest et al, 2020). The National Wound Care Strategy Programme is working to develop strategies for the management of lower limb wounds including VLUs, to improve healing outcomes nationally (Adderley, 2019). There are no time frames for the healing of VLU against which clinicians and providers can be measured. Thus, neither failure nor success can be accurately assessed; patients can be affected for years by unhealed wounds, reducing their quality of life,

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and resulting in increased pressure and costs for the NHS. Wound management is a specialist area of care and, as a result, the authors suggest that specialist training is required to deliver good healing outcomes in acceptable time frames. It appears that varying levels of staff training can lead to poor healing rates (Green et al, 2014; Guest et al, 2020).

Current evidence has shown that most, if not all, patients with chronic venous insufficiency (CVI) with a stage 3 or higher clinical, (a)etiologiical, anatomical, pathophysiological (CEAP) classification have lymphatic dysfunction (Wennen et al, 2019). Despite evidence supporting the treatment of lymphoedema in patients with CVI, current management ignores the role of the lymphatic system in the belief that chronic oedema in CVI patients can be resolved by addressing venous hypertension alone (Moffatt et al, 2019).

All oedemas are on a lymphoedema continuum (Farrow, 2010) and represent lymphatic impairment. McGuire et al (2022) argued that:

*'Damage to or alteration of the free flow of lymph through local or regional lymphatic vessels in the area of a chronic wound contributes to pathological changes to the lymphatic system and dysfunction of chemical modulators resulting in a delayed immune response referred to as "lymphatic immunopathy".'*

This failure of the immune function of the skin is referred to as lymphostatic dermatopathy and leads to the following:

- Loss of dermal integrity
- Tissue breakdown with reduced oxygenation of the tissues and tissue fibrosis
- Superficial infection and increases in the size of wounds
- Fibrosis affecting nerves, which can increase pain and discomfort
- The activation of inflammatory cytokines results in a change in oedematous fluid from watery to protein rich.

Therefore, impaired lymphatics compromise the essential immune functions of the skin, rendering the skin and wounds vulnerable to the following:

- High bioburden
- Chronic infections
- Recurrent cellulitis.

When this inflammatory cycle becomes chronic the ability to heal wounds is significantly decreased and the risk of developing wounds is significantly increased (Wennen et al, 2019; McGuire et al, 2022).

Specialist VLU care has been shown to produce faster healing rates and improve the quality of life of patients, which can in turn relieve pressures on and costs for healthcare

**Table 1. Patient demographics for 2020–2022**

Gender of healed patients	Number
Male	232
Female	342
Age of healed patients (years)	Number
18–30	1
31–50	24
51–70	136
71–90	363
90–97	50

systems (Moffatt et al, 1992; Gray et al, 2020). Specialist nursing practices presented here are centred around hybrid tissue viability and lymphoedema nursing, where interventions aim to prevent lymphatic capillary damage and facilitate lymphatic drainage, alongside debridement and the application of specialised dressings (Stanton, 2020). This combination of tissue viability and lymphoedema nursing can address inconsistent healing rates and provide optimal care for the many patients who suffer with VLUs. Often, training for tissue viability nurses lacks specific education regarding oedema/lymphoedema and there are ramifications of this condition for wound healing (Morgan et al, 2005; White et al, 2014). Specialised techniques that consider chronic oedema, such as compression and debridement used in the service discussed here, have been shown to improve outcomes and reduce healing times (Gray et al, 2020; Stanton, 2020; Stanton et al, 2022). Improvements for patients and the healthcare service as a whole require innovations such as hybrid tissue viability and lymphoedema nursing.

The outcomes data set in this article presents improved healing rates resulting from specialist hybrid nursing provided by a wound healing and lymphoedema service, which is located in the south east of England and is a third-party provider of venous leg ulcer and lymphoedema services to the NHS in England. This data set covers the course of the COVID-19 pandemic, when many tissue viability services had reduced patient-facing appointments (Guest and Fuller, 2023). Face-to-face and domiciliary visits were used by this service throughout the pandemic in line with the relevant guidance applicable at the time. This work builds on a previous 6-year study and demonstrates improved healing rates compared with 2013–2019 resulting from specialist venous leg ulcer services (Gray et al, 2020). This article presents results for healing rates for patients suffering from VLUs who received specialist care from the wound healing and lymphoedema service between 2020 and 2022. Here, healing rates of 88.5% were achieved, a decrease of 1.5% from the 2013–2019 rates of 90% (Gray et al, 2020). These outcomes represent a new approach to addressing the increasing problem posed by unhealed wounds via specialist hybrid nursing, which offers an avenue to improving the lives of many patients who are affected.

## Wound healing and lymphoedema centres

The Pioneer Sussex Wound Healing and Lymphoedema Centres wound healing and lymphoedema service is a third-party provider of NHS wound and lymphoedema specialist services with multiple sites across the southeast of England. GPs, community nurses and general practice nurses make direct referrals to the service if patients have had a VLU of more than 28 days' duration. Between 2013 and 2019 referrals could be made only after the patient had had a wound for 90 days. The service operated ambulatory clinics with domiciliary visits during the pandemic from six locations in the mid-Sussex area using a hub-and-spoke service delivery model.

## Methods

Data were collected on all patient referrals to the centres ( $n=1041$ ) and retrospectively analysed manually. Summary statistics were carried out. Wound healing progress data collection was carried out as previously described (Gray et al, 2020). Wounds were photographed and monitored regularly along with measurements, and all progress was recorded in the notes. Reviews were carried out every 4 weeks to assess the effectiveness of compression, debridement, and dressing choices. If aspects of the care plan were deemed ineffective or no longer appropriate, they were discontinued and revised. Patients who did not heal as expected were placed on the complex review caseload and this was discussed with the specialist clinical team at monthly reviews.

## Hybrid tissue viability and lymphoedema practice

To improve care for patients with wounds, an understanding of the relationship between periwound lymphoedema and wound healing is required (Bjork, 2013; Stanton, 2020). Healthy continuous flow of lymph is needed to clear bacteria and toxins from wounds to the lymph nodes where an immune response can be triggered. When the lymphatic system is not functioning properly, as is the case with chronic oedema, the immune response is compromised, and debris, dead cells and bacteria can cause the wound environment to stall, slowing healing. Patients with lymphoedema require a modified approach to compression treatment (Moffatt et al, 2005; Green, 2007). All staff prescribing or supervising care in these centres are dual qualified in wound and lymphoedema management.

Staff in the centres were formally trained, either by undertaking a specialist university skills programme to learn and develop debridement skills or having previously undertaken debridement training before joining. All staff were tested for competency in debridement via a qualified supervisor and could request guidance from experienced colleagues if needed. Patients provided written consent for debridement, with the exact method chosen by the nurse specialist according to patient requirements.

All staff were trained in the following methods:

- Curettage debridement of wound beds to remove necrotic tissue, debris and potential biofilm
- Selection of wound dressings: staff training was provided on dressing selection from the local formulary
- Compression dressing with considerations of co-existing conditions (lymphoedema), interventions that addressed swelling were used where required.

**Table 2. Summary of data for patients referred, 2020–2022**

		Discharged before allocation to a pathway	Patients allocated to simple pathway (12 weeks)	Patients allocated to complex pathway (20 weeks)	Total
<b>Referrals</b>	Referrals received	365	370	306	1041
	% mix of pathways	–	70%	30%	100%
<b>Discharge reason</b>	Declined treatment and discharged	100	0	0	100
	Assessment only and discharged	200	0	0	200
	Not met criteria	65	0	0	65
	Discharged healed		315	259	574
	Moved away – discharged non-healed (other)		6*	13*	19
	Referred to other specialist service, eg vascular or dermatology so discharged as non-healed		36*	13*	49
	Died		7*	1*	8
	Maintenance or extension		6*	20*	26
			<b>Mean values</b>		
<b>Healing rates</b>	Healing rate of patients referred to service		91%	86%	88.5%
<b>Time in care</b>	Mean number of appointments (per year) to healed (range 1–269)		10.5	21.2	15.85
	Mean number of days in care (per year) (range 1–269)		46.5	110.3	78.4

\* All patients who were discharged before healing are accounted for within the pathway to which they were allocated

### Patient inclusion criteria

Patients with non-healing wounds that had not responded to treatment in primary care after 28 days were included. Patients were registered with a practice in the designated catchment area with an ulcer to the lower limb (excluding the foot) due to venous or arterial insufficiency, or other pathologies. Patients with diabetes mellitus were included where a leg ulcer was evident (excluding the foot), treatable and the ankle-brachial pressure index (ABPI) was less than 1.3.

### Treatment methods and pathways

Following initial assessment, a 4-week treatment regimen was started, the details of which have been published previously (Gray et al, 2020). Patients were defined as requiring treatment on either the simple or complex pathway.

### Ethical considerations

Patients signed consent forms at their first assessment and were asked for consent at each visit. Patients had the opportunity to withdraw consent at any time.

### Results

Patient demographics are summarised in *Table 1* and *Table 2*. Of 1041 patients referred, a total of 200 (19.2%) underwent

assessment only and were discharged (where GPs requested Doppler scans and a hosiery care plan), 100 declined treatment (9.6%), 65 (6.2%) did not meet the criteria or were referred incorrectly. After initial review, 49 (4.7%) were referred to another specialist service (such as dermatology, vascular, back to GP), 26 (2.5%) were placed on maintenance or extension pathways as they had multifactorial social/psychological issues, which at the point of being seen prevented a wound healing trajectory; 8 (0.8%) patients passed away and 19 (1.8%) cases were defined as 'other' (eg the patient moved away and was discharged). The patients remaining with the service were then allocated to either the simple pathway (370; 55%) or the complex pathway (306; 45%). If, following allocation to a pathway, a patient was discharged before healing, the reason was documented and is presented in *Table 2* within the statistics for each pathway. The breakdowns for each pathway are summarised in *Table 2*.

The healing rate for all the patients reviewed was 88.5% over the course of 30 months. The average number of appointments to discharge (healed) was 16 (range 1–269), and the average number of days under care was 78 (range 1–269).

*Table 3* presents the data for patient referrals over the period 2020–2022, including which of the two pathways they were placed on. Compared with 2013–2019 when, of the 801

**Table 3. Patients referrals and pathway allocation across the two studies**

Time period	Discharged before allocation to pathway	Simple	Complex
2013–2019	801	232 [29%]	569 [71%]
2020–2022	365	370 [55%]	306 [45%]

patients, 232 (29%) were allocated to the simple pathway and 569 (71%) to the complex pathway, the 2020–2022 cohort of 1041 had a more equal split: 370 (55%) of patients were placed on the simple pathway and 306 (45%) on the complex pathway.

According to the NHS contract, if the patient met one or more of the following criteria then they were defined as complex: a history of non-concordance, a history of infection, a wound greater than 10cm<sup>2</sup> or wound that had been present for more than 12 months.

### Limitations

Detailed analysis of other patient outcomes was not reported, and patient demographics and comorbidities were not included in healing outcomes analysis. Outcomes were not corrected for age in keeping with previously published research. There are, however, no missing patients and healing outcomes for every accepted patient were recorded.

### Discussion

A significant change in the data sets between 2013–2019 and 2020–2022 was an increase in the rate of patients declining treatment from 0.6% in the original cohort to 9.6% during the pandemic. This is entirely understandable given the circumstances.

These results support previously reported research (Moffatt et al, 1992; Gray et al, 2020) that those attending specialist clinics have consistently high levels of healing. Ennis et al (2017) in the largest ever cohort of 669079 patients with wounds published, the authors observed healing rates of between 74.6% and 77.6% in a highly complex group of patients whose complexity exceed those presented in this article. From Moffatt et al (1992) to Ennis et al (2017) to Gray et al (2020) the message has remained consistent: the relationship between high wound healing rates and effective management delivered by suitably trained specialist staff. If patients were fully informed of this relationship between specialist staff and high healing rates, it is highly likely they would wish to understand the level of expertise that the staff caring for them have. Faster healing times help to alleviate the increasing pressures felt by national healthcare systems and have the potential to reduce stress on nursing staff, as well as reducing costs and waiting times overall.

This data set also addresses healing outcomes over the course of the COVID-19 pandemic, where health services typically experienced a drop in patient-facing appointments. Guest and Fuller (2023) described a cohort of 1946 patients with VLU's and, during 2020 and 2021, observed a drop in healing rates of 16% and 42% respectively; the proportion of

ulcers healed in their cohort was 46% in 2020 and dropped to 32% in 2021. Between 2013 and 2019, as reported in Gray et al (2020), the mean number of days to healing was 117; in this cohort, from the same team during 2020–2022, the mean number of days to healing was 78 (range 1–269). The percentage of patients healed in the 2013–2019 cohort was 90%, which fell slightly to 88.5% for 2020–2022.

It would be an error to assume that the drop in the number of days to healing reflects improved practice or the introduction of new techniques between 2013–2019 and 2020–2022. The slight drop in average healing rates across the two pathways from 90% to 88.5% remains favourable when taken into consideration with the healing rates of 46% and 32% for 2020–2021, as reported by Guest and Fuller (2023) and seen as indicative of UK-wide pandemic healing rates. It is possible that alteration in the ambulatory clinic delivery of care impacted on healing rates, but the drop is small. In reality, the reason for the reduction in the number of days to healing from a mean of 117 days to a mean of 78 days is most likely explained by the change in the contract: in 2013–2019 primary care staff were unable to refer patients for to the service until they had treated the patient for 90 days, whereas in 2020 this time span was changed to 28 days. This change, in conjunction with the reduction in access to face-to-face appointments with GPs and primary care nurses during the pandemic, is likely to have hastened referrals and reduced the time for patients to deteriorate following the wound developing. The definition of complex and simple wounds demonstrates the impact of earlier referral on the definition of the patients referred, with a reversal of the earlier 29:71 percentage split between those allocated to the simple and the complex pathway; the 2020–2022 cohort had a 55:45 percentage split in favour of simple cases. This would seem to be the most likely reason for improved time to healing: the faster referral to a specialist service.

As previously reported (Gray et al, 2020; Cooper et al, 2022), we have endeavoured to be open and transparent with our outcomes and allow the reader to track all of the patients in the data set in the same spirit as Ennis et al (2017). It is vital that, when presenting clinical outcomes, the reader can understand the context of the clinical situation, for example, the cases described by Ennis et al (2017) were significantly more complex than those of the cohort presented here. Therefore, comparisons of the healing rates between the two services would be futile, but the theme is the same: specialist care fosters high levels of rapid healing, which benefits the patients and the healthcare organisations.

### Conclusion

In this article, the authors have been transparent as to the outcome for every patient referred to their service during the study period. The outcomes reported are favourable when compared with other published cohorts, but it is worth noting the paucity of data published in the UK. It should be noted that the data presented here and in the previous publication from the same service (Gray et al, 2020) were collected as part of a contractual requirement stipulated by the previous clinical commissioning group (CCG), now the integrated care board (ICB), in the NHS contract. If this approach were replicated

KEY POINTS

- Assessing a patient's periwound skin to identify potential lymphatic issues can help plan for more effective wound healing
- Patients with venous leg ulcers (VLUs) who have undiagnosed lymphoedema are at increased risk of wound infection, increased wound bioburden and compromised wound healing
- Training nurses in both wound care and lymphoedema equips them with the skills to recognise signs of lymphoedema and apply advanced bandaging techniques that are required to improve lymphatic flow and optimise wound healing
- There are no time frames for healing of VLUs against which clinicians and providers can make comparison, thus failure/success cannot be accurately assessed
- There is a clear need for all organisations providing wound care to publish their healing outcomes to gain consensus on benchmarks/acceptable healing standards

by other commissioners in England, then there should be a significant increase in sharing of outcomes data. The authors would conclude that, by delivering care that combines wound and lymphoedema techniques, they have been able to maintain high rates of healing. The reduction in the time to healing has likely been impacted by earlier referral to the specialist service. This simple message has been known since the work of Moffatt and Franks (1992), but has not been implemented sufficiently across the NHS in England, as demonstrated by the findings of Guest and Fuller (2023). This failure condemns tens of thousands of patients to unnecessary suffering each year as they and their families contend with unhealed wounds. **BJN**

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CPD reflective questions

- Are you aware of the signs and symptoms of lymphoedema?
- Are you able to spot areas of a wound bed that would benefit from sharp debridement?
- Does your organisation publish wound healing outcomes?
- Would you know how to go about publishing wound care outcomes?